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**ATMOSPHERIC PATTERN STUDIES FROM A
SURFACE IMAGER DURING 2005 JANUARY AT INPE
SOUTHERN REGIONAL CENTER, SÃO MARTINHO
DA SERRA RS BRAZIL**

Sylvio Luiz Mantelli Neto, Enio Bueno Pereira, José Celso Thomaz Júnior, Aldo Von Wangenheim, Luís Gustavo Lorgus Decker, Leandro Coser

Joint research report between
INPE-CCST and INCOD-LAPIX

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“Humans are remarkably sensitive to the statistical regularities of their environment”.

STEYVERS, GRIFFITHS AND DENNIS (2006, PAG. 333).

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**ESTUDO DOS PADRÕES ATMOSFÉRICOS A PARTIR DE UM
IMAGEADOR NA SUPERFÍCIE DURANTE JANEIRO DE 2005, NO
CENTRO REGIONAL SUL DO INPE EM SÃO MARTINHO DA
SERRA RS BRASIL**

RESUMO

Neste trabalho é descrita a análise de um conjunto de imagens de superfície para a estação de São Martinho da Serra RS Brasil. As imagens foram obtidas a partir de um imageador de nuvens e serão utilizadas para estabelecer um critério para definir o céu claro e a cobertura de nuvens para a validação de imagens de satélite. O método a ser utilizado é o BAYESIANO em duas fases: treinamento supervisionado e análise. O treinamento supervisionado será realizado utilizando ferramentas estatísticas e análise exploratória de dados ou AED. A análise será realizada através de prioridade hierárquica e discriminante estatístico multivariado. Desta maneira, os valores dos pixels presentes nas imagens serão mapeados em padrões atmosféricos. Somente os padrões definidos pela óptica e física atmosférica do espectro visível serão analisados. Dois outros métodos também foram implementados a título de comparação de dados. Adicionalmente foram obtidos dados de radiação solar global direta e difusa de uma estação BSRN co-alocada ao imageador de nuvens. A partir destes dados também foram calculadas as estimativas de cobertura de nuvens. Para reduzir a complexidade de lidar com um grande volume de dados, os relatórios de análise foram separados mensalmente. Este é o primeiro relatório e descreve com mais detalhes os métodos utilizados para tratar os dados nos relatórios subsequentes. Os dados referente ao mês de Janeiro de 2005, com a análise de 1659 imagens encontram-se nos anexos.

ABSTRACT

In this work it is described the analysis of a surface image set obtained at São Martinho da Serra RS, Brazil. The images taken from a surface imager, will be used to establish a criteria to define clear sky and clouds for validation of satellite images. The method used for that purpose is the BAYESIAN in two steps: supervised learning and analysis. Supervised learning will be done by statistics tools and multivariate exploratory data analysis or EDA. Analysis is based on hierachic priority and multivariate statistics discrimination. By this way, pixel values present on images will be mapped into atmospheric patterns. Only patterns identifiable in visible spectrum and defined by optical and atmospheric physics will be analyzed. Two other methods were also implemented to be compared with the presented method. Complementary to surface images it was obtained solar data of global direct and diffuse radiation from a co-allocated BSRN station. From these sensors it was calculated cloud coverage estimates from surface. To reduce the massive amount of data, they will be split in monthly reports. The current report describes the methods used to calculate data and describes the results relative to January of 2005 with 1659 images.

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LIST OF ABBREVIATIONS

BSRN	– Baseline Surface Radiation Network
CCST	– Earth Terrestrial Systems Center
CF	– Cloud Force
CH	– Celestial Hemisphere
$\cos\theta_z$	– Cosine of zenith angle
DENS	– diffusion of non selective scattering
df	– Diffuse fraction
dirH	– Direct shortwave radiation horizontal
diff	– Diffuse Shortwave Radiation horizontal
DRAY	– diffusion of rayleigh scattering
EDA	– exploratory data analysis
EGD	– Euclidean geometric distance
ENS	– non selective scattering
glo	– Global Shortwave Radiation horizontal
GT	– Ground Truth a reference image
HSL	– Hue, Saturation and Luminance color space
INPE	– Brazilian Institute of Space Research
kt	– Clearness index.
MIE	– MIE scattering.
min	– Minute of the day (UTC)
NC	– non classified
op	– Opacity
RGB	– Red, Green and Blue color space
RAYL	– Rayleigh scattering
SB	– point of saturation of blue dimension on RGB color space
SEPY	– yellow selective scattering
SEPR	– red selective scattering
SG	– point of saturation of green dimension on RGB color space
SO	– Surface synoptic Observer
SMS	– Sao Martinho da Serra station
SONDA	– Brazilian National System for Environmental Data
SOS	– Synoptic Observation System
SAT	– point of full saturation during clear skies
ST	– point of full saturation during cloudy skies
toa	– Estimated top of atmosphere radiation
TSI	– Total Sky Imager
WMO	– World Meteorological Organization

LIST OF SYMBOLS

AND : logical operator.

α : is the level of confidence established for the evaluation test.

B : pixel blue dimension of RGB color space.

C_{KC} : KARSTEN and CZEPLAK cloud cover index.

diff : is the diffuse Radiation SW data.

D^2 : is the pixel's squared Mahalanobis distance from the GT (or population) pattern being classified.

d : is the Sun-Earth distance.

df : is the diffuse fraction index.

e_r : standard error of GT red dimension.

e_g : standard error of GT green dimension.

e_b : standard error of GT blue dimension.

EGD : Euclidean Geometric Distance.

F : F-distribution.

G : pixel green dimension of RGB color space.

glo : is the Global Radiation SW data.

h : pixel hue dimension of HSL color space.

kt : is the Clearness Index.

n_{ENS} : number of pixels of ENS GT pattern.

n_{RAYL} : number of pixels of RAYL GT pattern.

n : is the number of pixels and also the number of degrees of freedom used to determine the GT sampled population.

μ : is the average GT (or population) vector.

op : is the opacity index.

p : is the degrees of freedom correspondent to the number of color space dimensions ($p = 3$).

R : pixel red dimension of RGB color space.

s_r : standard deviation of red dimension

s_g : standard deviation of GT? green dimension.

s_b : standard deviation of GT? blue dimension.

Σ : is the GT covariance matrix.

S_0 : is the average solar constant.

T : is the transpose matrix operation.

toa : is the top of atmosphere radiation.

θ_z : is the Sun zenith angle.

x : is the pixel vector to be classified, represented by its color dimensions (r,g,b).

$^{-1}$: is the inversion matrix operation.

∞ : infinite is when the number of the degrees of freedom is ≥ 120 .

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1 INTRODUCTION

Clouds are one of the most important *phenomena* present on atmosphere. They influence the climate [Hu e Stamnes \(2000\)](#) and are a major modulator of solar energy that reaches the surface with heating [Harrisson et al. \(1993\)](#) or cooling [Yamanouchi \(1993\)](#) effects. By this reason, it is important their proper evaluation to reduce uncertainties of physical models, assessments, forecasting, etc. considering them. Clouds evaluation could be done in two perspectives: from surface and/or satellite. Each point of view have its own positive and negative aspects. The current work will focus on surface cloud observation by images.

Surface assessment of clouds are being performed for years by synoptic observers (SO). Observation reports performed by SO are normalized by World Meteorological Organization [WMO \(2008, sec.15.1.1\)](#), [WMO \(1975\)](#), [WMO \(1987\)](#), [WMO \(1995\)](#). SO basically evaluates cloud amount, base and type at synoptic observations intervals. It is a highly subjective evaluation on qualitative (type) and quantitative (base and amount) features of cloud conditions. Synoptic Observation Systems (SOS) are being used to reduce SO subjective analysis, uncertainty of cloud estimation, shifts of human observations, etc.

Most SOS using camera images, evaluates now casting conditions based on a dichotomy classification approach [Long et al. \(2001\)](#), [Long et al. \(2006\)](#), [Souza-Echer et al. \(2006\)](#), [Cazorla et al. \(2008\)](#), [Kalisch e Macke \(2008\)](#), [Mantelli et al. \(2010\)](#). These systems commonly present their results in terms of clouds and sky results only. But clouds are not the unique *phenomena* observable from surface. According to atmospheric and optics physics there are other *phenomena* that could be observed by naked eye [Naylor \(2002\)](#), [Mantelli \(2010\)](#). Dichotomy approach in that case is a restriction of the task observation domain [Newell e Simon \(1972\)](#). If cloud assessment done by a human operator is intended to be replaced by an intelligent agent [Russell e Norvig \(1995\)](#), a more refined approach should be used to avoid automatic misclassification.

Another limitation existent on above mentioned methods used for clouds identification, is the reduction of independent variable dimension, leading to information losses [Jain et al. \(2000\)](#). Color pixels are characterized usually by three dimension values. For example Red Green and Blue dimensions on RGB color space or Hue Intensity and Lightness on HSL color space, and so on. [Souza-Echer et al. \(2006\)](#) used

supervised thresholding [Gonzalez e Woods \(2002\)](#) on the Saturation (S) channel of HSL color space, i.e. one dimension only (1D), to discriminate clouds/sky patterns on the images. [Long et al. \(2001\)](#), [Long et al. \(2006\)](#) used a relation of $0.6R/B$ and [Kalisch e Macke \(2008\)](#) $0.8R/B$ of RGB color space, i.e. two dimensions only (2D), to discriminate clouds and sky patterns. Although [Kalisch e Macke \(2008\)](#) did not consider the green color component for cloud detection, it was used latter on the same work to detect direct sunshine. [Kalisch e Macke \(2008\)](#) also discarded images on low solar elevations, due to reported errors up to 50 % on that condition. The TSI imager embedded program used in the present analysis also avoid images at solar elevation below 5 degrees. But TSI program was modified in the present work to include them and have a broader analysis of images. [Cazorla et al. \(2008\)](#) used more sophisticated methods involving genetic algorithms to select parameters and neural networks (NN) to classify patterns, but still kept the domain of independent variable on two dimensions only of RGB color space. [Mantelli et al. \(2010\)](#) used a 3D independent variable to analyze patterns but maintained the dichotomy of the outcome analysis.

On [Mantelli \(2010\)](#) investigation, the dichotomy of atmosphere analysis was put aside in favor of a more appropriate approach. Instead of clouds and sky patterns only, the domain was mapped into several classes based on atmospheric physics and limitations of camera systems. [Mantelli \(2010\)](#)'s approach will be used in the present work to make the proposed investigation. It is believed that misclassification problems due to dichotomy approach and errors due to dimensioning reduction will be avoided.

The current research intends to use [Mantelli \(2010\)](#) methods on the images obtained in São Martinho da Serra Station to map the pixels values present on surface images onto atmospheric patterns in order to validate satellite images on visible region of spectrum. Validation will be done with surface data and implementing two other methods to compare the results.

Current research report is divided in the following parts.

Chapter 1 Presents an introduction and a brief literature review to this research.

Chapter 2 Will summarize the materials and methods used on the present research.

Chapter 3 Conclusions.

Appendix A Presents the surface images of January 2005, obtained from the sky imager and the results of three methods implemented.

Appendix B Presents daily graphic results for 3 methods during 2005 January.

Appendix C Presents the surface radiation measured and the derived quantities obtained from it, using tables and graphics.

2 Materials and methods

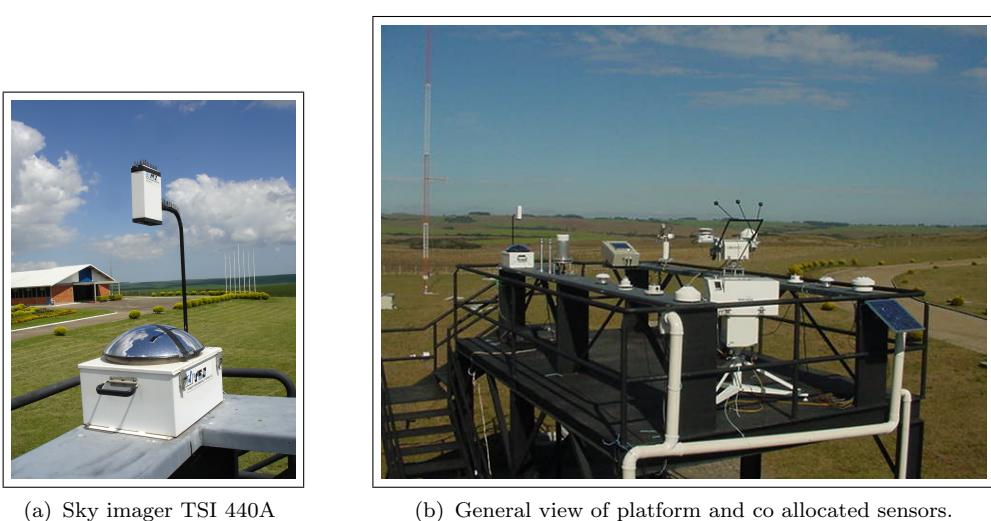
Most of this work was based on the methodology developed by Mantelli (2010). Original research was described in Portuguese on a MSc dissertation Mantelli (2001), PhD thesis Mantelli (2010) and scientific publications showing intermediate results on the following papers Mantelli et al. (2005), Mantelli et al. (2009), Mantelli et al. (2010), Mantelli et al. (2010). Current research report will made a short description of the methods used, and reproduce them on a new observation site with a larger data set. This chapter will have the following sections.

- Section 1: describes the experimental site and the equipments used to obtain the images.
- Section 2: describes the scientific methodology used on the present research.
- Section 3: describes the methods used to determine cloud coverage using radiometers.
- Section 4: conclusions.

2.1 Experimental site and apparatus

Experiment was deployed at INPE Southern Observatory station located in São Martinho da Serra (SMS) City in Rio Grande do Sul State, Brazil *LAT.* : $29^{\circ}26'34''S$ ($-29,4428^{\circ}$), *LONG.* : $53^{\circ}49'23''W$ ($-53,8231^{\circ}$), *ALT.* : $489m$. More details about the observatory could be found on link: <http://www.inpe.br/crs/>. The imager belongs to SONDA project, established to make assessment of solar and wind renewable energies. More details about SONDA project could be found on link: <http://sonda.ccst.inpe.br/>. The imager site is also co-located with a solar BSRN-compatible station, and a sun photometer compatible to AERONET program. More details about BSRN stations network could be found on link: <http://www.bsrn.awi.de/> and for AERONET program <http://aeronet.gsfc.nasa.gov/>. A figure showing station platform and equipments is illustrated on figure 2.1.

The equipment used to obtain the images was the TSI-440A manufactured by YANKEE environmental. TSI uses an image obtained from a reflector with an observation angle of 160° . The resident software system allows images to be obtained automatically at selected intervals, only when the Sun above 5° of elevation. But



(a) Sky imager TSI 440A

(b) General view of platform and co allocated sensors.

Figure 2.1 - Pictures of SONDA station at São Martino da Serra RS, Brazil.

resident program was changed to obtain images at lower elevation angles too. A more detailed information about TSI could be obtained from Long et al. (2001), Long et al. (2006) or on manufacturer data sheet available at the following link: <http://www.yesinc.com/products/cloud.html>.

2.2 Scientific methodology used on present research

This section describes the scientific methodology used in the present research. The main method used is the Bayesian NIST (2009), Pardo e Sberveglieri (2002) in two steps: supervised learning Heisele (2003) and analysis. A general figure illustrating the applied method could be observed on figure 2.2. The description bellow about these two steps, could also be checked in that figure.

During supervised learning step, a human analysis will be performed defining the patterns identifiable on images. These patterns were established according to optical atmospheric physics theory on visible spectrum Iqbal (1983), Lenoble (1993), Lille-sand e Kiefer (1994), Naylor (2002). These patterns have also a typical occurrence on color space Mantelli et al. (2010) and a set of images representing each one were selected. During this step also, all undesirable or interference patterns like poles, obstructions, shading band, equipment self image etc., were removed by masking. A different set of images was selected, to optimize masks build-up. This evaluation is specific for each observation site and have to be repeated if it is noticed any change in the surrounding obstructions on the horizon. Image analysis and

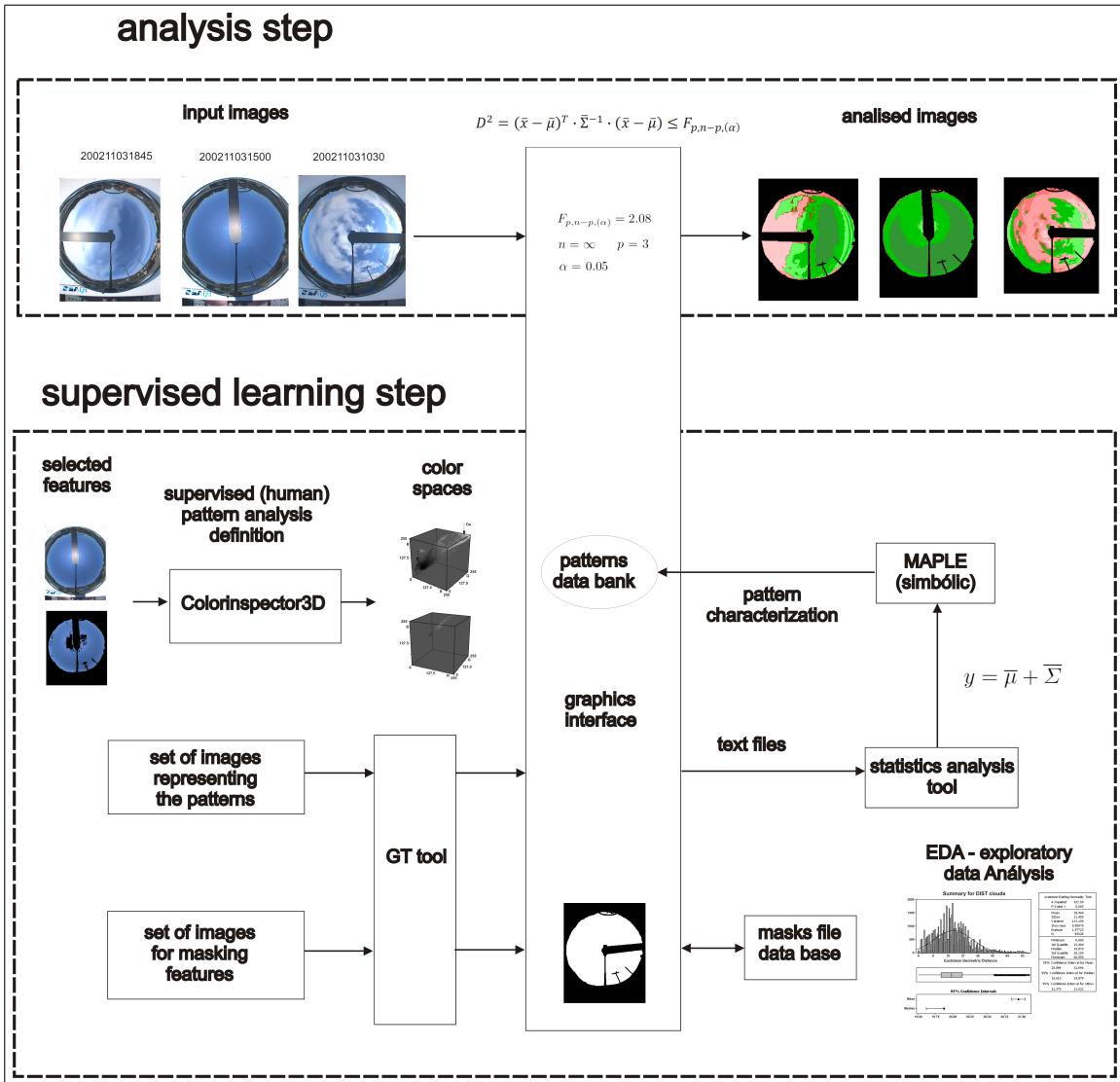


Figure 2.2 - Illustration of the Bayesian method in two steps used on current research.
 Figure adapted from Mantelli (2010, fig. 3.1)

pixel occurrence on color space regions was checked using the COLOR INSPECTOR 3D visualization tool developed by Barthel (2004) and available at <http://www.f4.fhtw-berlin.de/~barthel/ImageJ/ColorInspector//help.htm>. Red, Green, Blue (RGB) and Hue, Saturation and Lightness (HSL) color spaces were used on the analysis of patterns.

Patterns were removed from selected images using a GT tool, developed at LAPIX <http://www.lapix.ufsc.br>. The patterns were removed in the following sequence:

exploratory data analysis or EDA NIST (2009), Wilks (2005, Chap. 3) and a statistics multivariate characterization using software statistics tools. An average color point vector and a covariance matrix was used to characterize each pattern Johnson e Wichern (2007). A data bank of patterns were implemented on interface graphics. In that phase it was also defined the statistical discrimination functions based on F-distribution according to $(3, \infty)$ degrees of freedom and 95% level of confidence Montgomery (2005), to classify every pattern Duda et al. (2001). Pixel values distribution for every pattern were considered with normal or near normal distribution due to massive amount of data when defined Johnson e Wichern (2007, sect. 4.6). MAPLE software symbolic manipulation feature was also used to simplify the implementation of matrix calculation on a graphics interface. More information about MAPLE could be found at <http://www.maplesoft.com/>. A graphics user interface (GUI) was developed support all those operations in C^{++} language using WXWIDGETS cross-platform GUI free open source library. More information about WXWIDGETS could be found at <http://www.wxwidgets.org/>.

During analysis step, images were loaded on graphics interface and every pixel-triple from image, was checked against established patterns. Multivariate Mahalanobis (or statistical) distance Mahalanobis (1936), Johnson e Wichern (2007) was used in the classification to map pixel-triple values from input images into patterns. More informations about EDA and the statistical parameters used in this work could be found on Mantelli (2010).

2.3 Masking of nuisance factors

Masking is a necessary step on image analysis to remove nuisance factors affecting the results Montgomery (2005, chap. 1.4 p. 15) like: equipment self image, shading band, poles, surrounding buildings, etc. Masking also avoids unnecessary treatment of data that have no influence on output analysis. The procedure used to generate the masks were done in three steps. The first one performed on a generic mask representing the surrounding background. The second one performed on dynamic shading band for each position. The last step was the concatenation of images for each image acquisition time.

2.4 Determination of Observation and Task Domain

Embedded in the method used in the present research, was the concept of Intelligent Agents Russell e Norvig (2010), whether defining environments and domain tasks Newell e Simon (1972). “*An agent is anything that can be viewed as perceiving its environment through sensors and acting upon that environment through actuators*” Russell e Norvig (2010, sec. 2.1). The environment is the Celestial Hemisphere or (CH), where SO look at to make observations of now casting conditions. It is desired to use an intelligent agent or a SOS to replace SO. Actually the most common used SOS is based on cameras sensors, computer vision algorithm classification and response methods to evaluate now casting conditions. But it is important to notice that this SOS configuration is limited by sensor features and actuation. Cameras have limited capability, specially when monitoring natural scenes that usually presents higher magnitude scale of illumination. Actuation is limited when SOS are used to reproduce human qualitative analysis. Those facts limits the overall SOS capability analysis to a subset of environment named domain task Russell e Norvig (2010, sec. 8.2.1). SOS agents will perceive pixels values in that domain task of varying color and intensity (independent variables) and map or categorize them by a method to a set of patterns (dependent variables) Russell e Norvig (2010, sec. 2.1) and Cresswell (1994). It is important to evaluate what could be categorized in the domain task due to sensor limitations. In the next paragraphs it will be proposed a set of patterns that could be perceived by data pixel values existent on images, according to atmospheric optical physics theory.

The independent variables analyzed by SOS using cameras in the domain task are the pixel values on images in JPG (Joint Photograph Group) formats, RGB color space Gonzalez e Woods (2002). Every pixel is represented by a 3-D data unit of 24 bits/pixel with 8 bits or 255 values for every color dimension, performing a total of 16,777,216 different colors. The luminance values scale correspondent to main diagonal of RGB cube is limited to 441.653 ¹ Mantelli et al. (2010). Image resolution is 352x288 in a total of 101376 pixels per image. Nearly 50 % of image pixels generated by the sky imager are not useful, because they record horizon obstructions (poles, buildings, etc), equipment self image and mirror shading band. Cameras and displays are not able to obtain and reproduce the illumination scale existent on natural scenes Koslof (2006), Inanici e Navvab (2006), reducing even more the amount of

¹This is a non-dimensional value obtained from RGB color space

useful data. Reduction was due to pixel saturation, patterns distribution distortions with consequent difficulties on applying digital image processing algorithms, Intelligent Agent methods (i.e. neural networks, fuzzy logic, genetic algorithms, etc.) or statistical analysis. These restrictions also applies to file structures registering the information representing the images. Table 2.1 illustrates some light conditions existent in natural scenes. As could be observed in that table natural scenes spans from nearly 10^{-3} to 10^5 cd/m^2 . Images obtained and reproduced by SOS camera equipments on nearly 10^2 cd/m^2 scale causing saturation indicated by ST, SG and SB points and pattern distortions as illustrated on figures 2.3, 2.4, 2.5 and 2.6.

Table 2.1 - Levels of luminance found in some external environment. Source: Reinhard et al. (2006, chap. 1 tab. 1.1).

Condition	luminance cd/m^2
Starlight	10^{-3}
Moonlight	10^{-1}
Internal Illumination	10^2
Sunlight	10^5
Maximum intensity of CRT monitors	10^2

All the technology available to obtain, store, reproduce and process images was built under 10^2 cd/m^2 camera limitations. That problem is being overcome by a method called High Dynamic Range Imaging (HDRI) Debevec e Malik (1997), Reinhard et al. (2006), Inanci (2005), Moeck e Anaokar (2006) in the following steps:

- calibration of the camera by adjust of exposure time and opening shutter Mitsunaga e Nayar (1999) and
- taking multiple pictures at known exposure and opening of the same scene,
- using special file structures to store data Reinhard et al. (2006).

But that technology (adjust of exposure time and opening shutter) is not available by TSI-440A imager used in the current research, and was left as a suggestion for future research work.

2.5 Definition of Observation of Patterns According to Optical Atmospheric Physics

The restrictions described in previous section affected the current research and caused impact on the methods used for automatic analysis and patterns recognition, because a significant amount of pixels have their dimension values partly or totally saturated by the end of scale. It is important to notice the difference between Saturation dimension of HSL color space (with first letter uppercased or simply S) from the saturation of pixel value on image due to high illuminated scenes. In the presence of higher order illuminated scenes, it could be noticed the distortions of patterns by saturation of pixel values, degenerating the original colors in some cases and increasing the classification errors according to illustrated on figures 2.3 and 2.4. On figure 2.3 it could be noticed the occurrence of pixel distributions related to pattern observed on RGB and HSL color spaces for a clear sky image. In that figure a typical blue sky or RAYLEIGH SCATTERING PATTERN Lillesand e Kiefer (1994), Naylor (2002, sec. 1.2) is indicated as **RAYL**. In figure 2.3 it could be noticed too, the first saturation point of blue dimension pixel indicated as **SB**; and second saturation point of green dimension pixel value indicated as **SG**. In the present research that saturation was noticed on several images causing negative impacts on the performance of any method used on digital image processing. The pixels with values between **SB** and **SG**, could still be classified as RAYLEIGH SCATTERING PATTERN but were defined as DIFFUSION of RAYLEIGH SCATTERING PATTERN **DRAY**. It is speculated that one possible physical meaning that exacerbates that saturation is explained by MIE scattering caused by aerosols or water vapor, with higher optical density near the solar disk or at low solar elevation angles (near the surface). The last pattern noticed in that figure is the full saturation values of pixels indicated in the figure as **SAT**. A different discrimination *criteria* was used to classify **SAT** and **DRAY** pixels, due to the difficulty to classify their near saturation values. Their classification were done before the multivariate analysis by defining a hierarchical classification order, according to described in table 2.2.

Typical occurrence of patterns could also be noticed on partially covered sky as illustrated on figure 2.4. White clouds or NON SELECTIVE SCATTERING PATTERN **ENS** Lillesand e Kiefer (1994) also have a typical distribution on color space. Heavy gray clouds occurs continuously to white clouds patterns on color space due to cloud thickening, but with smaller values of luminance Mantelli et al. (2010). In the pres-

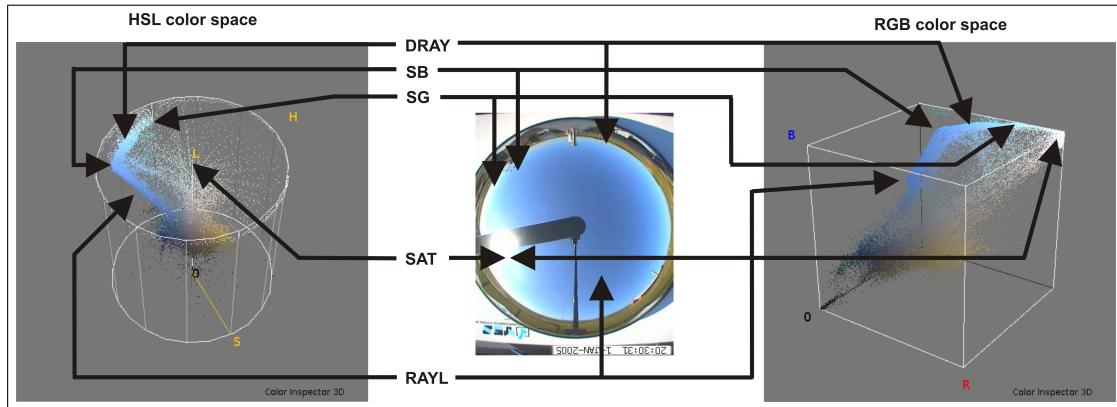


Figure 2.3 - Approximate indication of patterns distribution and distortion points on HSL and RGB color spaces for a clear sky. Image was taken at SMS on January 1st, 2005 20:30 GMT.

ence of higher order illuminated scenes during cloudy skies, **ENS** pixels values also saturates, near end of scale. The pixel saturation also starts with the blue dimension and is indicated in the figure 2.4 as **ST** on RGB and HSL color spaces. The saturation of **ENS** pattern was also noticed on several images and was defined in the present research as DIFFUSION of NON SELECTIVE SCATTERING PATTERN or **DENS**.

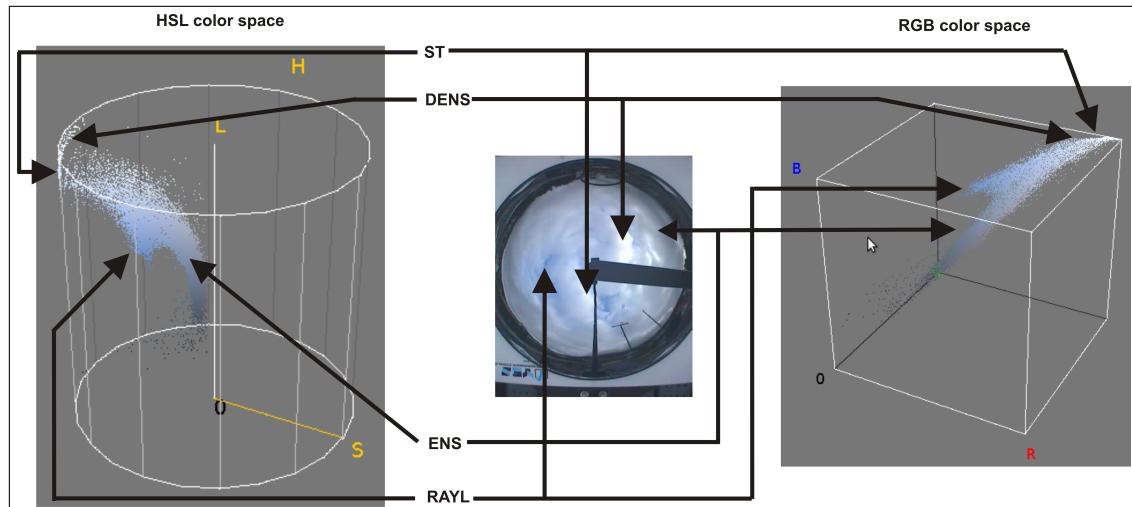


Figure 2.4 - Approximate indication of patterns distribution and their distortion points on HSL and RGB color spaces for a cloudy sky. Image was taken at SMS on January 3rd, 2005 20:30 GMT.

By sunset and sunrise, two other different color patterns in yellow and red could be noticed on sky scenes sometimes simultaneously to white and gray clouds. Those patterns occurs when the hues of Sun light after sunset is reflected by clouds Naylor (2002), Richards (1995, sec. 4.3). Those two patterns occurs at different locus in color space but both of them meaning clouds, that's why they are defined as distinct patterns. Yellow pattern is noticed when the sun is a bit higher above horizon indicating a SELECTIVE SCATTERING PATTERN in yellow Naylor (2002, sec. 1.2), in the present research indicated as **SEPY**. The figure 2.5 illustrates *Locus* occurrence of **SEPY** patterns on HSL and RGB color space.

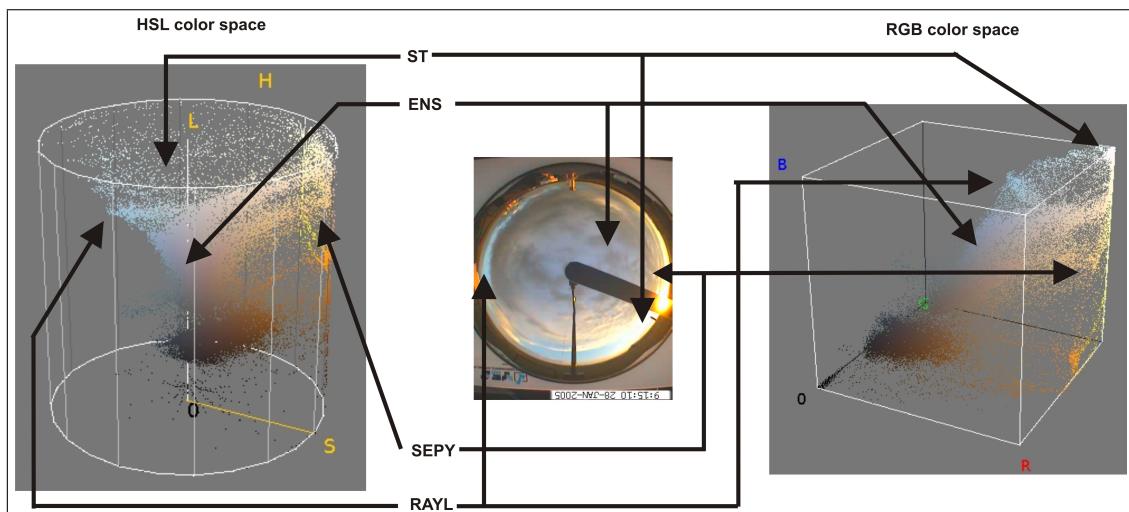


Figure 2.5 - Approximate indication of patterns distribution on HSL and RGB color spaces showing a partly cloudy sky yellow colors. Image was taken at SMS on January 28th, 2005 09:15 GMT.

Red is noticed when the sun is a bit lower when compared to yellow pattern, indicating a SELECTIVE SCATTERING PATTERN in red, in the present research indicated as **SEPR**. The figure 2.6 illustrates *Locus* occurrence of **SEPR** pattern on HSL and RGB color space. Saturation was also noticed on **SEPY** and **SEPR** pattern pixel values. But the discriminating method used based on Hue angle, allowed a precise separation even in the presence of saturated values. Hue angle discrimination was not used to separate **RAYL** and **ENS** patterns, because they occur in coincident angles and could not be discriminated.

All the patterns presented in current section were defined as dependent variables

to be identified in a limited domain. SOS perform a mapping or classification from independent to dependent variables Cresswell (1994). A summary of these pattern and a meaning to represent a clear or cloudy sky for sky coverage evaluation is presented in table 2.2. An hierarchic order should be used on classification, otherwise the algorithm will not work properly.

Table 2.2 - Patterns on dependent variables proposed in the present research and hierarchic classification order used.

Order	Symbol	Pattern	Meaning
01	DENS	diffusion of non selective scattering	cover
02	DRAY	diffusion of Rayleigh scattering	clear
03	SEPY	yellow selective scattering	cover
04	SEPR	red selective scattering	cover
05	ENS	non selective scattering	cover
06	RAYL	Rayleigh scattering	clear
07	NC	non classified	undetermined

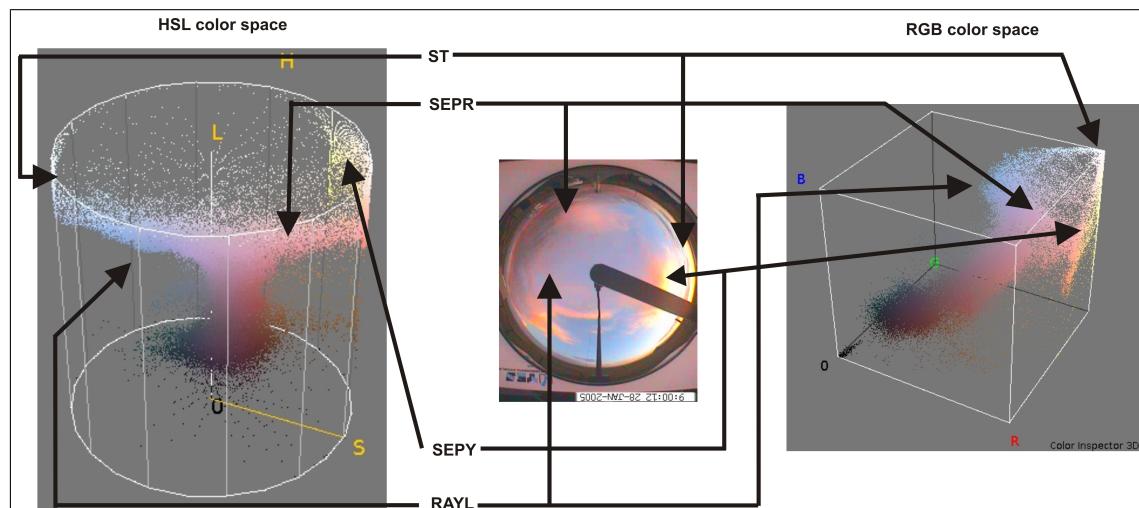


Figure 2.6 - Approximate indication of patterns distribution on HSL and RGB color spaces showing a partly cloudy sky red colors. Image was taken at SMS on January 28th, 2005 09:00 GMT.

2.6 Parametric analysis and modeling of target patterns

The patterns defined in the previous section, will be characterized by supervision, analyzed by an Exploratory Data Analysis EDA NIST (2009), Wilks (2005, Chap. 3) and classified according to proposed criteria on domain. It will be used a visualization tool called Colorinpector3D² Barthel (2004) to inspect the images, patterns and generate figures on RGB and HSL color spaces. A graphic user interface GUI based on C++ language using wxWidgets³ cross-platform library was developed to manipulate the patterns and save image files. An statistical software will be used to characterize patterns. The symbolic manipulation matrix algebra equations will be performed with MAPLE⁴ to rationalize the equations to be implemented on GUI. ENS and RAYL patterns will also be separated by EGD method Mantelli et al. (2010) developed by the research group. All images will be analyzed after masking to remove uncontrolled factors Montgomery (2005).

2.6.1 Definition of DENS pattern (diffusion of non selective scattering)

For the definition of **DENS** pattern, a typical image was selected with a clear evidence of its presence as illustrated on figure 2.7. Figure illustrates the image taken from SOS on the first row, its masked version on the second row, the **DENS** pattern on the third row as well as their respective distribution on RGB and HSL color spaces on the first and third columns. **DENS** pattern occurs in a *locus* that spans from the end of **ENS** pattern, marked by the pixel saturation of blue dimension to the RGB cube vertices's. Their typical values were extracted from image samples and defined by the logic and arithmetic equation 2.1.

$$\text{DENS} = (B \geq 255) \text{ AND } (EGD \leq 52.5) \quad (2.1)$$

where:

- R: pixel red dimension
- G: pixel green dimension

²colorinpector3D is available at <http://rsb.info.nih.gov/ij/plugins/color-inspector.html>

³ wxWidgets is available at <http://www.wxwidgets.org/>

⁴ <http://www.maplesoft.com/>

- B: pixel blue dimension
- AND: logical operator
- EGD: Euclidean Geometric Distance Mantelli et al. (2010)

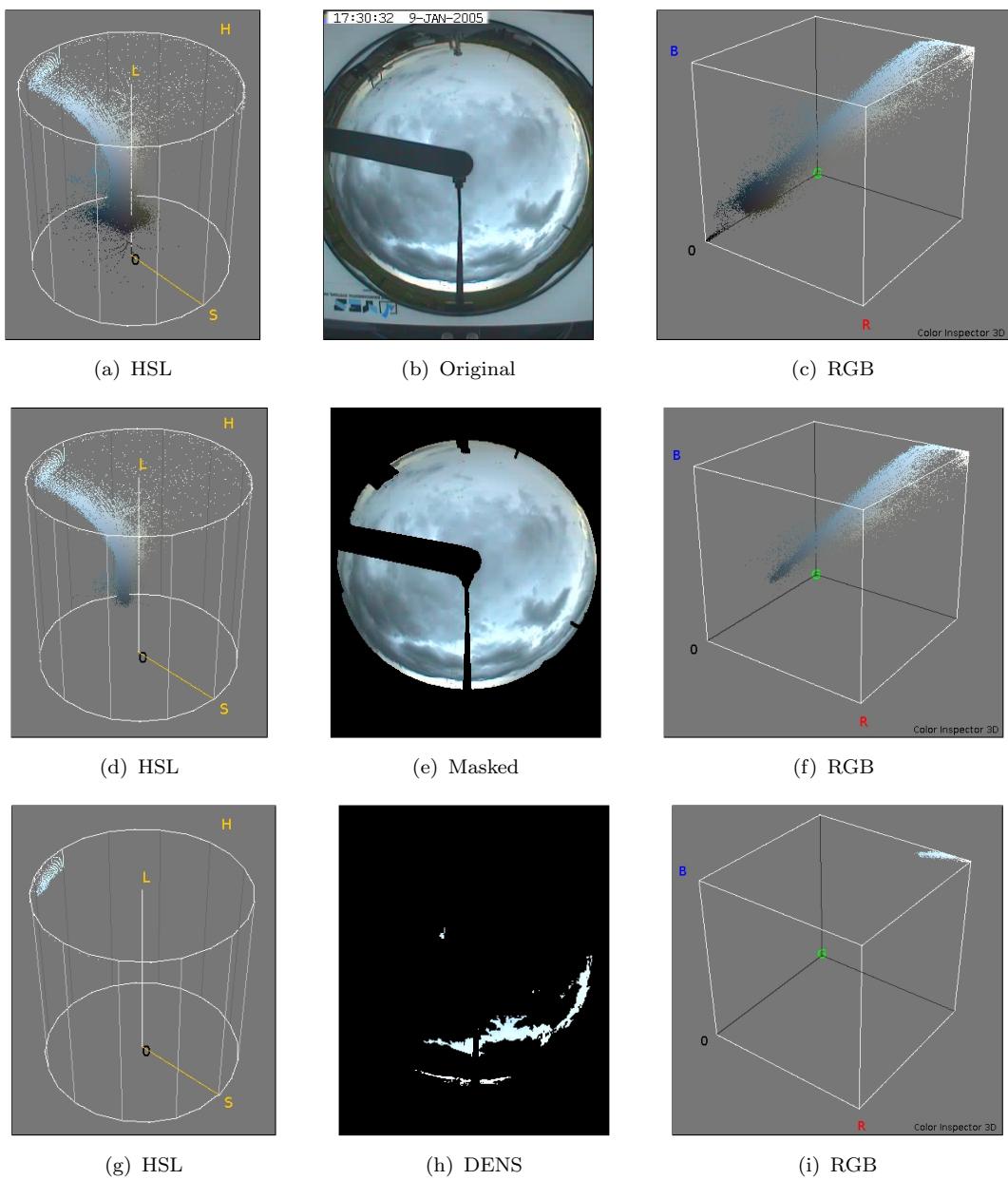


Figure 2.7 - **DENs** patterns classification evolution for January 09th 2005 1730 GMT.

2.6.2 Definition of DRAY pattern (diffusion of Rayleigh scattering)

For the definition of **DRAY** pattern, a typical image was selected with a clear evidence of its presence as illustrated on figure 2.8. Figure illustrates the image taken from SOS on the first row, its masked version on the second row, the **DRAY** pattern on the third row as well as their respective distribution on RGB and HSL color spaces on the first and third columns. **DRAY** pattern occurs in a *locus* that spans from the end of **RAYL** pattern, marked by the pixel saturation of blue dimension to the RGB cube vertices's. Typical values were extracted from image samples and defined by the logic and arithmetic equation 2.2.

$$\text{DRAY} = [(B \geq 255) \text{AND} (EGD \geq 52.5)] \quad (2.2)$$

It is important to notice the large amount of saturated pixels present on clear sky images showed on figure 2.8(h) correspondent to DRAYL pattern according to illustrated on HSL 2.8(g) and RGB 2.8(i) color spaces.

2.6.3 Definition of SEPY pattern (yellow selective scattering)

For the definition of **SEPY** pattern, a typical image was selected with a clear evidence of its presence as illustrated on figure 2.9. All the other patterns where cleared out by masking them from image. Only **SEPY** was left as illustrated on figure 2.9(h). After analyzing the image and the pattern occurrence it was noticed that the best way to classify **SEPY** was by pixel hue value discrimination of HSL color space. **SEPY** *locus* is very distinct from the other patterns and by this way could be easily discriminated according to details illustrated on figure 2.11(a). Typical values were extracted and refined from image samples and defined by the logic and arithmetic equation 2.3.

$$SEPY = \{\forall h \in [0, 1] \mid (h > 0.0833) \wedge (h \leq 0.1667)\} \quad (2.3)$$

2.6.4 Definition of SEPR pattern (red selective scattering)

The same procedure was used to discriminate the **SEPR** pattern. For the definition of **SEPR** pattern, a typical image was selected with a clear evidence of its presence as illustrated on figure 2.10. All the other patterns where cleared out by masking

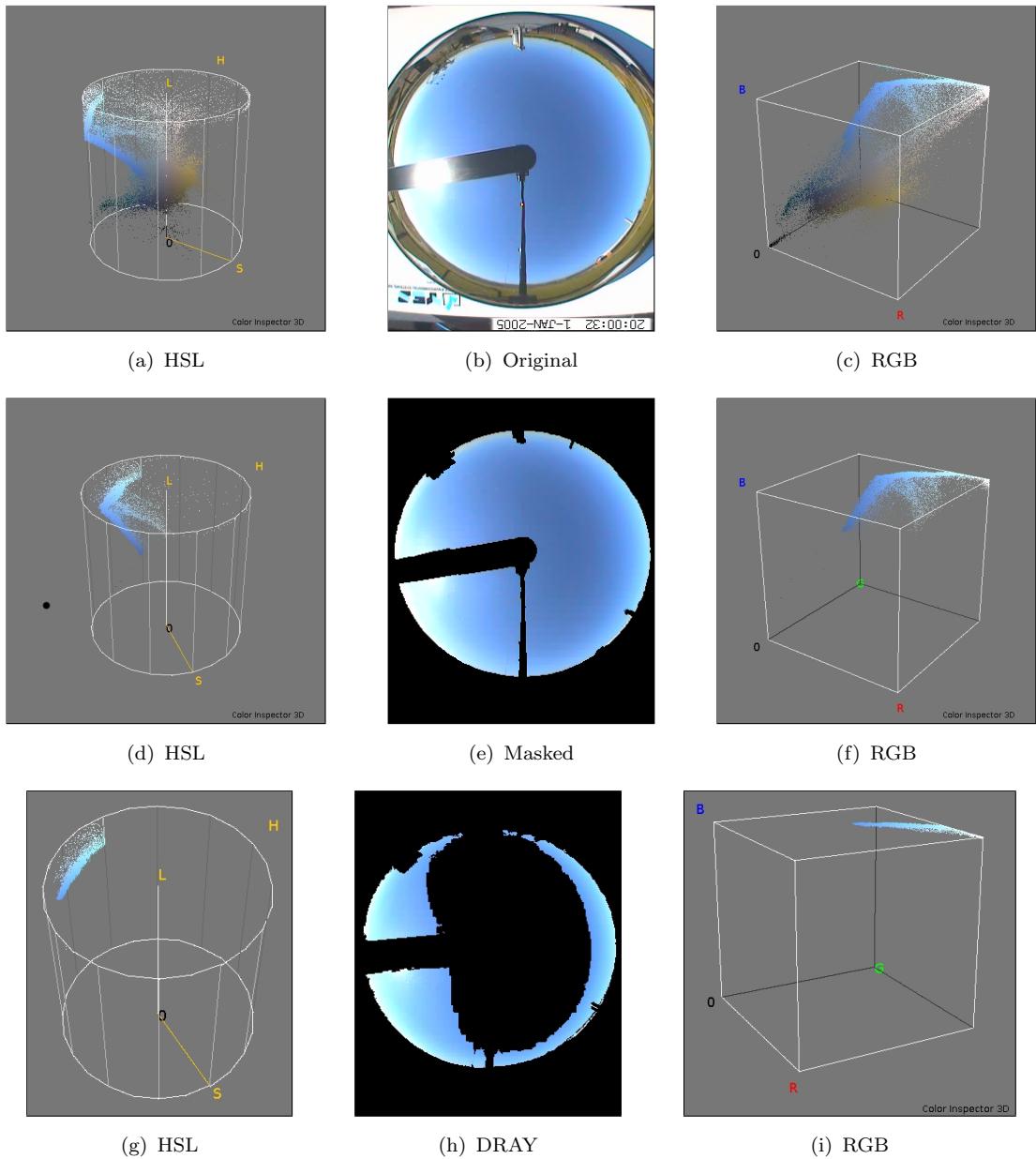


Figure 2.8 - DRAY patterns classification evolution for January 1st 2005 2000 GMT.

from image. Only **SEPR** was left as illustrated on figure 2.10(h). After analyzing the image and the pattern occurrence it was noticed that the best way to classify **SEPR** was by hue pixel value discrimination of HSL color space. **SEPR** *locus* is very distinct from the other patterns and by this way could be easily discriminated according to details illustrated on figure 2.11(b). Typical values were extracted and

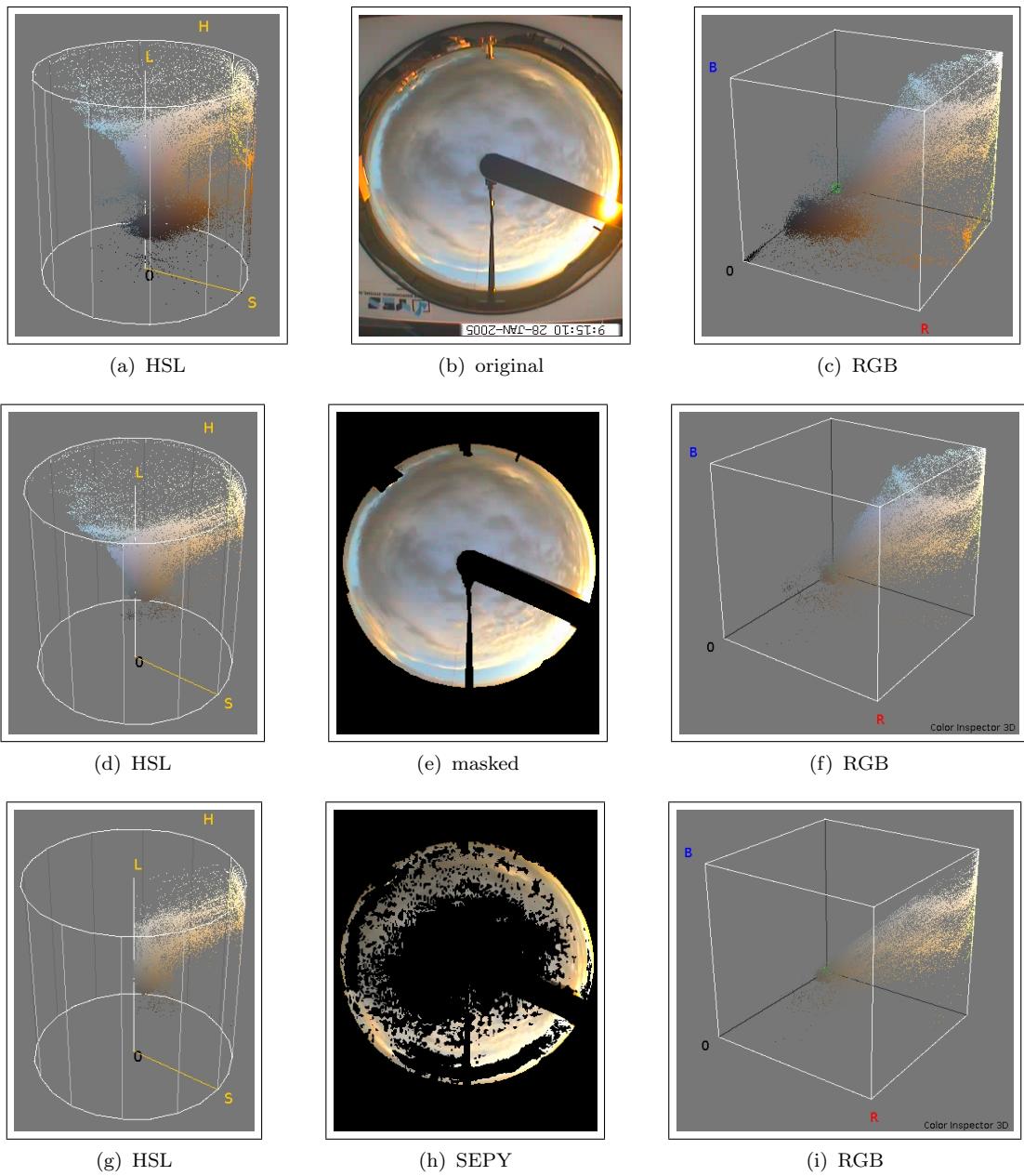


Figure 2.9 - SEPY patterns classification evolution for January 28th 2005 0915 GMT.

refined from image samples and defined by the logic and arithmetic equation 2.4.

$$SEPR = \{\forall h \in [0, 1] \mid (h \leq 0.0833)\} \quad (2.4)$$

It is important to notice that **SEPY** pattern occurs at higher solar elevations than

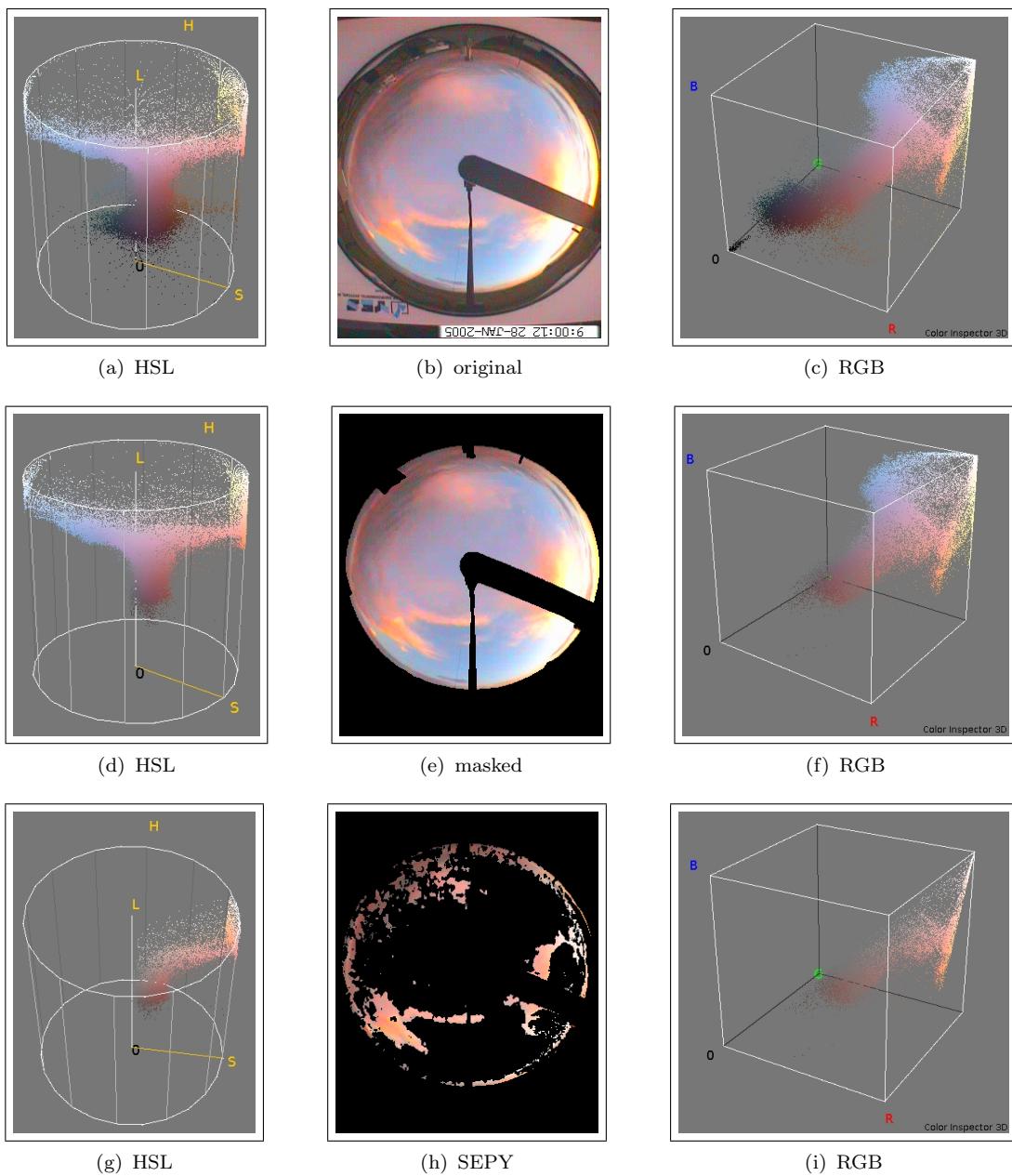
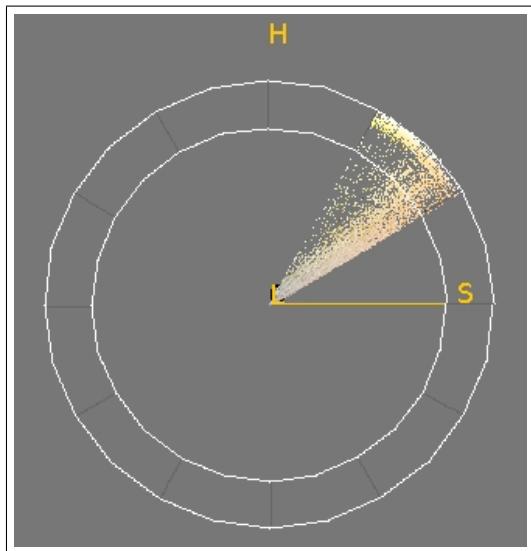
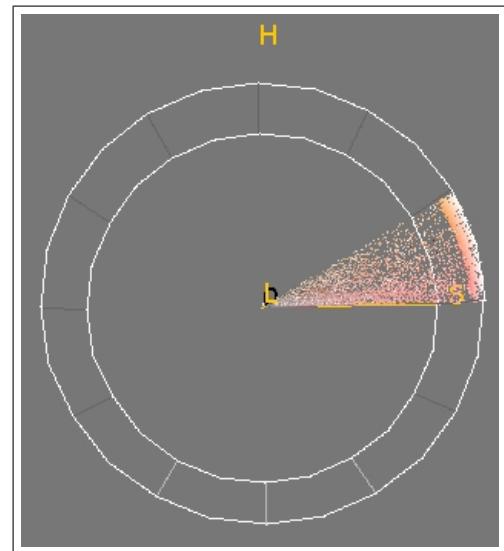


Figure 2.10 - SEPR patterns classification evolution for January 28th 2005 0900 GMT.

SEPR pattern.



(a) H dimension for SEPY on January 28th 2005 0915
GMT image



(b) H dimension for SEPR on January 28th 2005
0900 GMT image

Figure 2.11 - Differences between SEPY and SEPR classification function results on H dimension of HSL color space.

2.6.5 Definition of ENS pattern (non selective scattering)

For the definition of ENS pattern, three distinct cloudy sky images were selected. To take into account the variability of luminance images during the day at least on three different times and also at different days. Images used are illustrated on figures 2.12, 2.13 and 2.14. One important fact to notice is that saturated pixels correspondent to **DENS** pattern where removed from image before the statistical analysis, as illustrated on figures 2.13(e) and 2.14(b). DENS pattern pixels were considered a nuisance factor for ENS pattern and masked from image, to avoid errors on pattern definition.

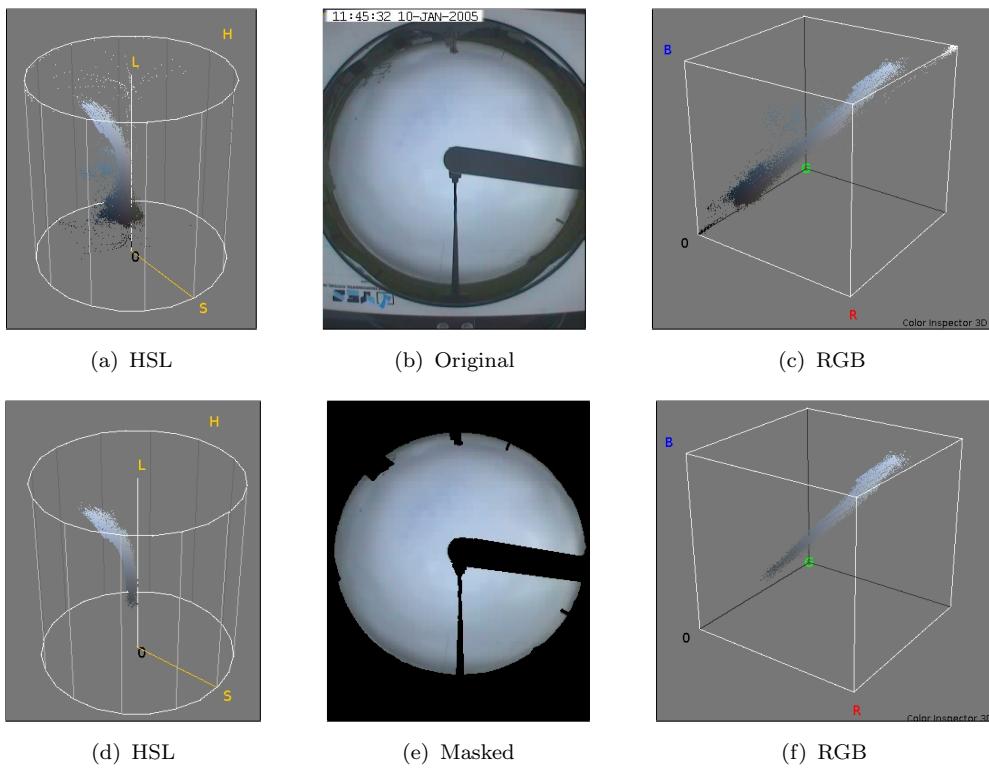


Figure 2.12 - First image used for ENS pattern GT for January 10th 2005 1145 GMT.

Images were obtained after processing on graphics interface that also generates data files from image patterns. These data were loaded into a statistical package to generate characterization of patterns by Exploratory Data Analysis (EDA). Graphical results obtained by EDA analysis are illustrated on figure 2.15.

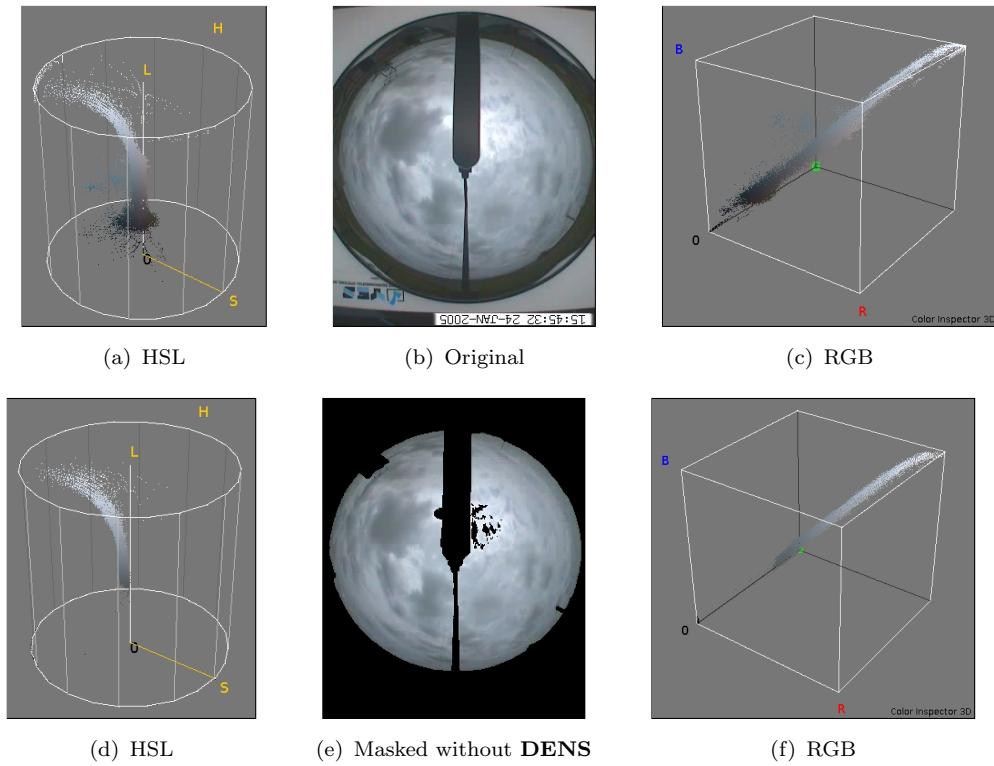


Figure 2.13 - Second image used for ENS pattern GT for January 24th 2005 1545 GMT.

After EDA the standard error determined for each dimension is illustrated on equation 2.5. The number of pixels used on image is very large, so the standard error is very low and will not be considered. The covariant matrix was also generated during multivariate analysis. The final pattern equation considered as a ground truth (GT) for the ENS pattern was determined by the equation 2.6.

$$\begin{aligned}
 e_r &= \frac{s_r}{\sqrt{n_{ENS}}} = \frac{29.82}{\sqrt{151920}} = 0.076 \\
 e_g &= \frac{s_g}{\sqrt{n_{ENS}}} = \frac{33.06}{\sqrt{151920}} = 0.085 \\
 e_b &= \frac{s_b}{\sqrt{n_{ENS}}} = \frac{37.30}{\sqrt{151920}} = 0.096
 \end{aligned} \tag{2.5}$$

where:

- e_r : standard error for red color dimension
- e_g : standard error for green color dimension

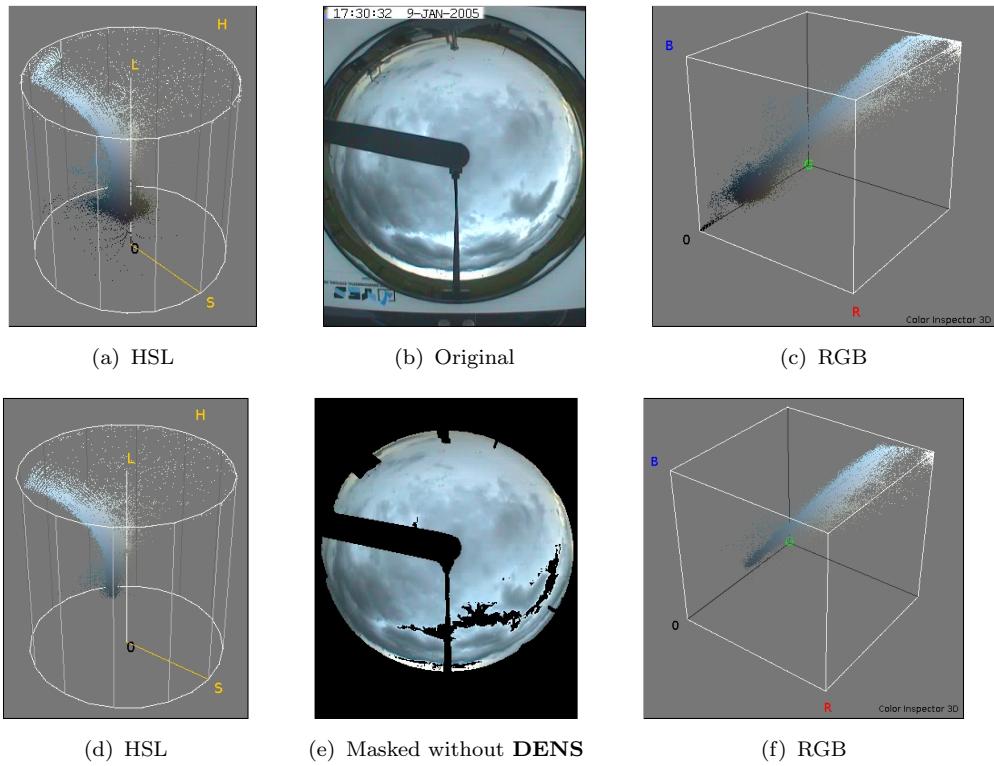


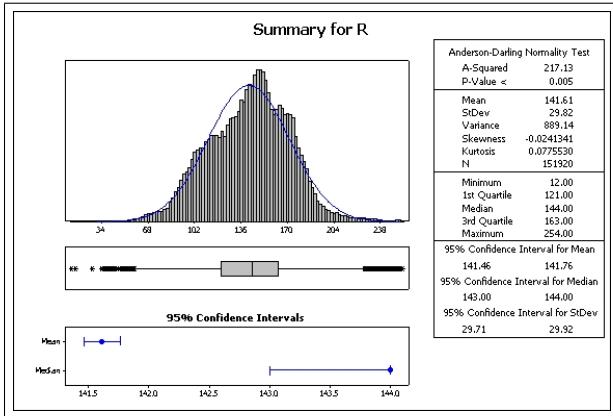
Figure 2.14 - Third image used for ENS pattern GT for January 09th 2005 1730 GMT.

- e_b : standard error for blue color dimension
- s_r : standard deviation of red color dimension
- s_g : standard deviation of green color dimension
- s_b : standard deviation of blue color dimension
- n_{ENS} : number of pixels used for ENS pattern definition

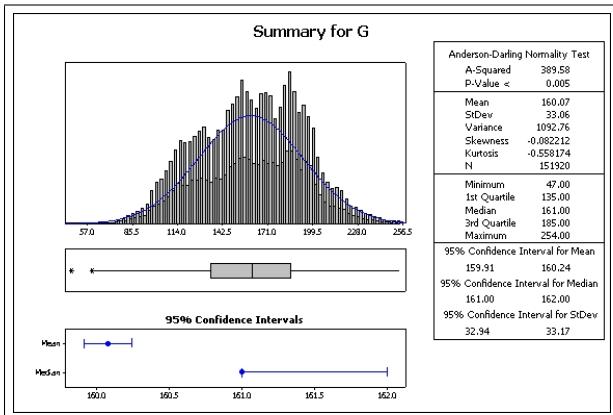
$$ENS = \begin{vmatrix} 141.61 \\ 160.07 \\ 174.01 \end{vmatrix} + \begin{vmatrix} 889.144 & 944.645 & 1039.041 \\ 944.645 & 1092.758 & 1214.737 \\ 1039.041 & 1214.737 & 1390.940 \end{vmatrix} + \begin{vmatrix} 0.076 \\ 0.085 \\ 0.096 \end{vmatrix} \quad (2.6)$$

2.6.6 Definition of RAYL pattern (rayleigh scattering)

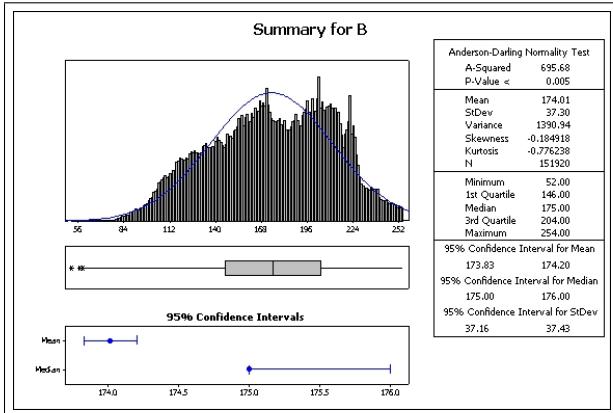
For the definition of RAYL pattern, three distinct clear sky images were selected. To take into account the variability of luminance images during the day at least on three



(a) RED dimension EDA for ENS



(b) GREEN dimension EDA for ENS



(c) BLUE dimension EDA for ENS

Figure 2.15 - EDA analysis for ENS pattern from three images.

different times and also at different days. Images used are illustrated on figures 2.16, 2.17 and 2.18. One important observation about figure 2.16 is that a significant amount of DRAY pattern pixels were considered a nuisance factor for RAYL pattern

and masked from image, to avoid errors on pattern definition. Another important observation is that dust on reflector surface could also cause diffusion on images around the Sun aureole, as illustrated near the shading band mask on figure 2.18.

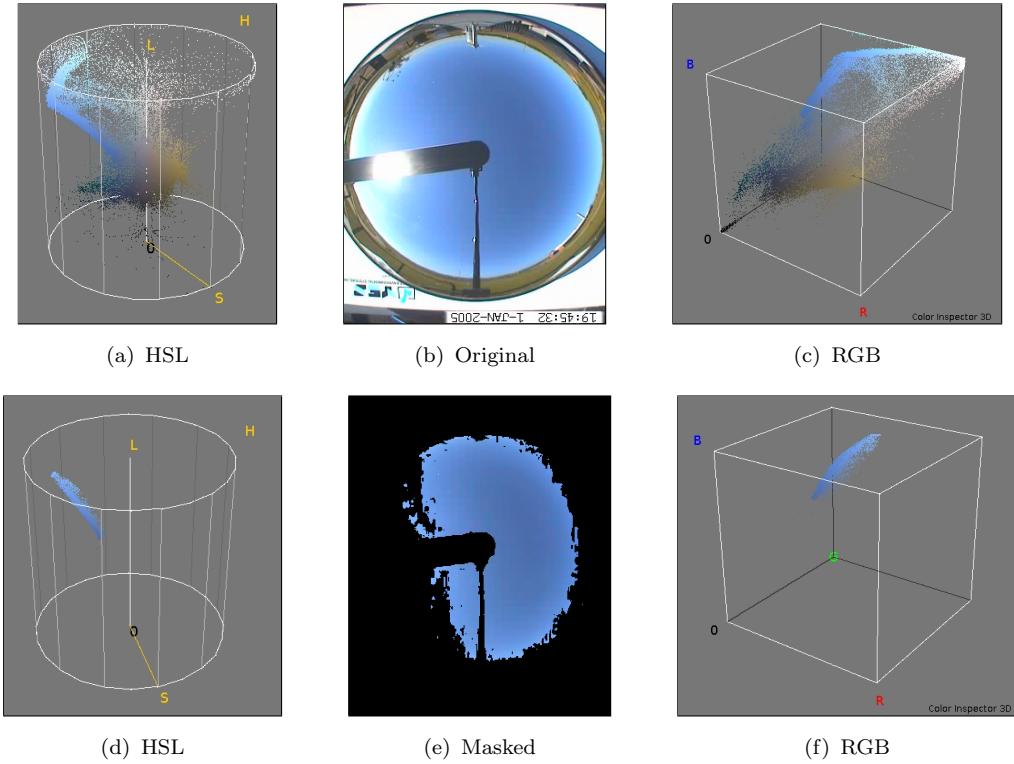


Figure 2.16 - First image used for RAYL pattern GT for January 1st 2005 1945 GMT.

Images were obtained after processing on graphics interface that also generates data files from image patterns. These data were loaded into a statistical package to generate characterization of patterns by Exploratory Data Analysis (EDA). Graphical results obtained by EDA analysis are illustrated on figure 2.19.

After EDA the standard error determined for each dimension is illustrated on equation 2.7. The number of pixels used on image is very large, so the standard error is very low and will not be considered. The covariant matrix was also generated during multivariate analysis. The final pattern equation considered as a ground truth (GT)

for the RAYL pattern was determined by the equation 2.8.

$$\begin{aligned}
 e_r &= \frac{s_r}{\sqrt{n_{RAYL}}} = \frac{12.16}{\sqrt{120354}} = 0.035 \\
 e_g &= \frac{s_g}{\sqrt{n_{RAYL}}} = \frac{16.61}{\sqrt{120354}} = 0.049 \\
 e_b &= \frac{s_b}{\sqrt{n_{RAYL}}} = \frac{21.36}{\sqrt{120354}} = 0.062
 \end{aligned} \tag{2.7}$$

where:

- e_r : standard error for red color dimension
- e_g : standard error for green color dimension
- e_b : standard error for blue color dimension
- s_r : standard deviation of red color dimension
- s_g : standard deviation of green color dimension

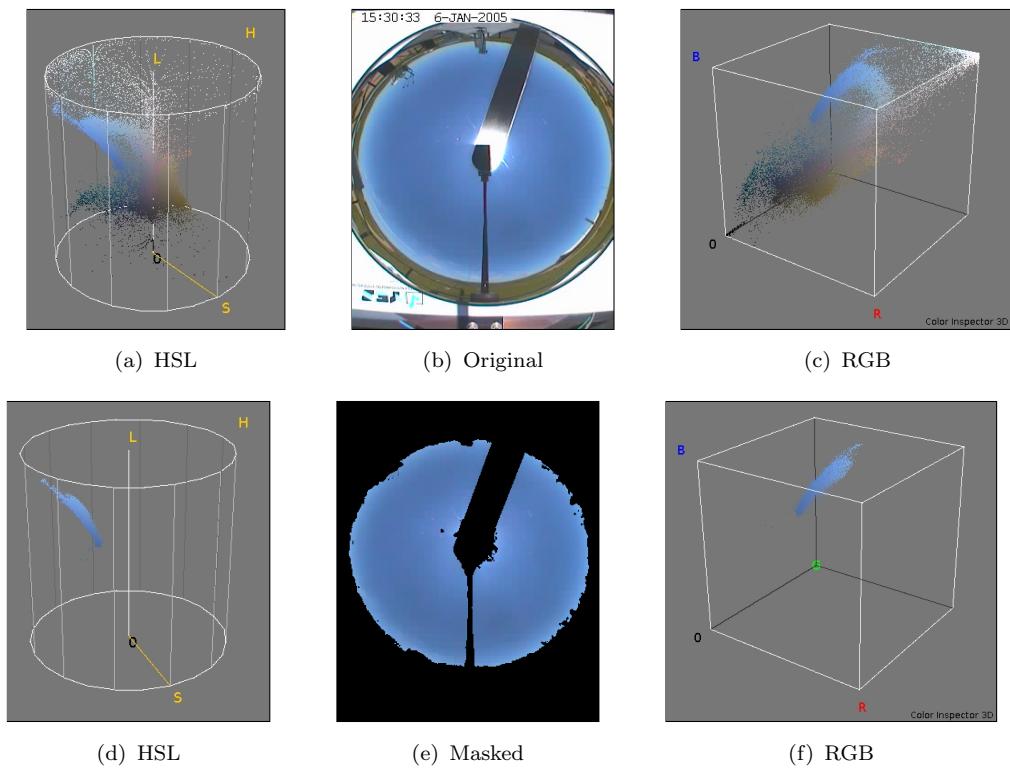


Figure 2.17 - Second image used for RAYL pattern GT for January 6th 2005 1530 GMT.

- s_b : standard deviation of blue color dimension
- n_{RAYL} : number of pixels used for RAYL pattern definition

$$RAYL = \left| \begin{array}{c} 88.65 \\ 128.48 \\ 191.90 \end{array} \right| + \left| \begin{array}{ccc} 147.90 & 190.11 & 235.32 \\ 190.11 & 275.95 & 342.42 \\ 235.32 & 342.42 & 456.11 \end{array} \right| + \left| \begin{array}{c} 0.035 \\ 0.049 \\ 0.062 \end{array} \right| \quad (2.8)$$

After RAYL GT patterns has been defined by multivariate analysis, unknown pixels could be classified by mahalanobis (or statistical) distance [Mahalanobis \(1936\)](#), [Johnson e Wichern \(2007\)](#). Mahalanobis distance has F-distribution and could be calculated according to the equation recommended by Mahalanobis [2.9](#).

$$D^2 = n(\mathbf{x} - \mu)^T \cdot \Sigma^{-1} \cdot (\mathbf{x} - \mu) \quad (2.9)$$

where:

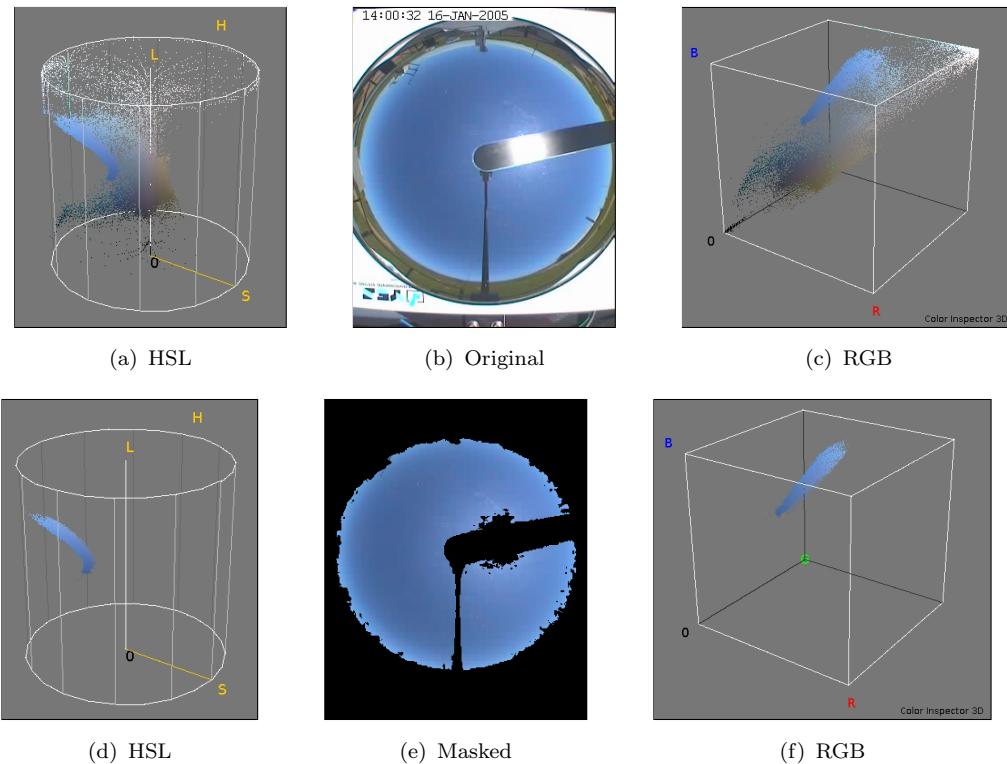
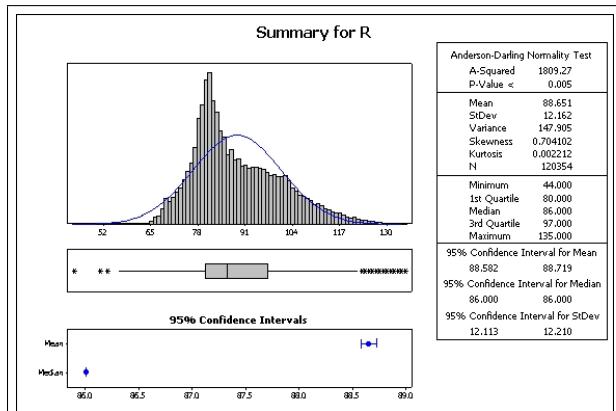
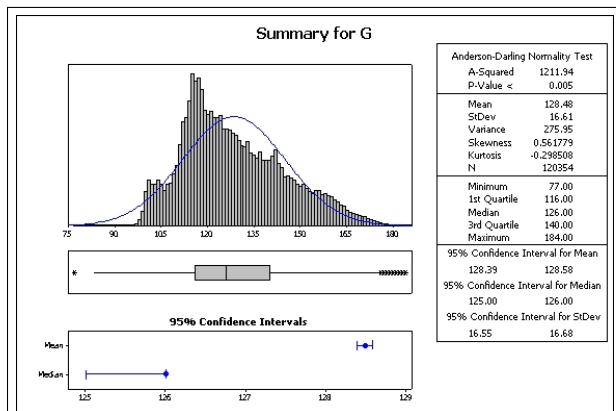


Figure 2.18 - Third image used for RAYL pattern GT for January 16th 2005 1400 GMT.

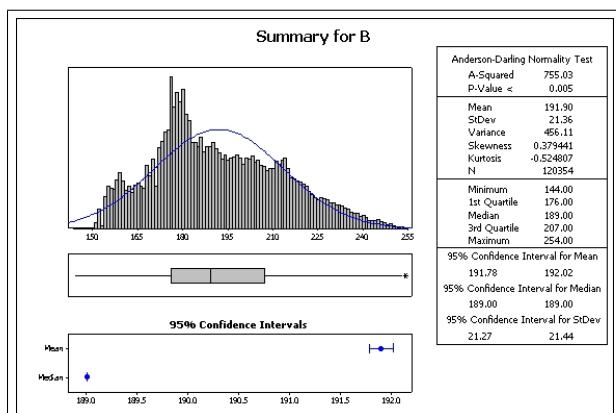
- D^2 : is the pixel squared Mahalanobis distance from the GT pattern being classified.



(a) RED dimension EDA for RAYL



(b) GREEN dimension EDA for RAYL



(c) BLUE dimension EDA for RAYL

Figure 2.19 - EDA analysis for RAYL pattern from three images.

- \mathbf{x} (r,g,b) : is the pixel vector to be classified, represented by its color dimensions.
- μ : is the average GT vector.
- T : is the transpose matrix operation.
- -1 : is the inversion matrix operation
- n : is the number of pixels used to determine the GT.
- p : is the degrees of freedom correspondent to the number of color space dimensions ($p = 3$).
- $n-p$: is the degree of freedom of the GT sampled population. If $(n-p) \geq 120$ the statistics tables considers the degree of freedom to be infinite (∞).
- $\alpha = 0,05$: is the level of confidence established for the evaluation test.
- $F_{p,n-p,(\alpha)}$: is the discrimination threshold from GT. This value is obtained from the percentage point from a F-distribution table. $F_{3,\infty,(0,1)} = 3,78$; $F_{3,\infty,(0,05)} = 2,61$; $F_{3,\infty,(0,01)} = 2,08$
- Σ is the GT covariance matrix.

A discrimination threshold based on pixel values is established based on statistical F-scores on the same way as the traditional hypothesis testing. Statistical tables are easily found on related literature according to degrees of freedom on the formula suggested by (JOHNSON; WICHERN, 2007, chap. 5) and illustrated on equation 2.10. For practical reasons and large population cases, the distance and threshold values needed to be adjusted according to application. Otherwise a large amount of pixels will be discarded by its rigorous criteria. That situation happened in the present research and the statistical threshold values were tunned up to $D_{ENS}^2 = 29.1$ and $D_{RAYL}^2 = 22.68$.

$$D^2 \leq \frac{(n-1)p}{(n-p)} F_{p,n-p,(\alpha)} \quad (2.10)$$

2.6.7 Resume of Principal classification methods proposed

After the definition of the criteria used for pattern classification they were implemented in a graphic interface to generate the results. Table 2.3 describes the resume of the principal methods used in the present work.

Table 2.3 - Principal classification methods proposed. H is the hierarchical order, P is the pattern.

H	P	Criterion of classification
1	DENS	$\{\forall R, G, B \in [0, 255] \mid ((B \geq 255) \text{ AND } (EGD \leq 52,5))\}$
2	DRAY	$\{\forall R, G, B \in [0, 255] \mid ((B \geq 255) \text{ AND } (EGD \geq 52,5))\}$
3	SEPY	$\{\forall h \in [0, 1] \mid (h > 0.0833) \text{ AND } (h <= 0.1667)\}$
4	SEPR	$\{\forall h \in [0, 1] \mid (h <= 0.0833)\}$
5	ENS	$D_{ENS}^2 \leq F_{p,n-p,(\alpha)} = 29,01$
6	RAY	$D_{RAY}^2 \leq F_{p,n-p,(\alpha)} = 22,68$
7	NC	Non classifiable on above cases

2.7 Methods used to determine cloud coverage using radiometers

Surface solar radiation sensors are widely used for cloud validation. Most models consider mainly the dependence of radiation fluxes on cloud amount and type (KARSTEN; CZEPLAK, 1980) or cloud forcing (NORRIS, 2005). Parametrization could be done by evaluating Top of Atmosphere (toa) irradiance combined with Global (glo) and Diffuse (diff) Earth surface measurements (HARRISON et al., 2008), or by using time series characterization of clear sky (LONG; ACKERMAN, 1996). Usually these methods take into account the difference between clear-sky parametrization and current (or all-sky) conditions, such as the methods developed by (HARRISON et al., 2008; DUCHON; O'MALLEY, 1999; CESS et al., 1995; LONG; ACKERMAN, 1996; LONG, 1997; WALISER et al., 1996). The current work will make a comparison among three indexes obtained from two solar radiation based methods.

The solar radiation data used was sampled every second and collected in one minute interval averages. Only the data coincident to image acquisition was used. Three indexes of two SW-based methods were selected in related literature defined by a long historical record performed by (KARSTEN; CZEPLAK, 1980; HARRISON et al., 2008) for data comparison with EGD image-based as follows. Karsten and Czeplak

(KARSTEN; CZEPLAK, 1980) parameterized clouds from Earth surface based on data collected from synoptic observers (SO) over a period of 10 years with global (glo) and diffuse (diff) SW radiometers at the Hamburg-Germany meteorological observatory. They compared the SW data with SO observations, proposing an expression indicating cloud cover (C_{KC}) relating G and D. Rearranging the cloud cover expression as a function of glo and diff data to obtain percentage values instead of eights, we arrived at Equation 2.11 as follows:

$$C_{KC} = \sqrt{\left(\frac{diff}{glo} - 0.3\right) \frac{1}{0.7}}. \quad (2.11)$$

Harrison et al. (HARRISON et al., 2008) also parametrized clouds from Earth surface based on 10 years of SW Global and Diffuse data using two indexes, Opacity (op) and Diffuse Fraction (df), described in Equations 2.12 to 2.15 as follow:

$$df = \frac{diff}{glo}, \quad (2.12)$$

$$op = 1 - kt, \quad (2.13)$$

$$kt = \frac{diff}{toa}, \quad (2.14)$$

$$toa = \frac{S_0 \cos \theta_z}{d^2}. \quad (2.15)$$

Where, df is the (HARRISON et al., 2008) Diffuse Fraction index; D is the Diffuse Radiation SW data; G is the Global Radiation SW data; op is the (HARRISON et al., 2008) Opacity Index; kt is the Clearness Index; toa is the Top of Atmosphere Radiation; S_0 is the Average Solar Constant (IQBAL, 1983), d is the Sun-Earth distance and θ the Sun Zenith Angle.

All data table and graphs obtained from derived quantities are described on appendix C.

3 CONCLUSÕES

The present work described a method developed for classification of atmospheric patterns using cameras and its limitations considering the dynamic range of outdoor scenes. It was described a qualitative analysis of surface images intended to be used as synoptic observations system to replace synoptic observations of cloud coverage. Results are intended to be used to evaluate cloud coverage from surface to validate satellite models.

It was used an on-the-shelf sky imager system co allocated to a BSRN station to develop the present report. Present research demonstrated that image analysis are limited to the available technology of acquisition and file storage. The illumination scale domain of natural scenes is at least five decades broader than the sensitivity of cameras, resulting on distortions to accommodate the image subjects. By this reason a special proceeding is necessary to identify the saturation patterns on image.

Nearly 1650 images were used, collected every 15 minutes during daylight period. Co-allocated solar sensors data were also simultaneously collected for a comparison with the image methods. A massive amount of results are presented in the appendixes **A**, **B** and **C**.

The large amount of data presented in this report is intended to be used as a reference for future scientific work and publications on related area, but is too extensive to be presented in more detail. Future work on this area include high dynamic range imaging of sky scenes on new file format to accommodate logarithmic scale of high luminance scenes.

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Appendix A - Surface images of January 2005, obtained from the sky imager and the results of three methods implemented

This appendix illustrates the original images obtained from the SOS, and the result of LONG, EGD and MAHA classification methods. The color legends used on the classification for each method is described on figure A.1.

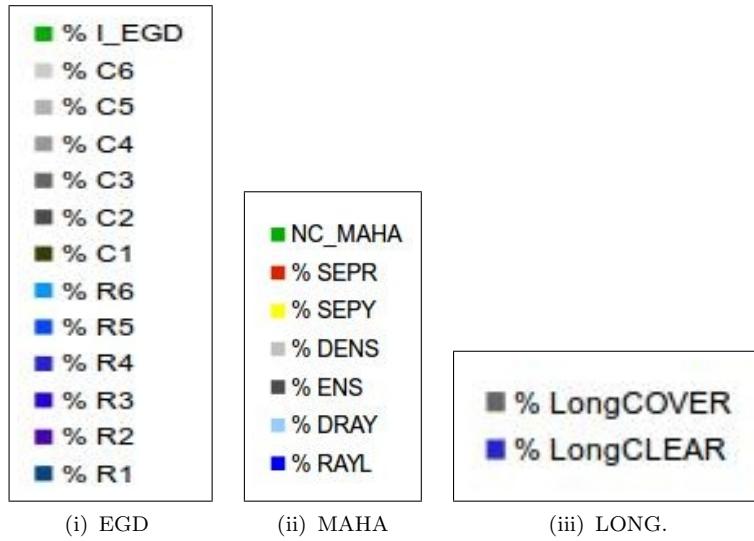


Figure A.1 - Color codes used on each image classification method.

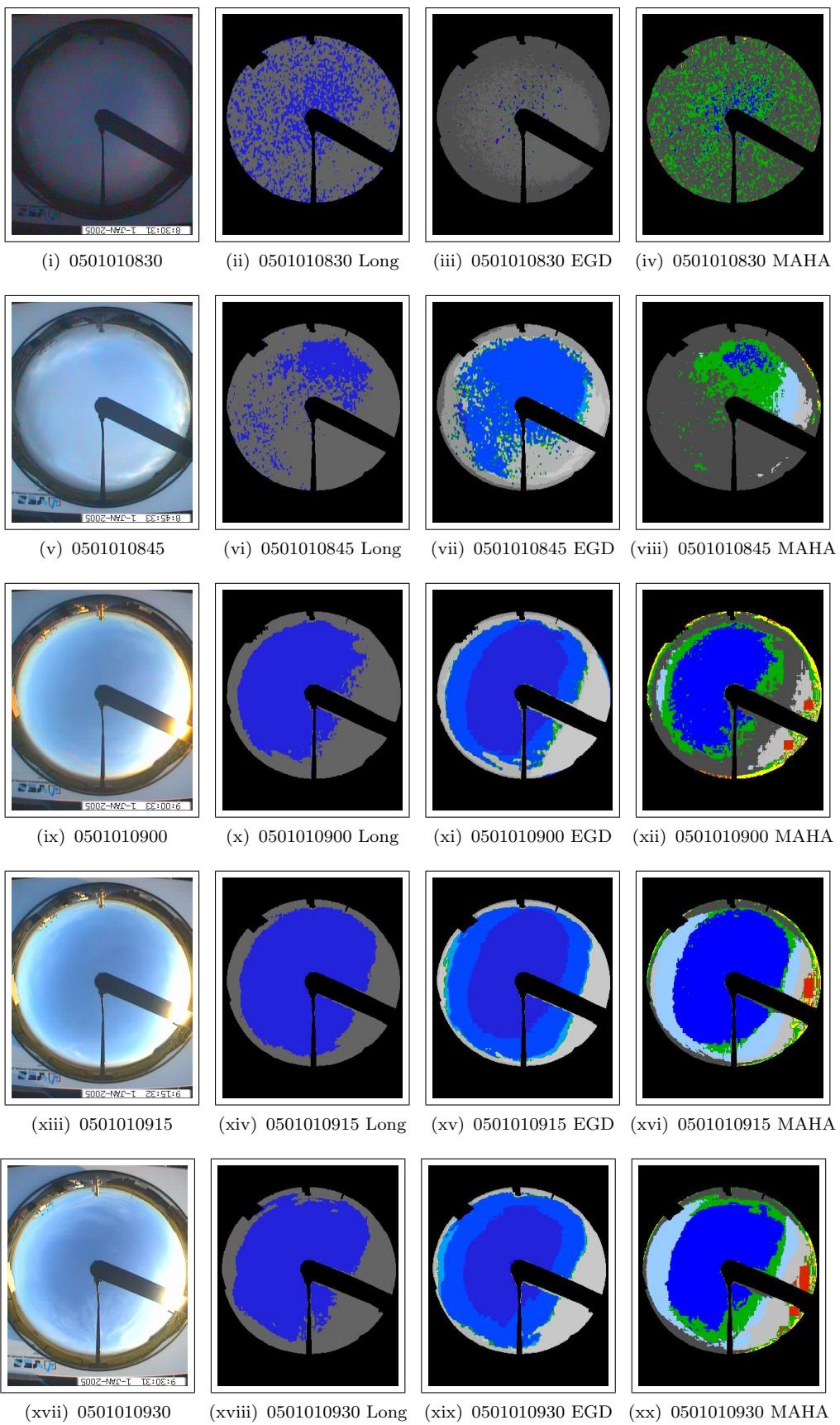


Figure A.2 - Sky images generated from 0501010830 to 0501010930.

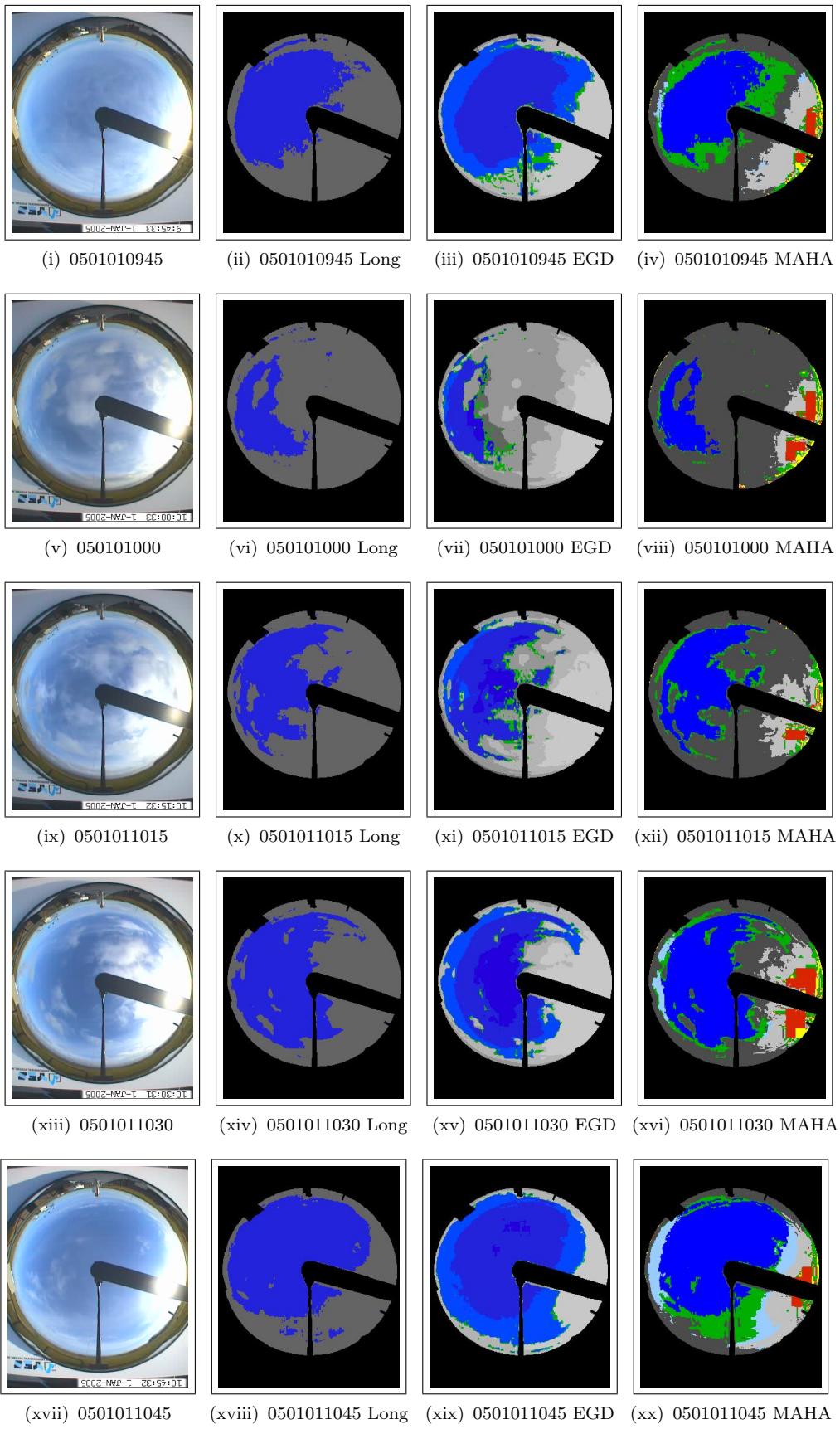


Figure A.3 - Sky images generated from 0501010945 to 0501011045.

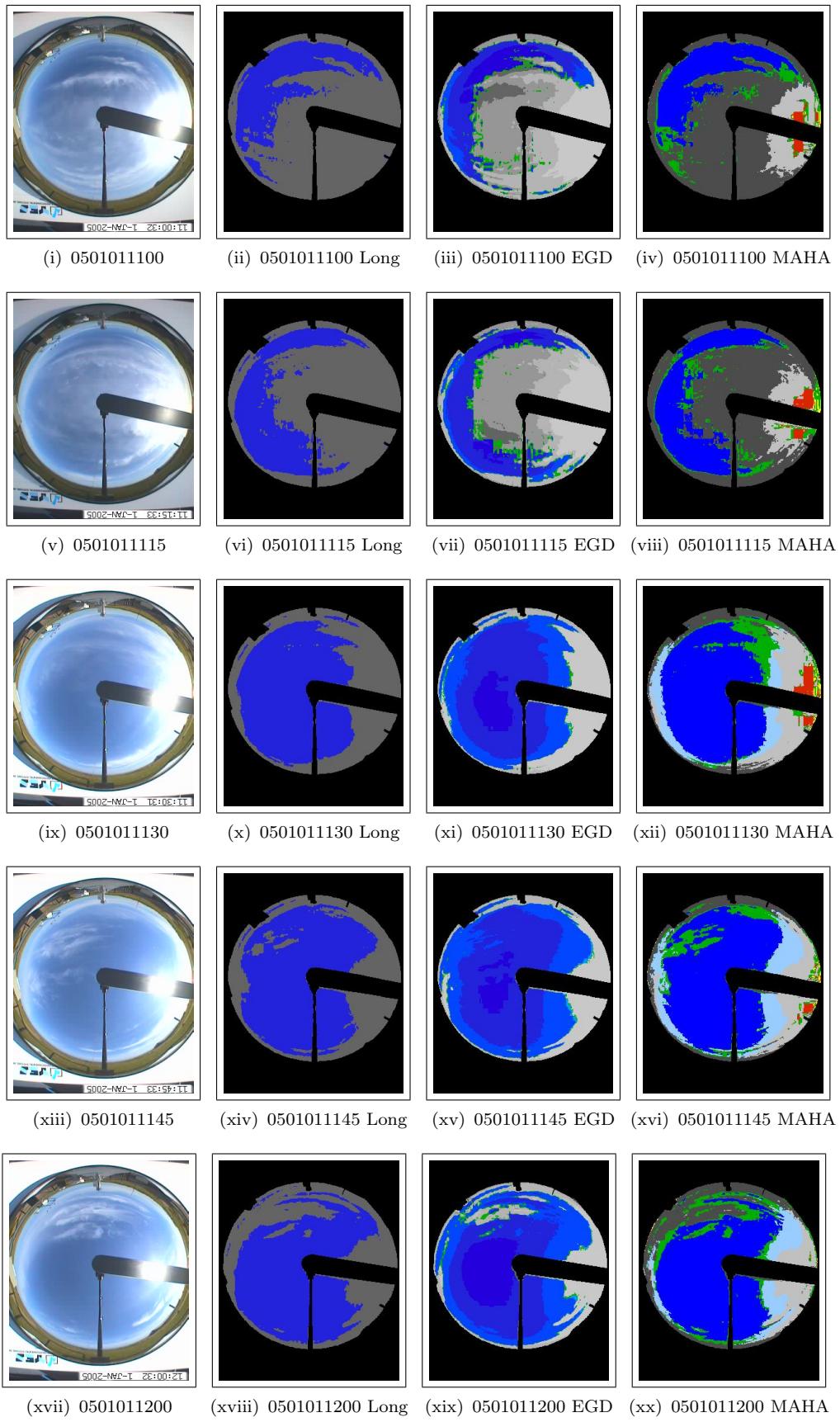


Figure A.4 - Sky images generated from 050101100 to 0501011200.

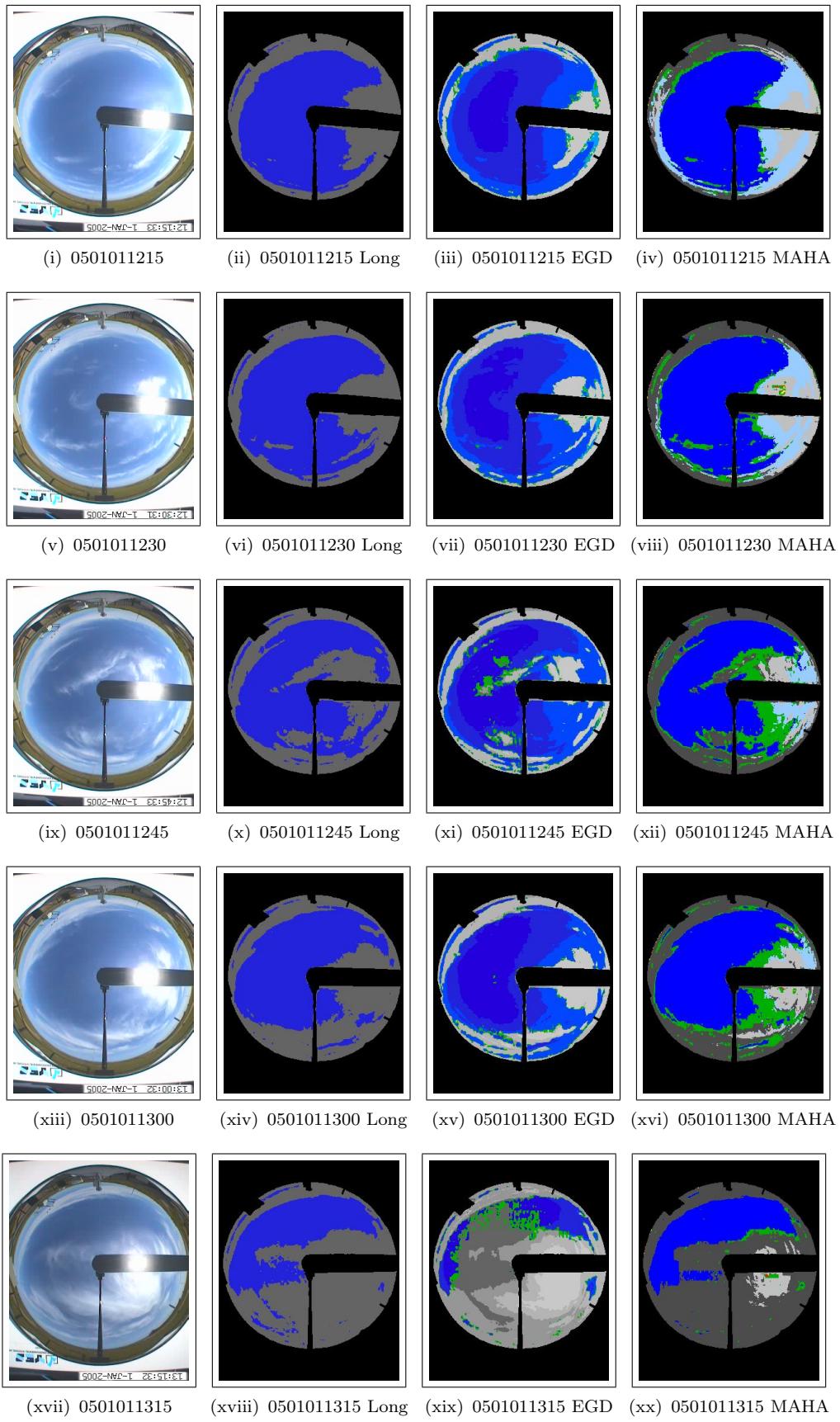


Figure A.5 - Sky images generated from 0501011215 to 0501011315.

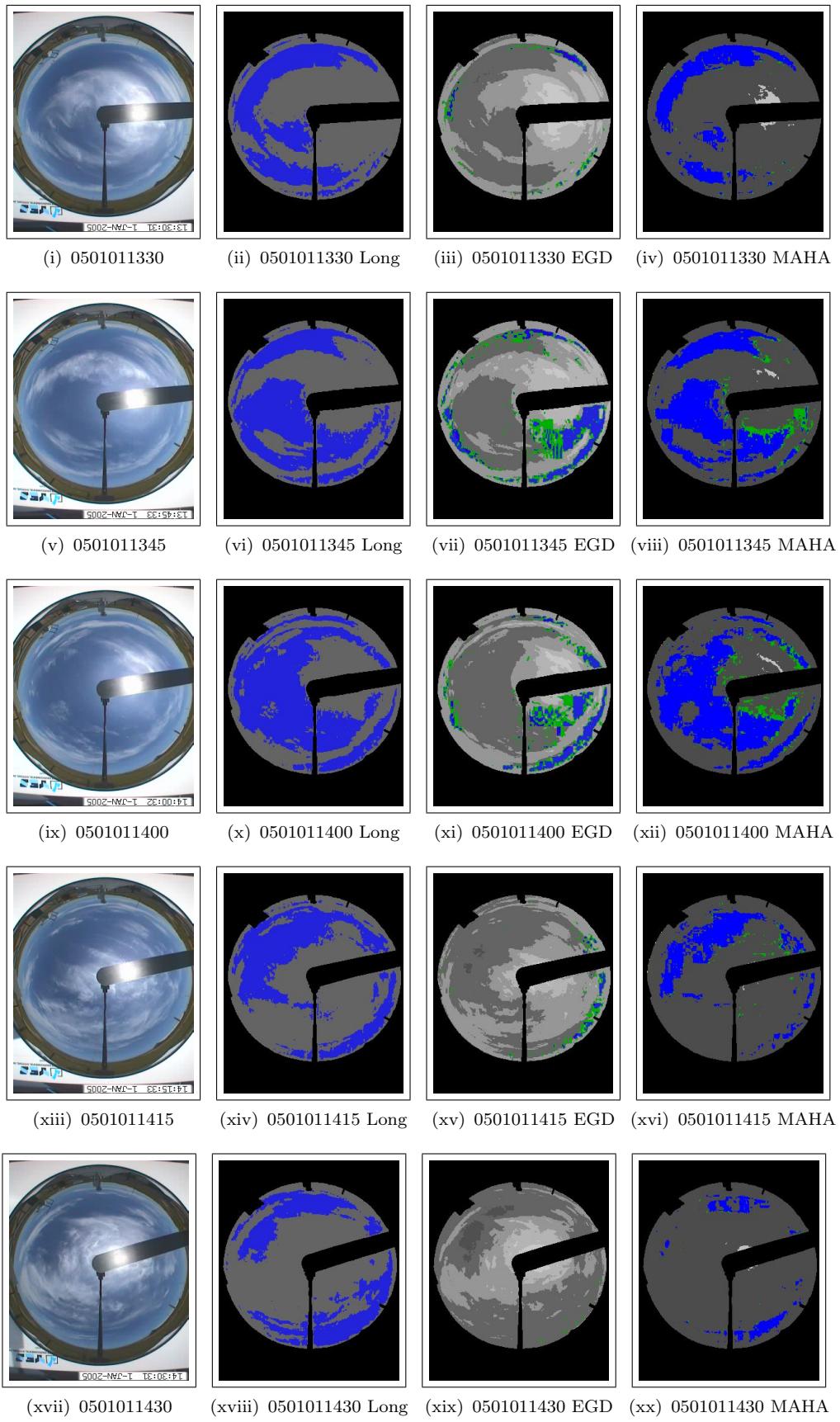


Figure A.6 - Sky images generated from 0501011330 to 0501011430.

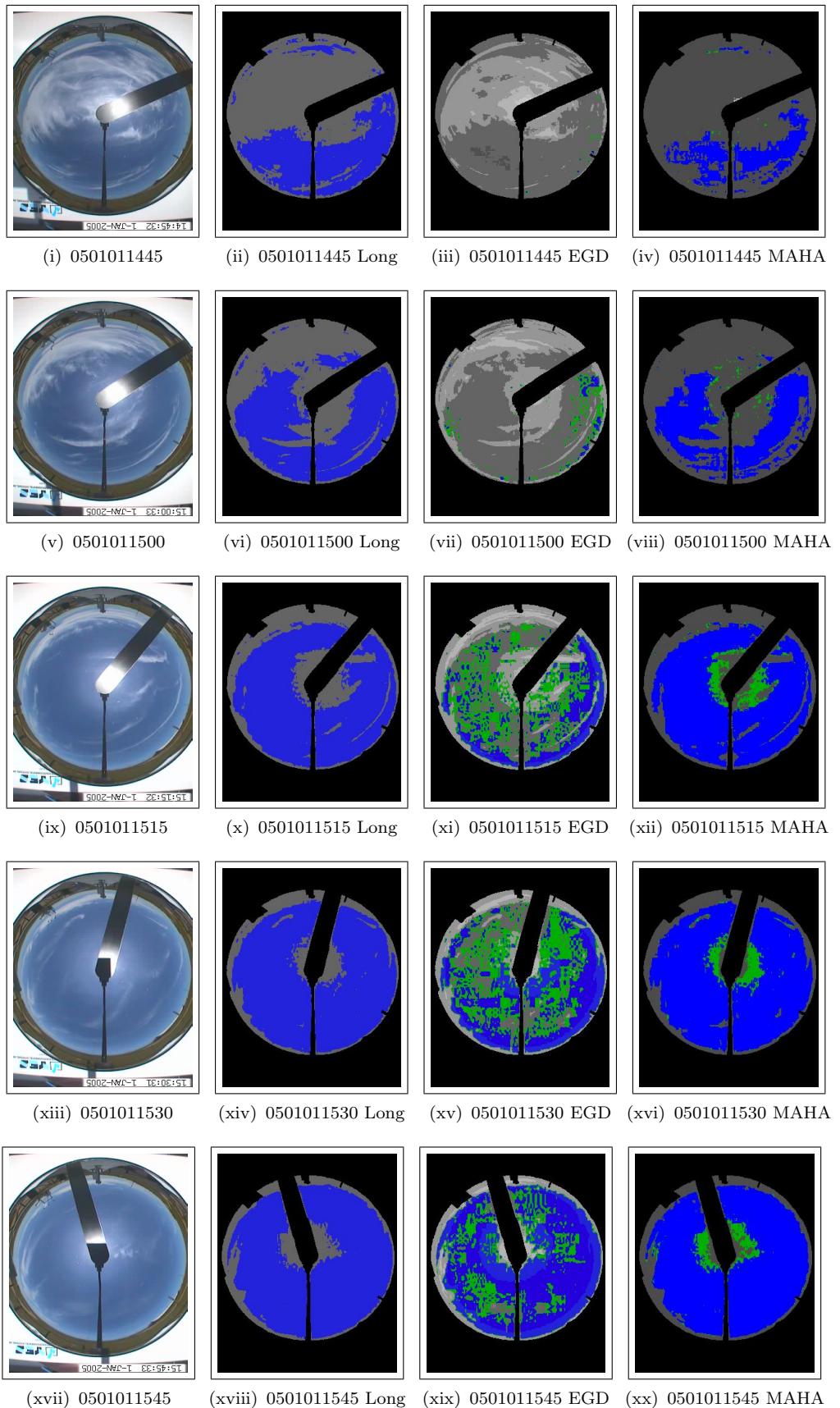


Figure A.7 - Sky images generated from 0501011445 to 0501011545.

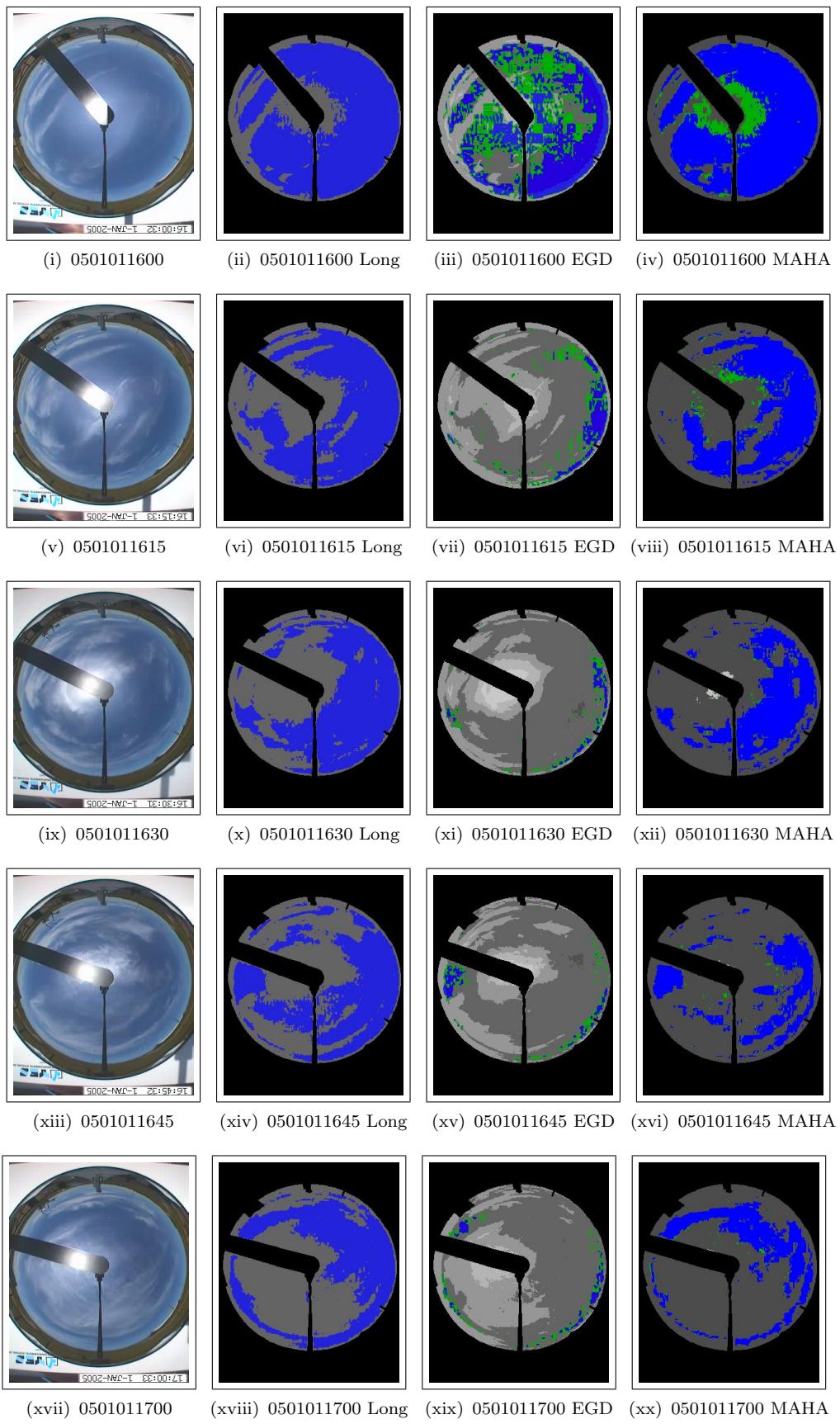


Figure A.8 - Sky images generated from 0501011600 to 0501011700.

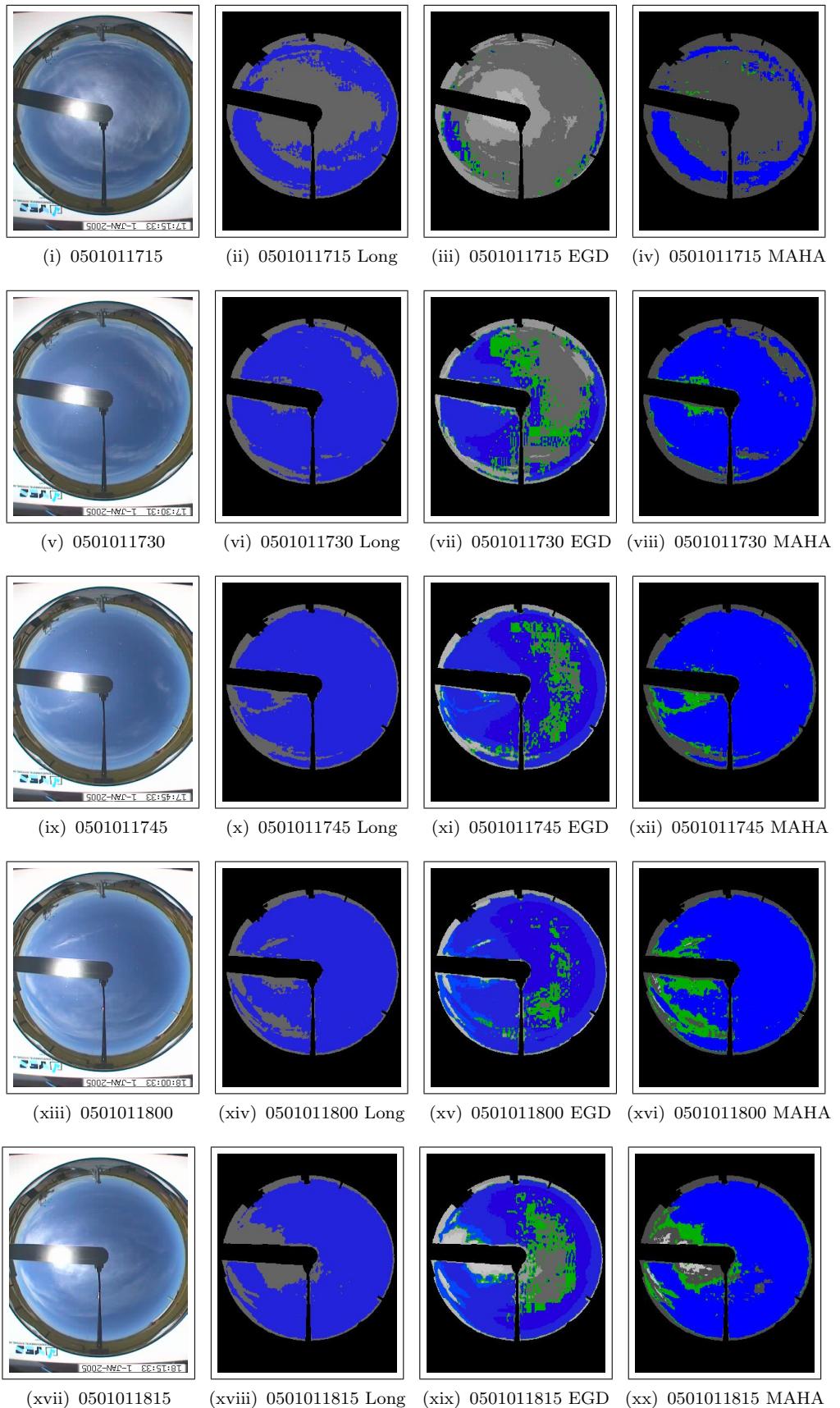


Figure A.9 - Sky images generated from 0501011715 to 0501011815.

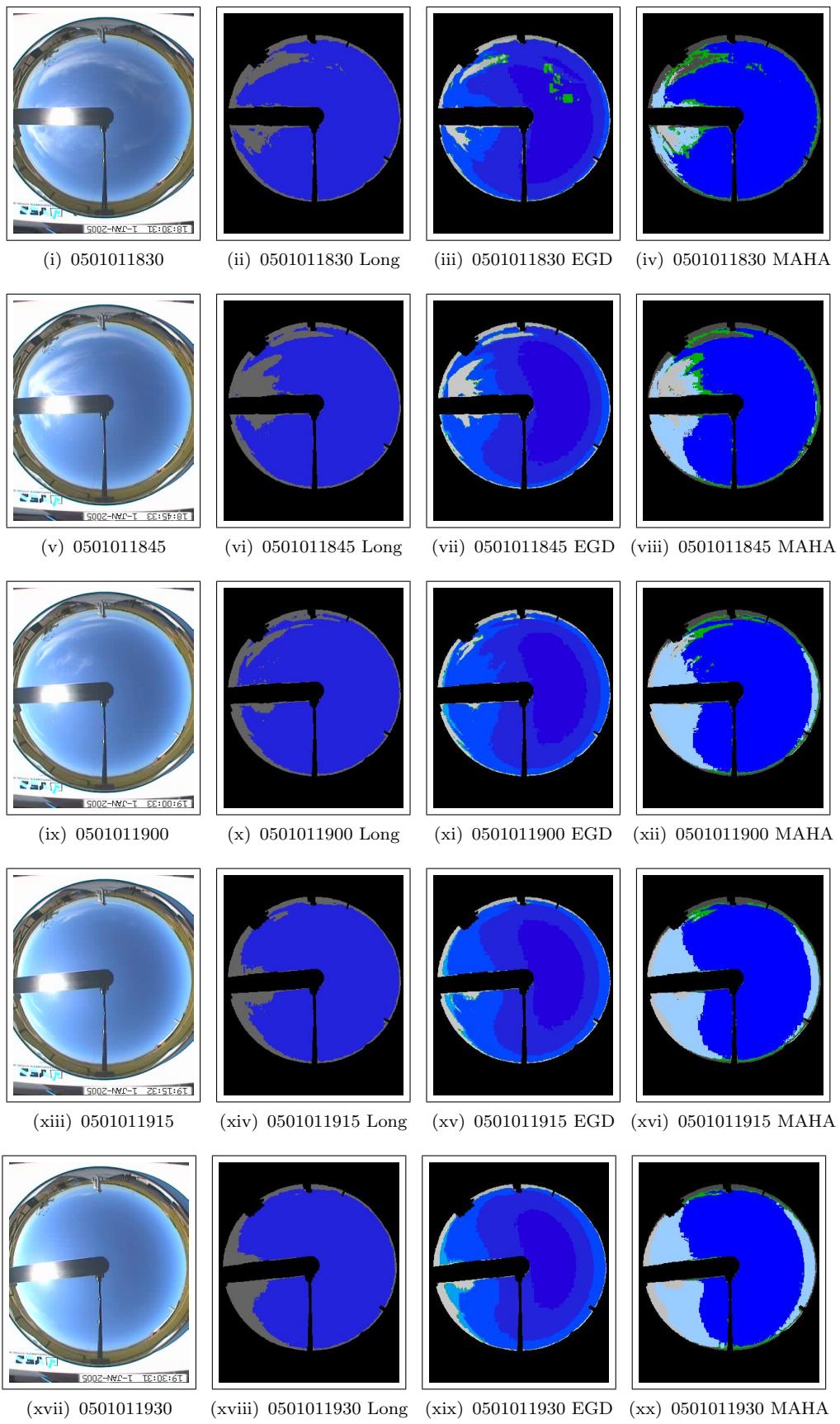


Figure A.10 - Sky images generated from 0501011830 to 0501011930.

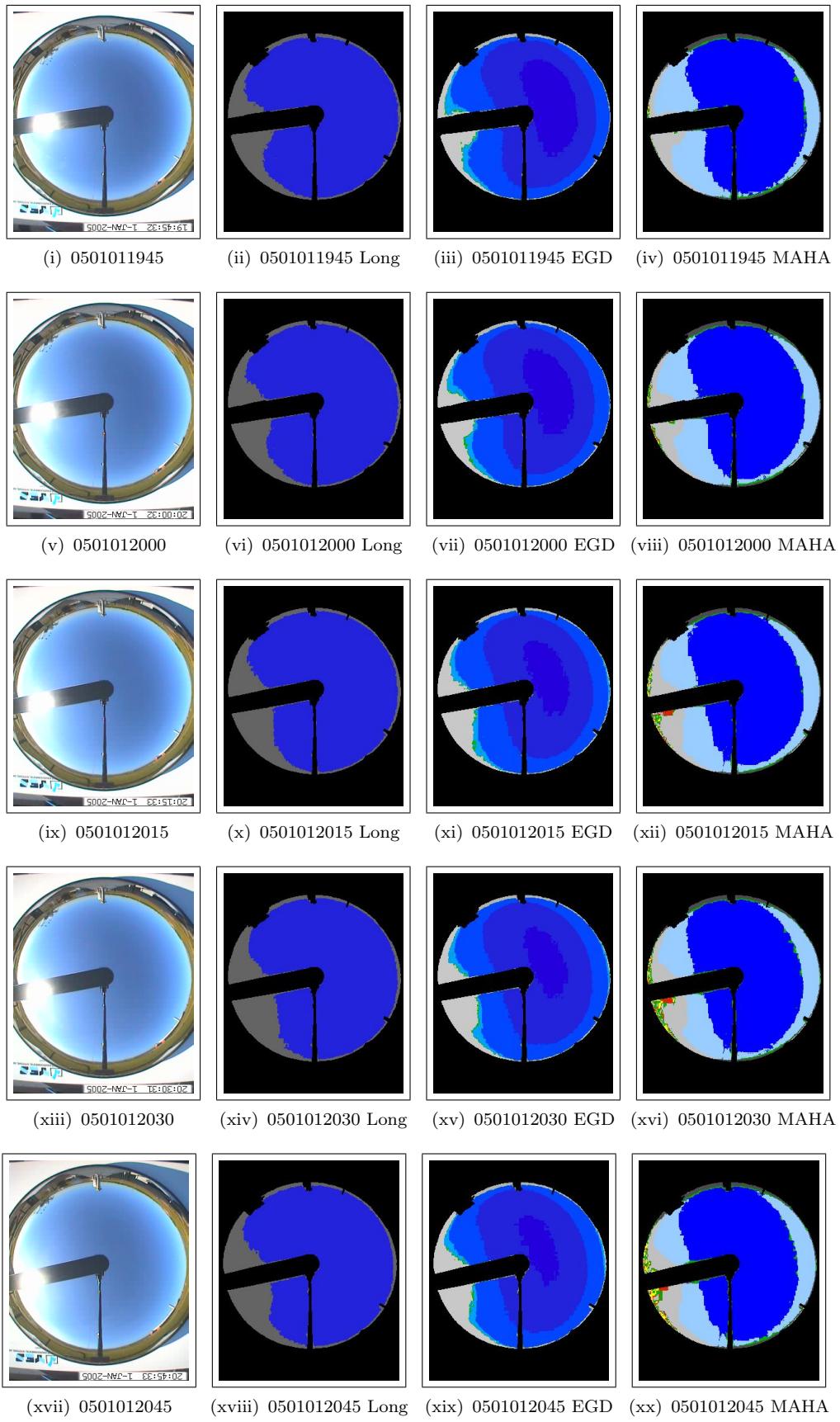


Figure A.11 - Sky images generated from 0501011945 to 0501012045.

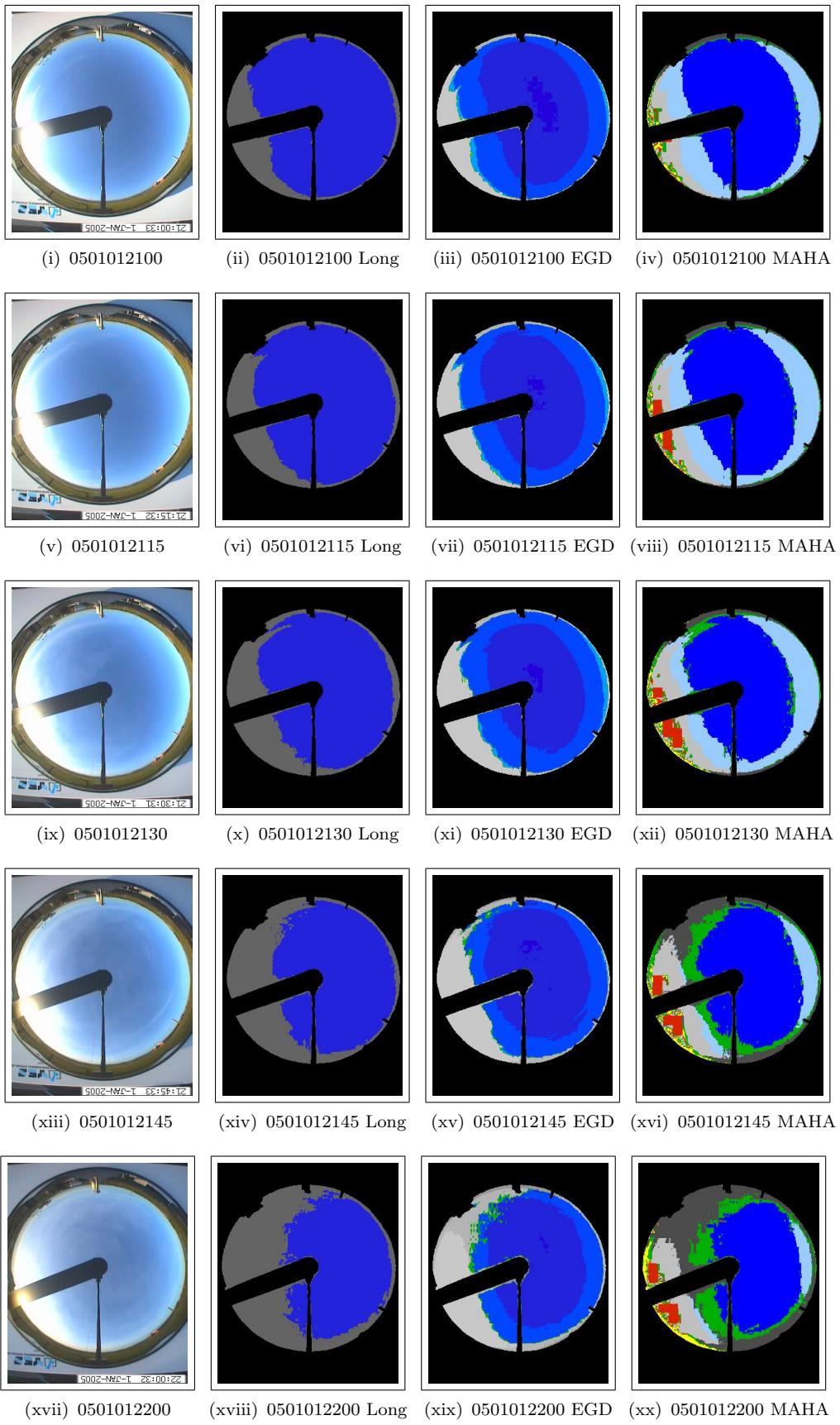


Figure A.12 - Sky images generated from 0501012100 to 0501012200.

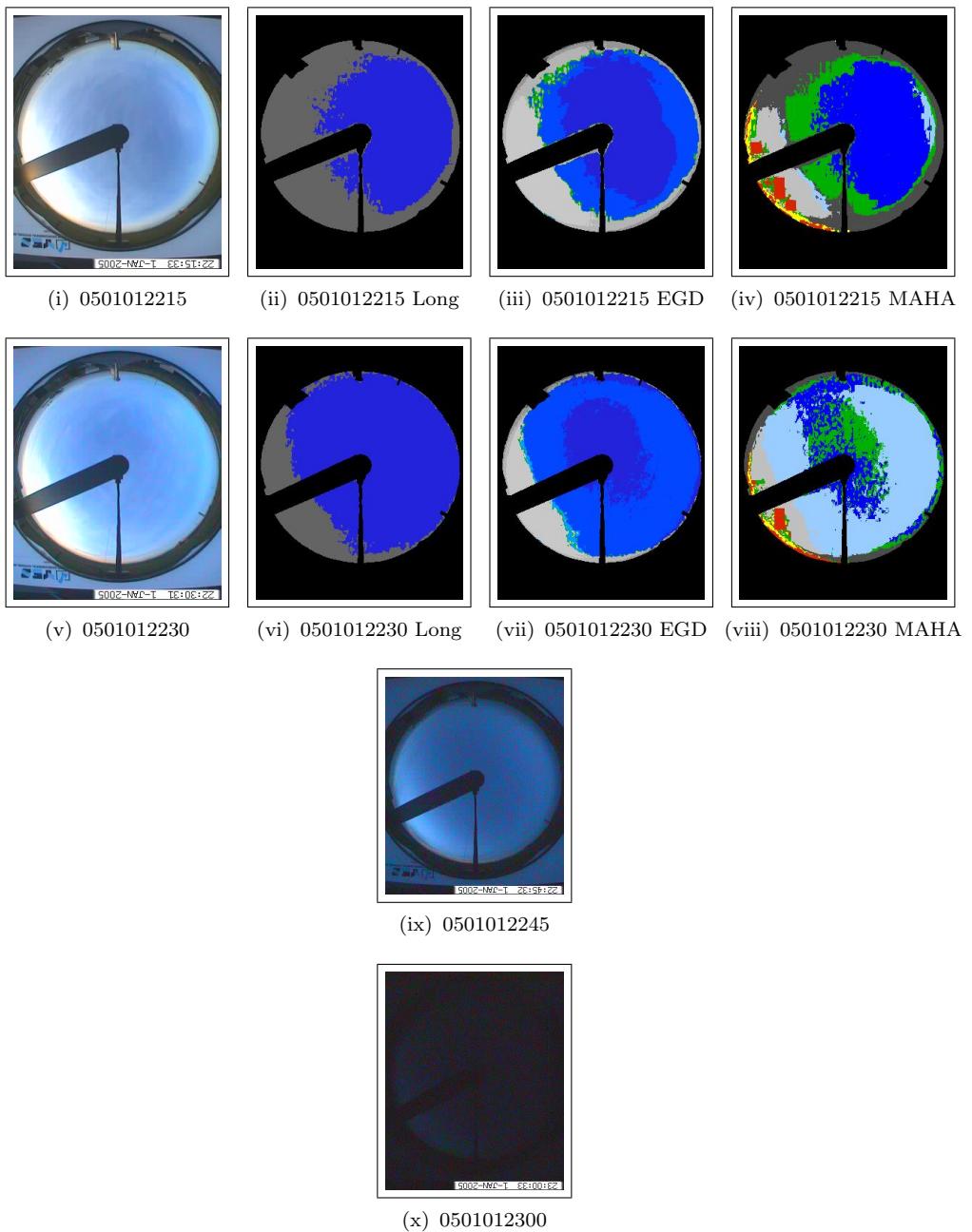


Figure A.13 - Sky images generated from 0501011600 to 0501012300.

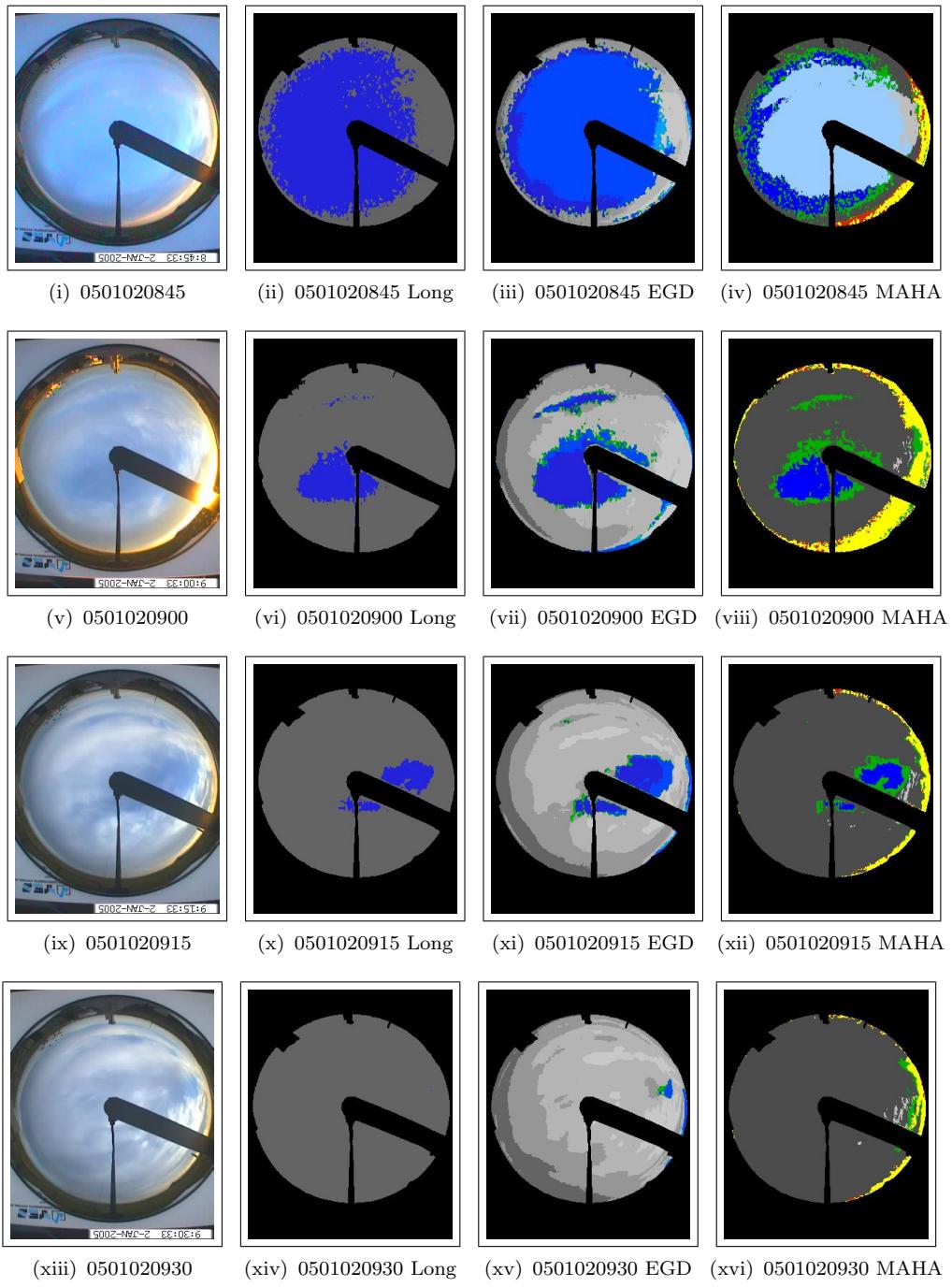


Figure A.14 - Sky images generated from 0501020845 to 0501020930.

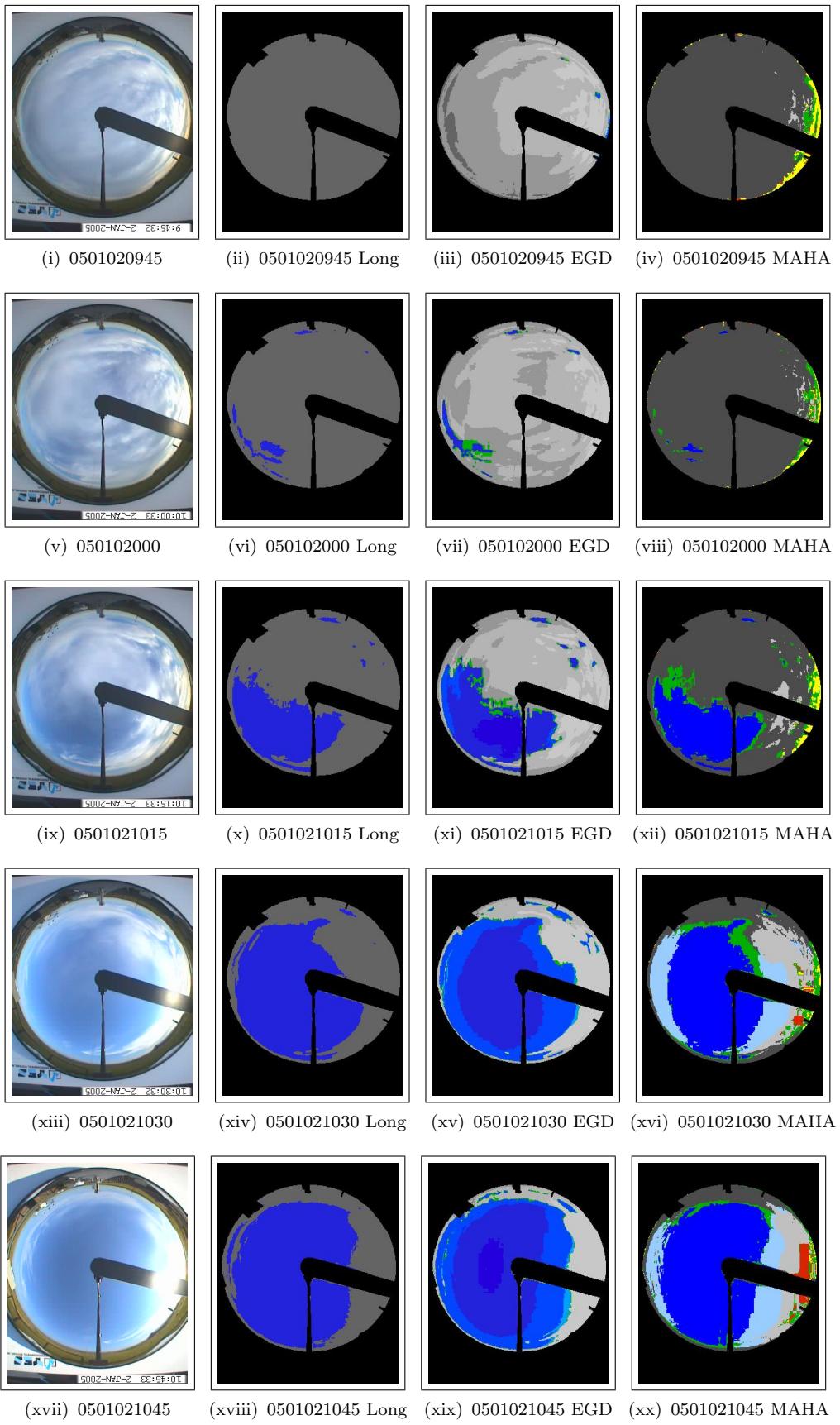


Figure A.15 - Sky images generated from 0501020945 to 0501021045.

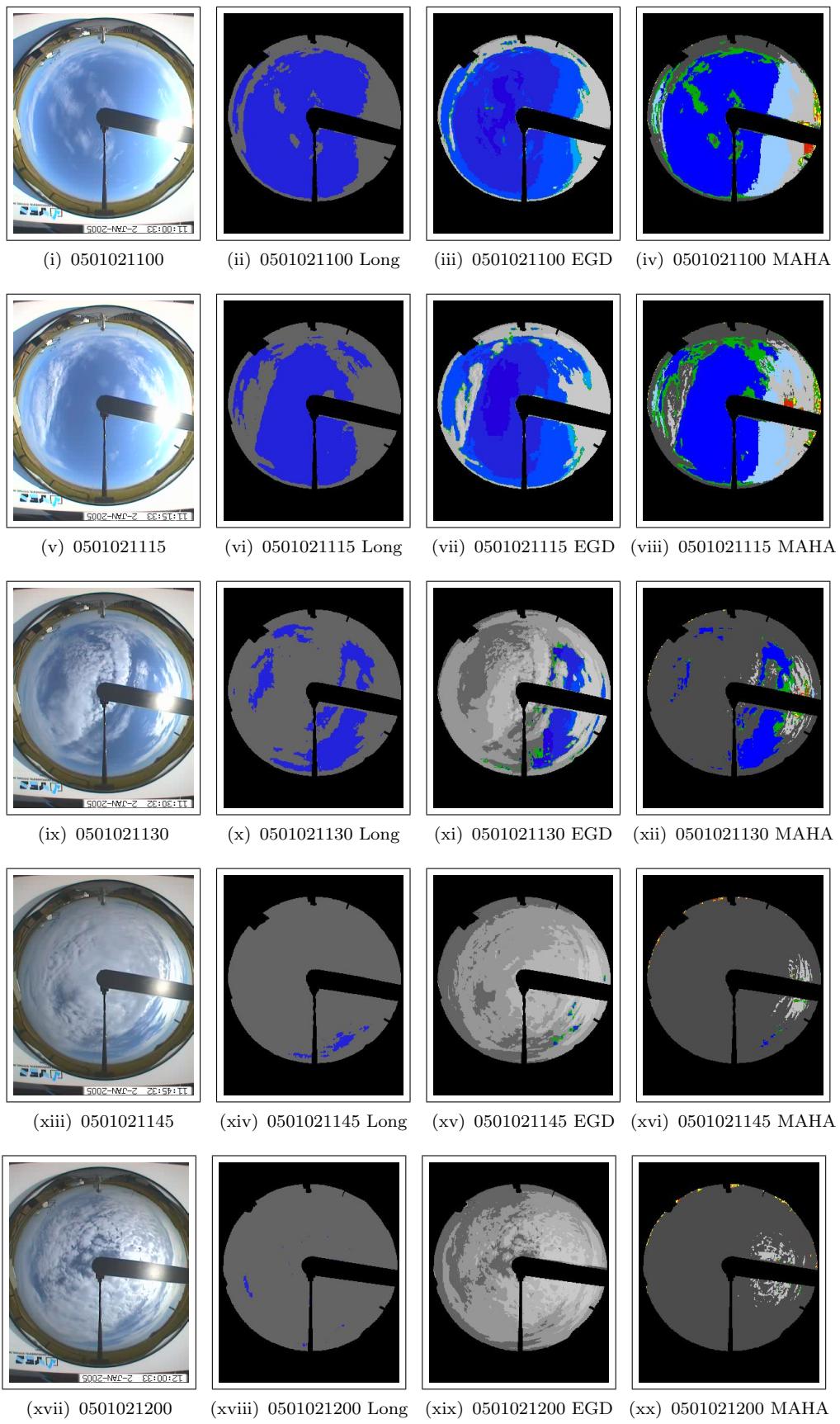


Figure A.16 - Sky images generated from 050102100 to 0501021200.

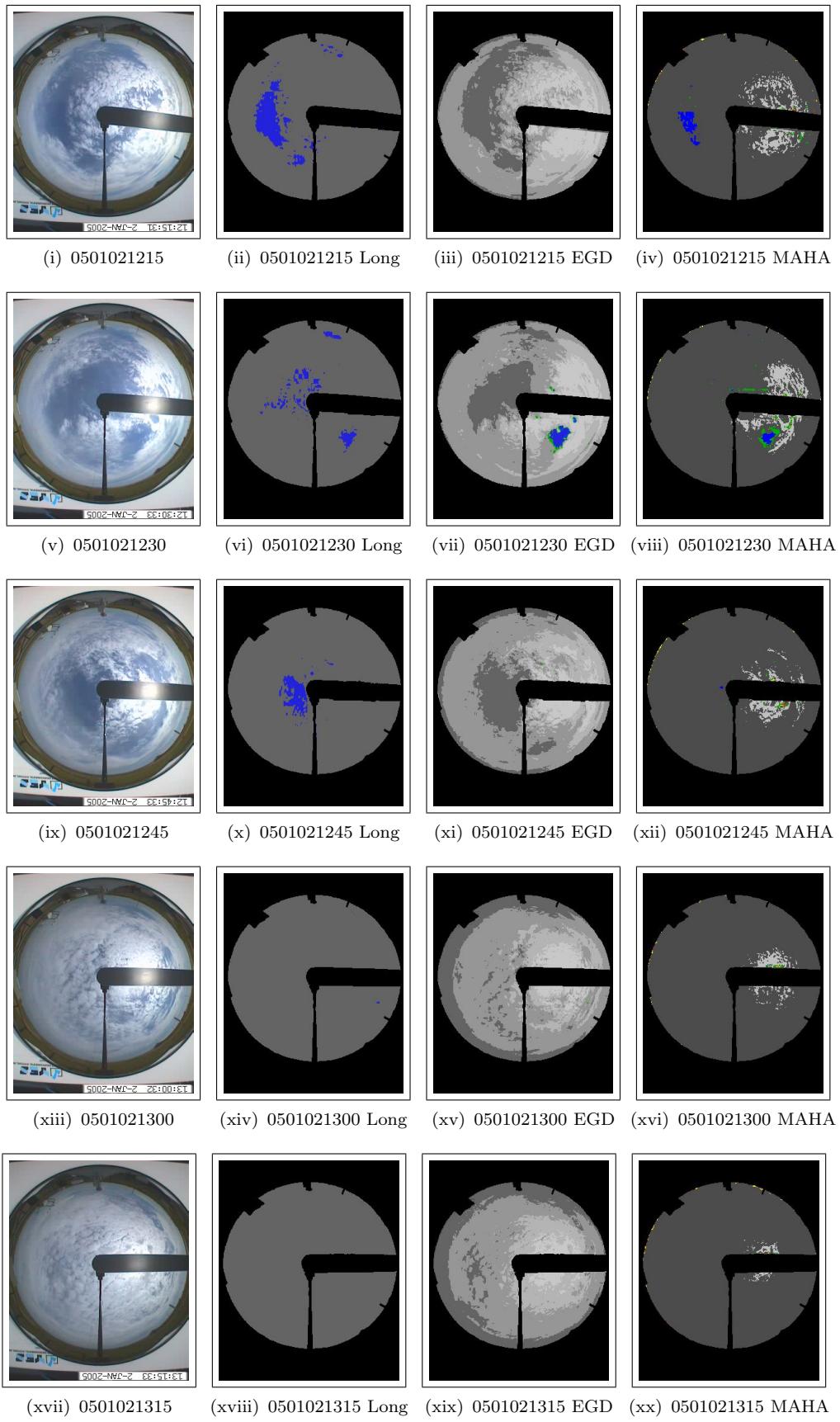


Figure A.17 - Sky images generated from 0501021215 to 0501021315.

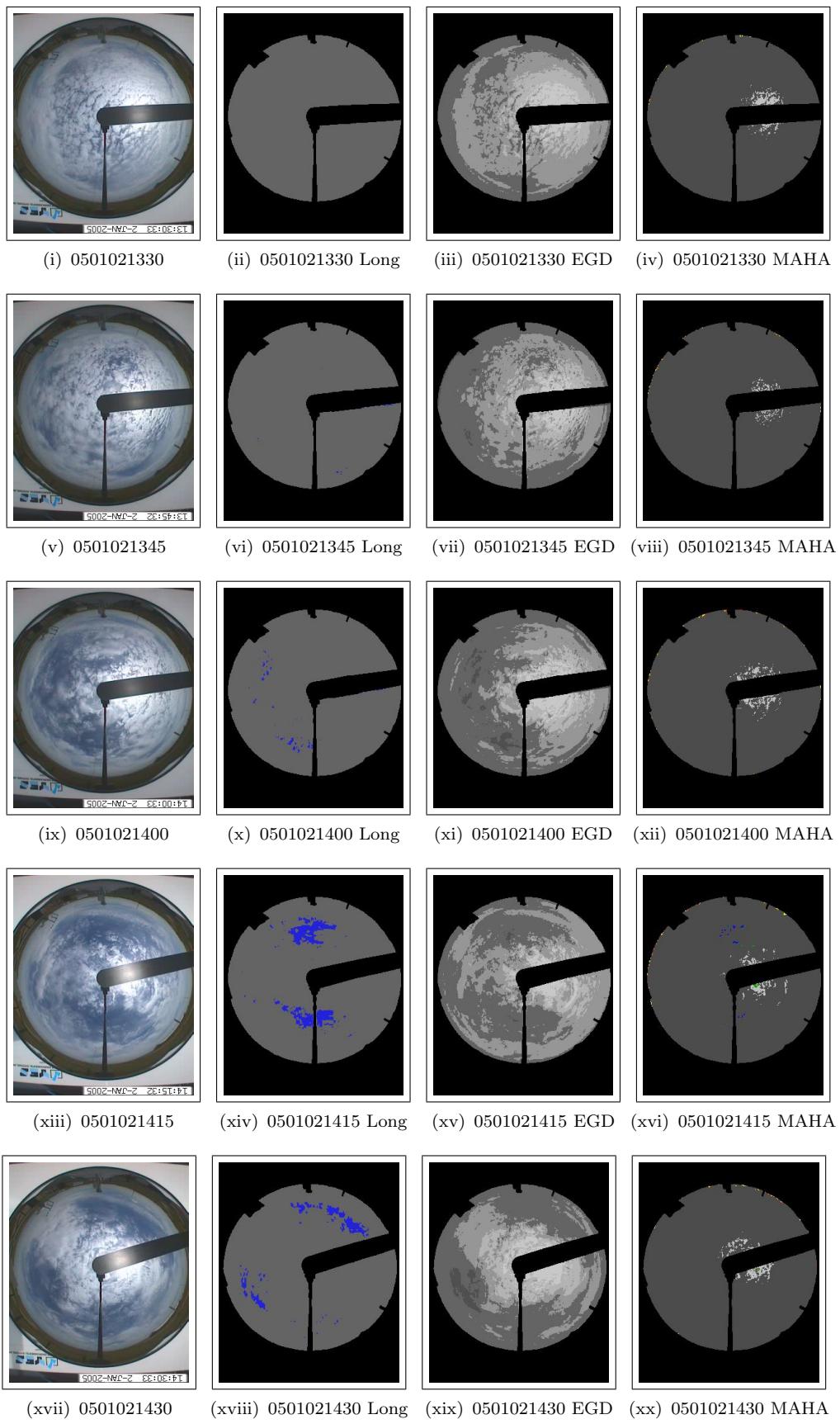


Figure A.18 - Sky images generated from 0501021330 to 0501021430.

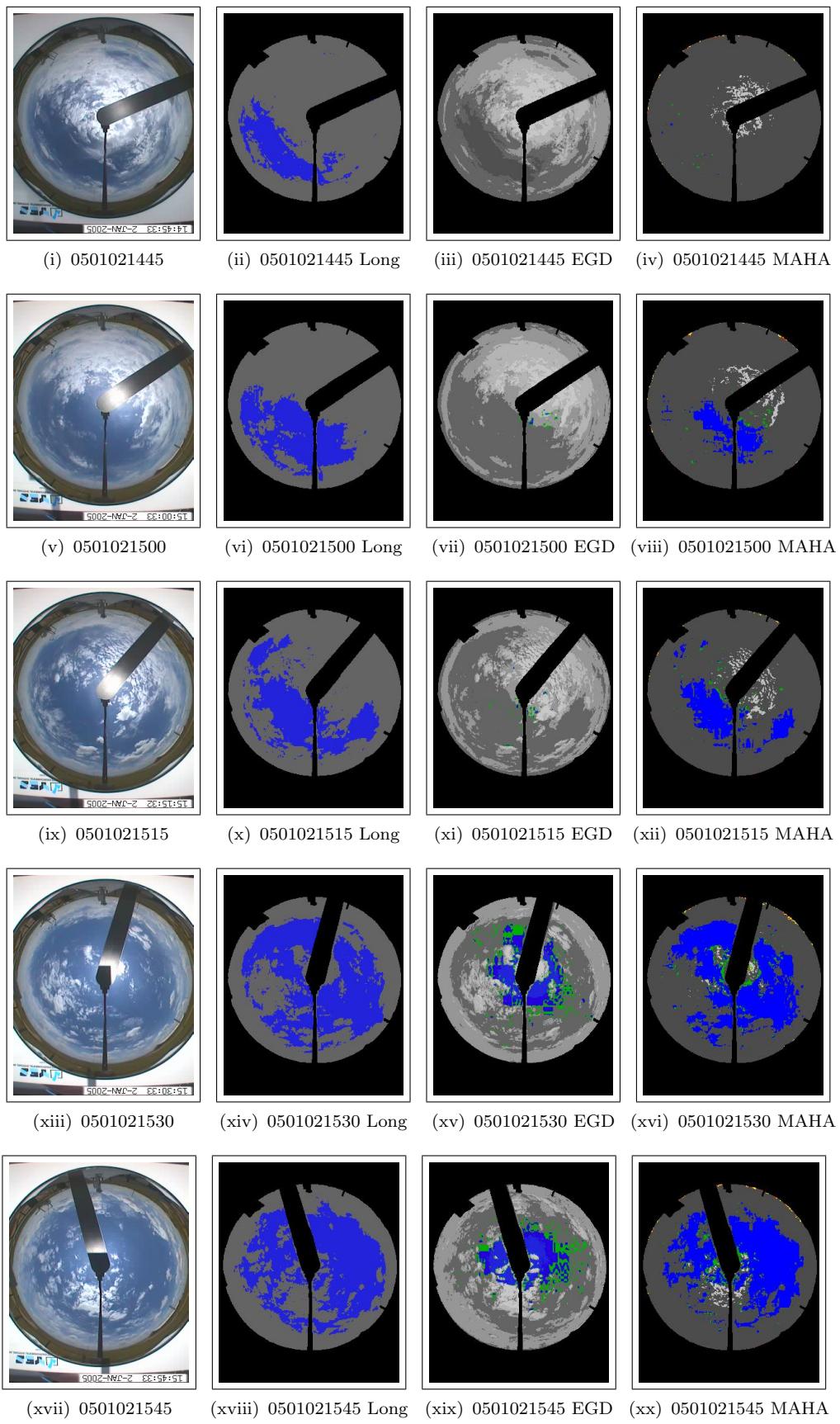


Figure A.19 - Sky images generated from 0501021445 to 0501021545.

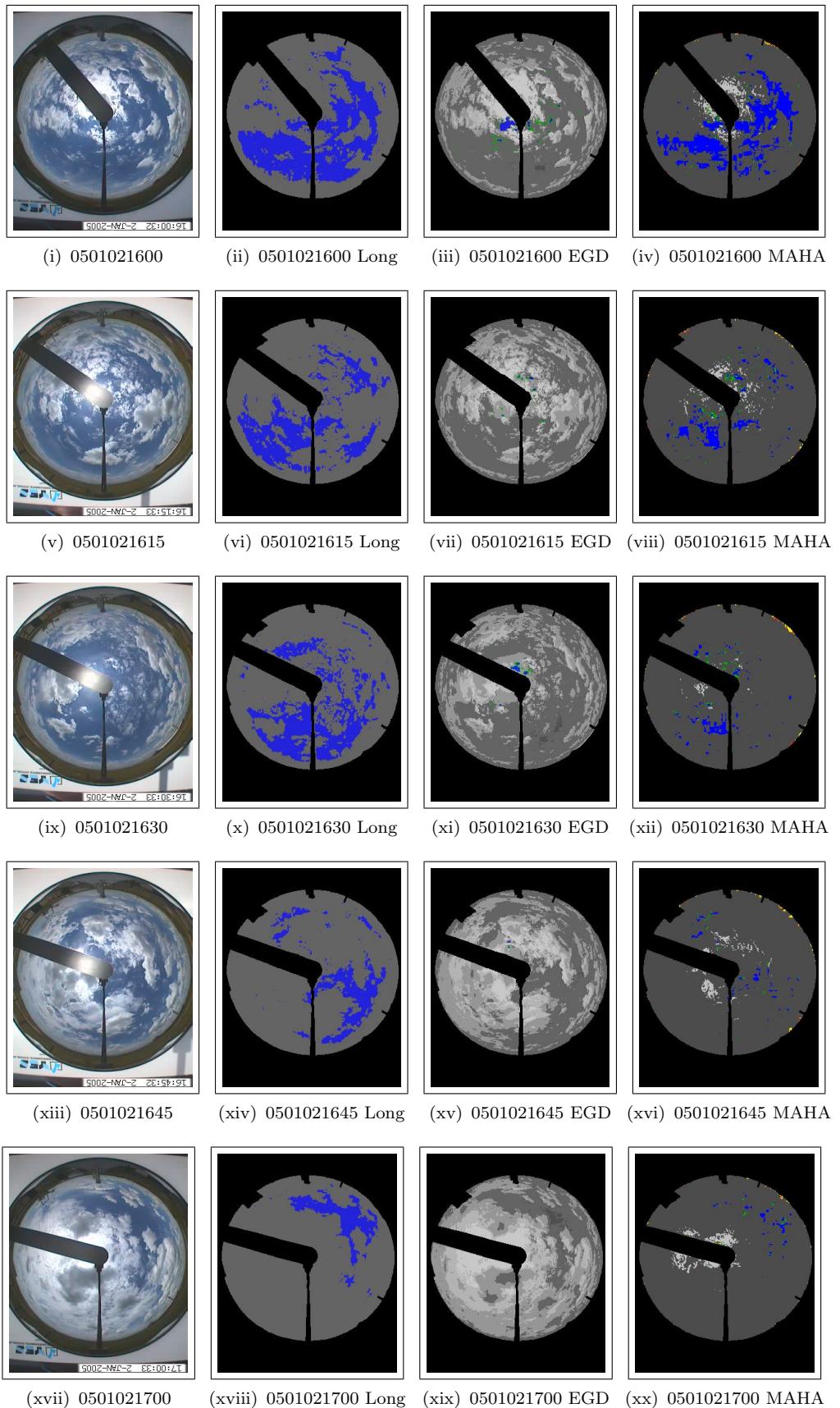


Figure A.20 - Sky images generated from 0501021600 to 0501021700.

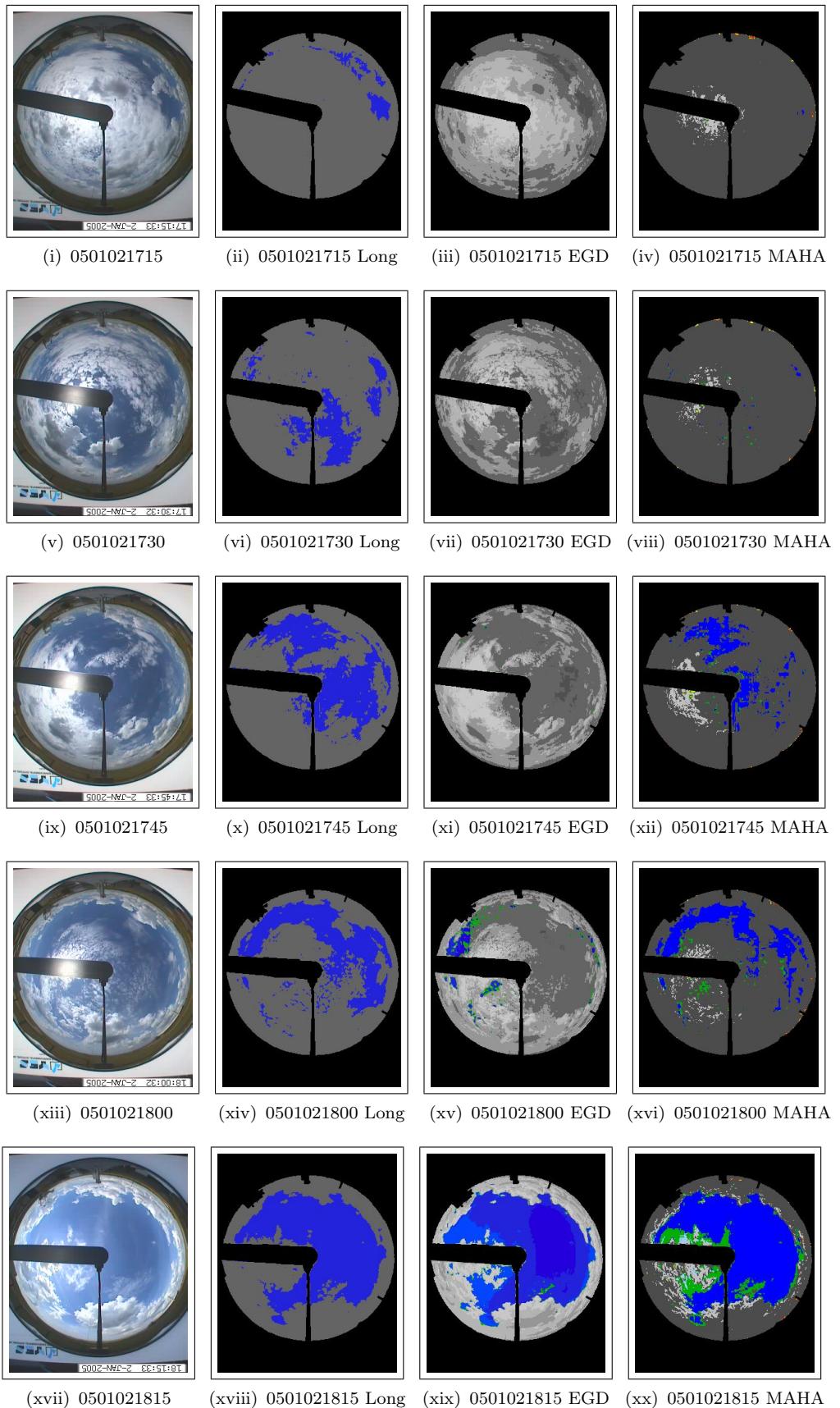


Figure A.21 - Sky images generated from 0501021715 to 0501021815.

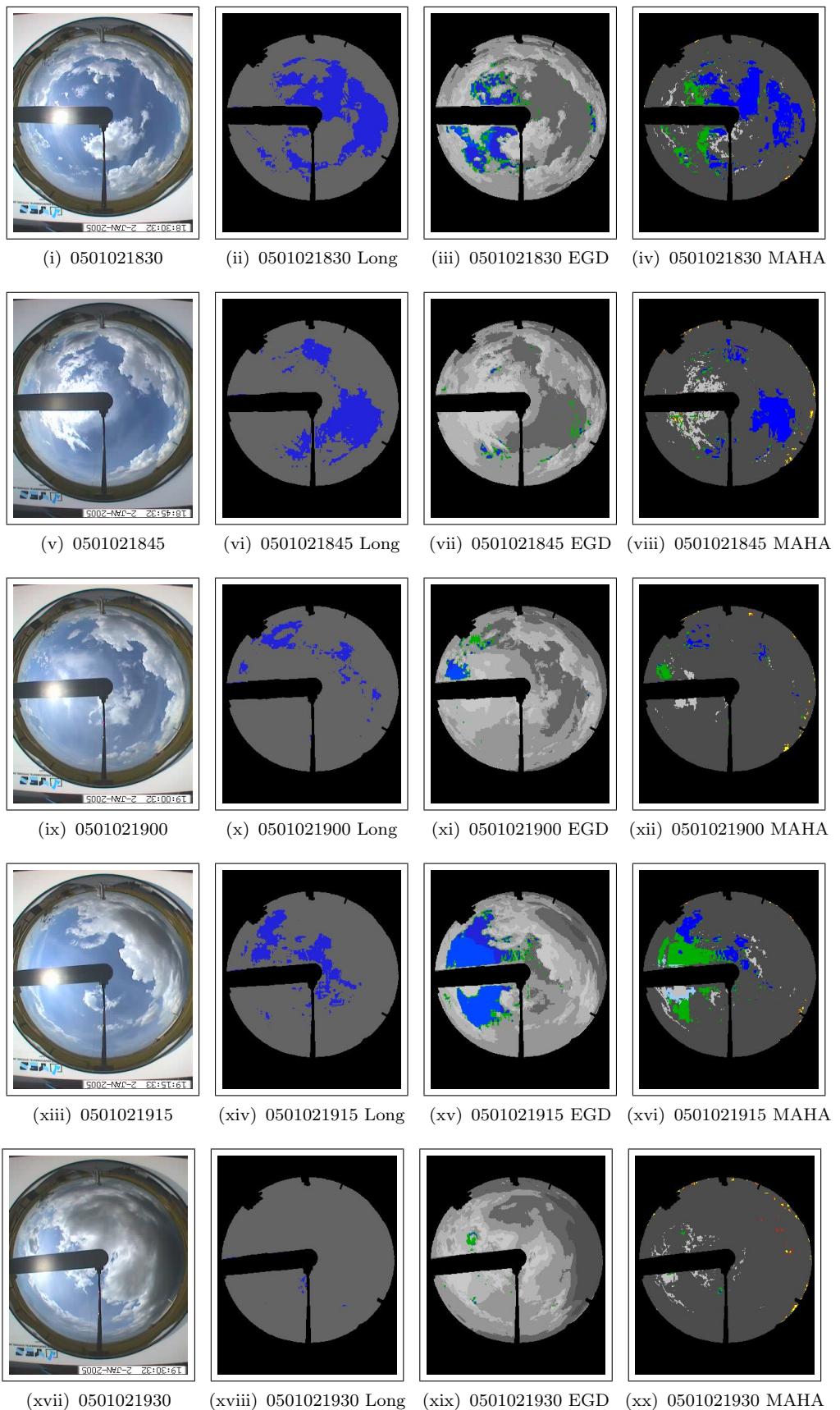


Figure A.22 - Sky images generated from 0501021830 to 0501021930.

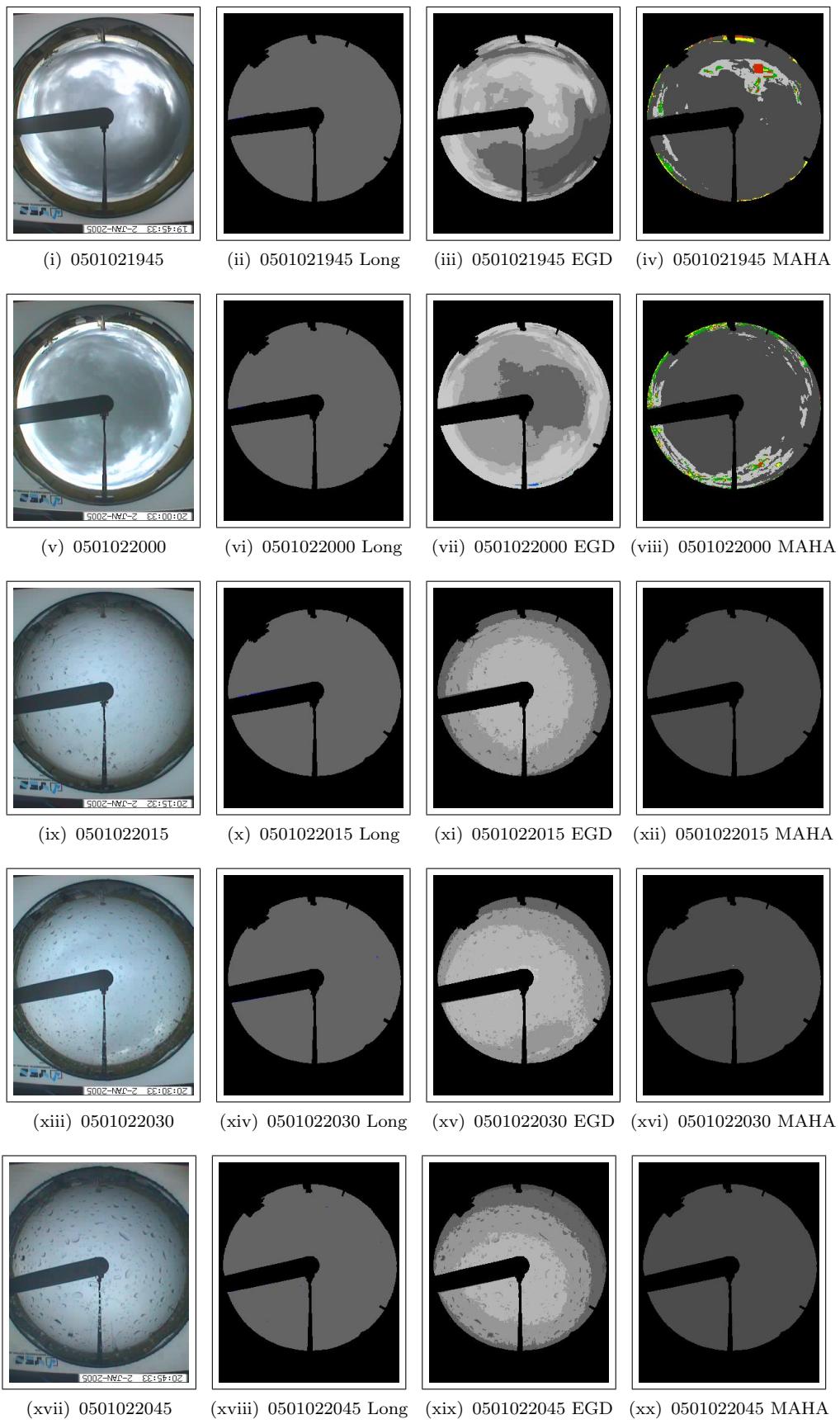


Figure A.23 - Sky images generated from 0501021945 to 0501022045.

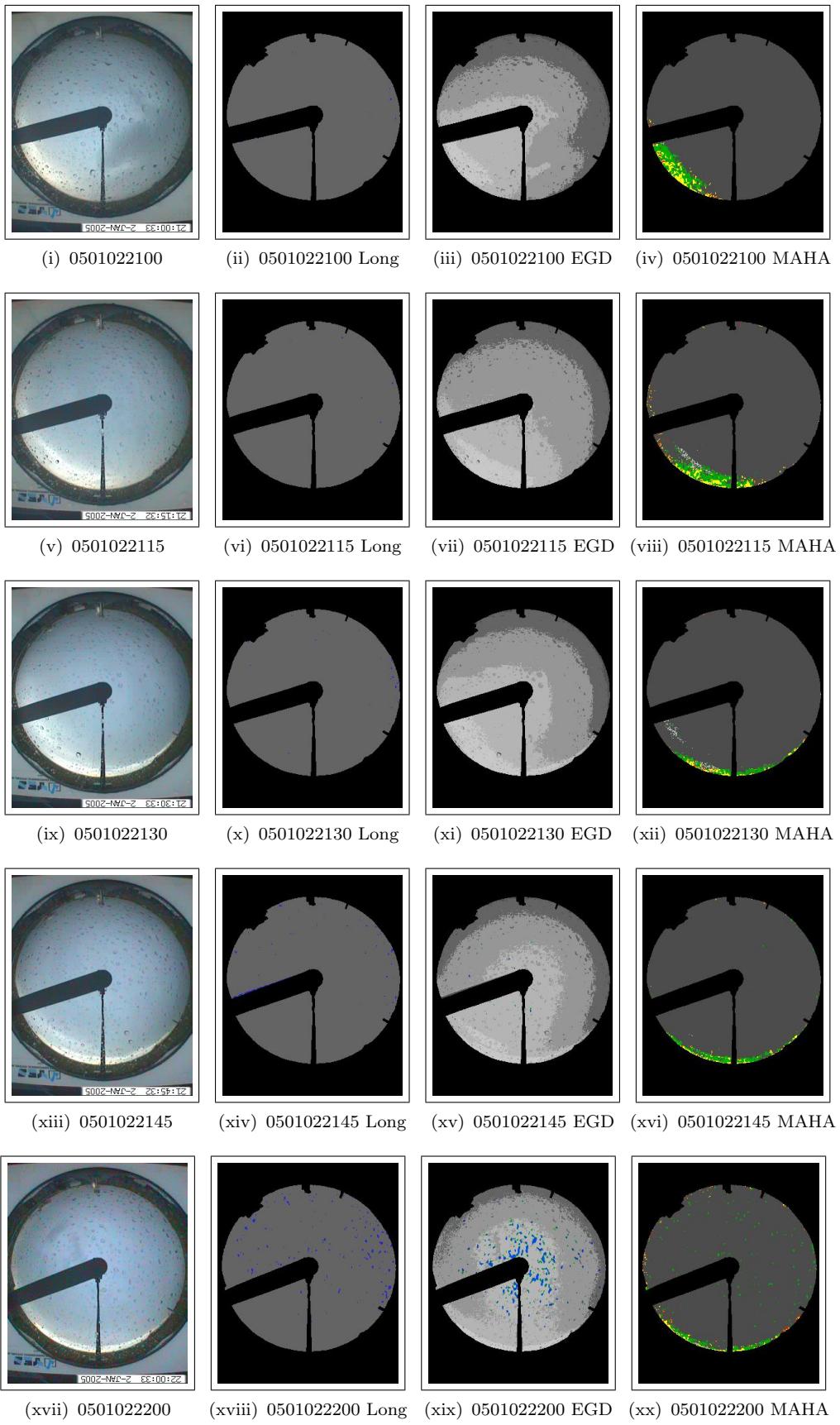


Figure A.24 - Sky images generated from 0501022100 to 0501022200.

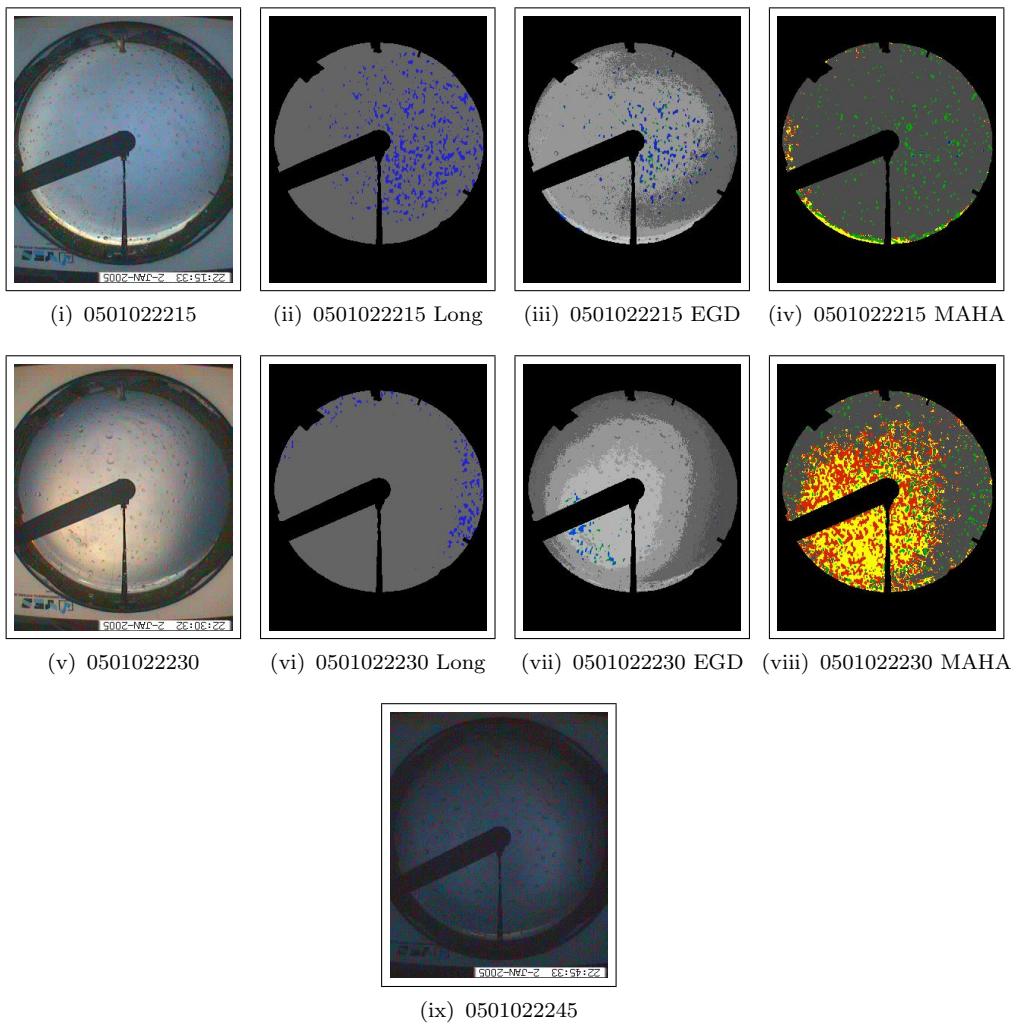


Figure A.25 - Sky images generated from 0501022215 to 0501022245.

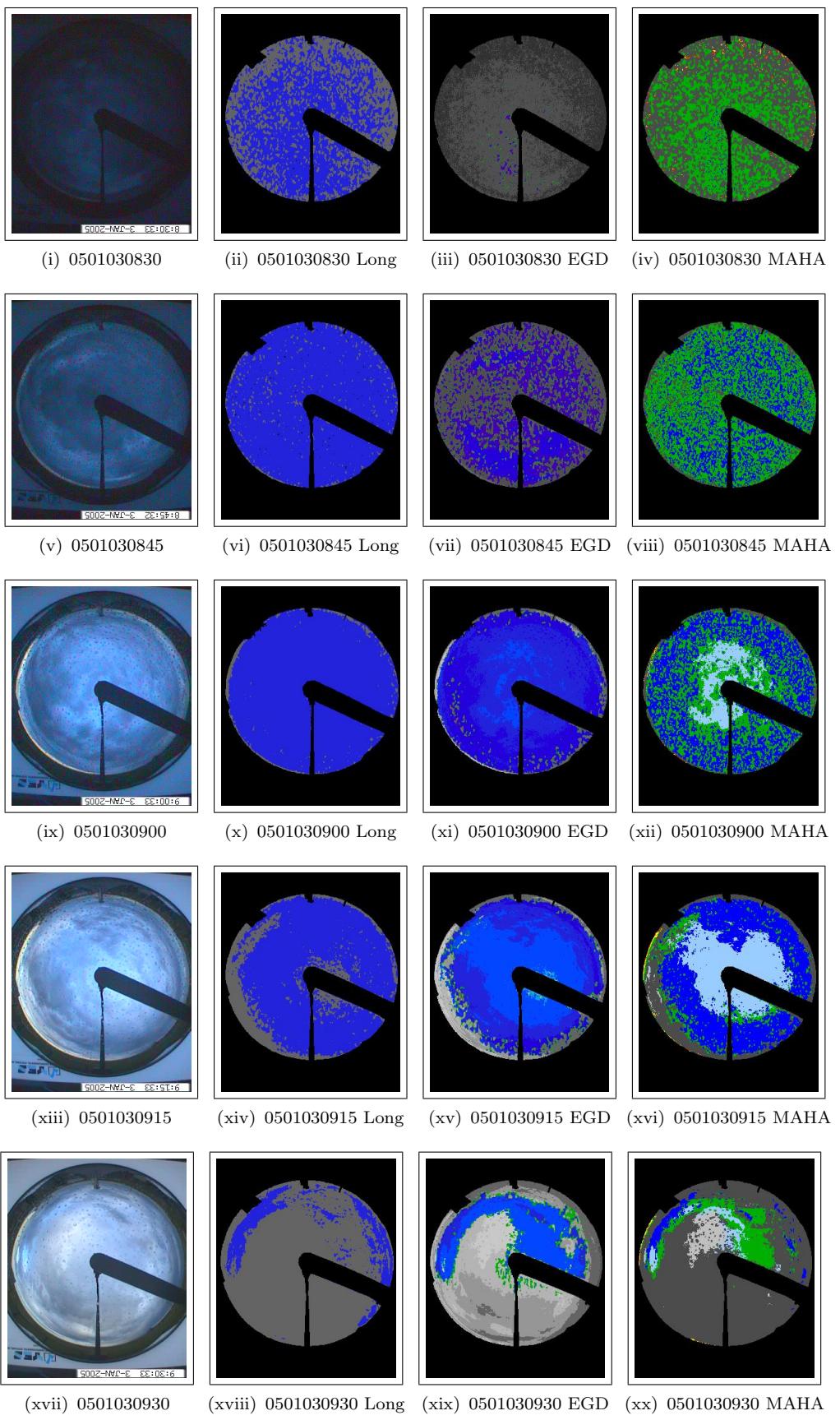


Figure A.26 - Sky images generated from 0501030830 to 0501030930.

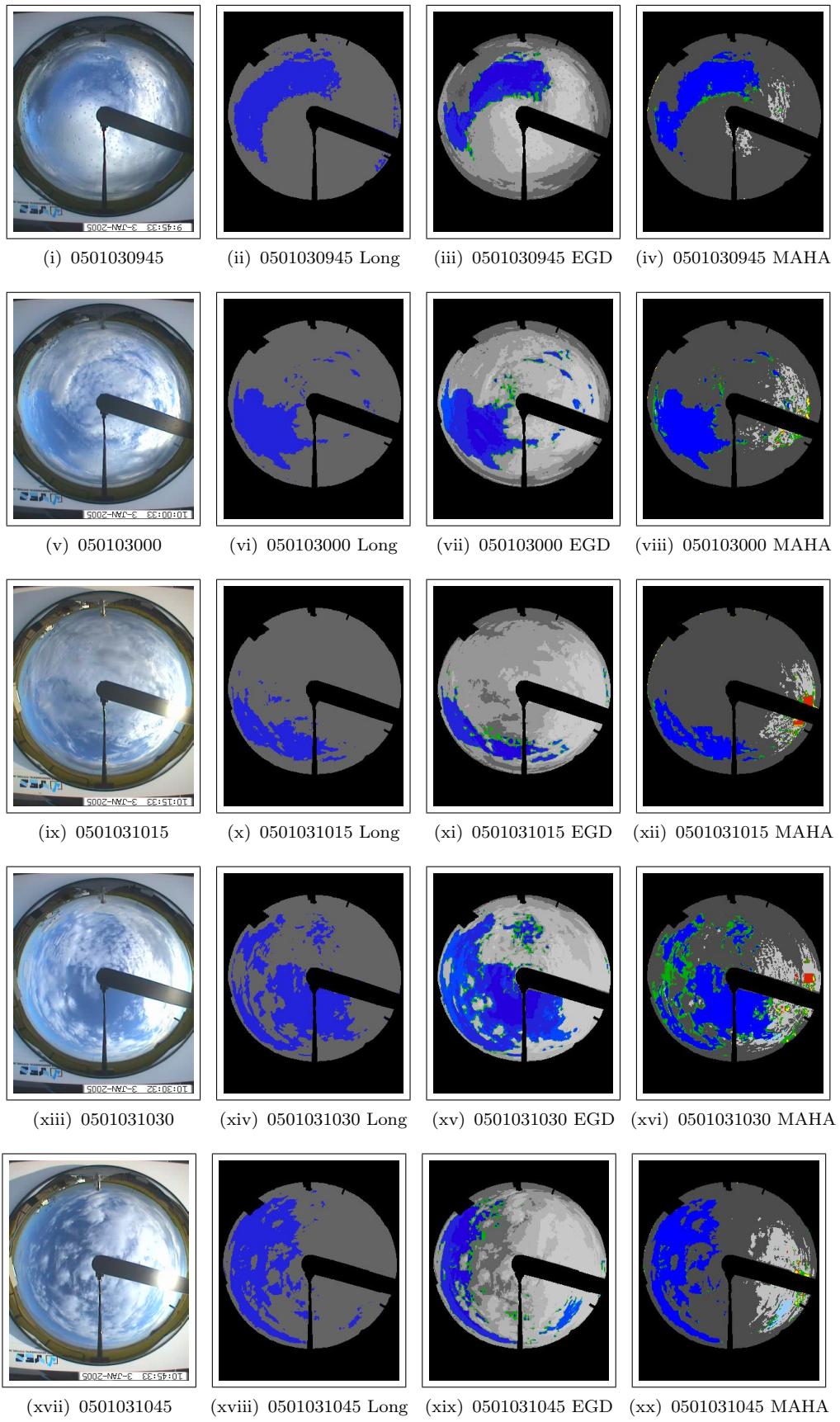


Figure A.27 - Sky images generated from 0501030945 to 0501031045.

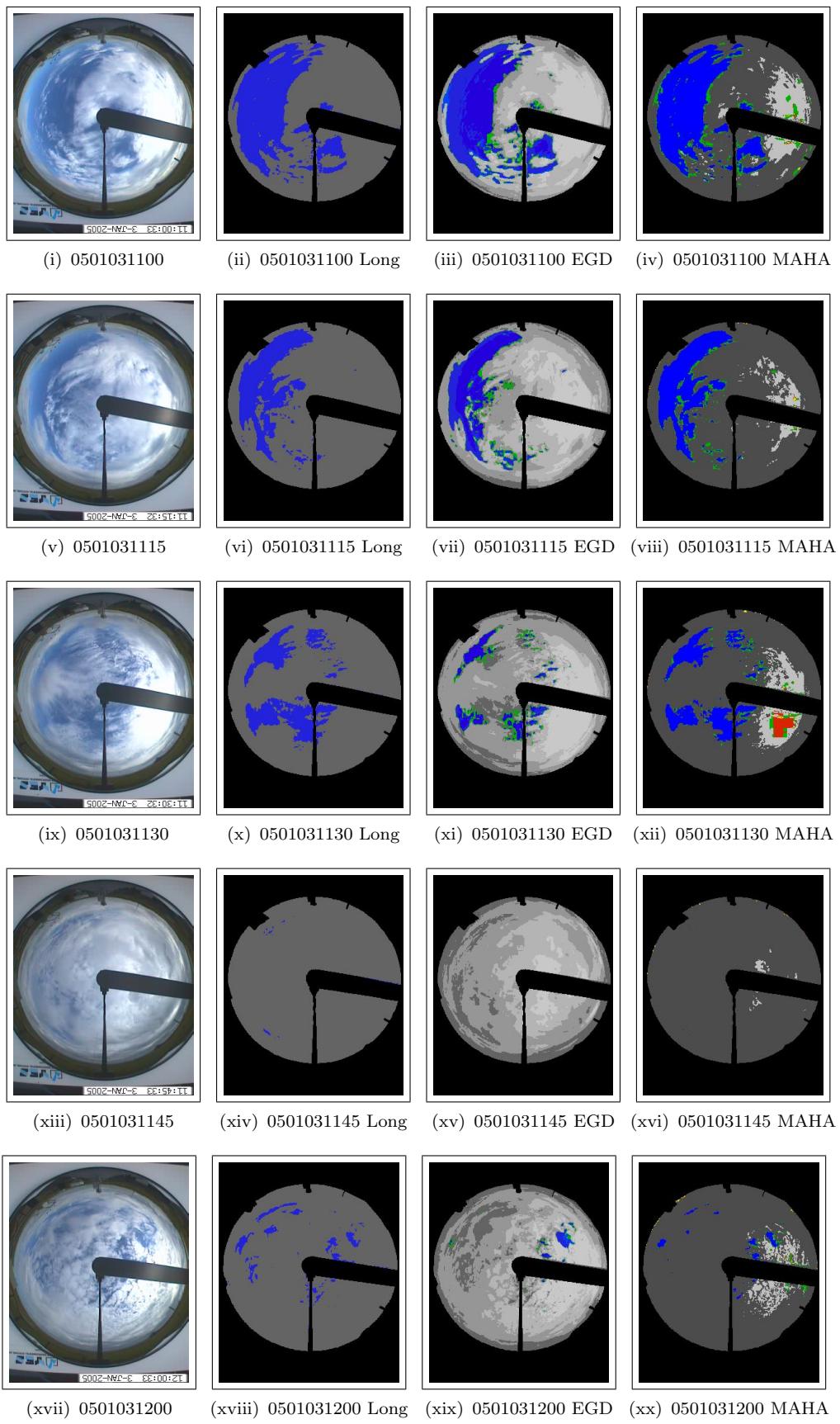


Figure A.28 - Sky images generated from 050103100 to 0501031200.

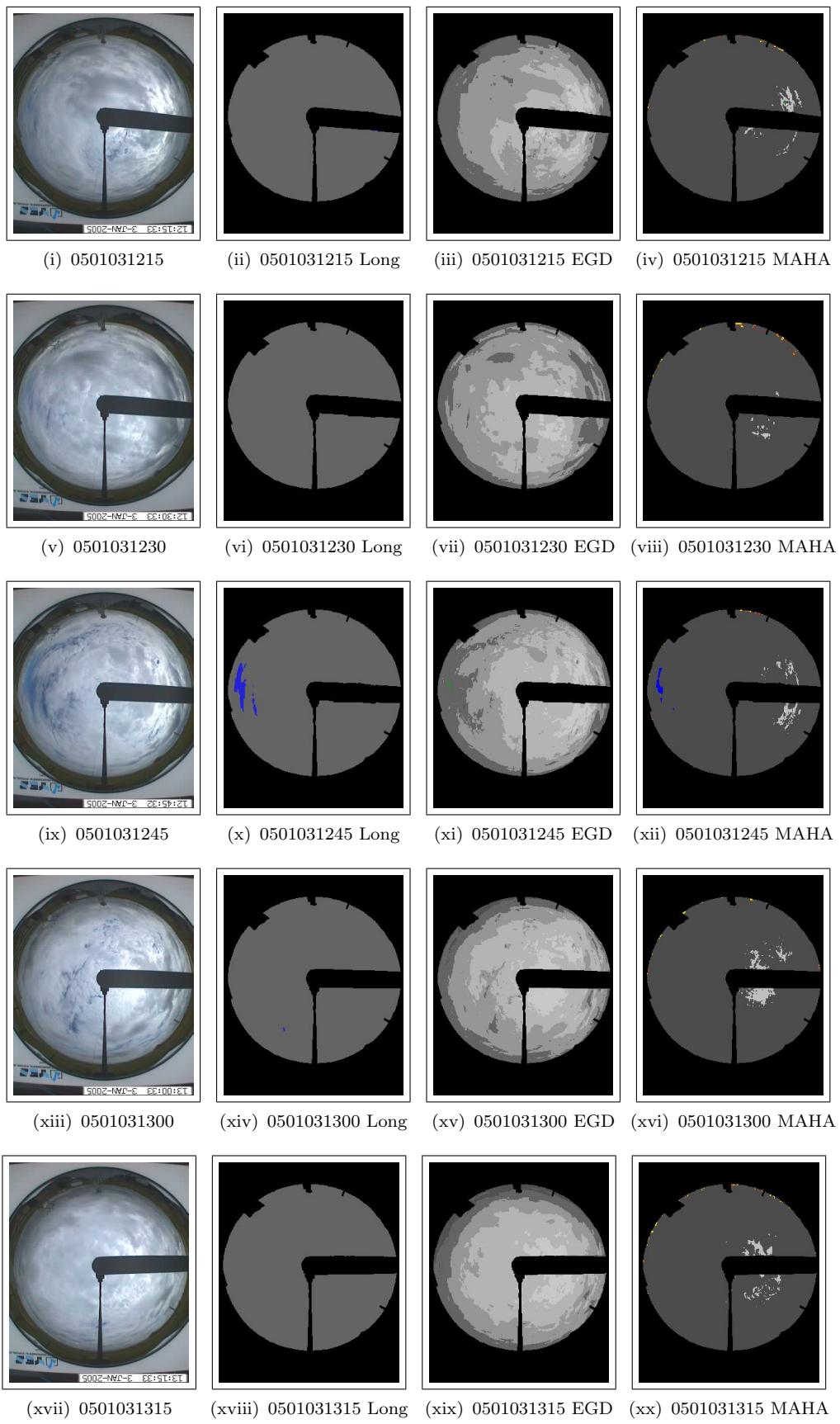


Figure A.29 - Sky images generated from 0501031215 to 0501031315.

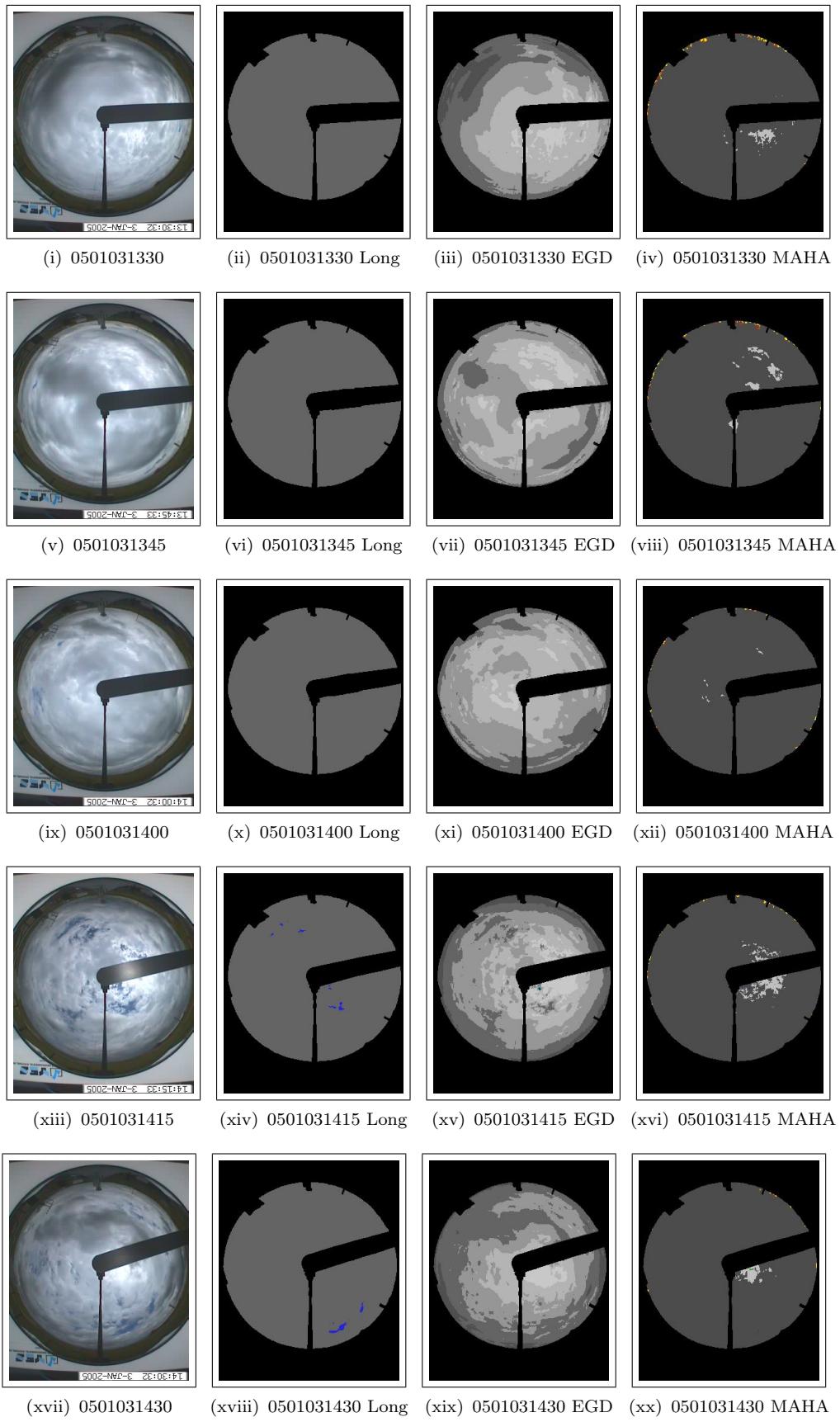


Figure A.30 - Sky images generated from 0501031330 to 0501031430.

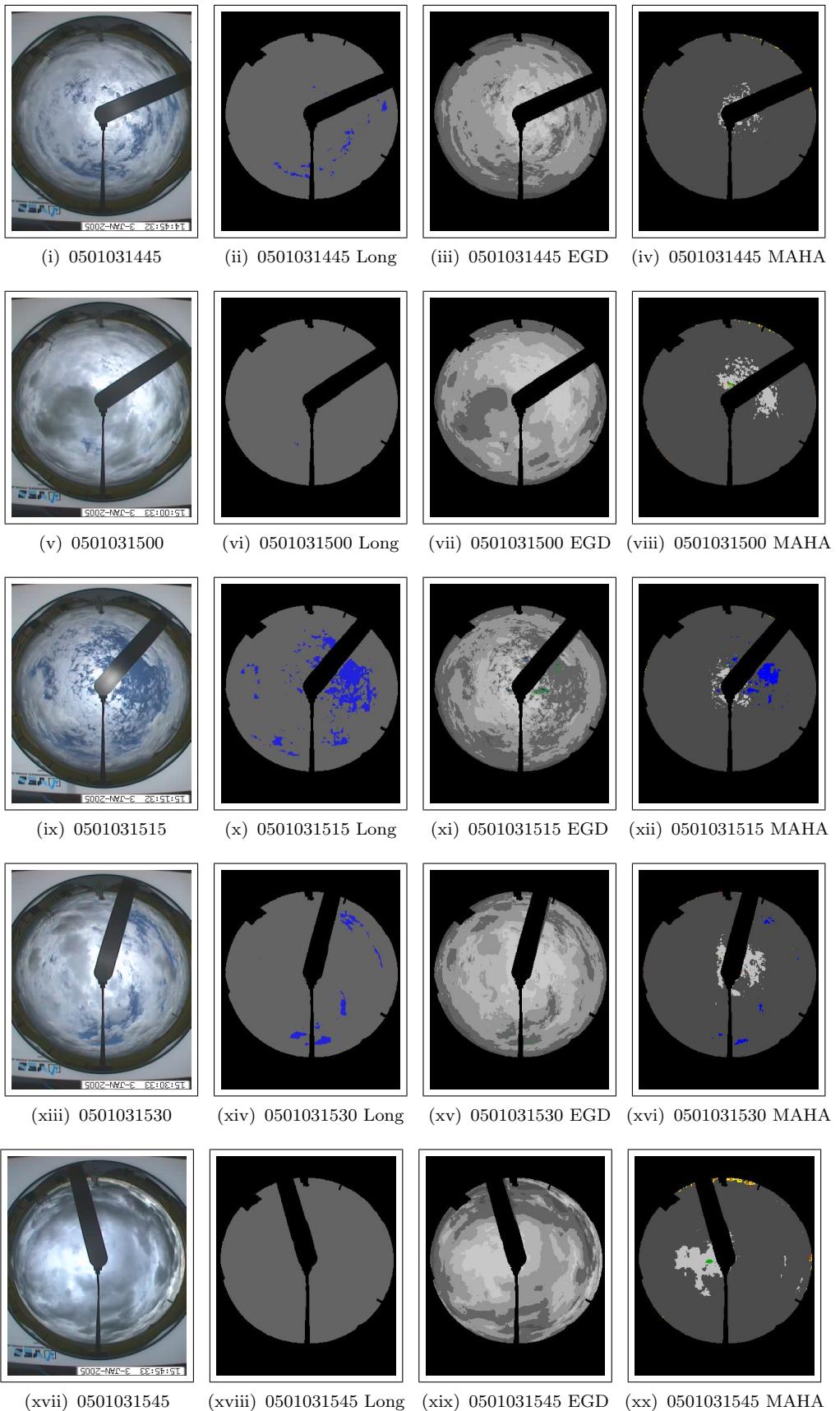


Figure A.31 - Sky images generated from 0501031445 to 0501031545.

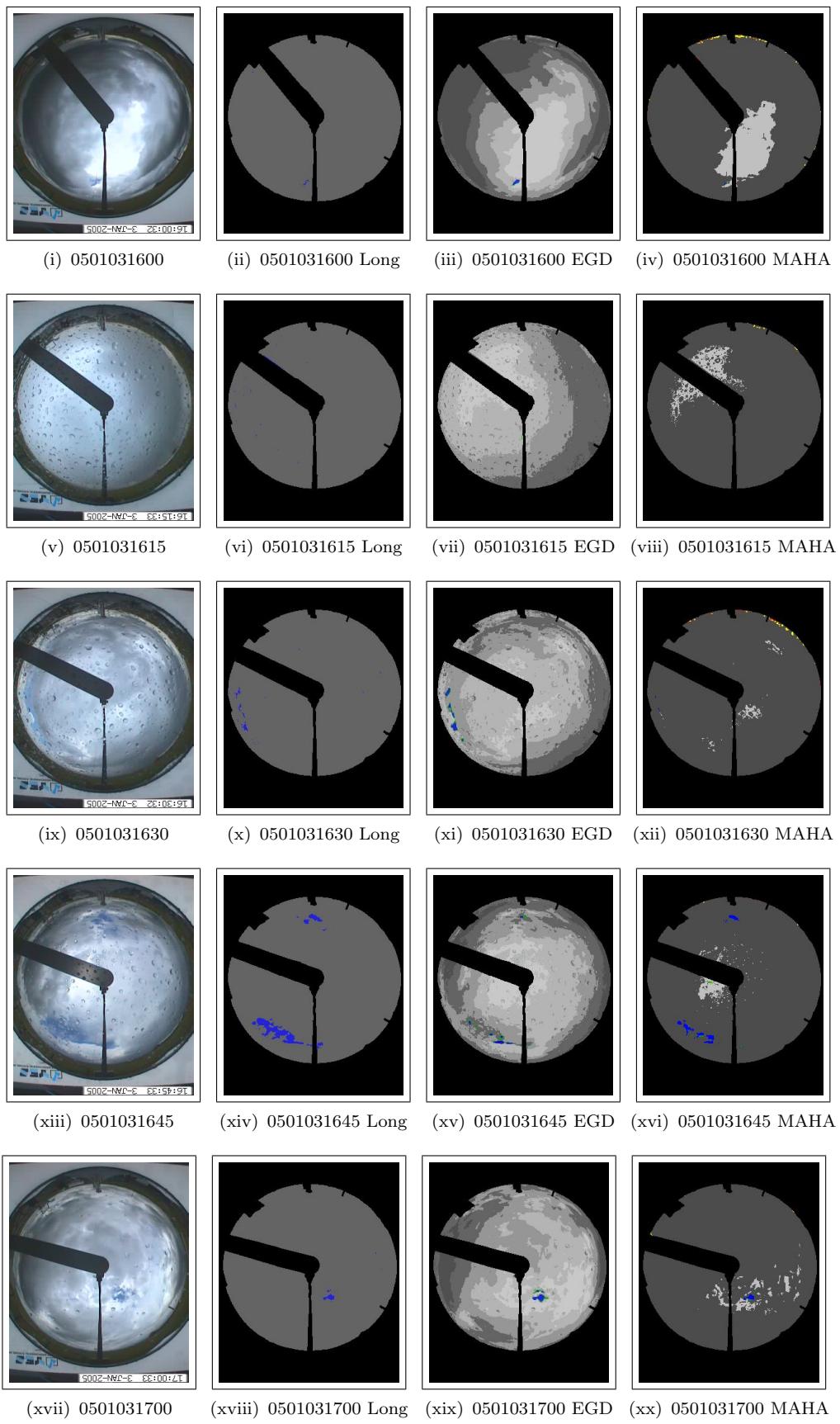


Figure A.32 - Sky images generated from 0501031600 to 0501031700.

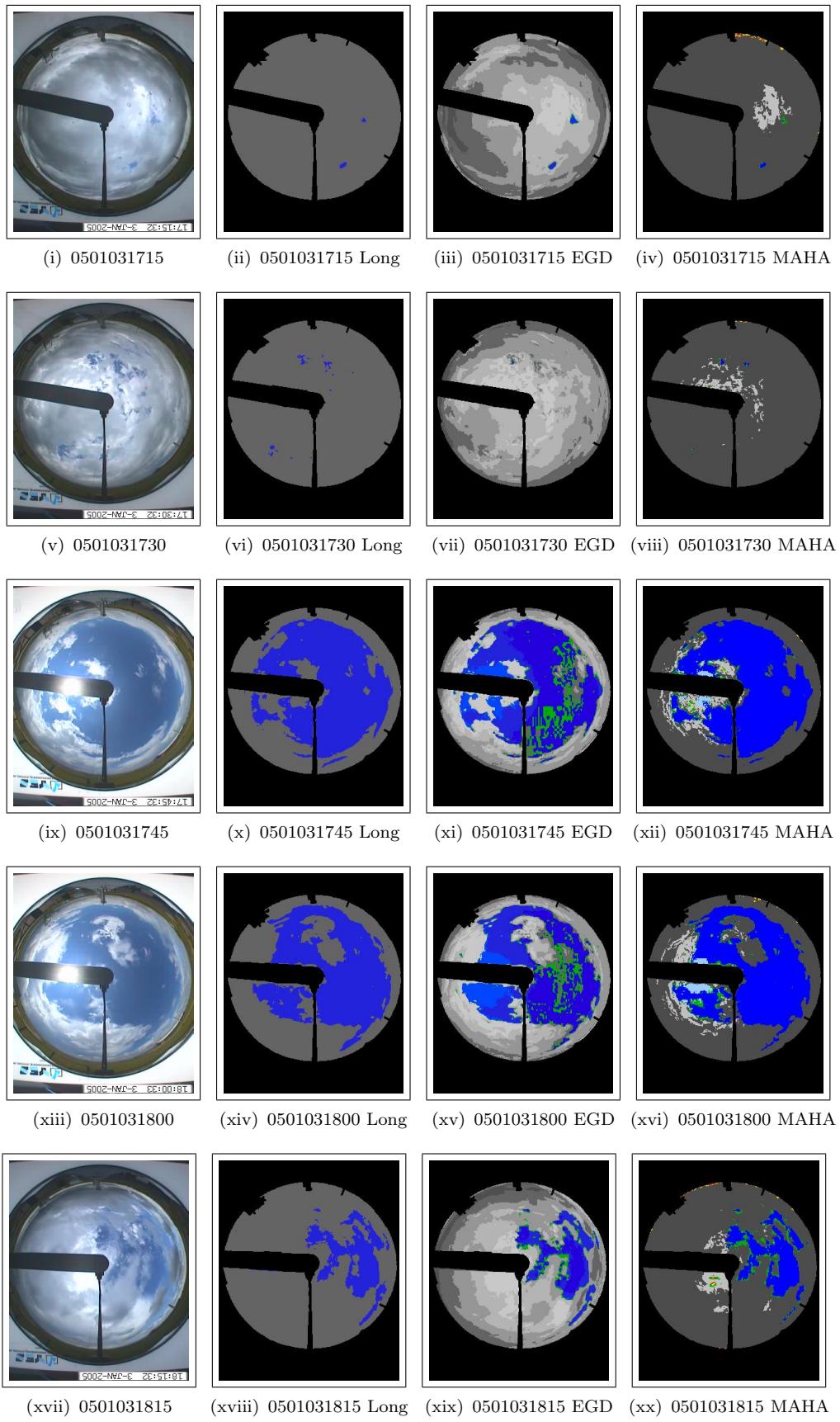


Figure A.33 - Sky images generated from 0501031715 to 0501031815.

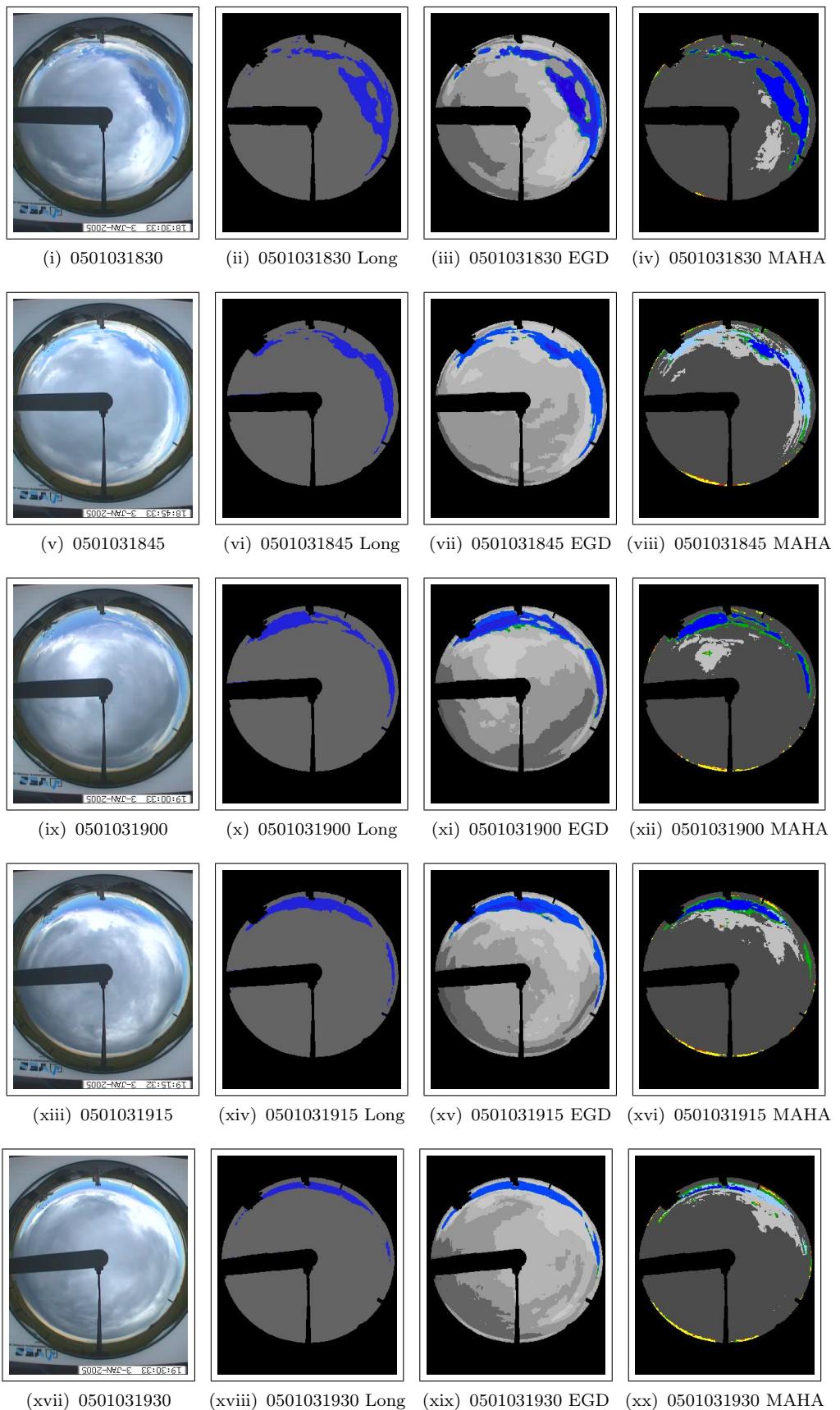


Figure A.34 - Sky images generated from 0501031830 to 0501031930.

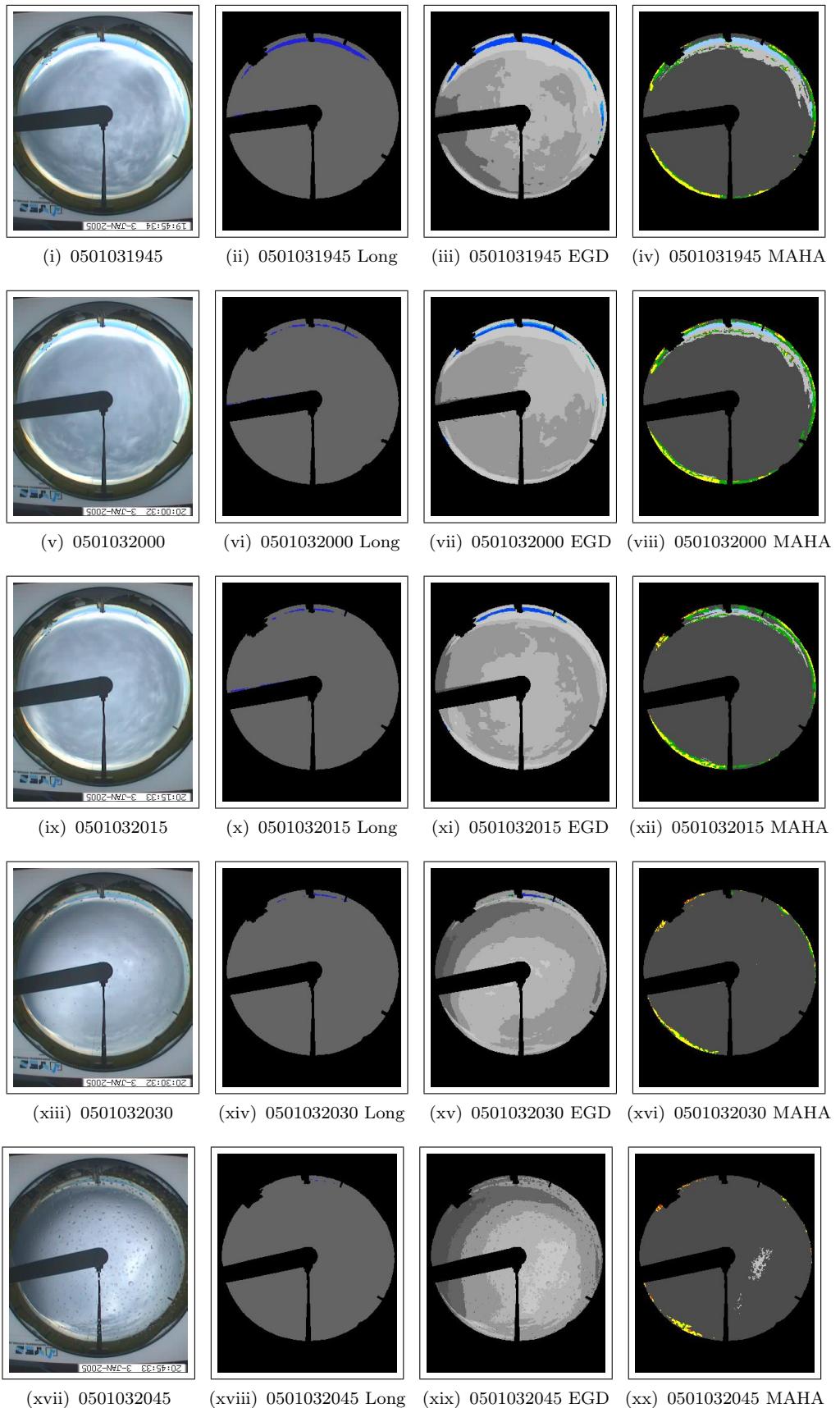


Figure A.35 - Sky images generated from 0501031945 to 0501032045.

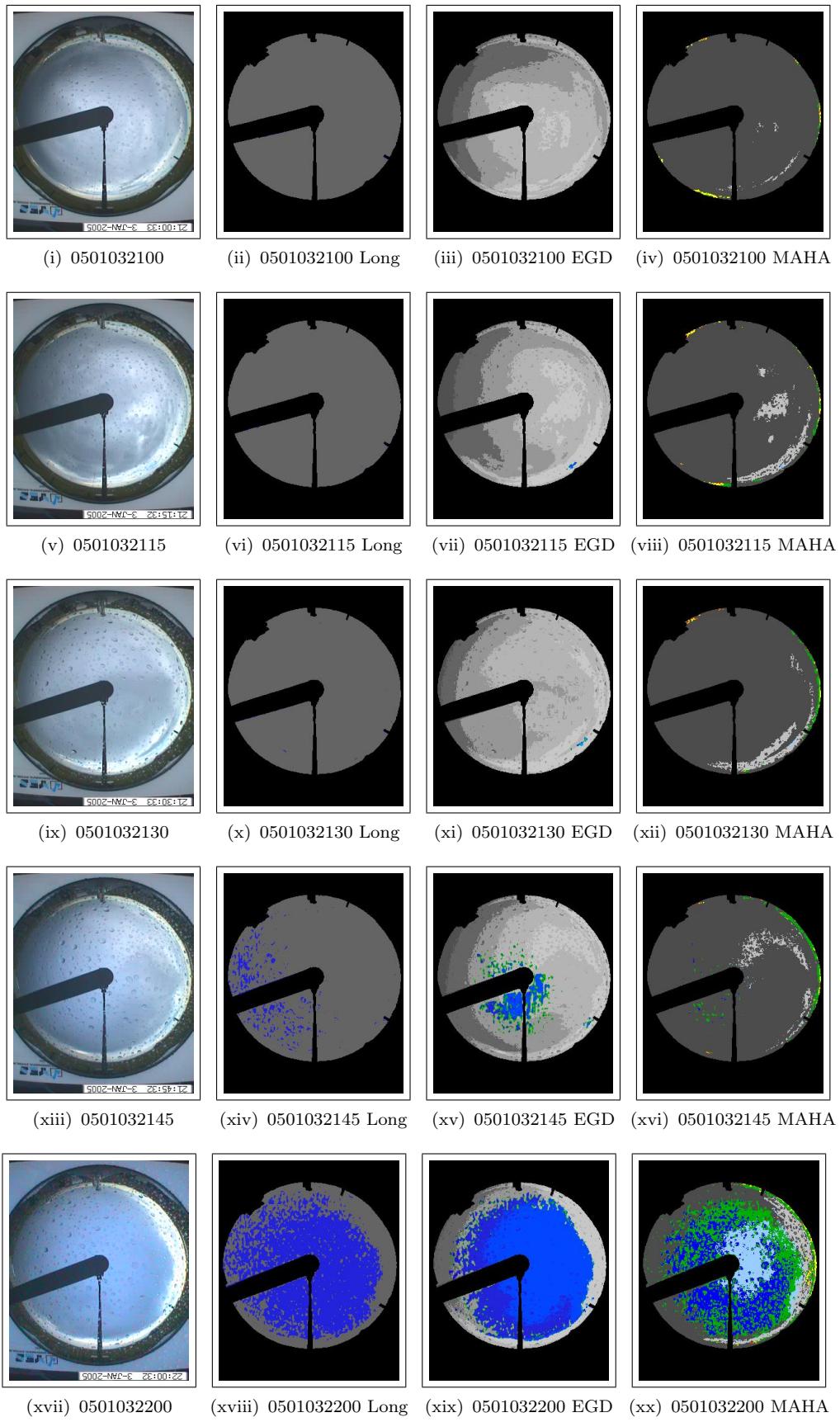


Figure A.36 - Sky images generated from 0501032100 to 0501032200.

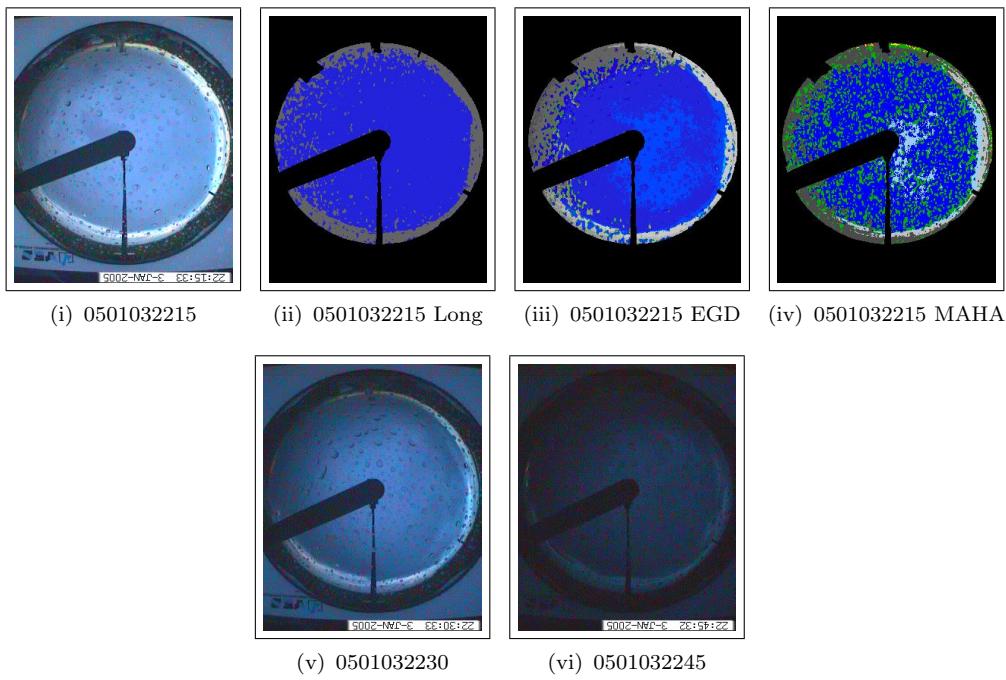


Figure A.37 - Sky images generated from 0501031600 to 0501032300.

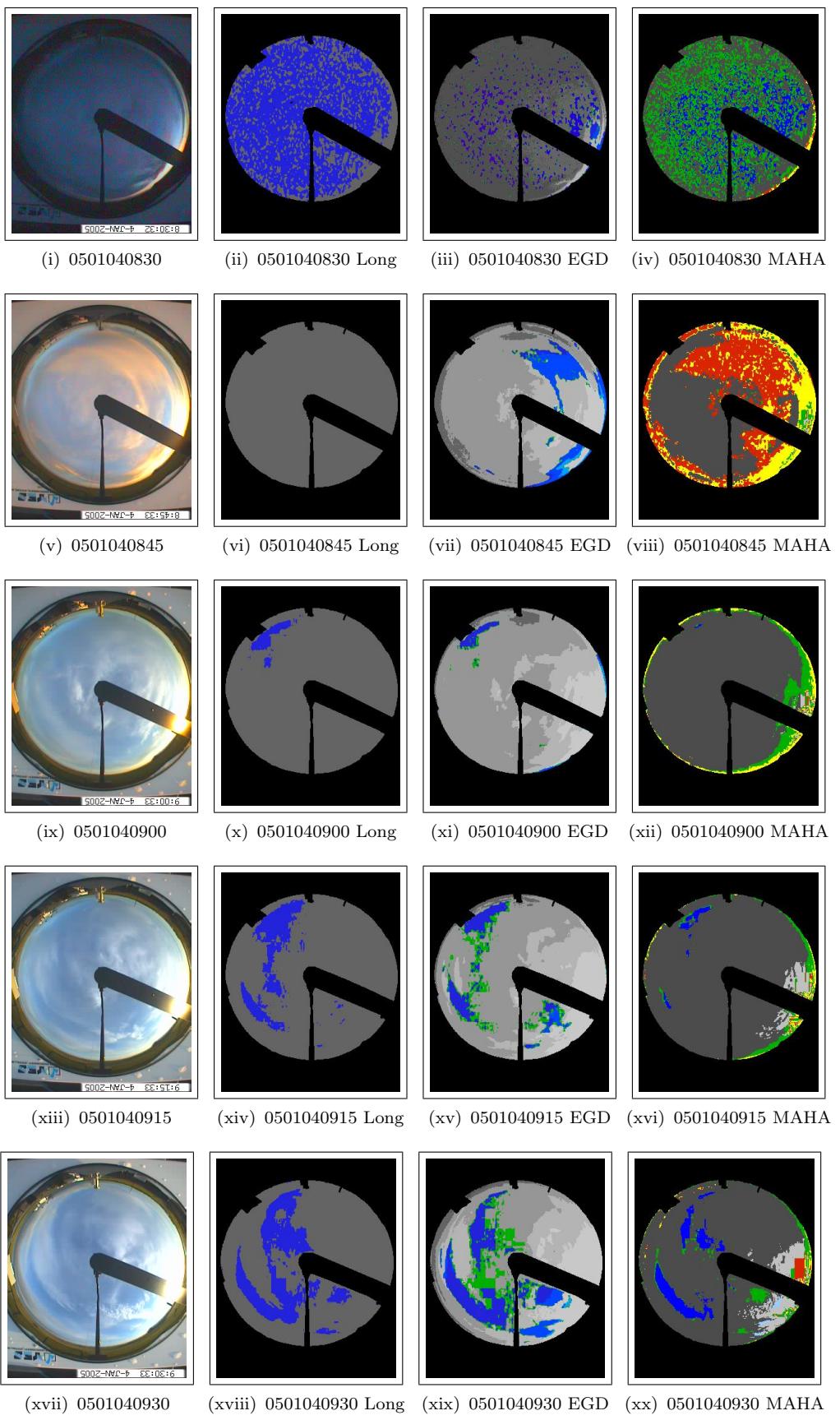


Figure A.38 - Sky images generated from 0501040830 to 0501040930.

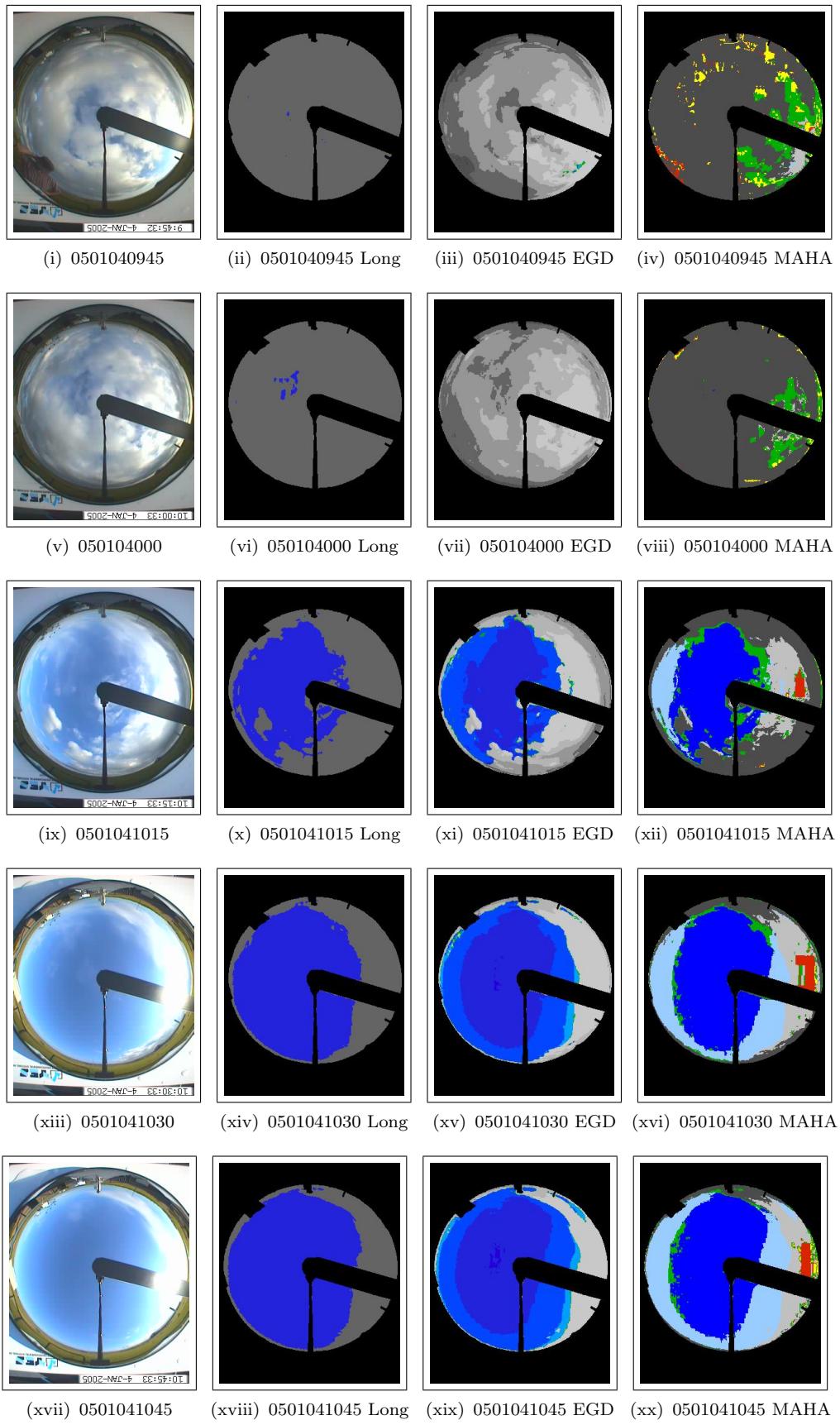


Figure A.39 - Sky images generated from 0501040945 to 0501041045.

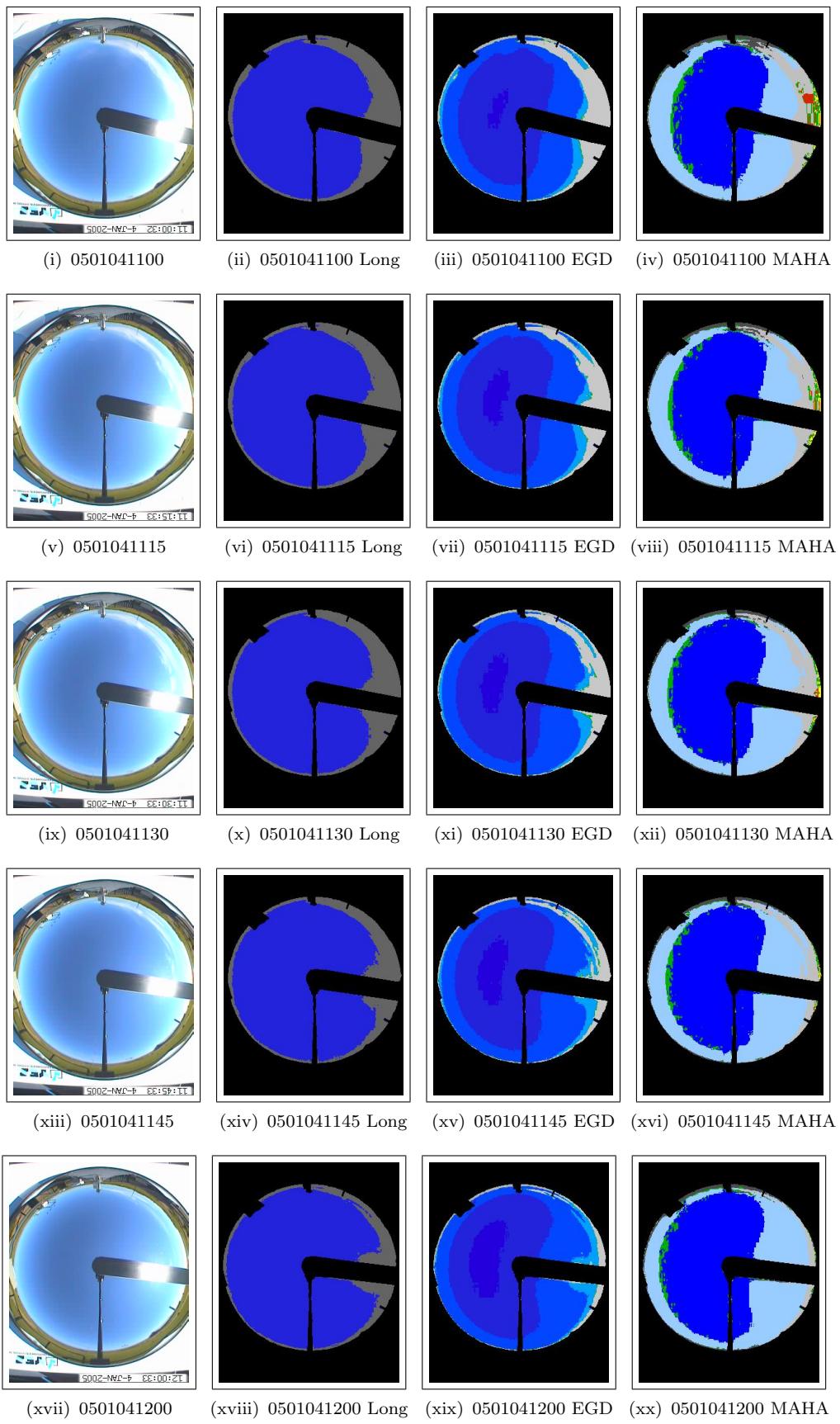


Figure A.40 - Sky images generated from 050104100 to 0501041200.

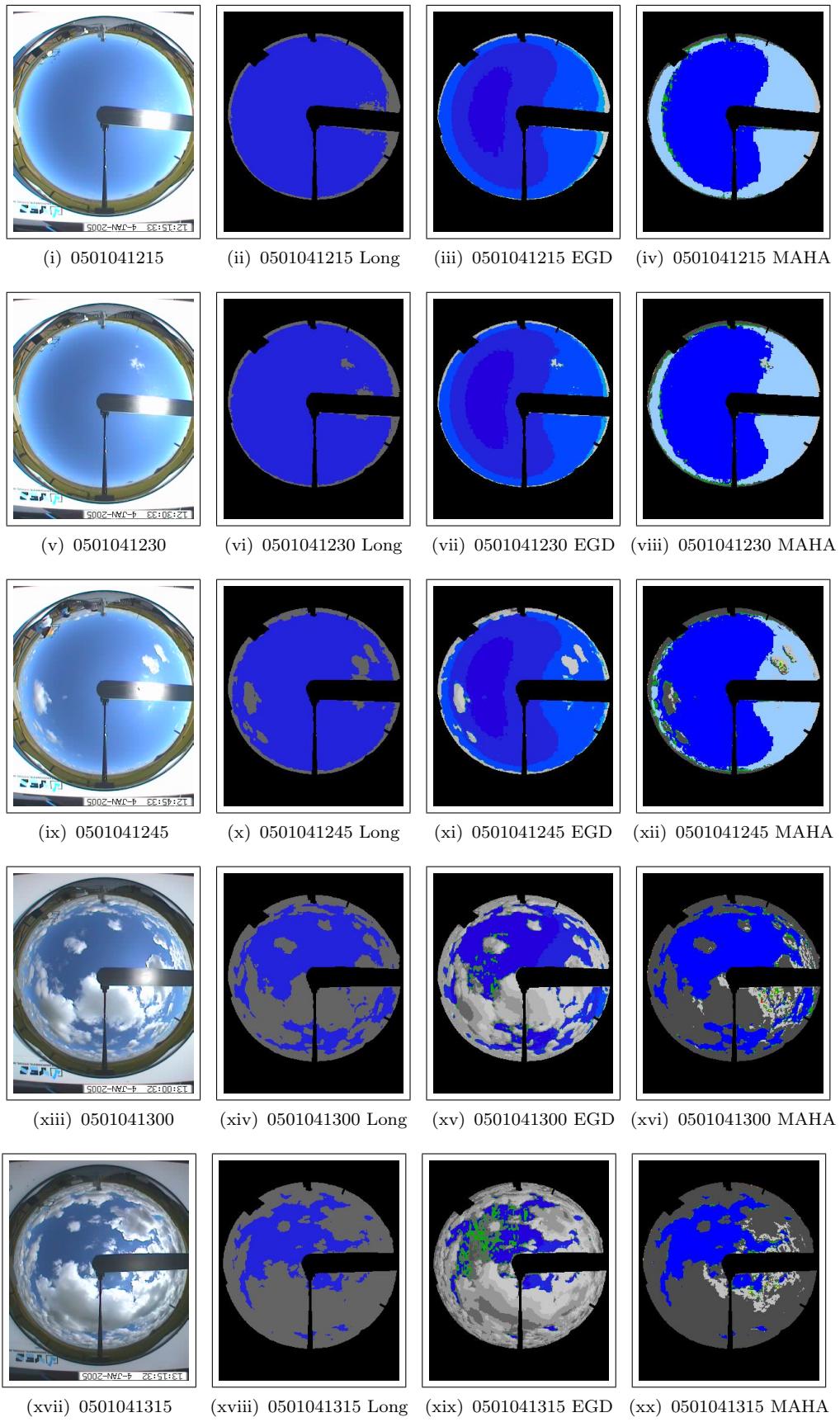


Figure A.41 - Sky images generated from 0501041215 to 0501041315.

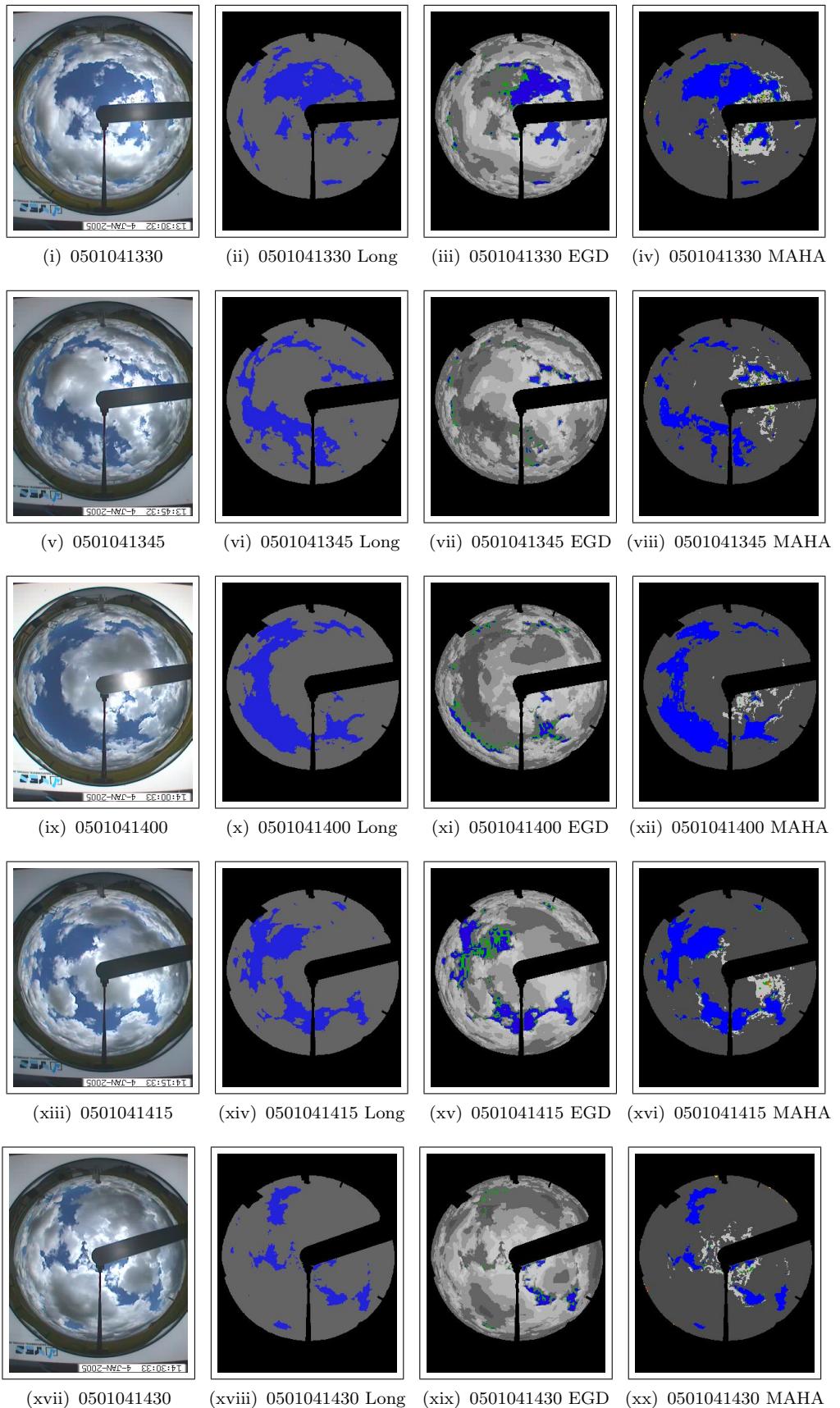


Figure A.42 - Sky images generated from 0501041330 to 0501041430.

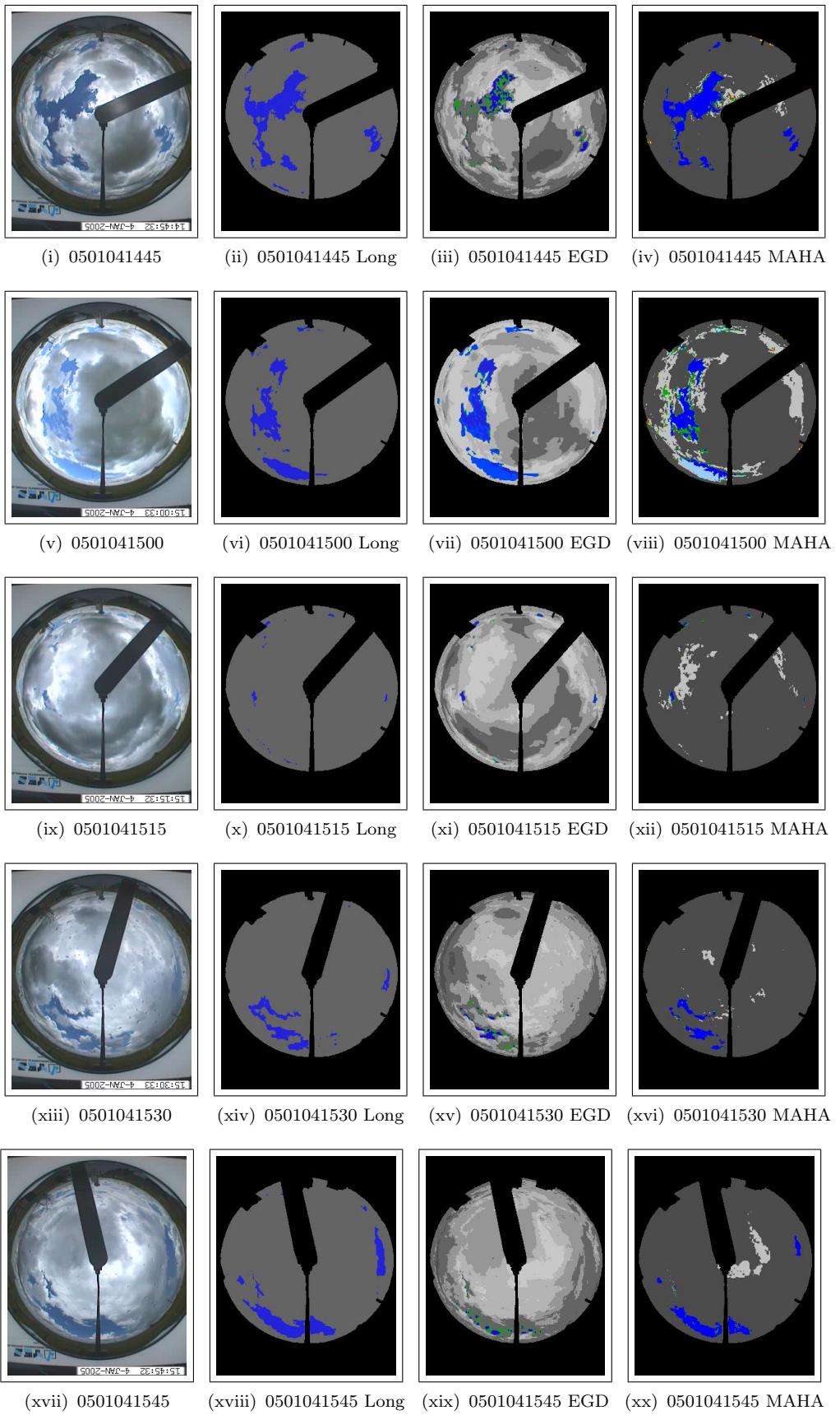


Figure A.43 - Sky images generated from 0501041445 to 0501041545.

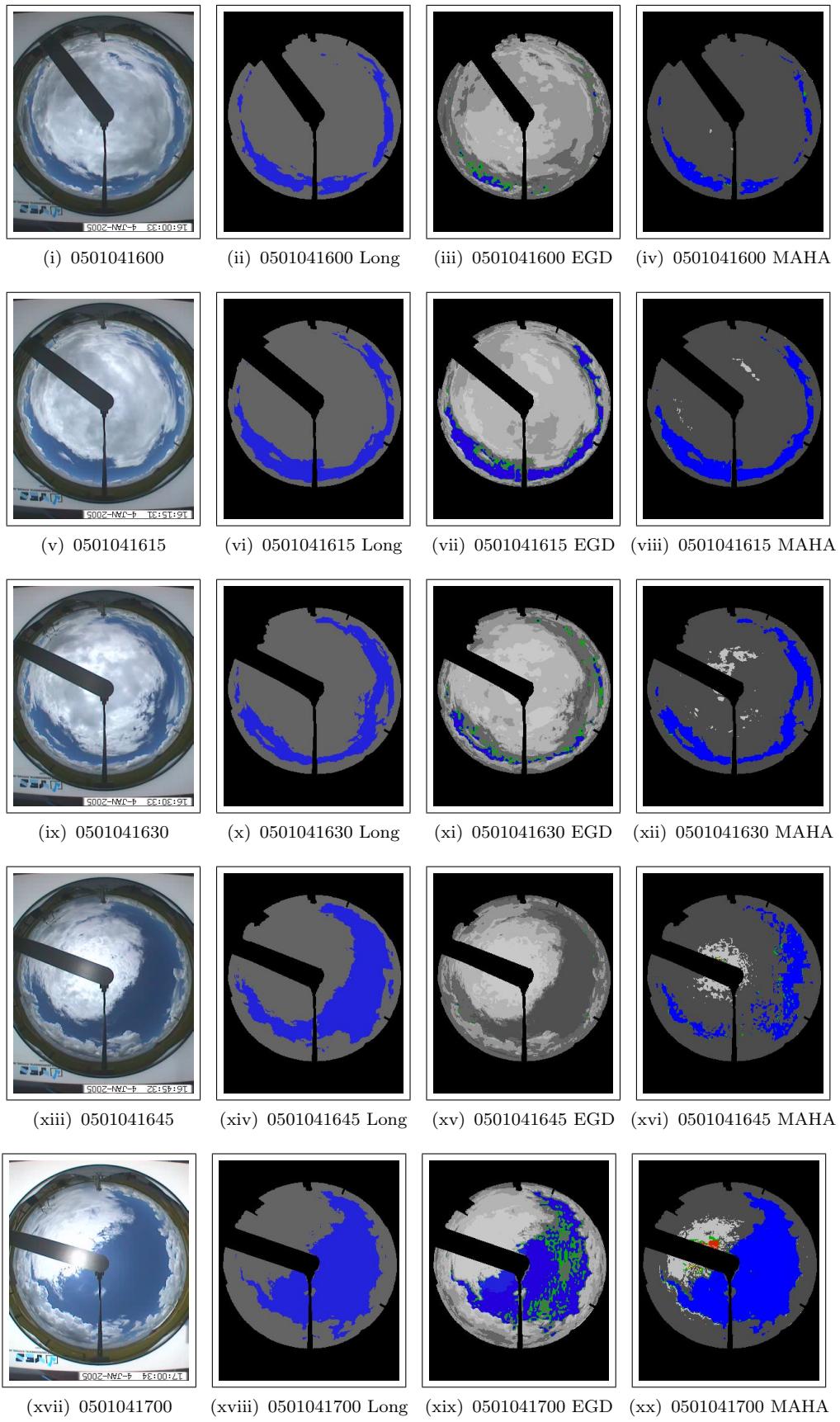


Figure A.44 - Sky images generated from 0501041600 to 0501041700.

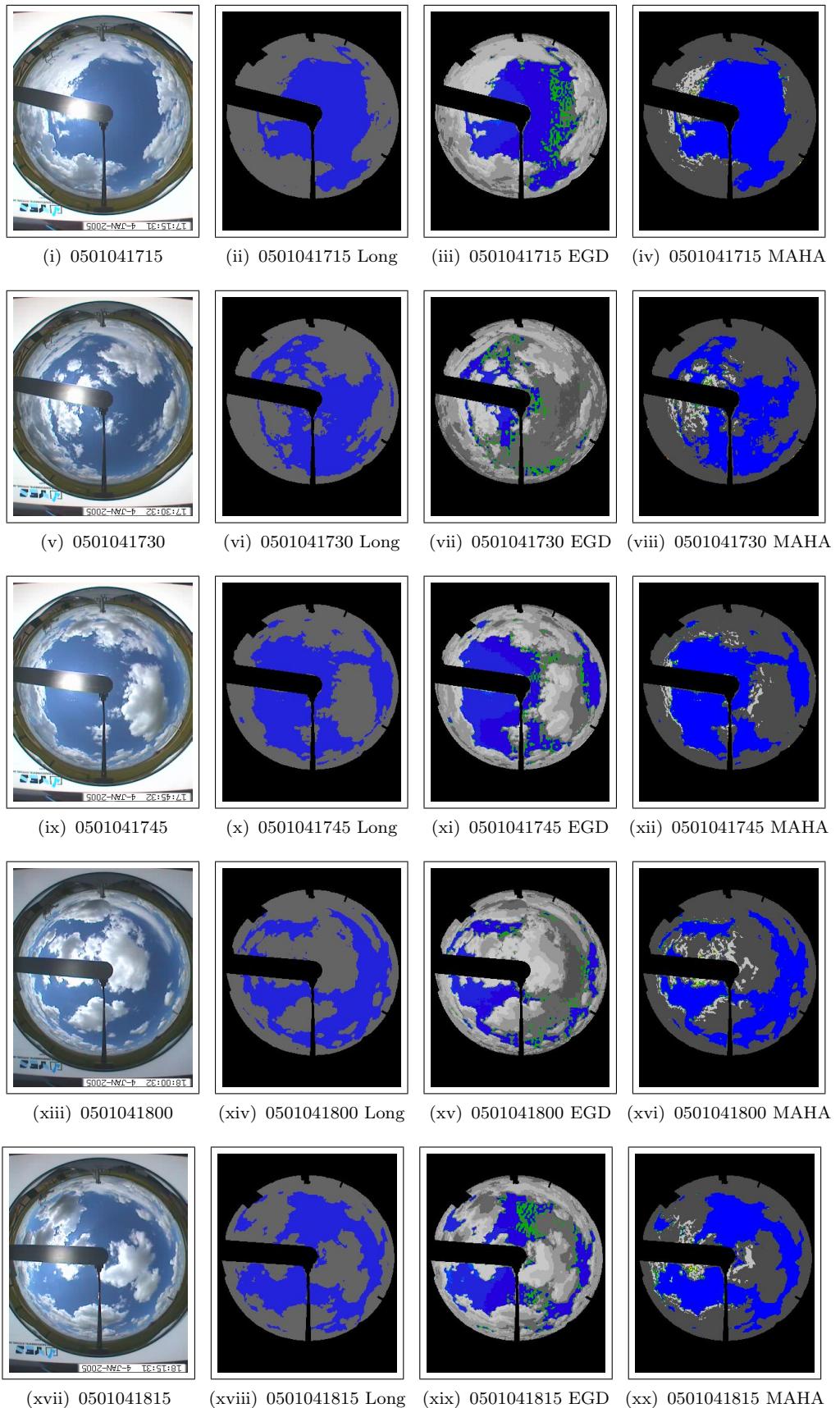


Figure A.45 - Sky images generated from 0501041715 to 0501041815.

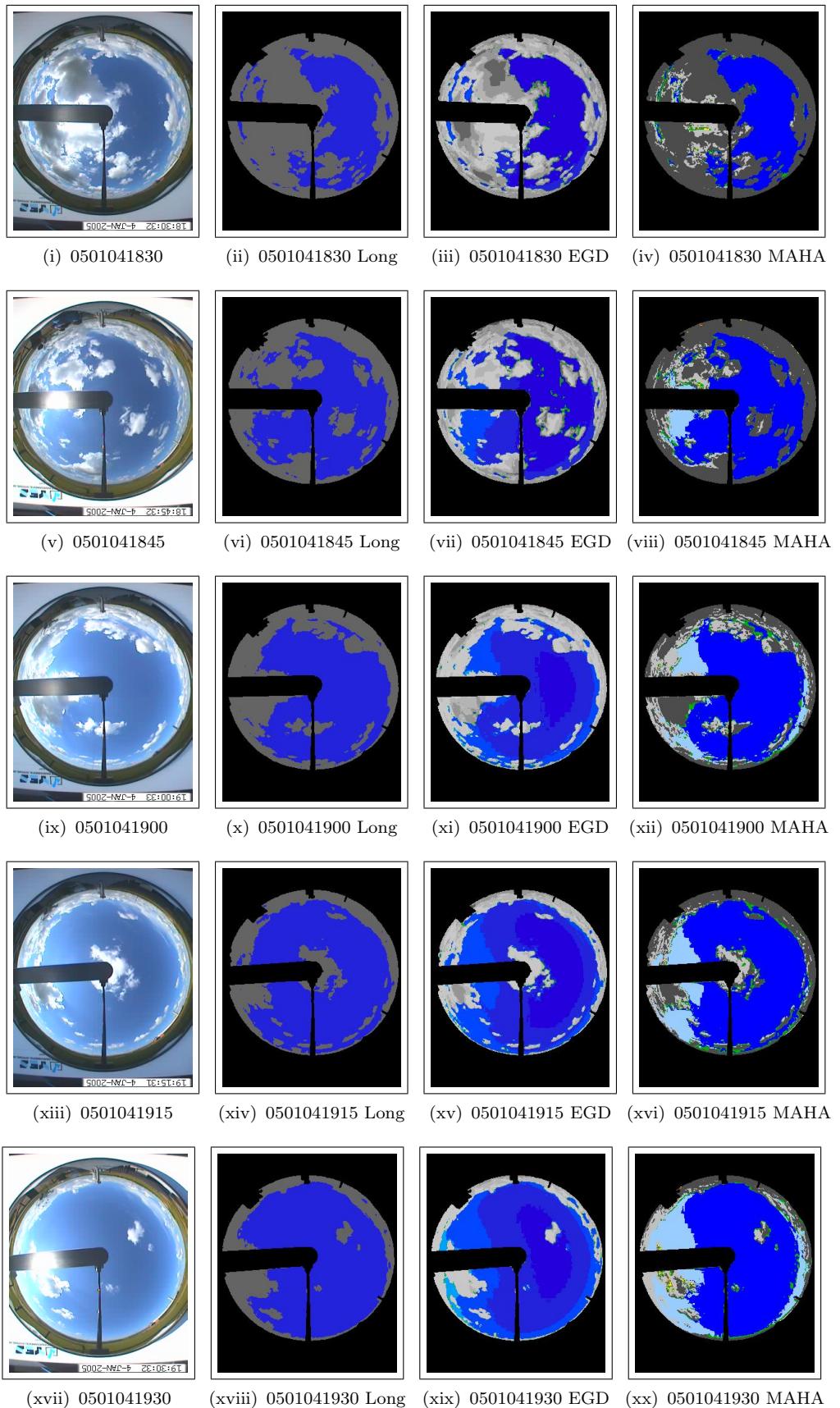


Figure A.46 - Sky images generated from 0501041830 to 0501041930.

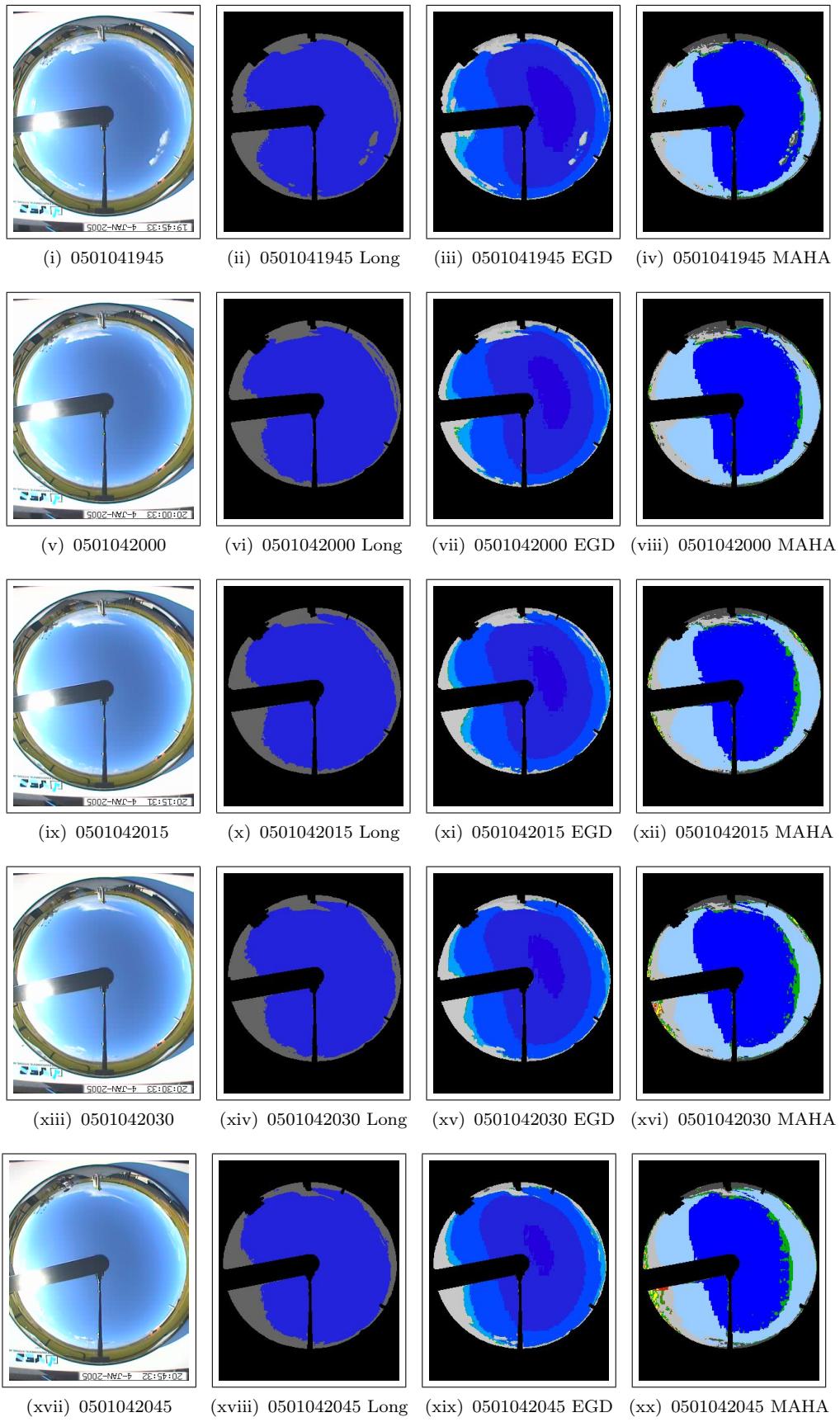


Figure A.47 - Sky images generated from 0501041945 to 0501042045.

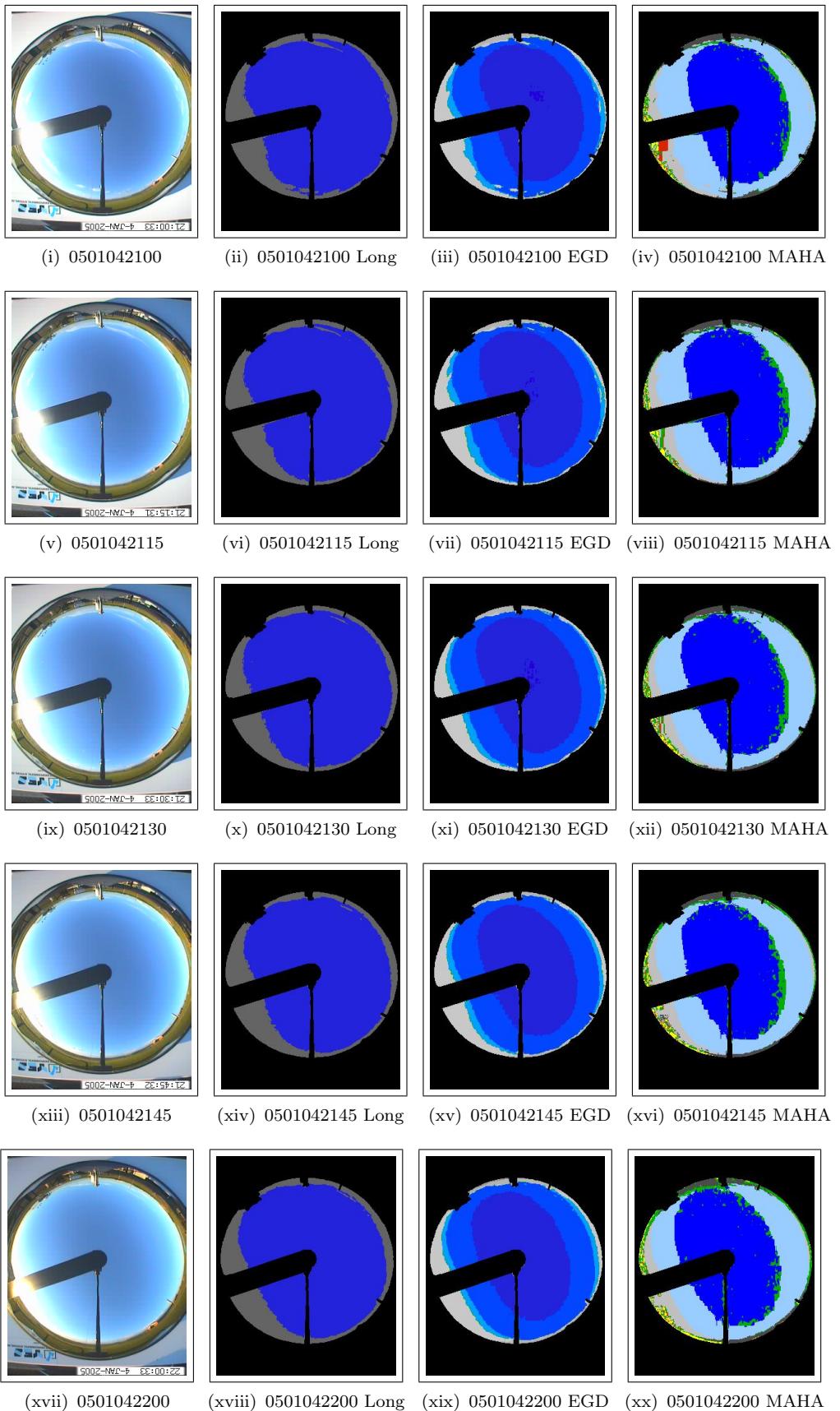


Figure A.48 - Sky images generated from 0501042100 to 0501042200.

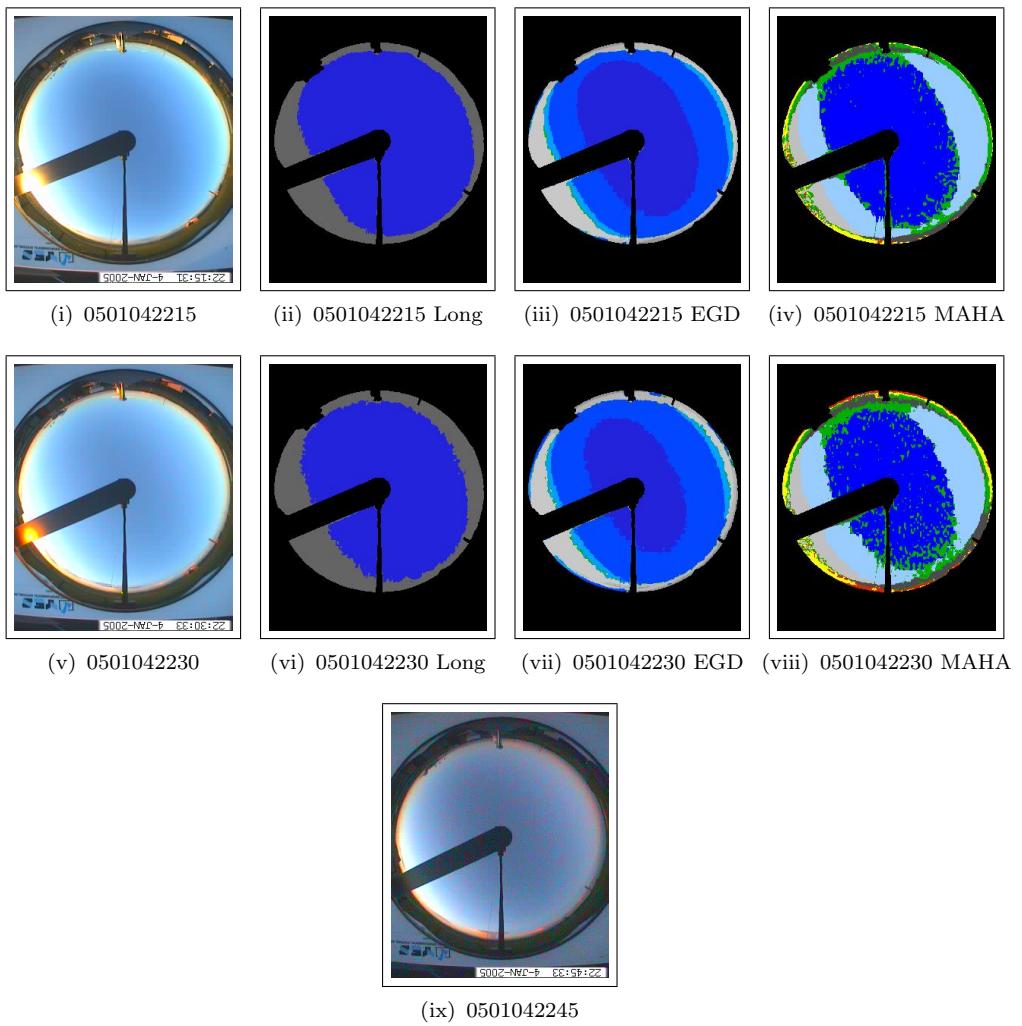


Figure A.49 - Sky images generated from 0501041600 to 0501042300.

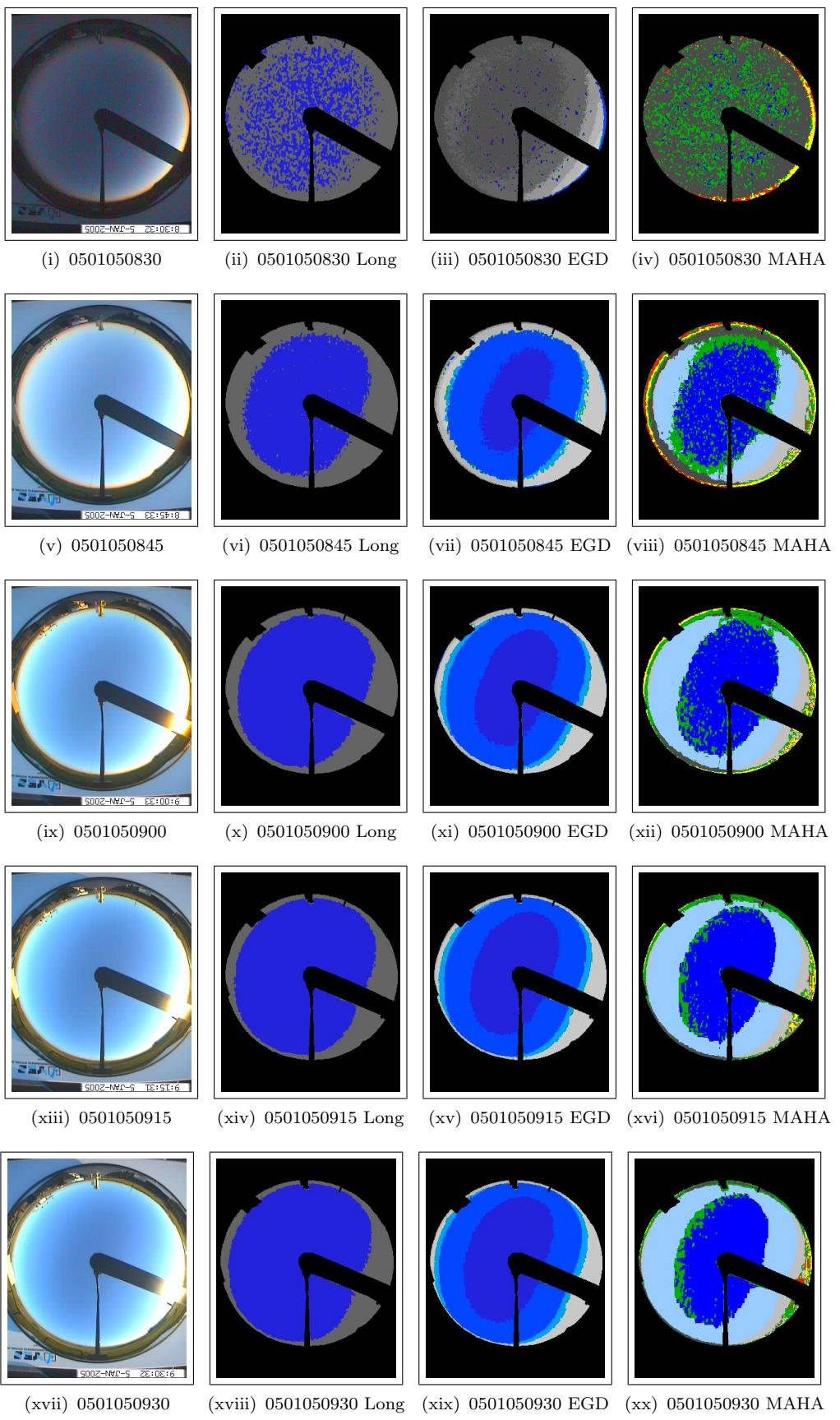


Figure A.50 - Sky images generated from 0501050830 to 0501050930.

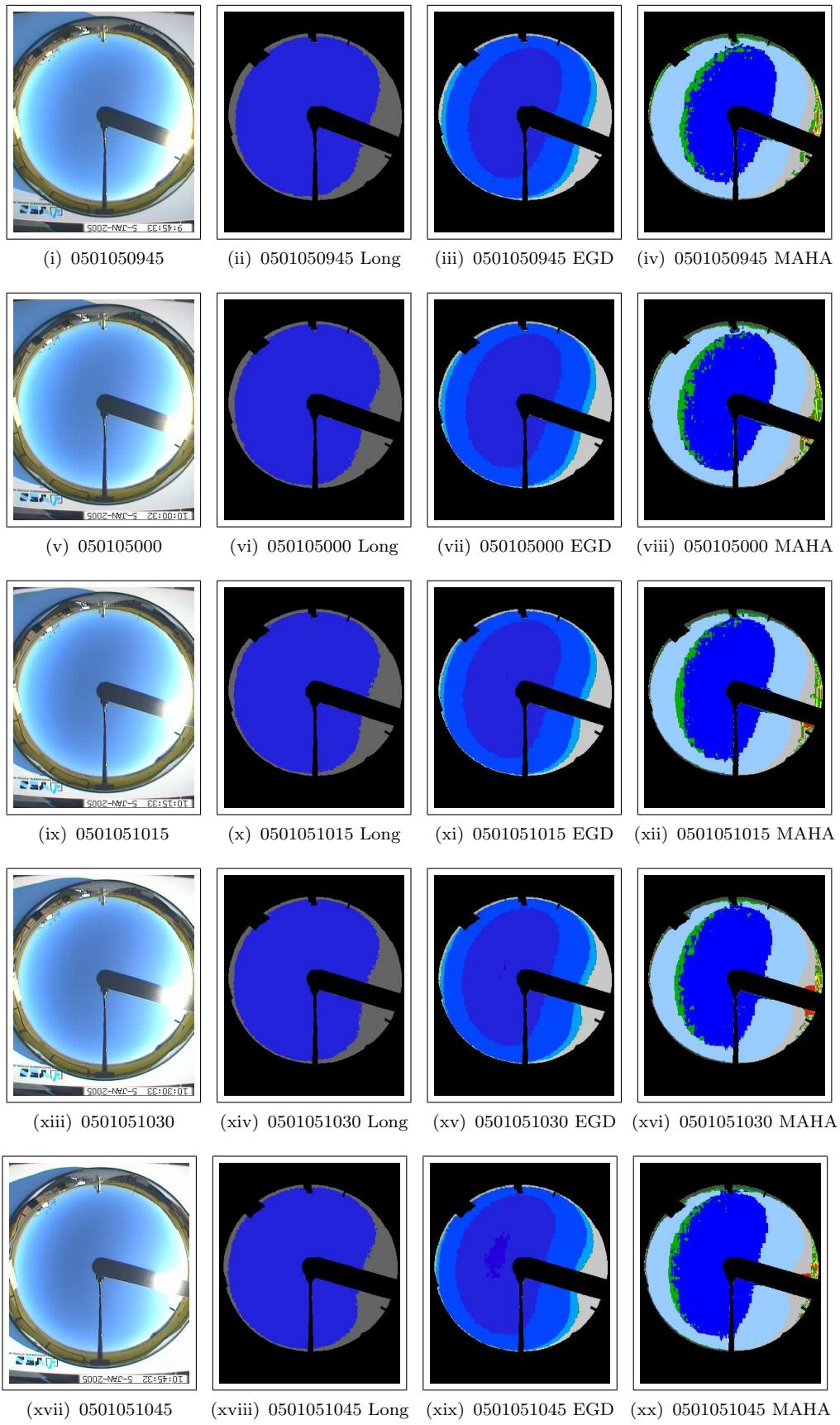


Figure A.51 - Sky images generated from 0501050945 to 0501051045.

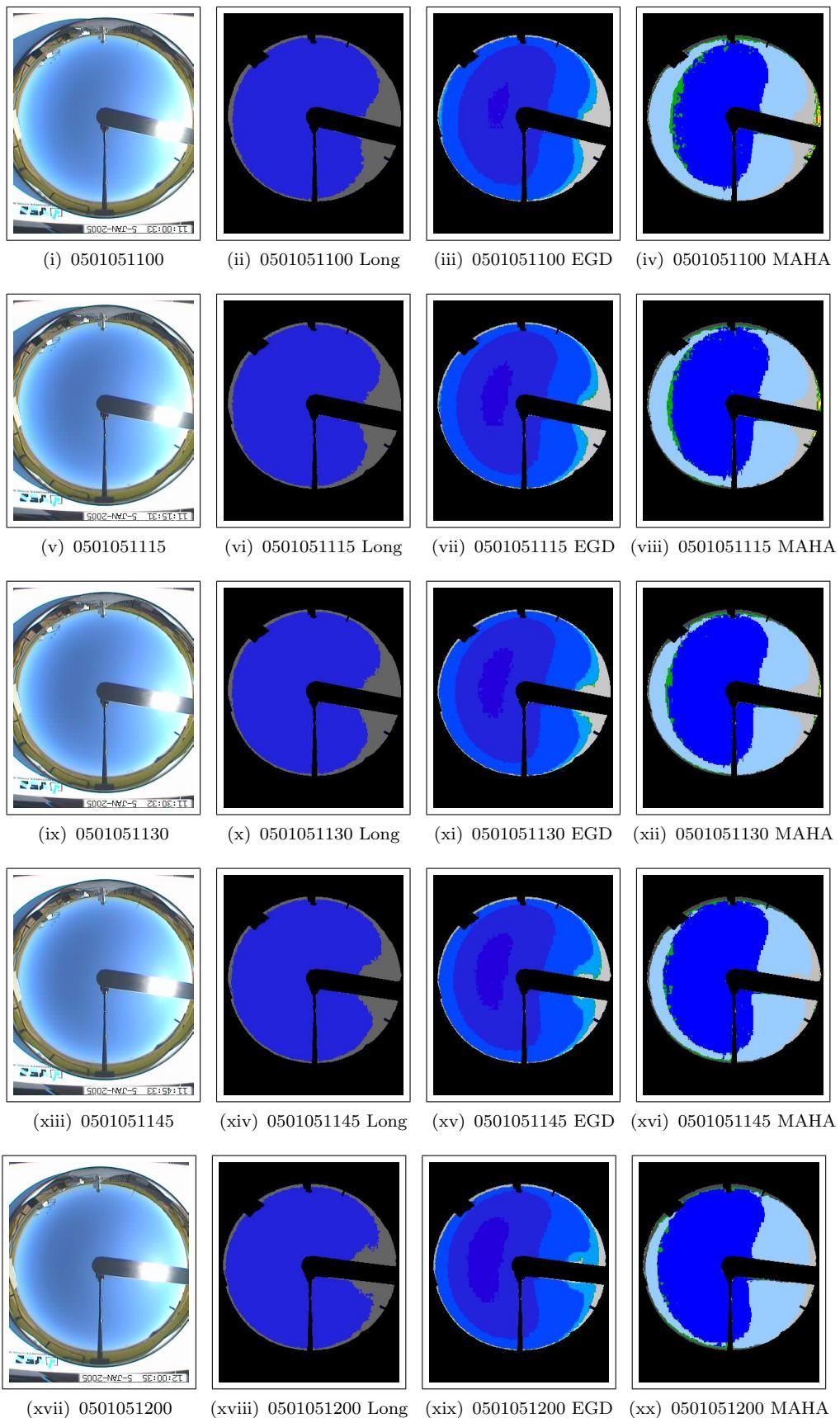


Figure A.52 - Sky images generated from 050105100 to 0501051200.

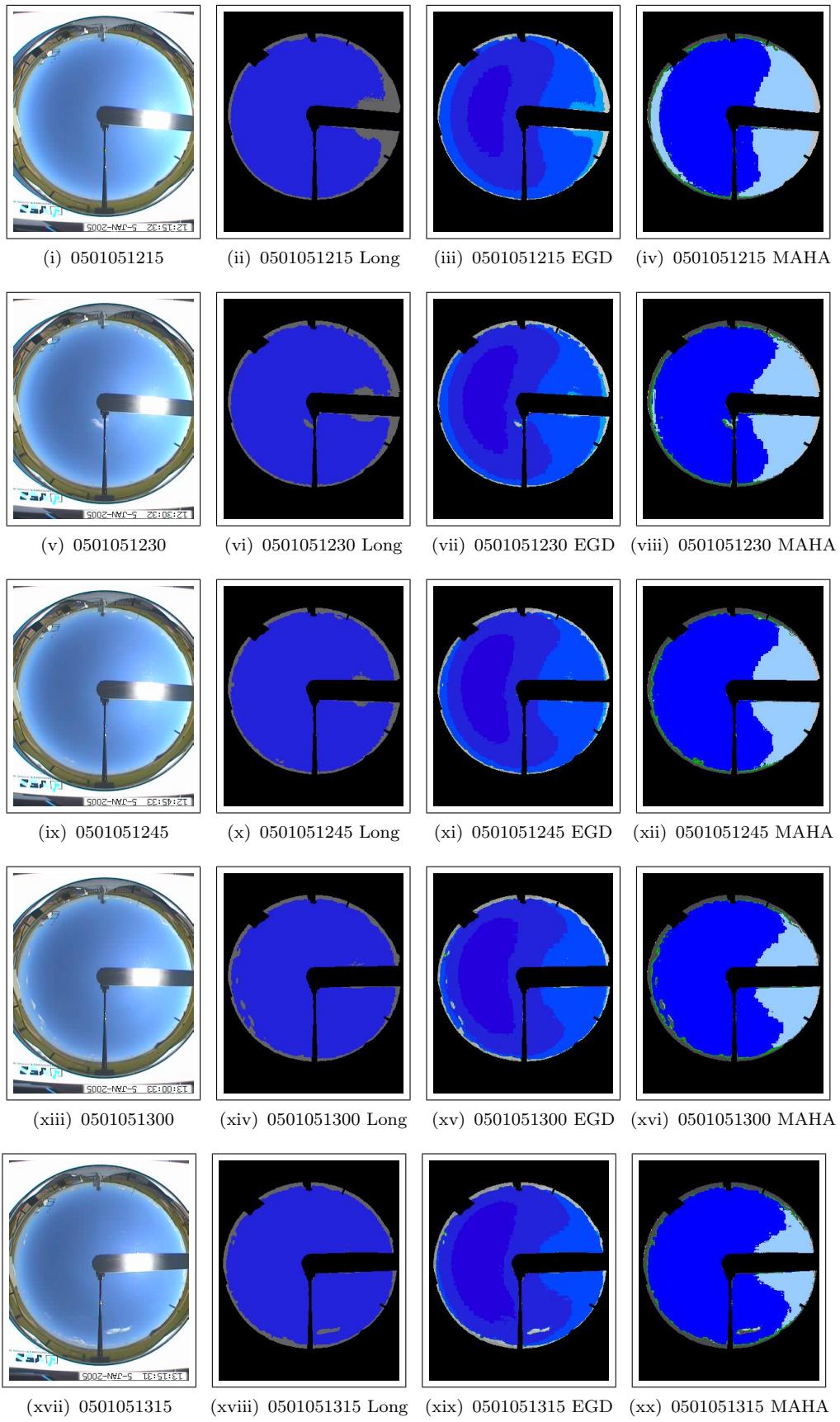


Figure A.53 - Sky images generated from 0501051215 to 0501051315.

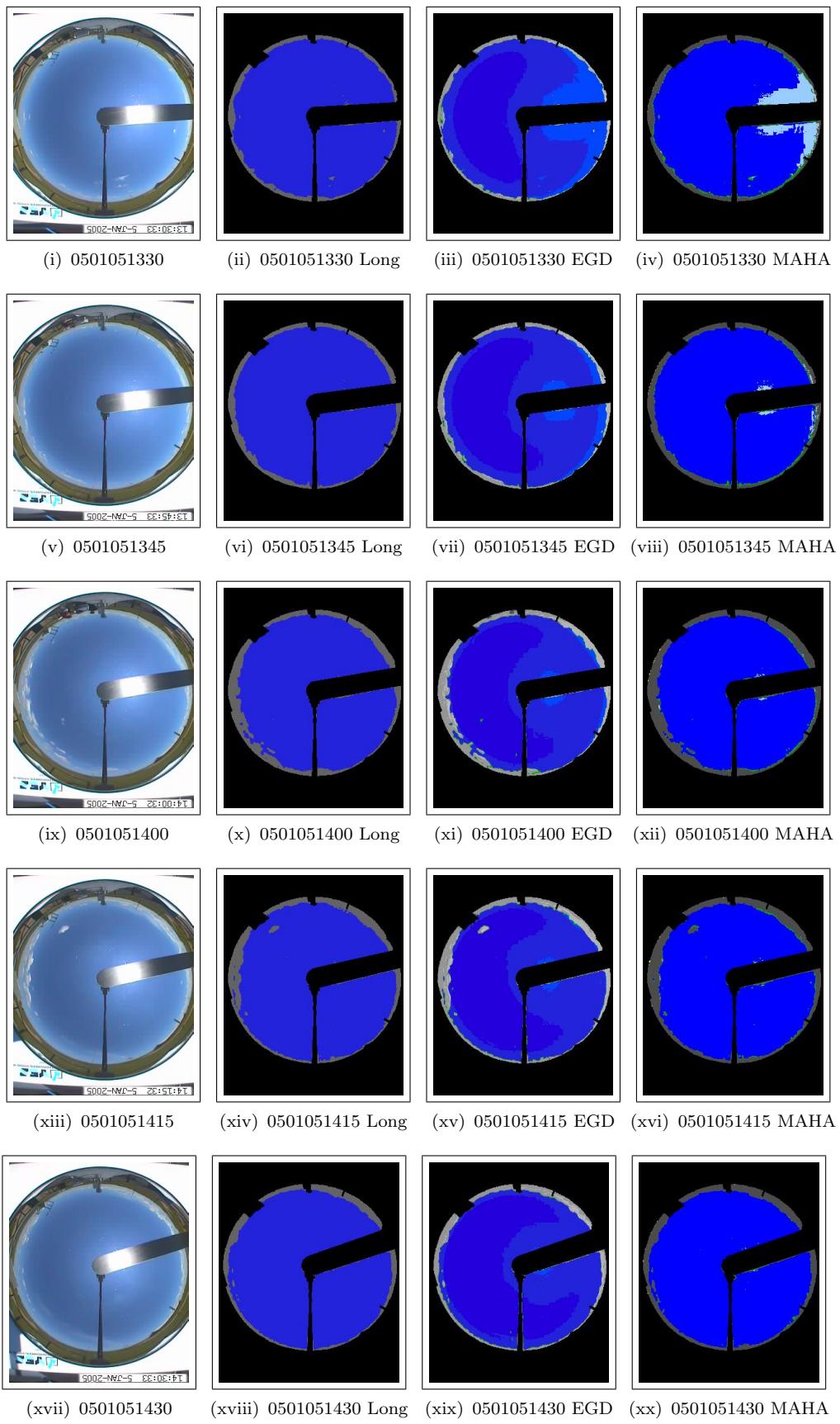


Figure A.54 - Sky images generated from 0501051330 to 0501051430.

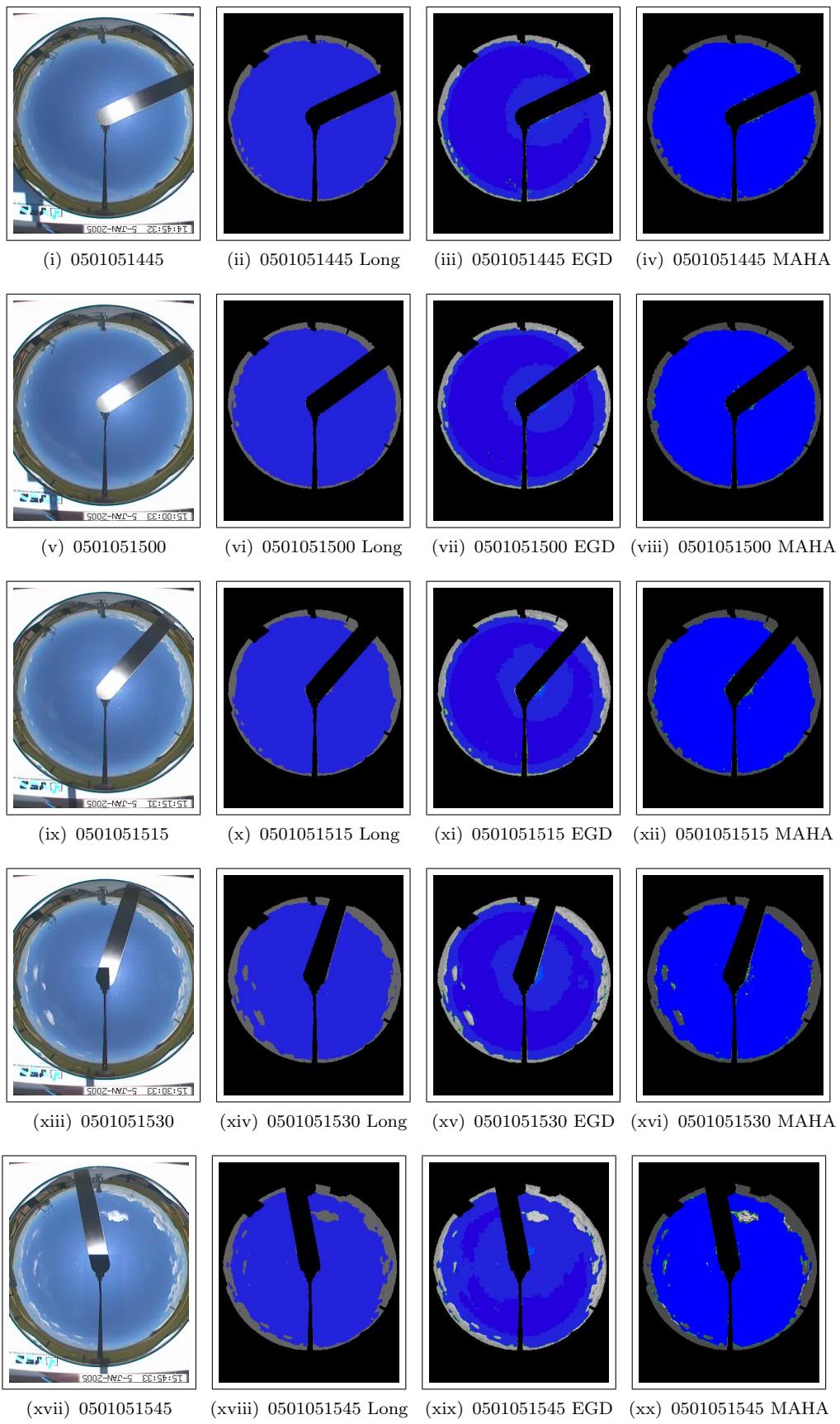


Figure A.55 - Sky images generated from 0501051445 to 0501051545.

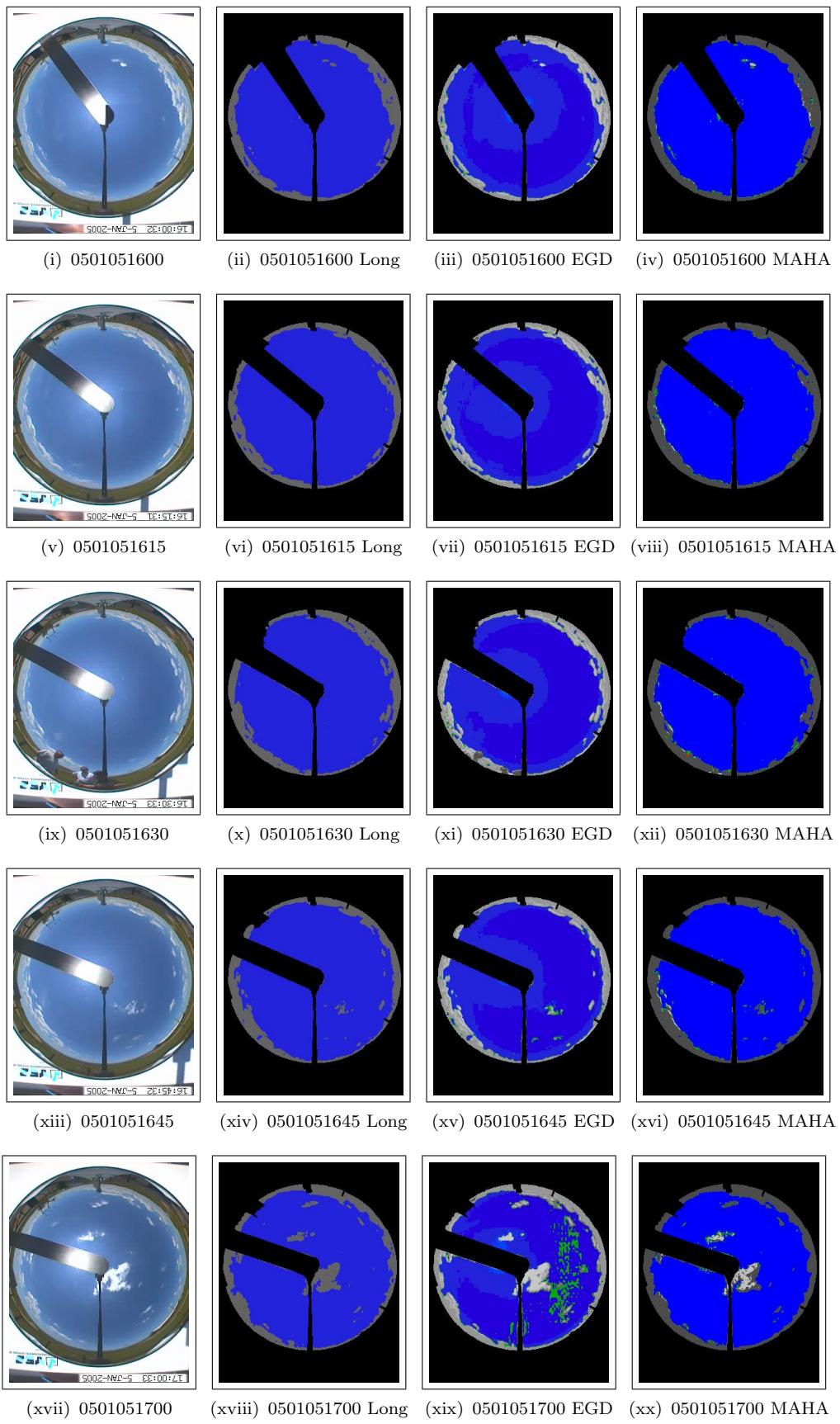


Figure A.56 - Sky images generated from 0501051600 to 0501051700.

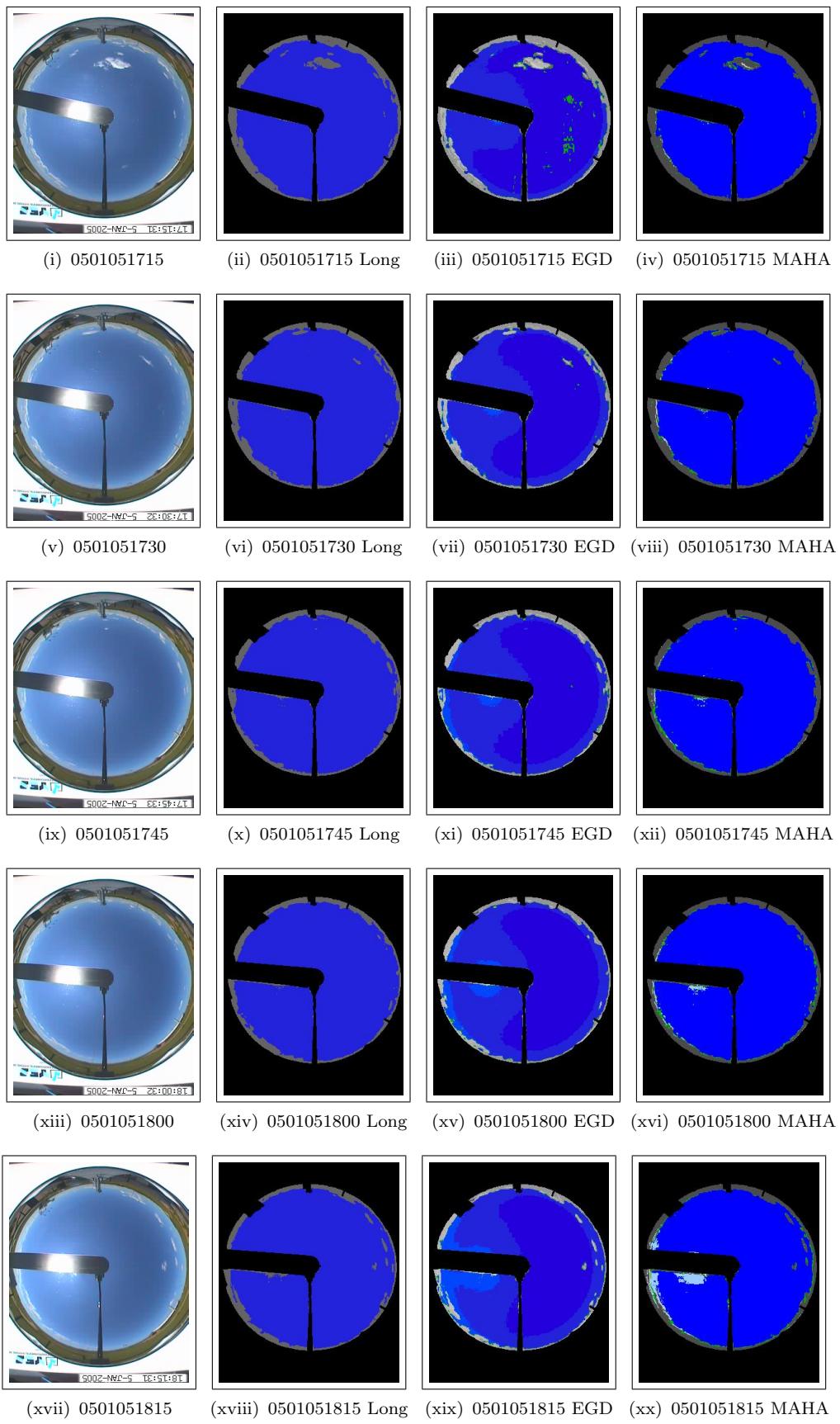


Figure A.57 - Sky images generated from 0501051715 to 0501051815.

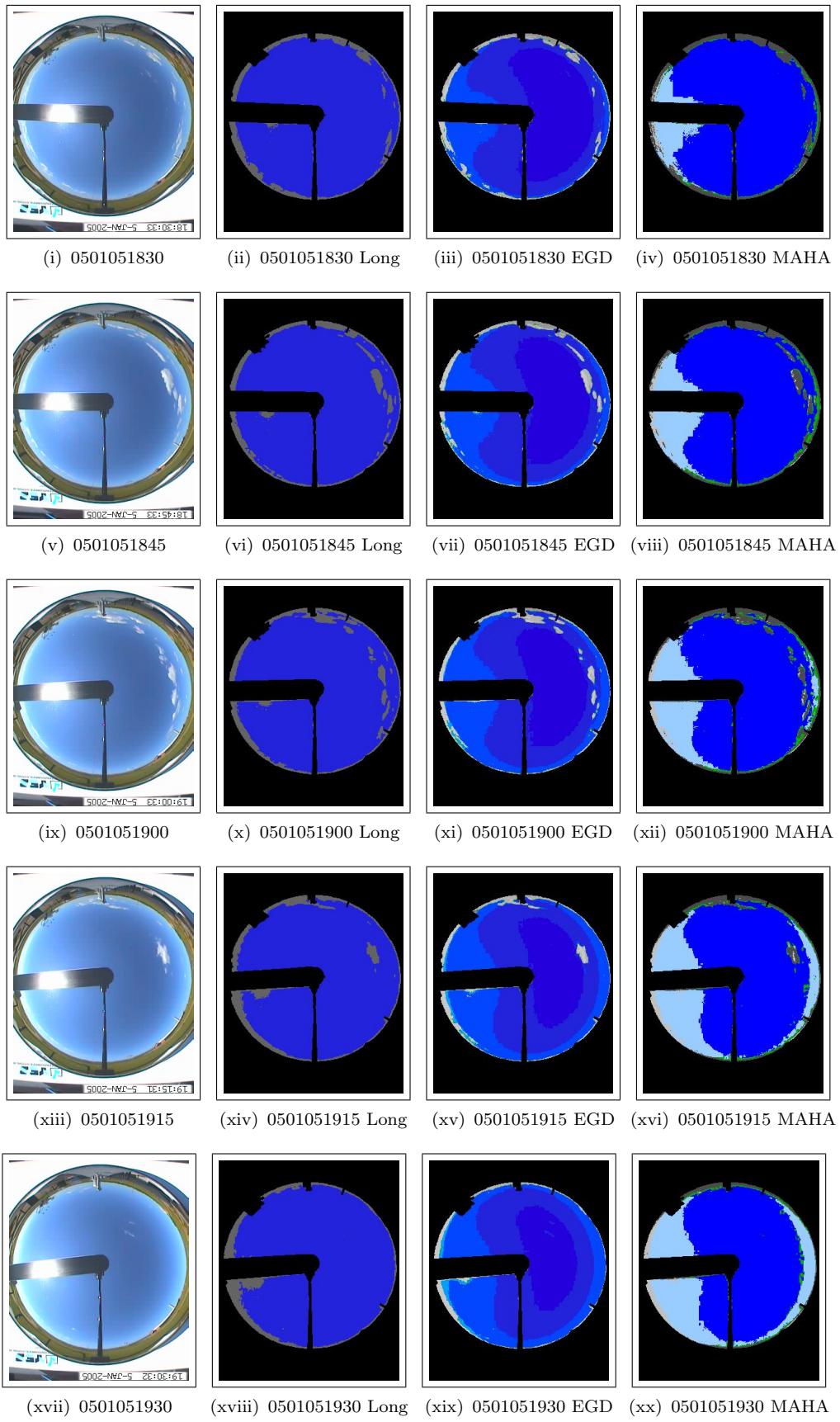


Figure A.58 - Sky images generated from 0501051830 to 0501051930.

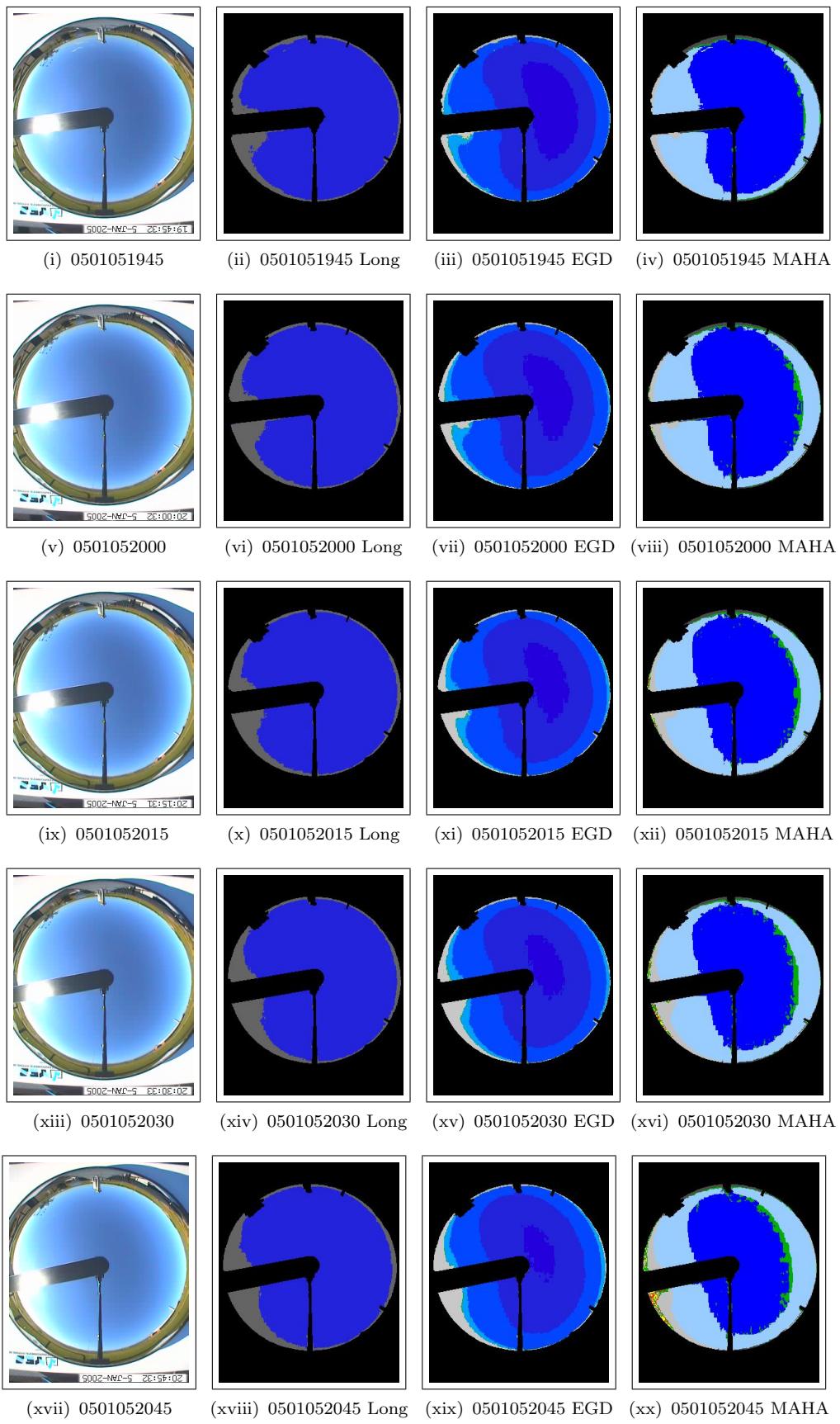


Figure A.59 - Sky images generated from 0501051945 to 0501052045.

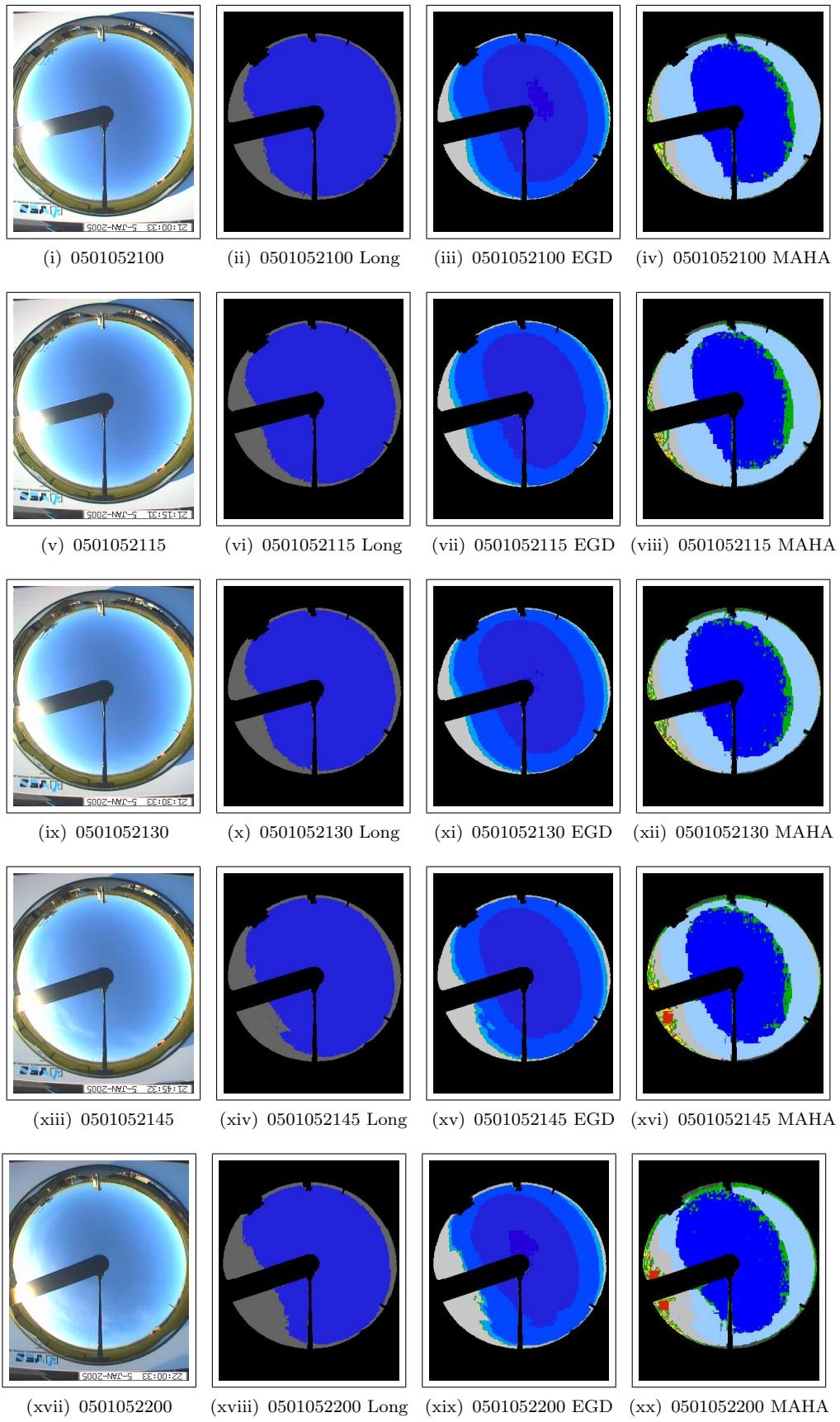


Figure A.60 - Sky images generated from 0501052100 to 0501052200.

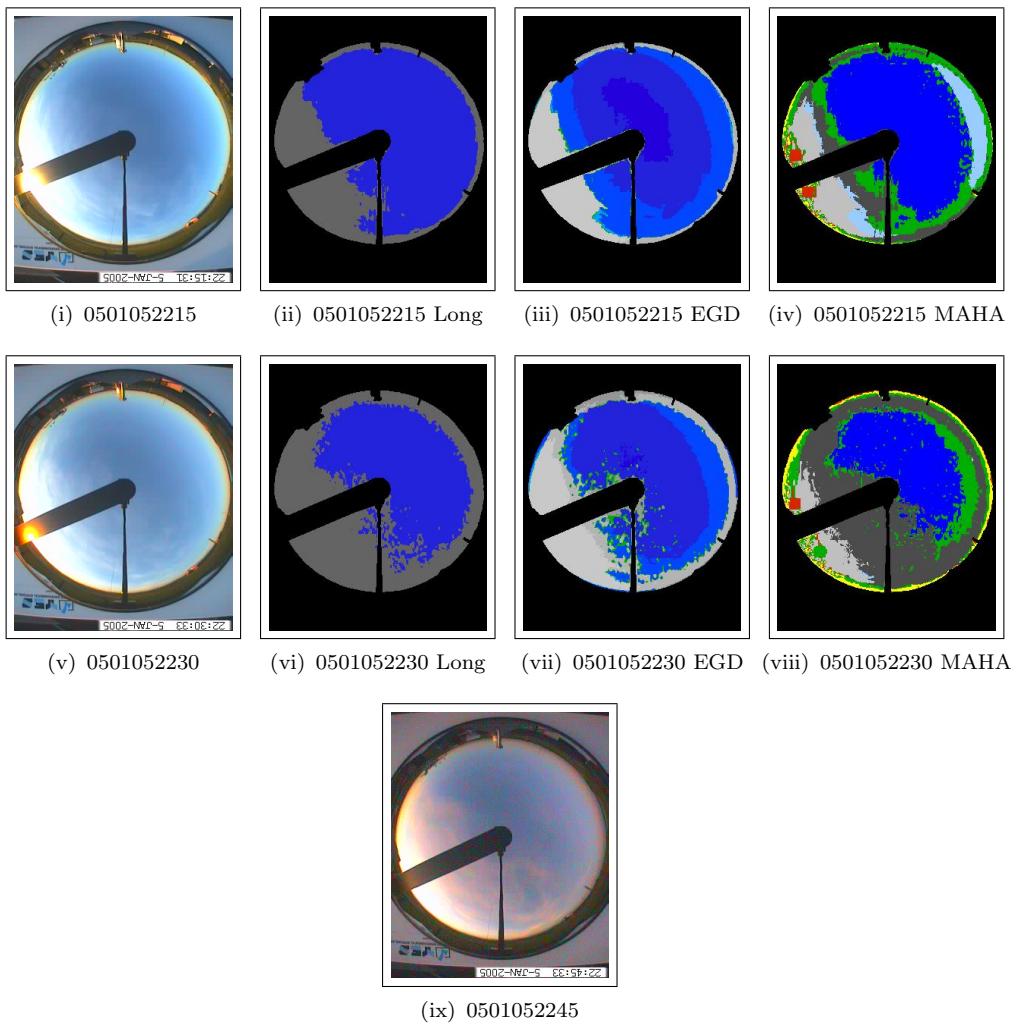


Figure A.61 - Sky images generated from 0501051600 to 0501052300.

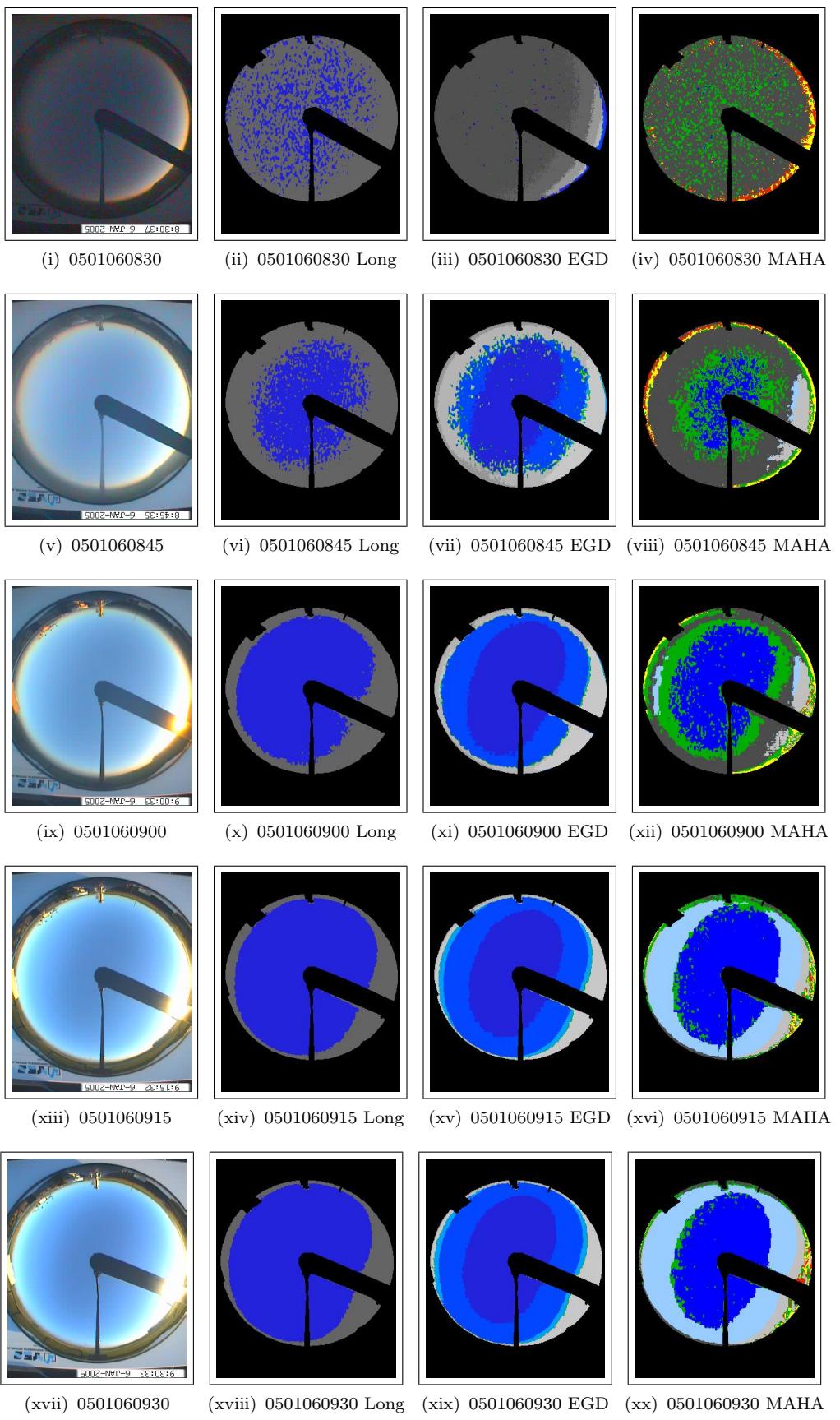


Figure A.62 - Sky images generated from 0501060830 to 0501060930.

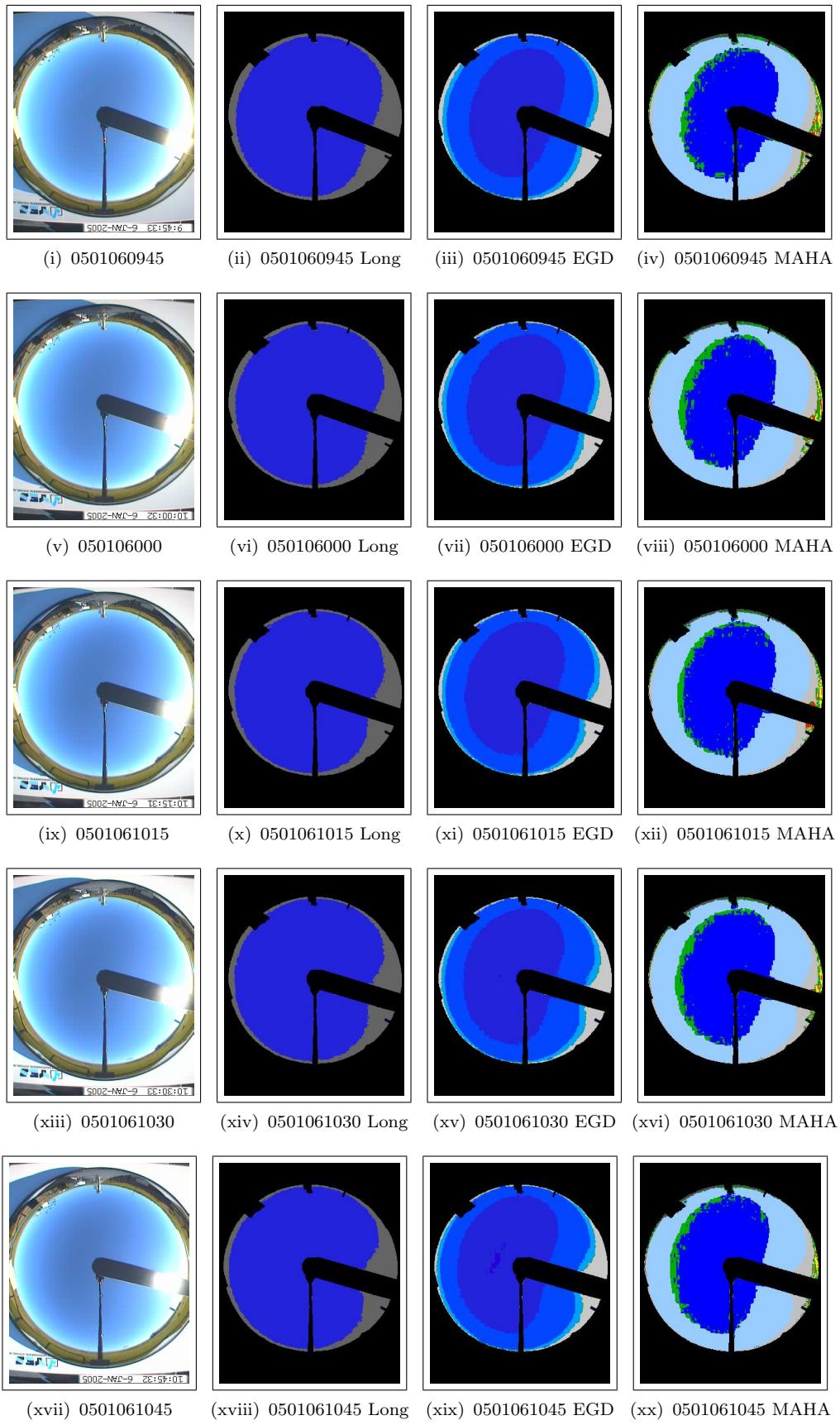


Figure A.63 - Sky images generated from 0501060945 to 0501061045.

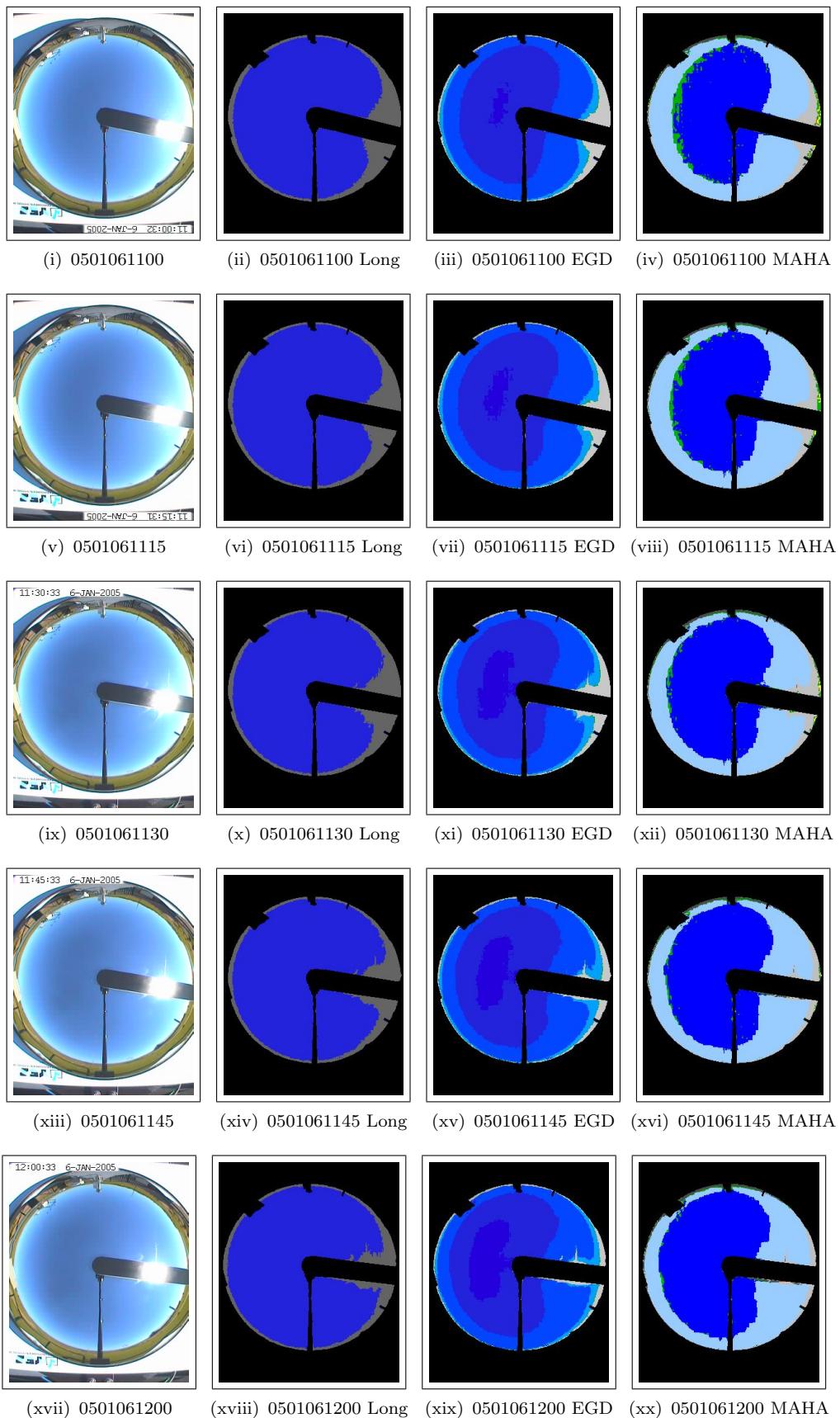


Figure A.64 - Sky images generated from 050106100 to 0501061200.

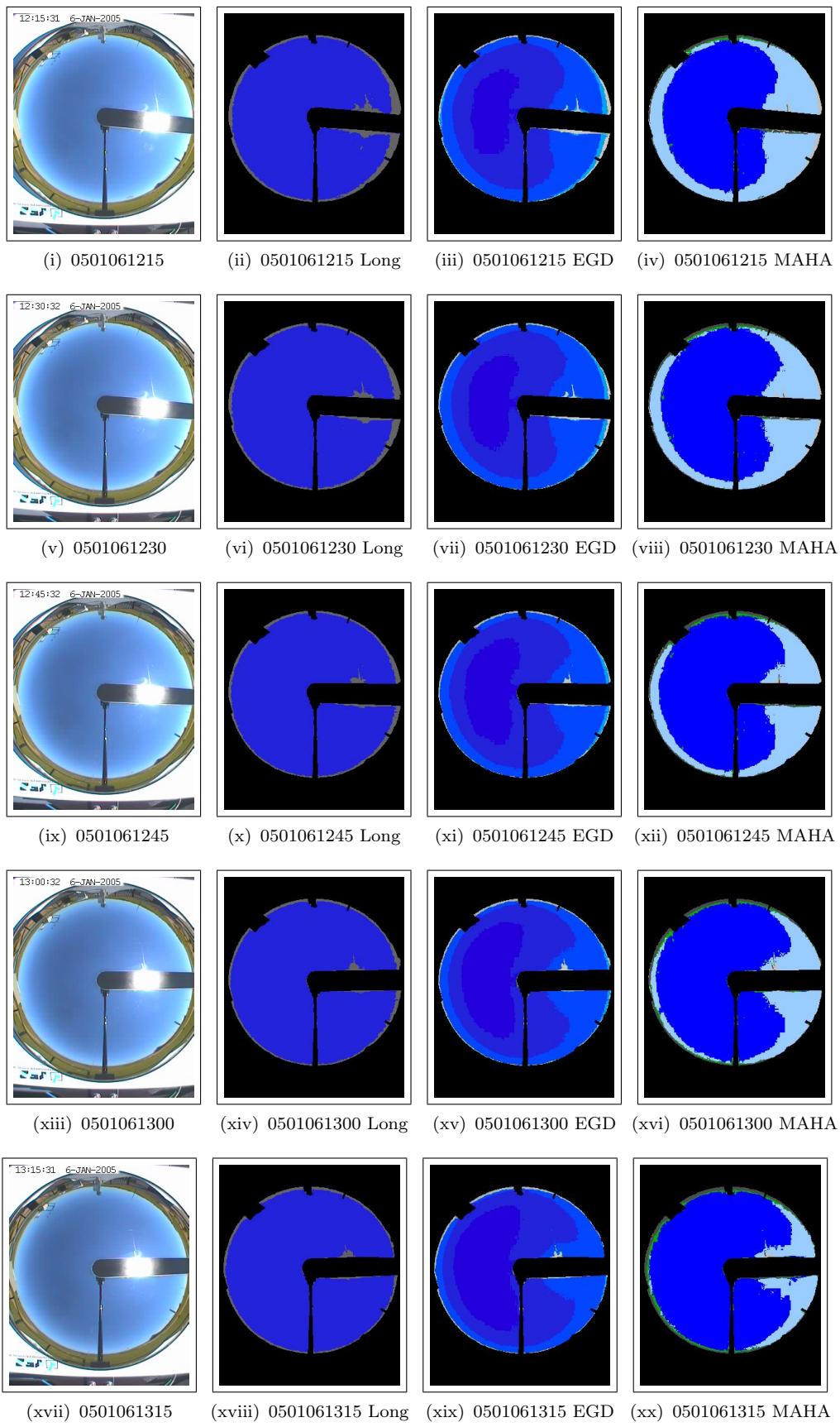


Figure A.65 - Sky images generated from 0501061215 to 0501061315.

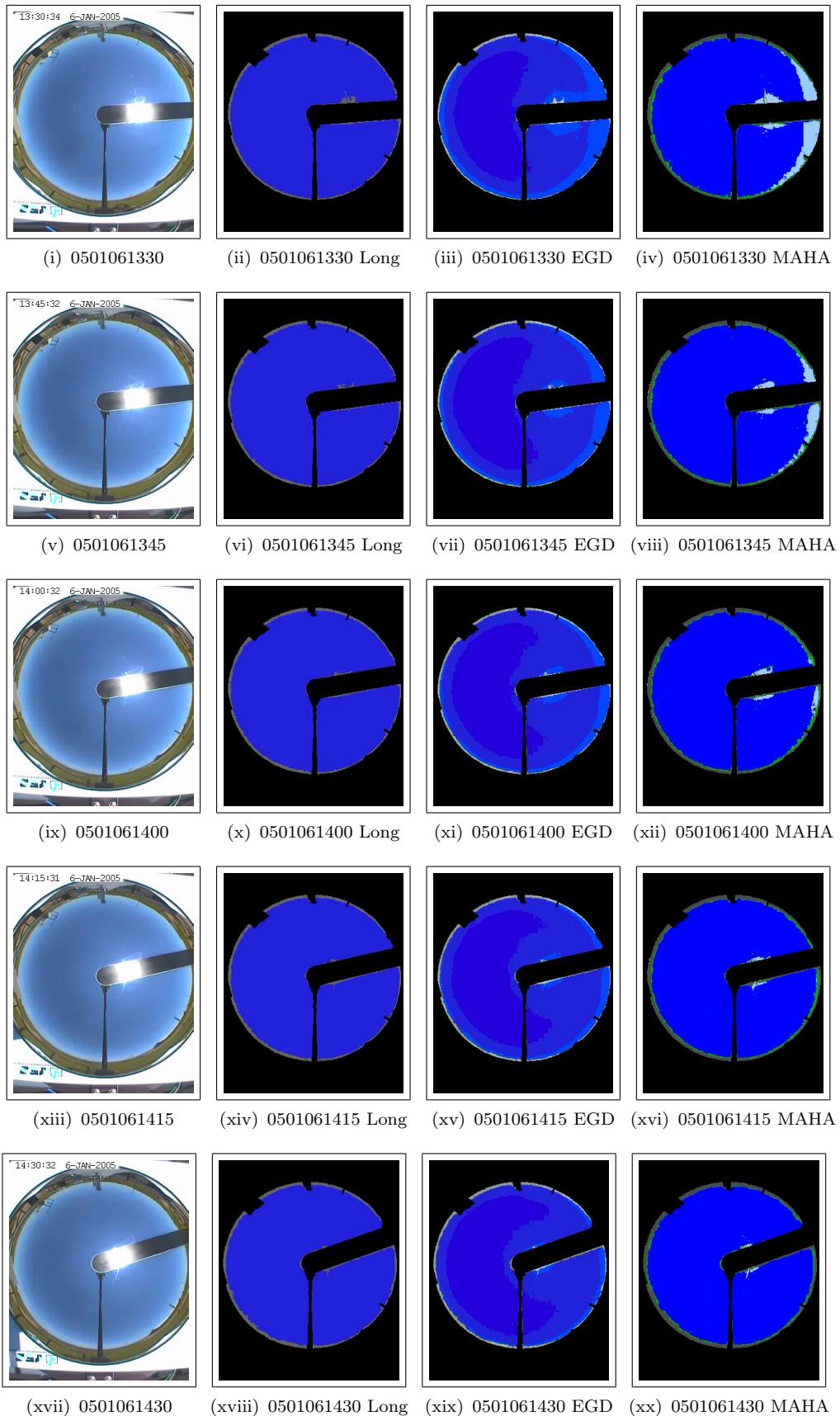


Figure A.66 - Sky images generated from 0501061330 to 0501061430.

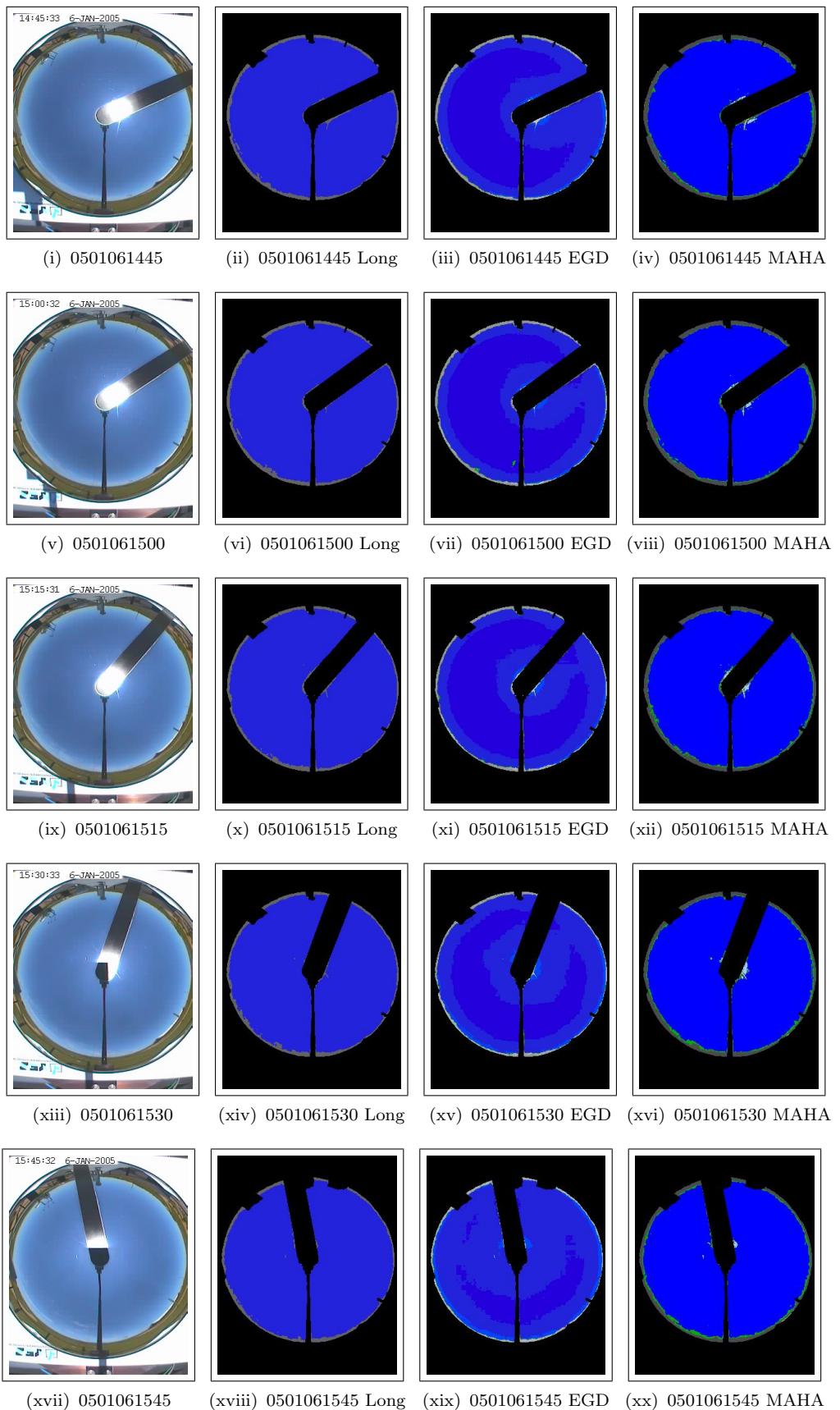


Figure A.67 - Sky images generated from 0501061445 to 0501061545.

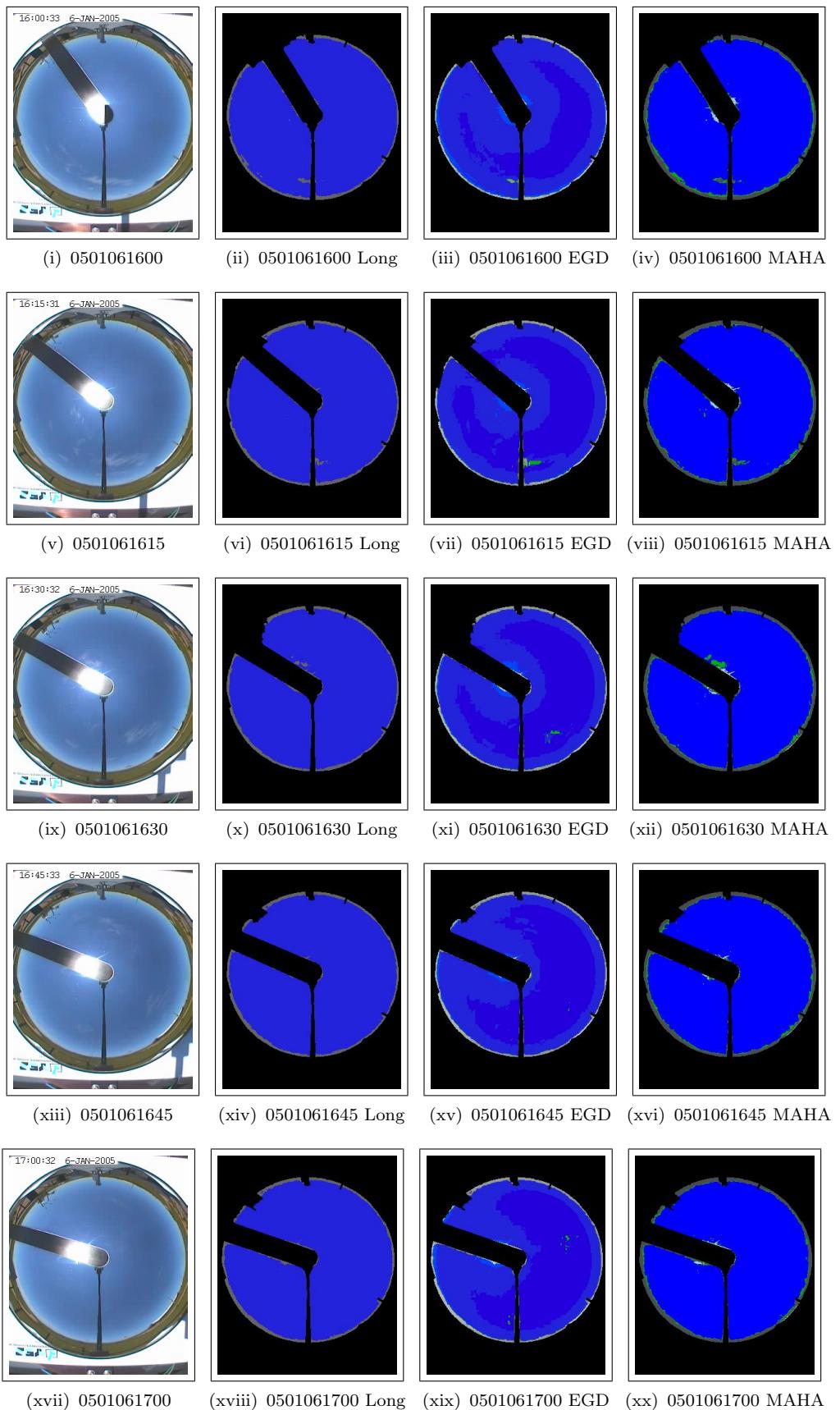


Figure A.68 - Sky images generated from 0501061600 to 0501061700.

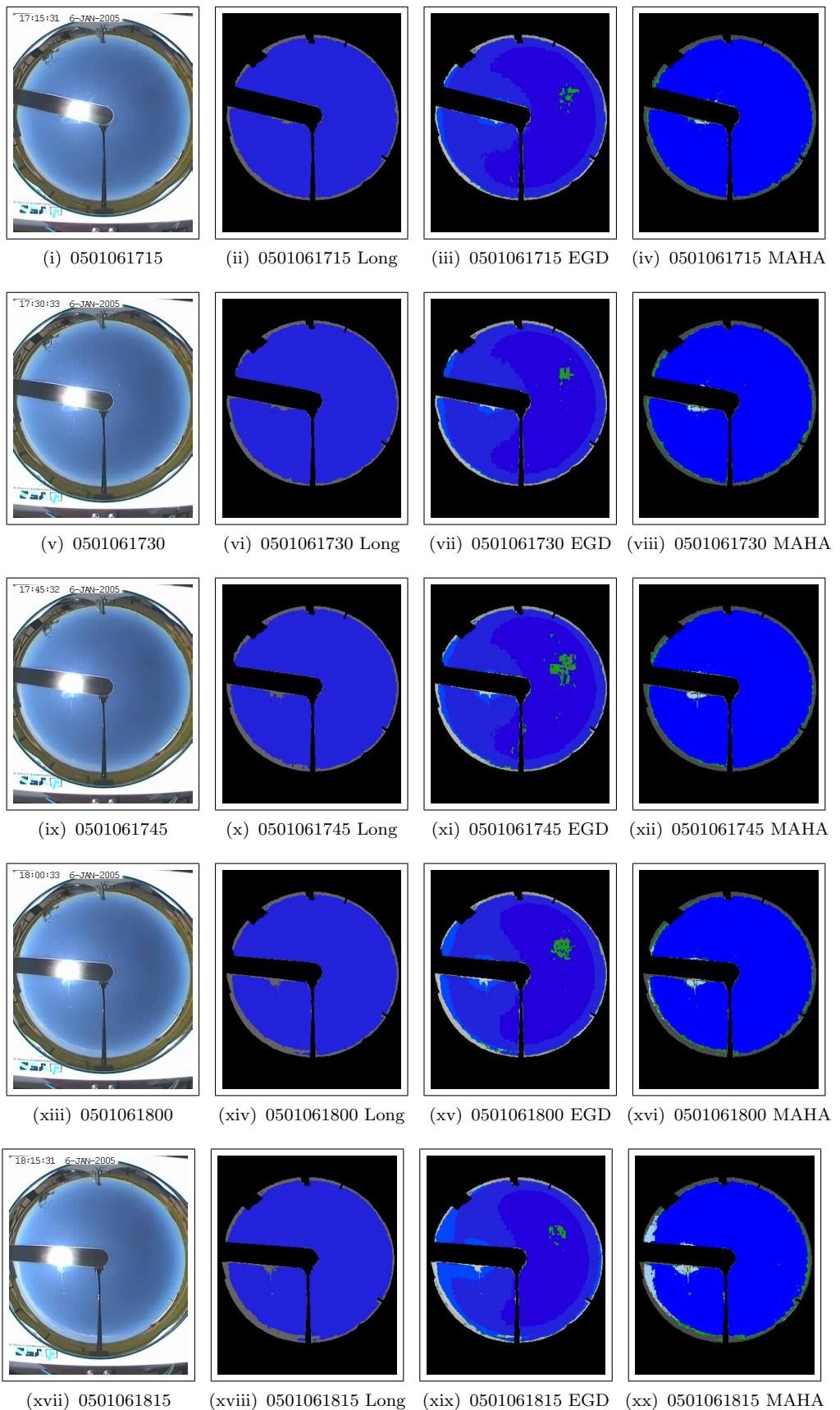


Figure A.69 - Sky images generated from 0501061715 to 0501061815.

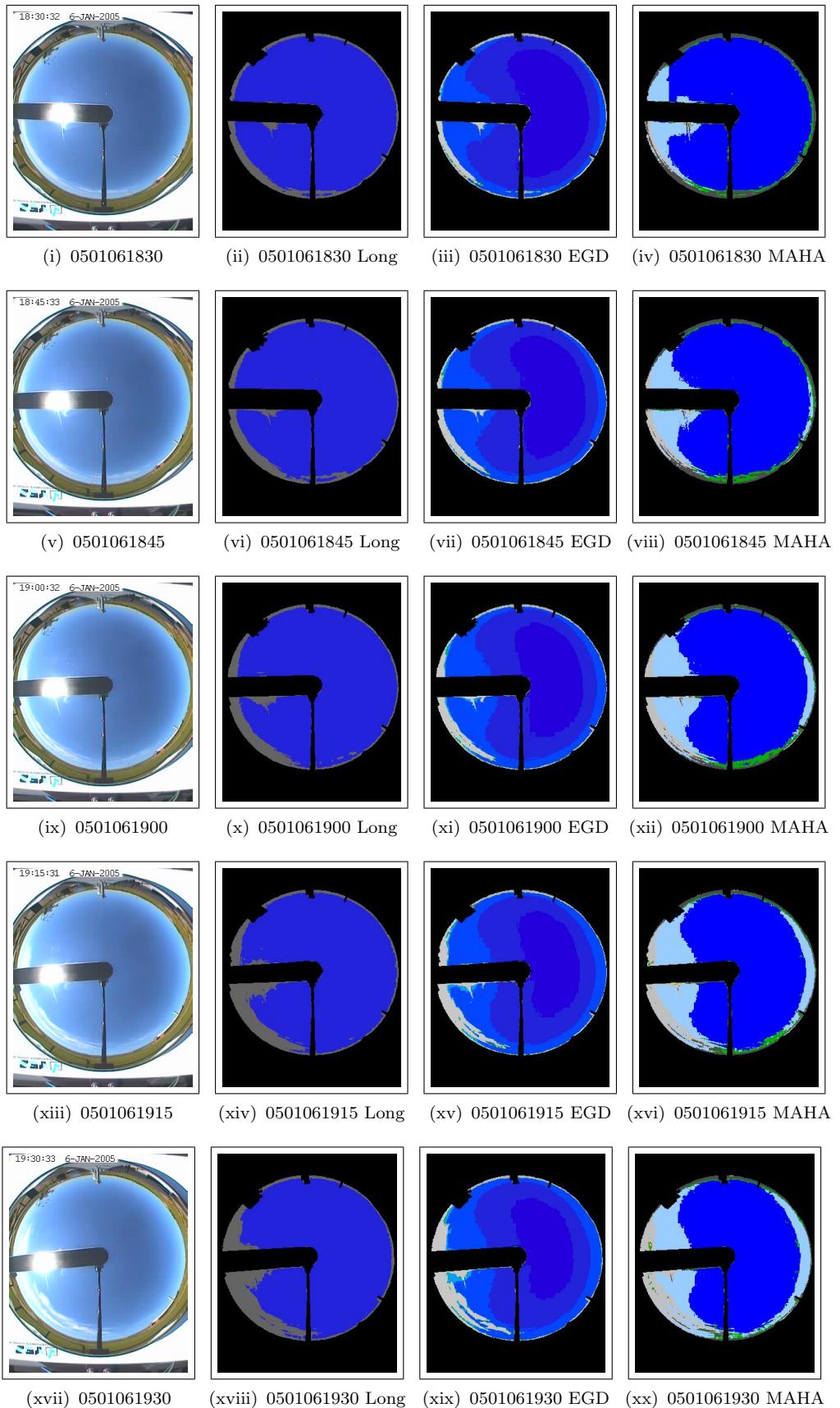


Figure A.70 - Sky images generated from 0501061830 to 0501061930.

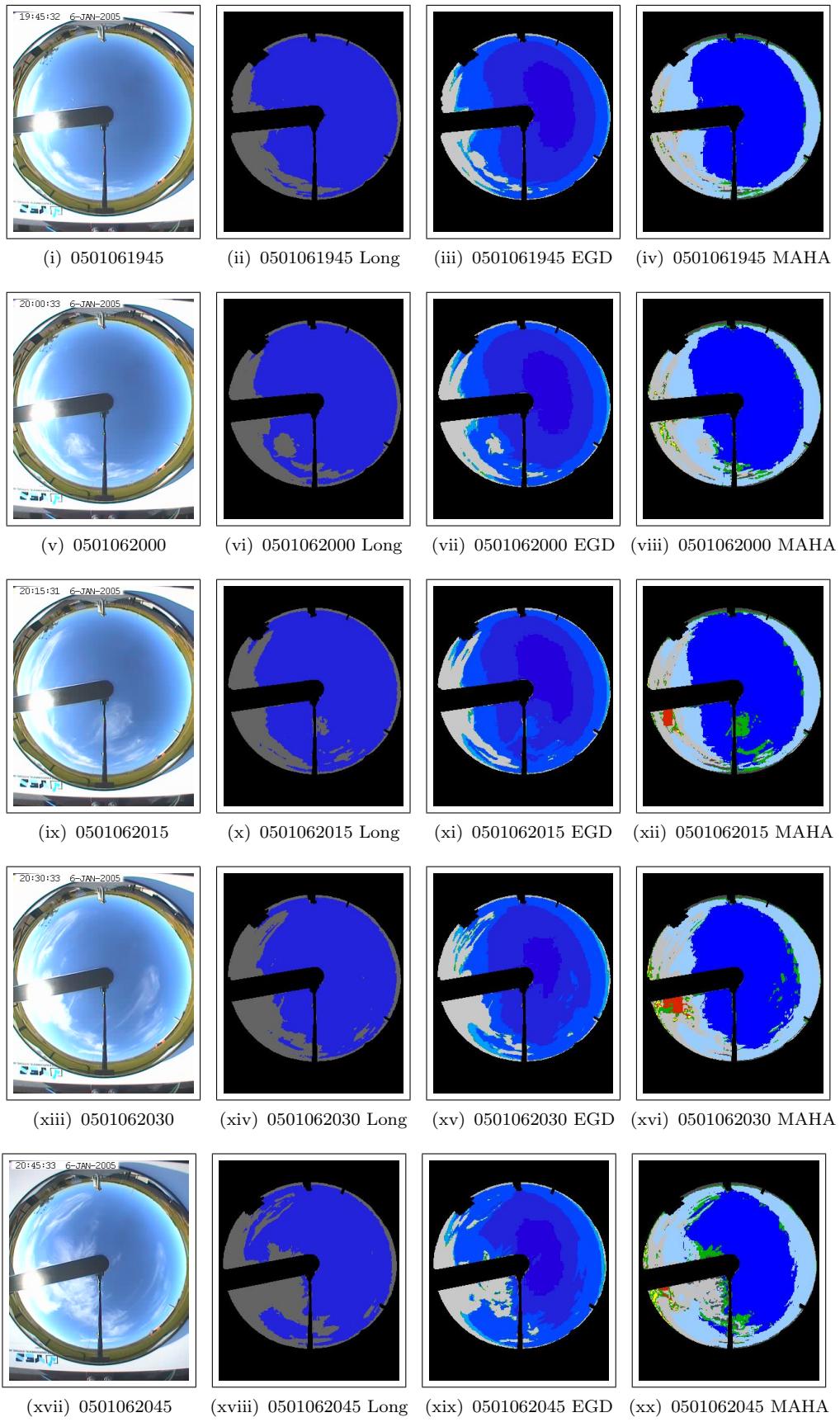


Figure A.71 - Sky images generated from 0501061945 to 0501062045.

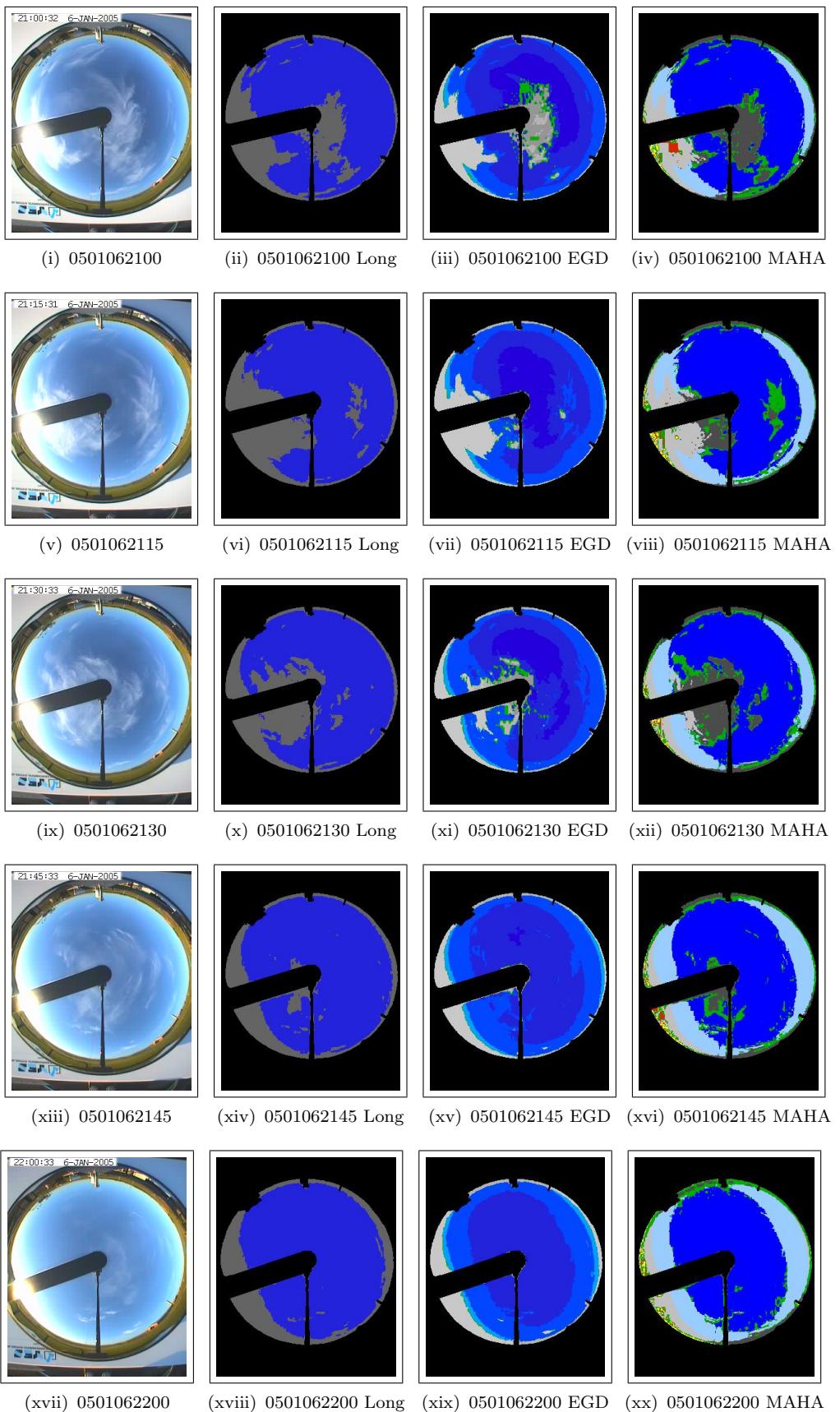


Figure A.72 - Sky images generated from 0501062100 to 0501062200.

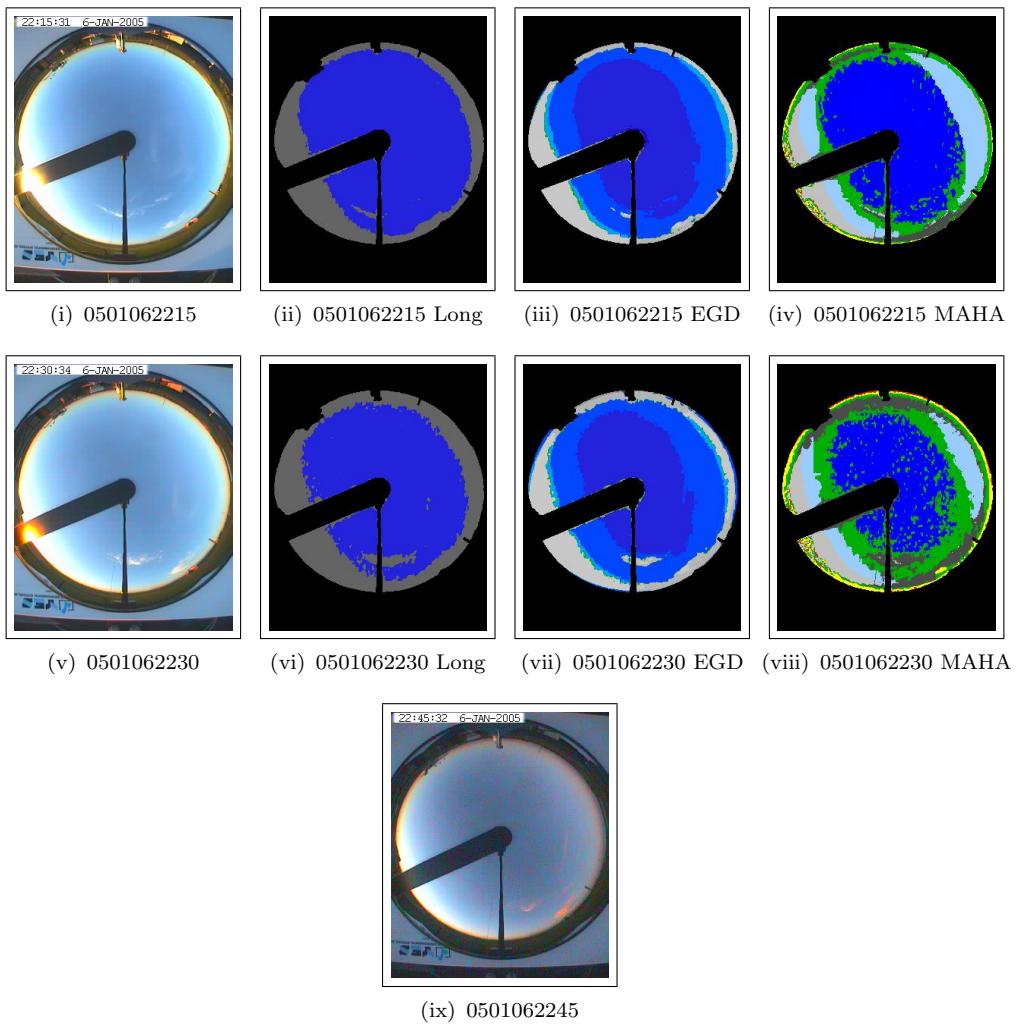


Figure A.73 - Sky images generated from 0501061600 to 0501062245.

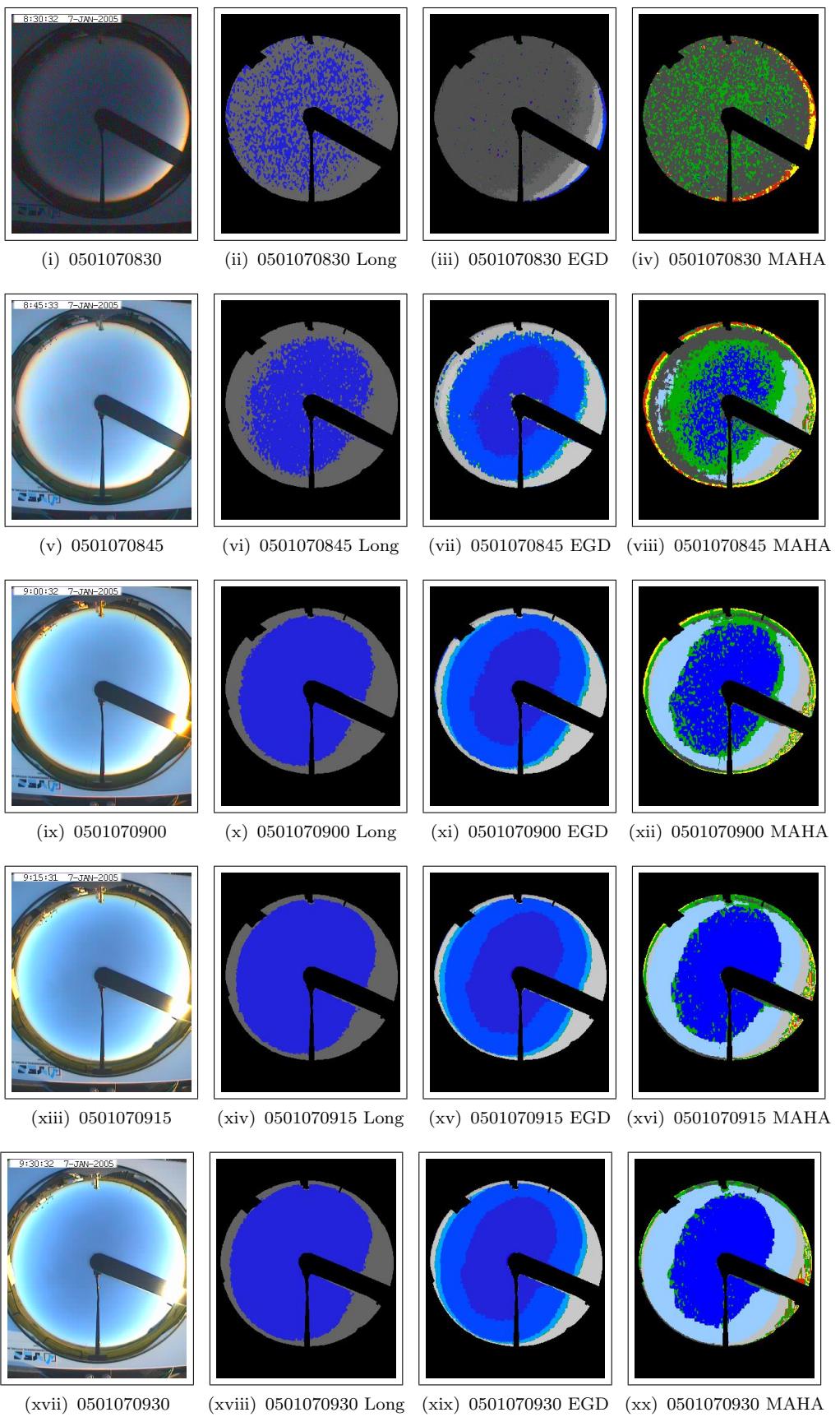


Figure A.74 - Sky images generated from 0501070830 to 0501070930.

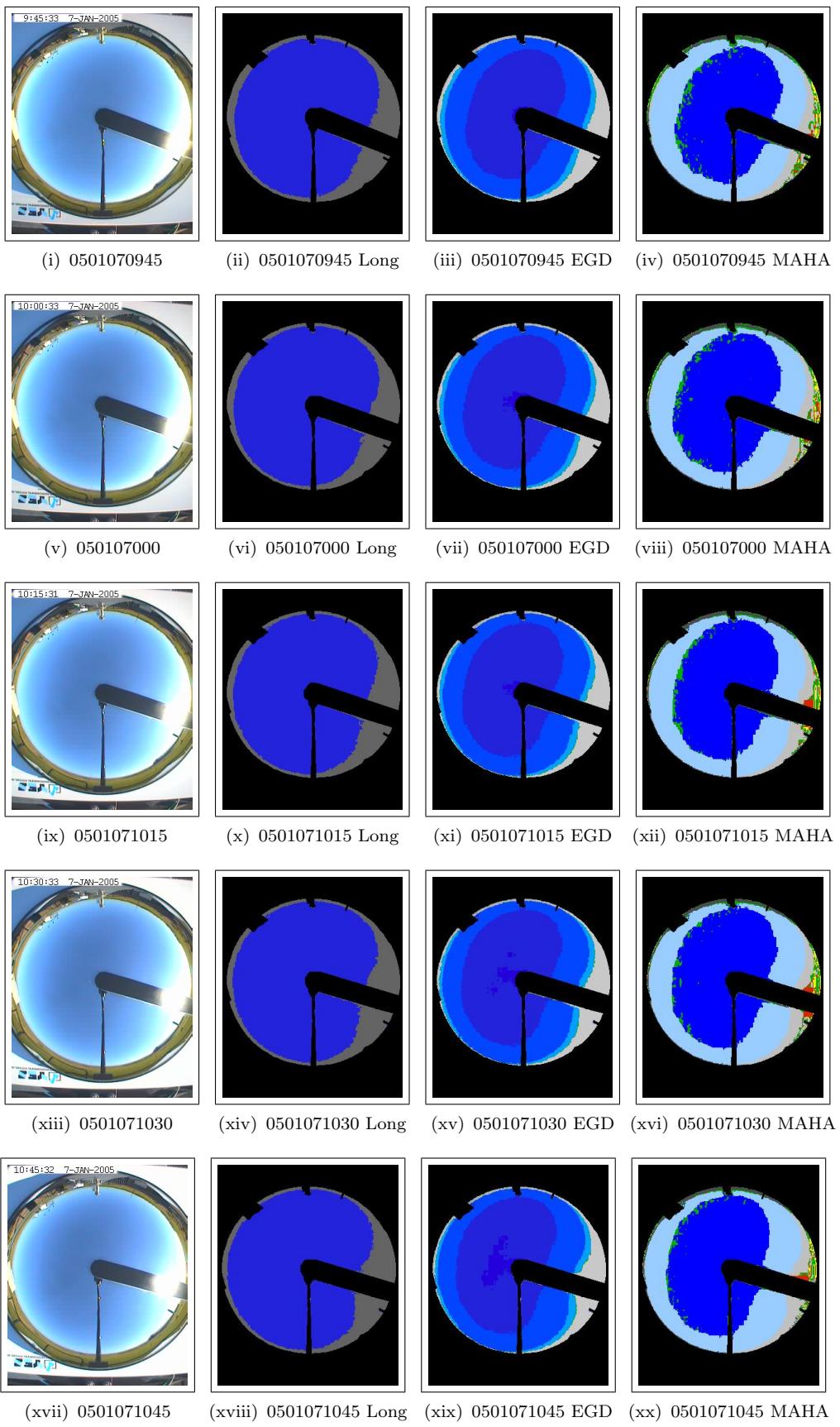


Figure A.75 - Sky images generated from 0501070945 to 0501071045.

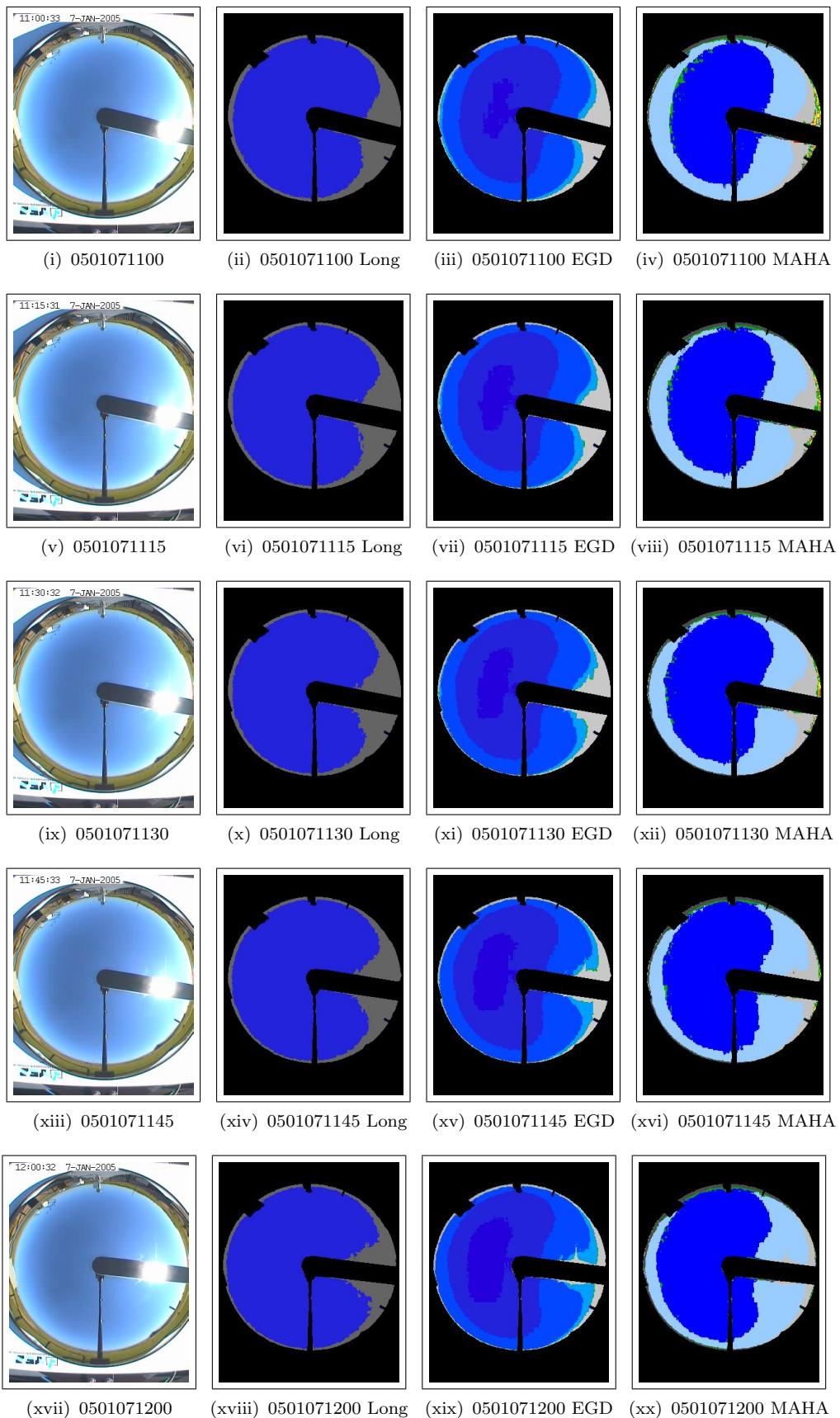


Figure A.76 - Sky images generated from 050107100 to 0501071200.

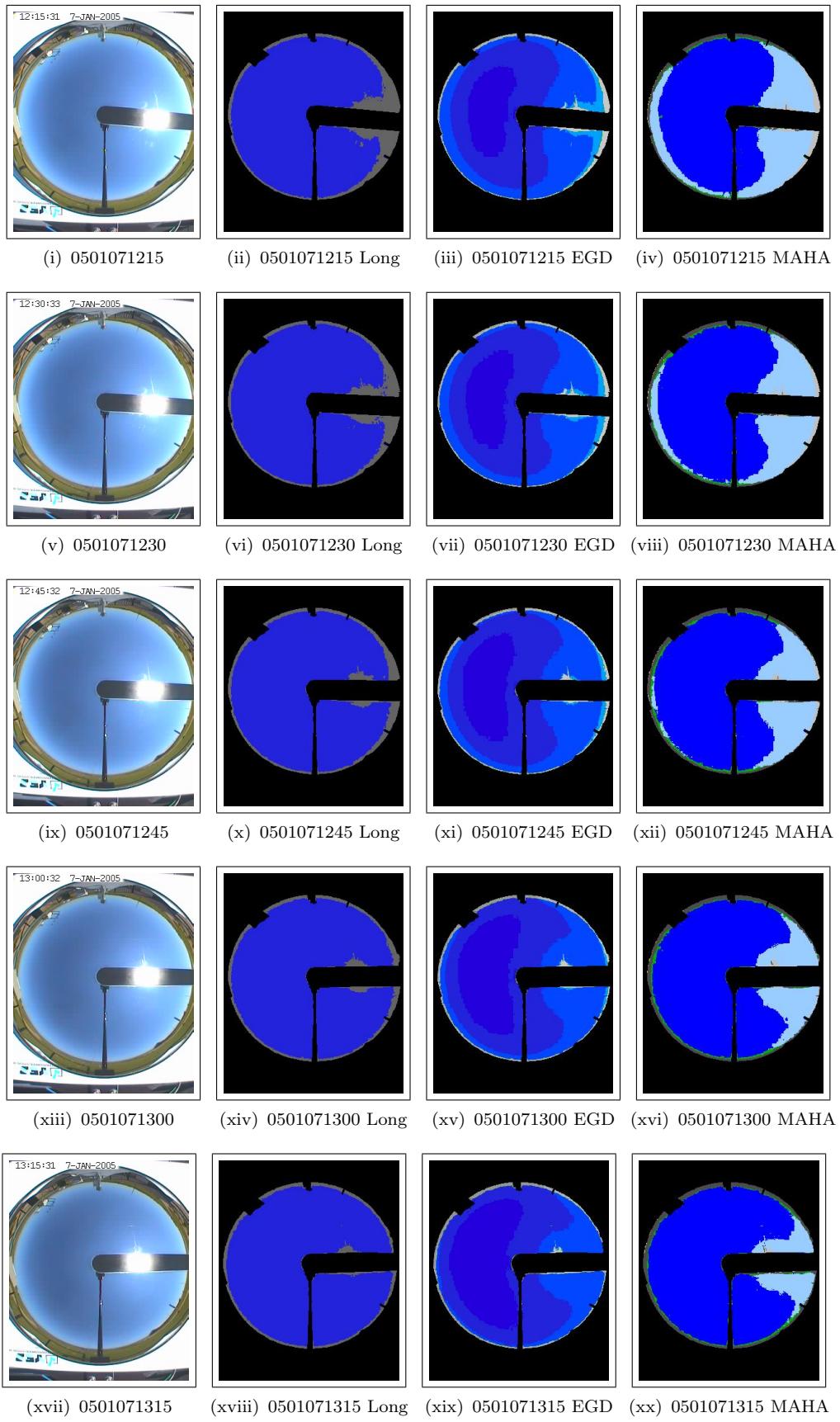


Figure A.77 - Sky images generated from 0501071215 to 0501071315.

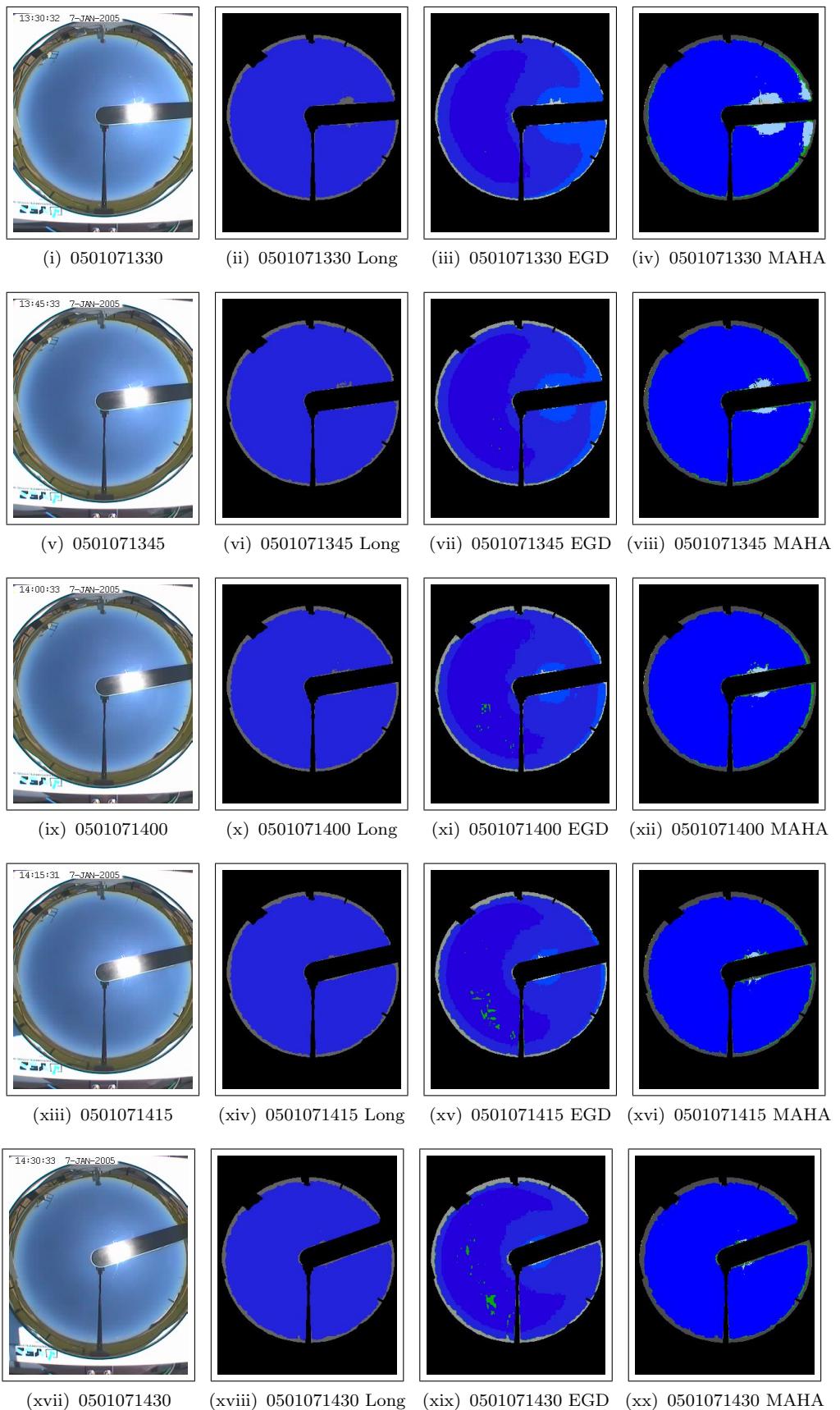


Figure A.78 - Sky images generated from 0501071330 to 0501071430.

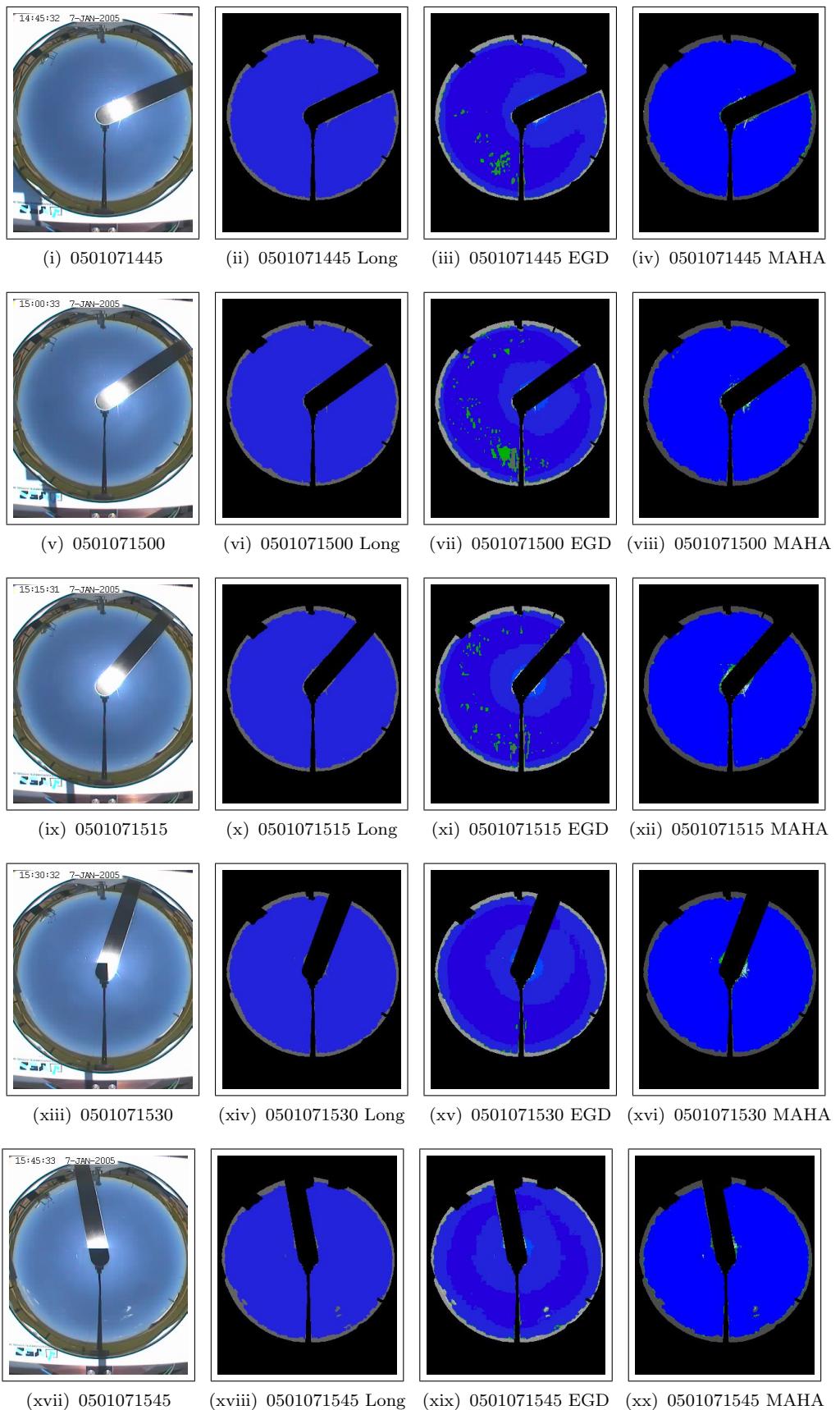


Figure A.79 - Sky images generated from 0501071445 to 0501071545.

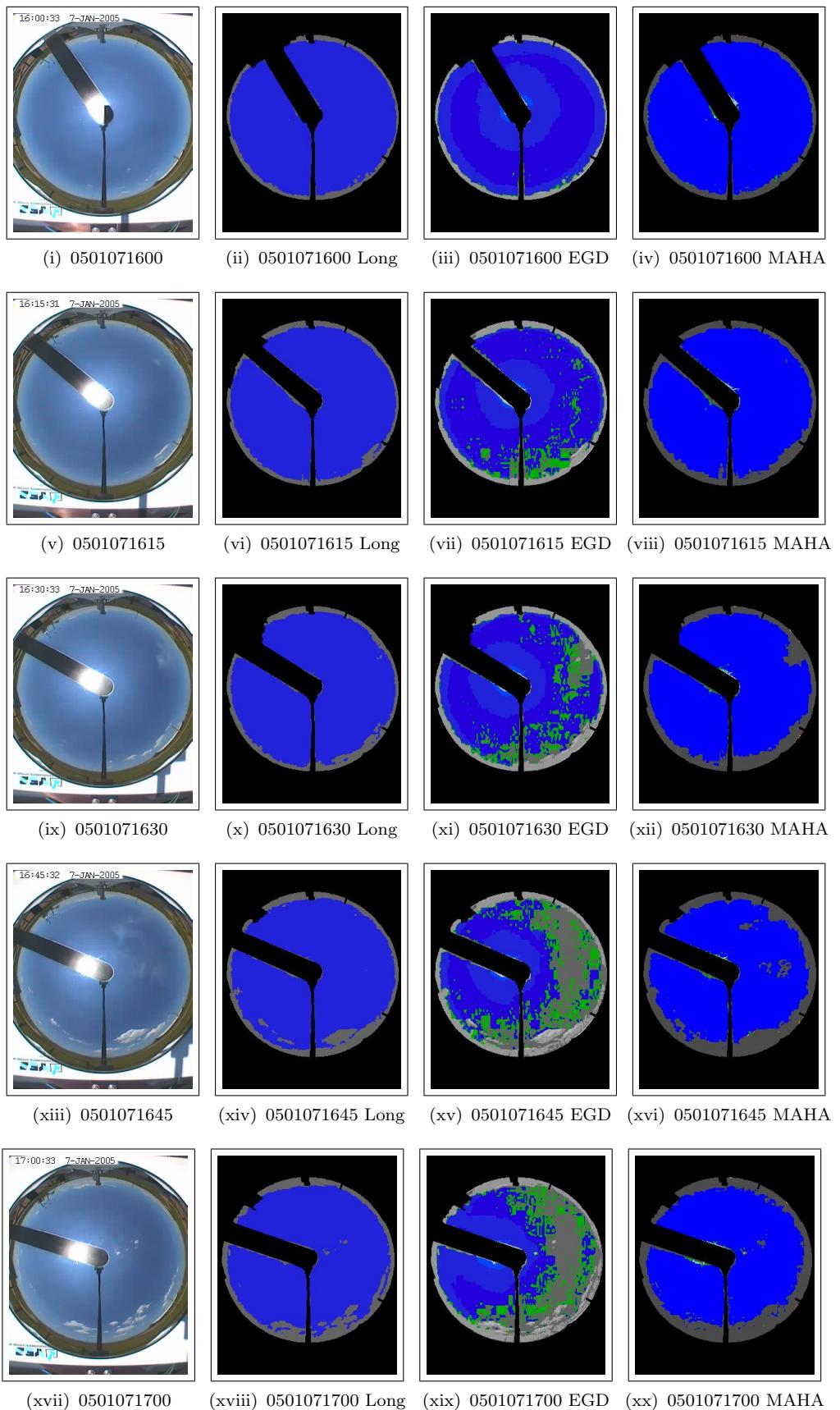


Figure A.80 - Sky images generated from 0501071600 to 0501071700.

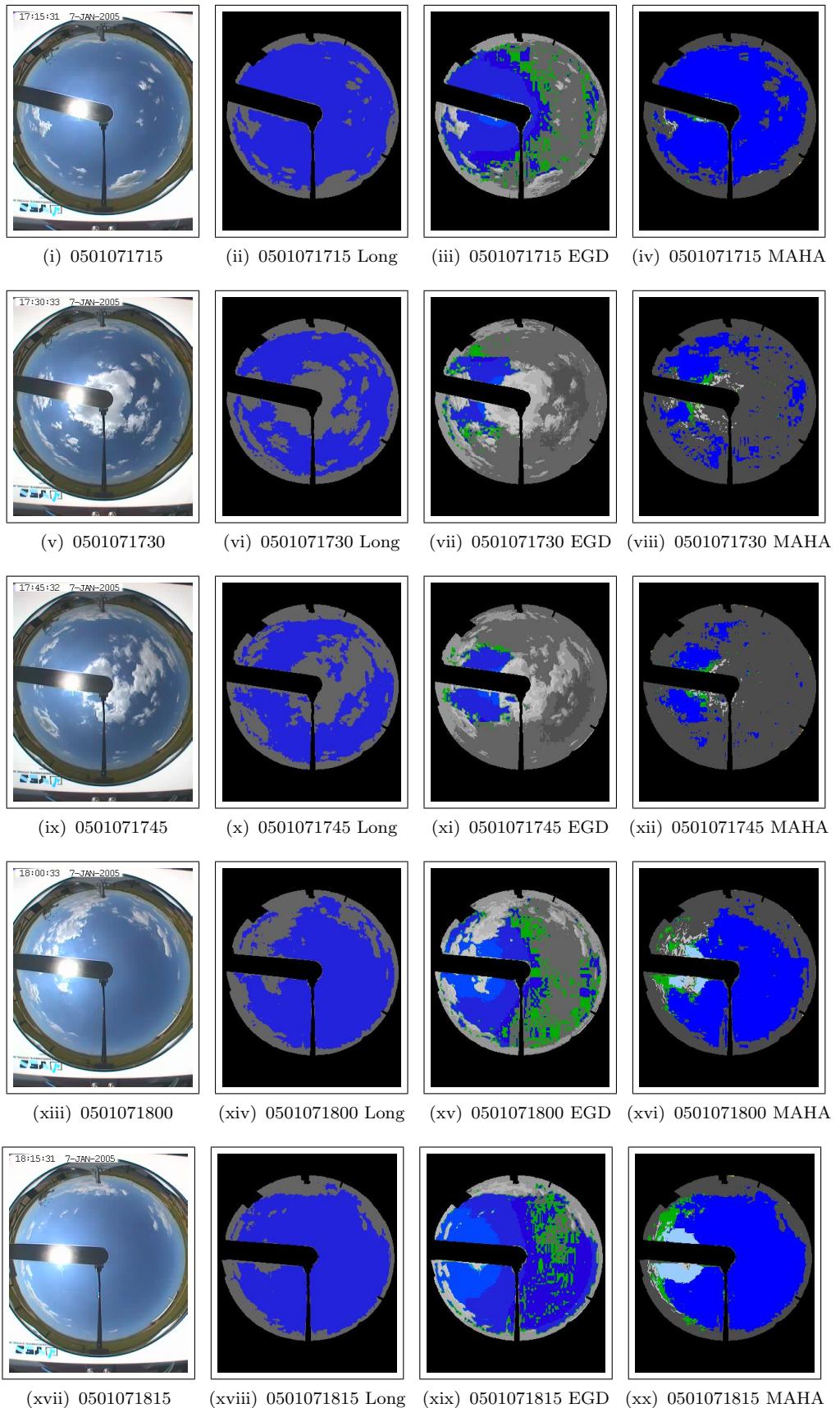


Figure A.81 - Sky images generated from 0501071715 to 0501071815.

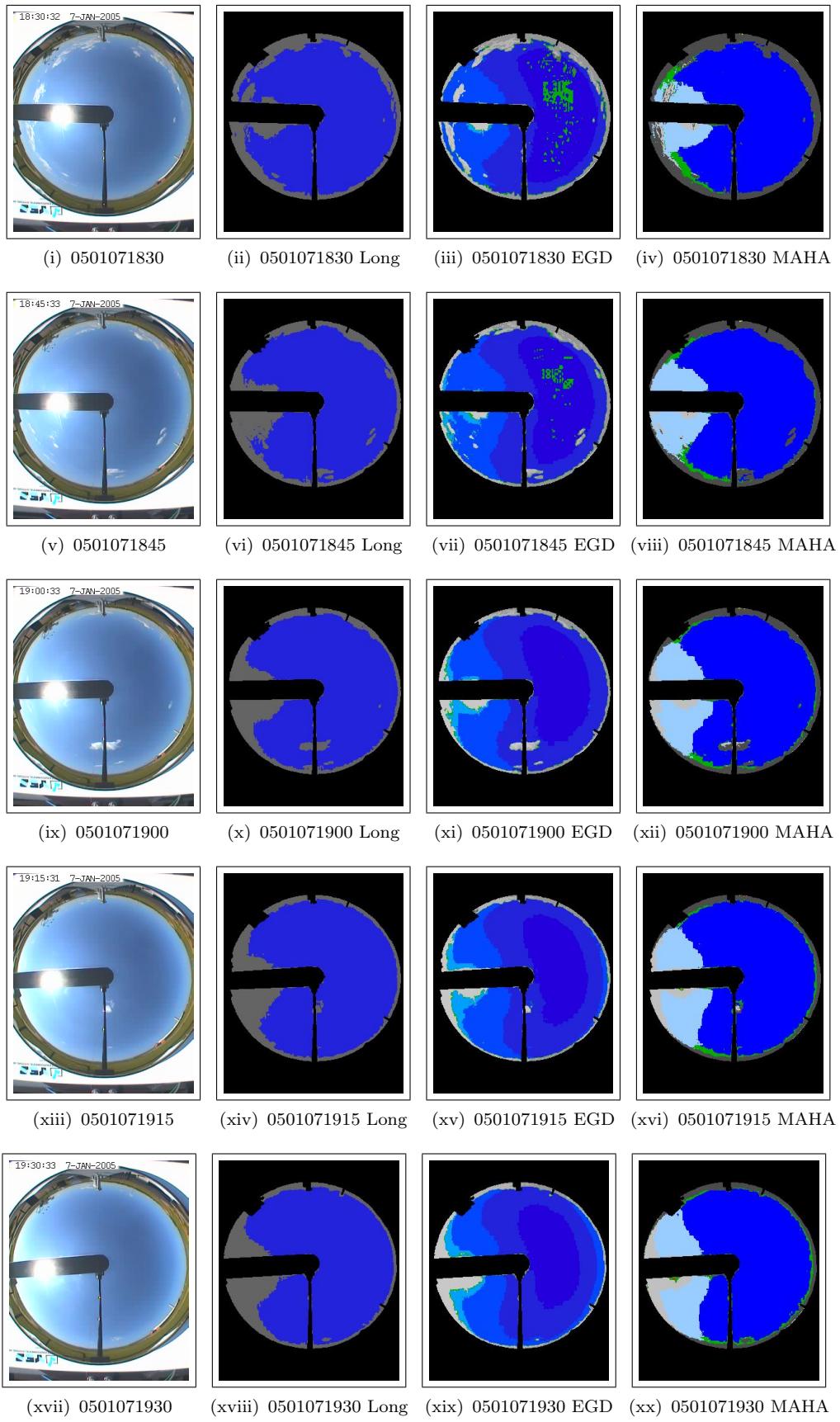


Figure A.82 - Sky images generated from 0501071830 to 0501071930.

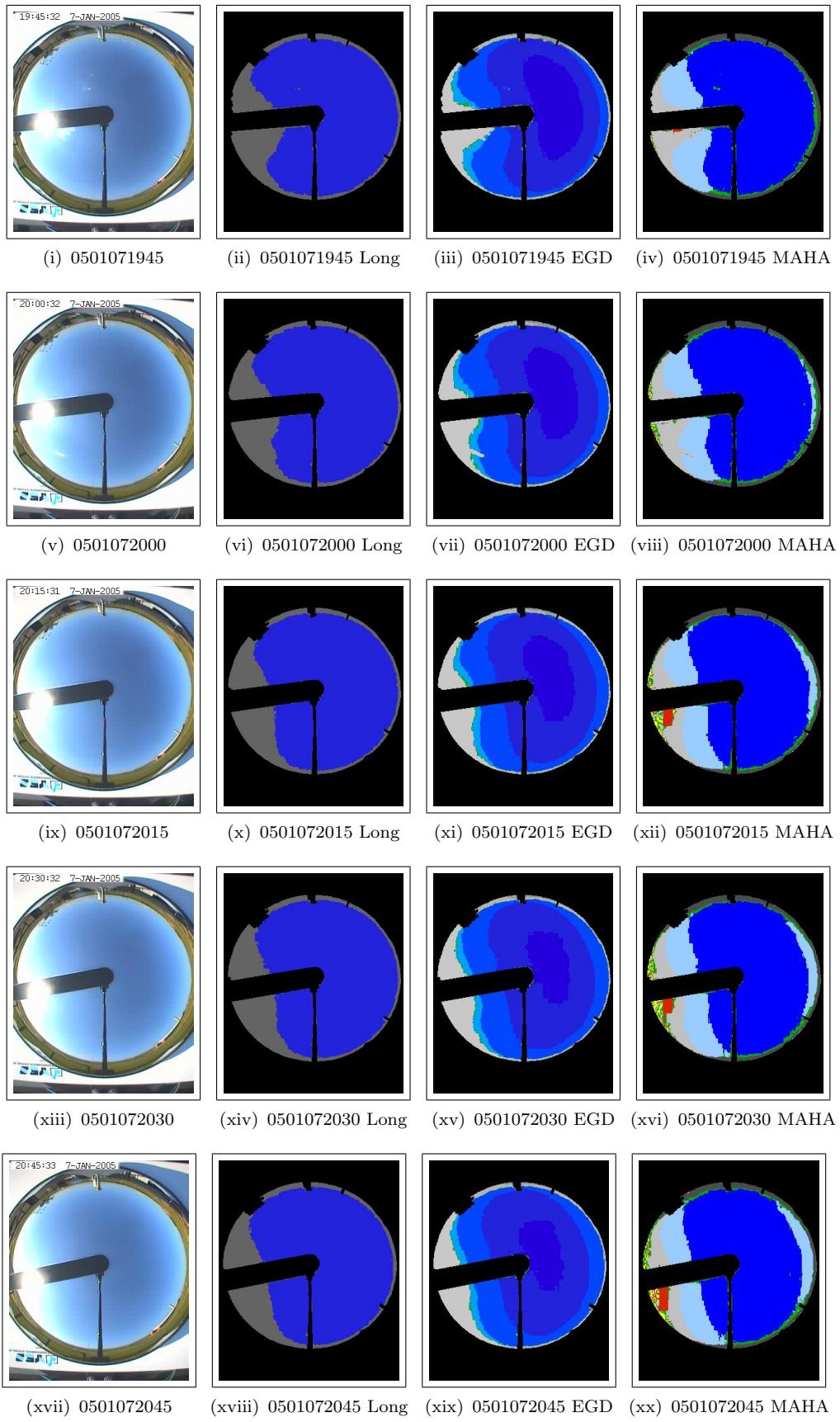


Figure A.83 - Sky images generated from 0501071945 to 0501072045.

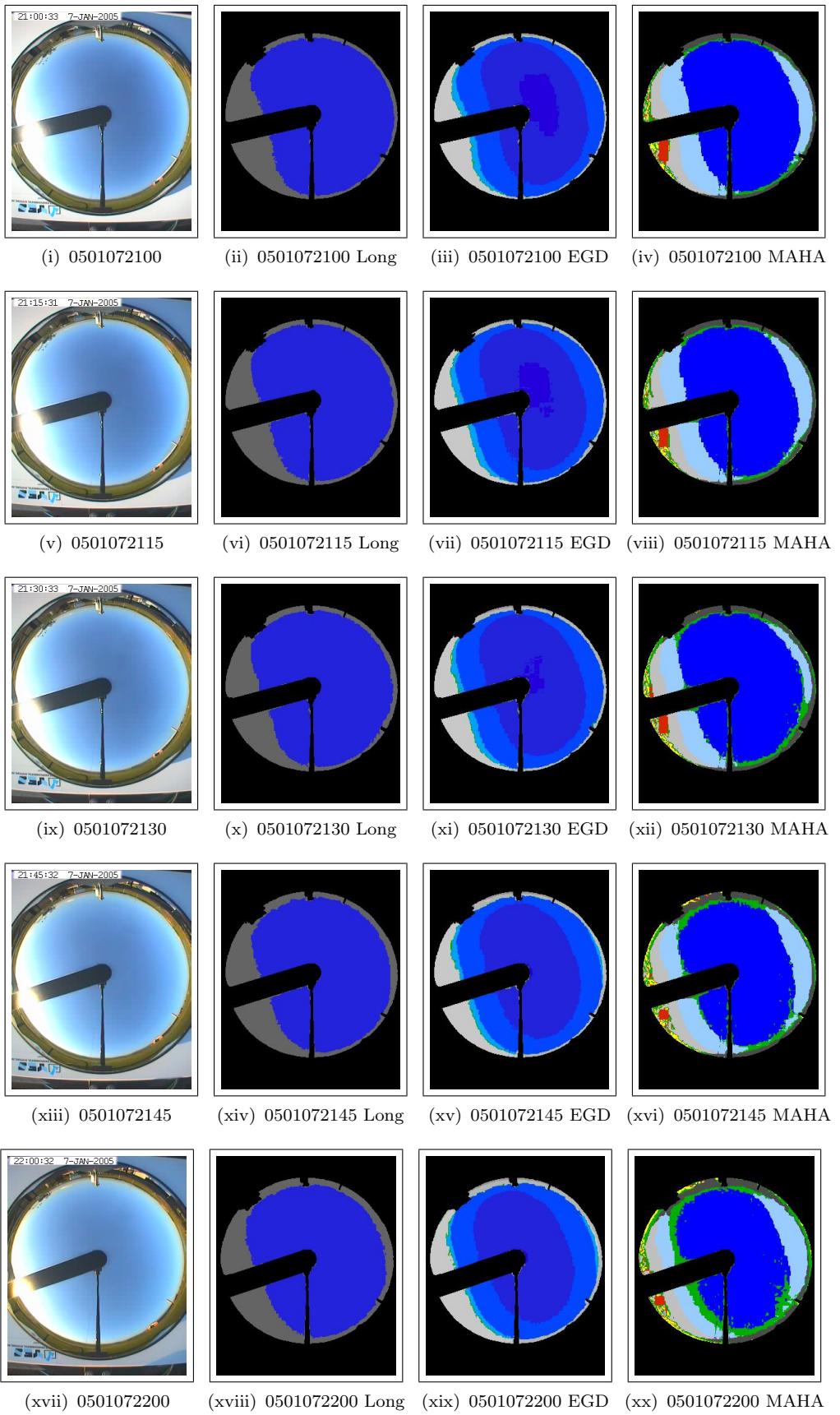


Figure A.84 - Sky images generated from 0501072100 to 0501072200.

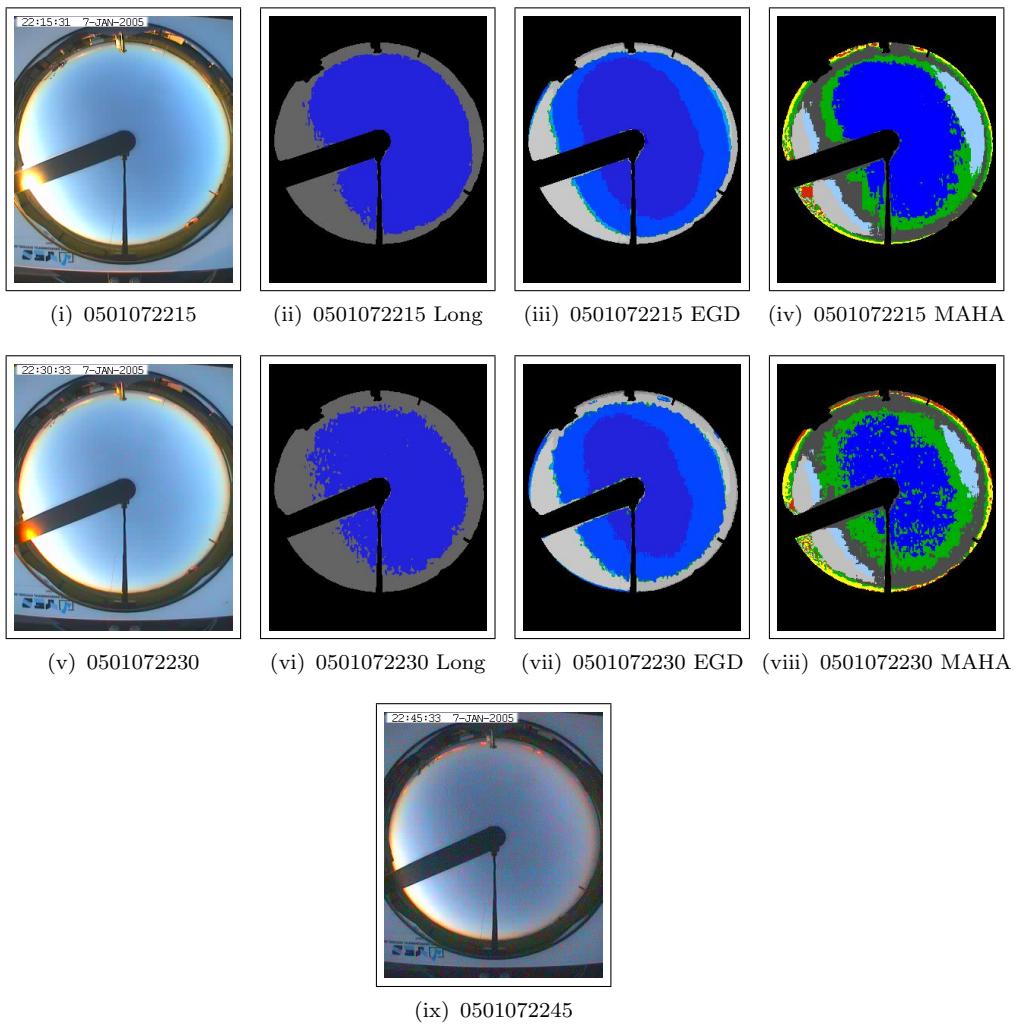


Figure A.85 - Sky images generated from 0501071600 to 0501072245.

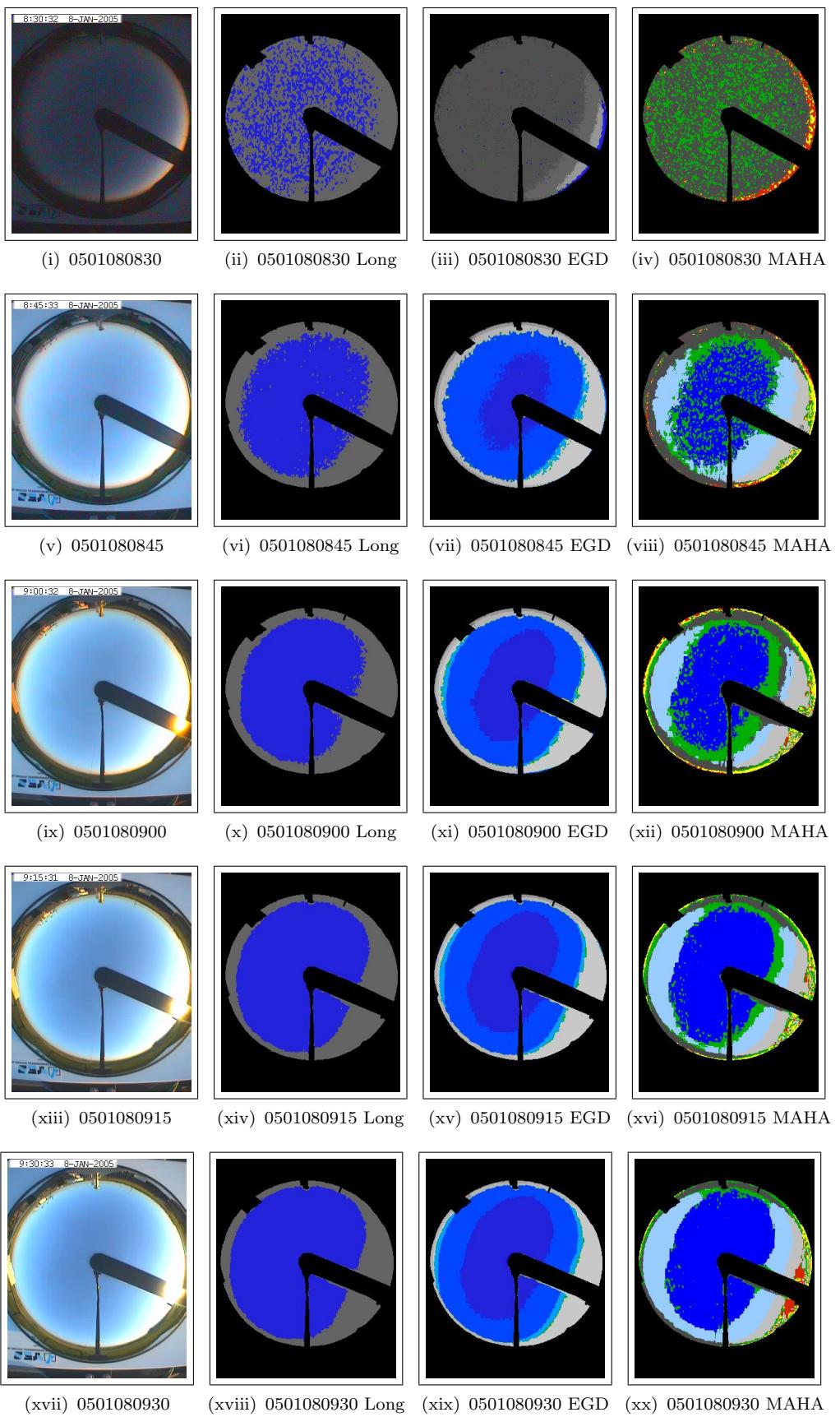


Figure A.86 - Sky images generated from 0501080830 to 0501080930.

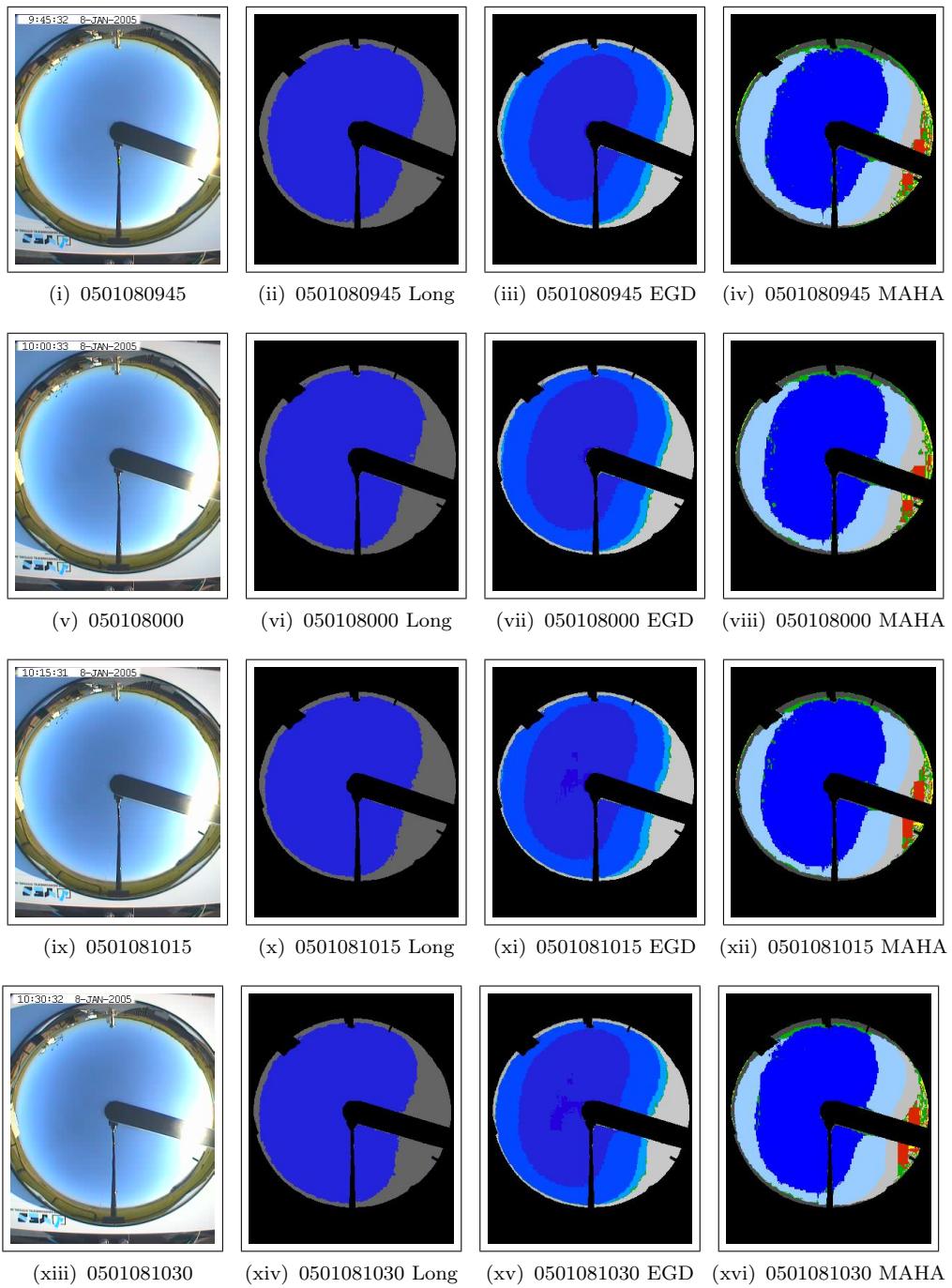


Figure A.87 - Sky images generated from 0501080945 to 0501081030.

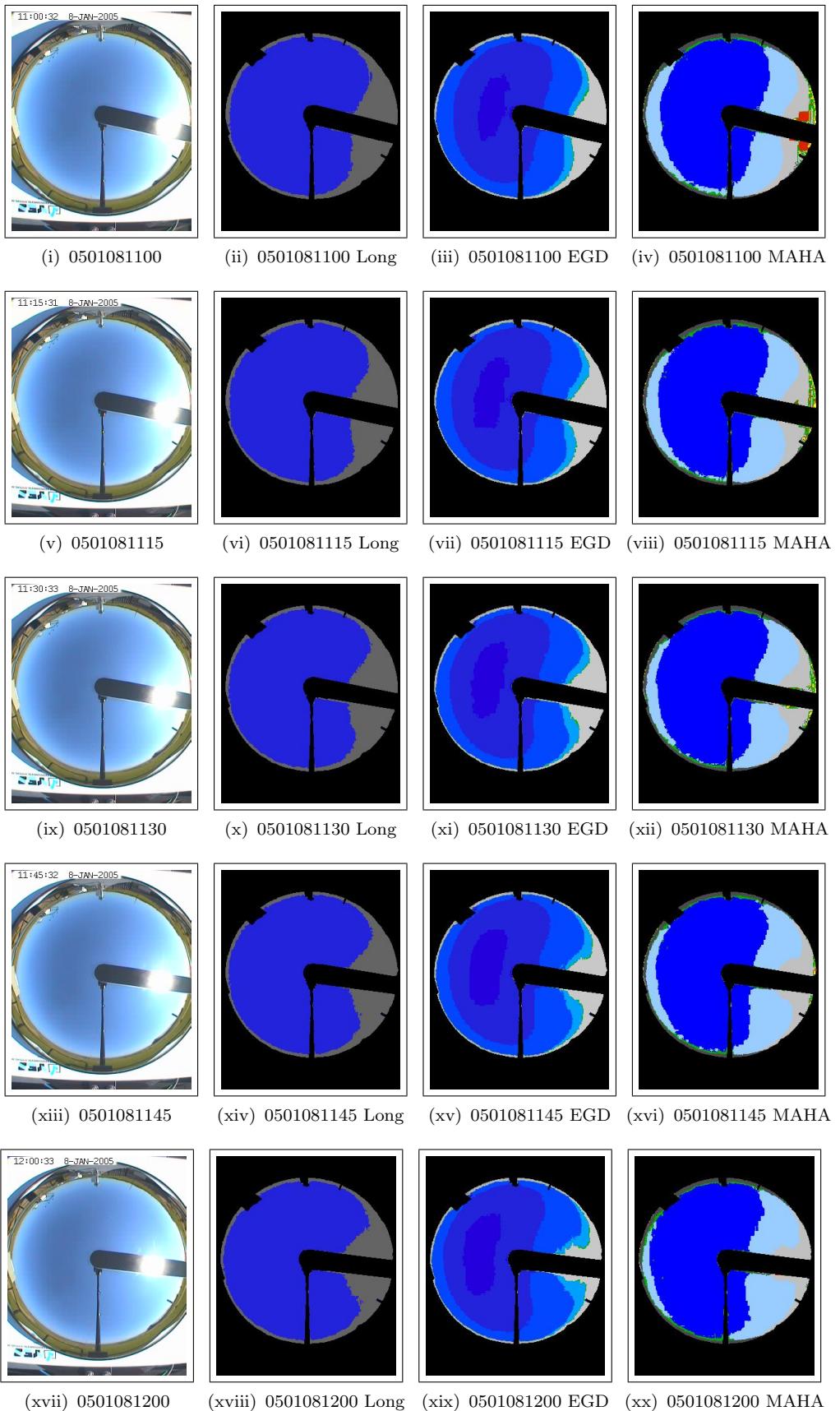


Figure A.88 - Sky images generated from 050108100 to 0501081200.

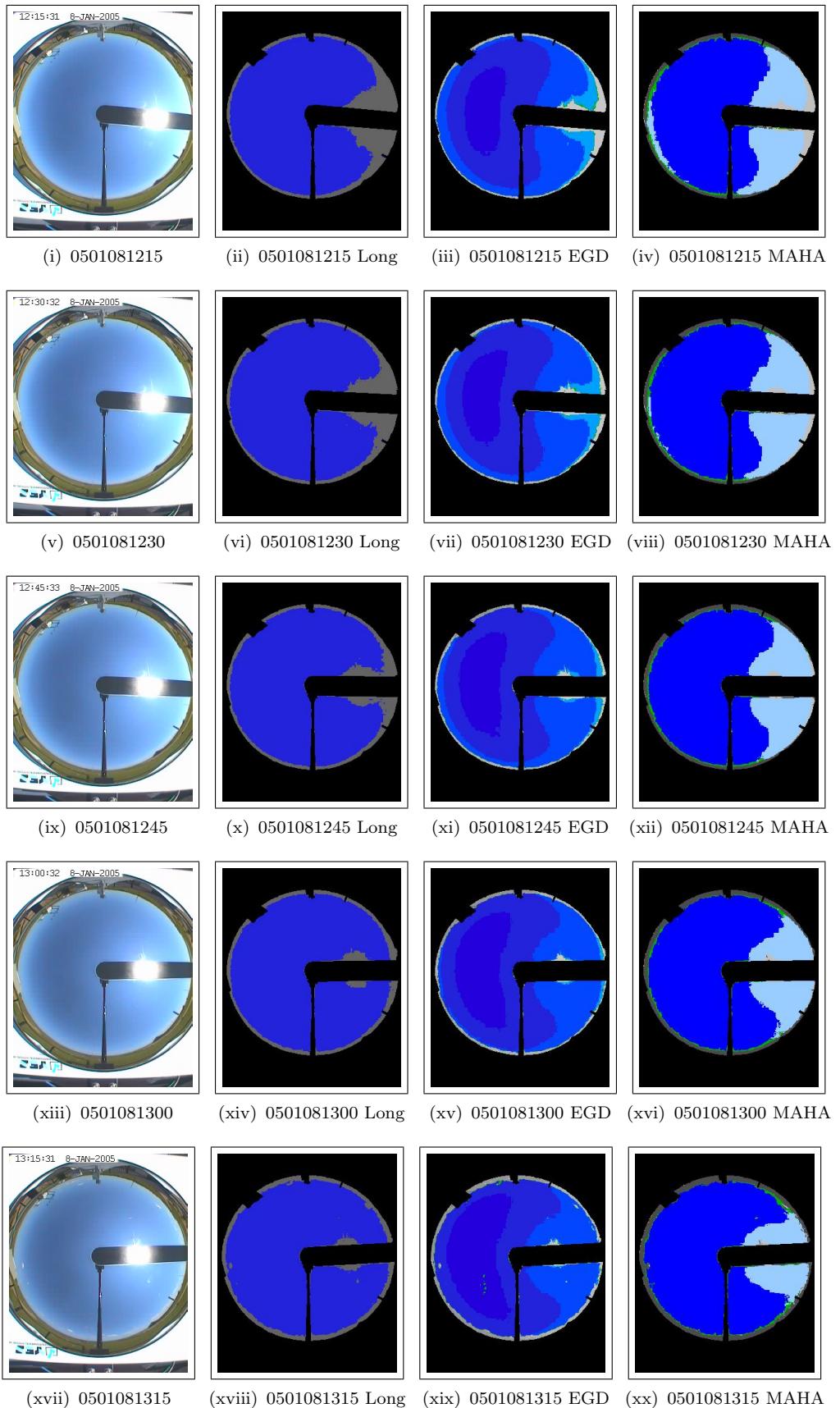


Figure A.89 - Sky images generated from 0501081215 to 0501081315.

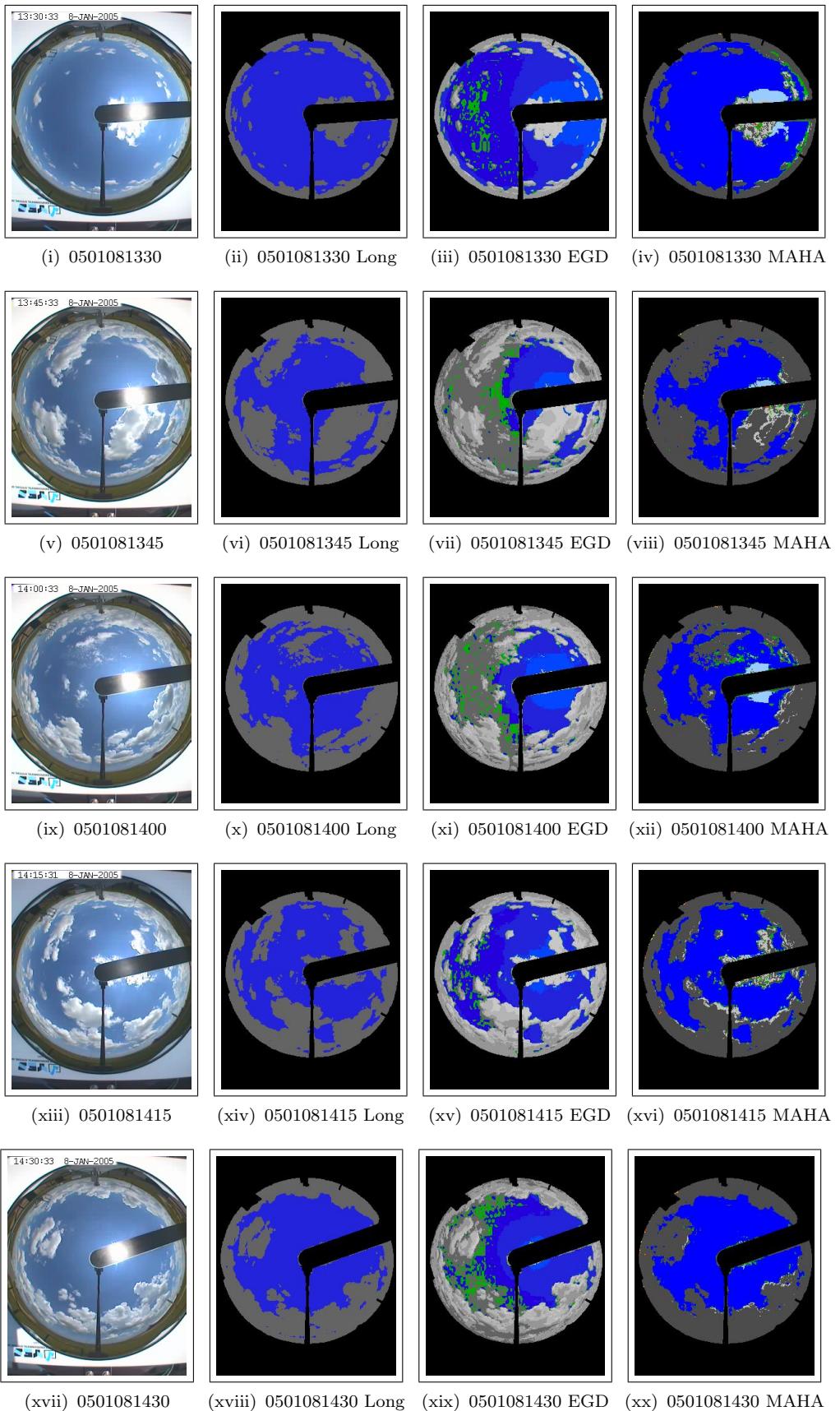


Figure A.90 - Sky images generated from 0501081330 to 0501081430.

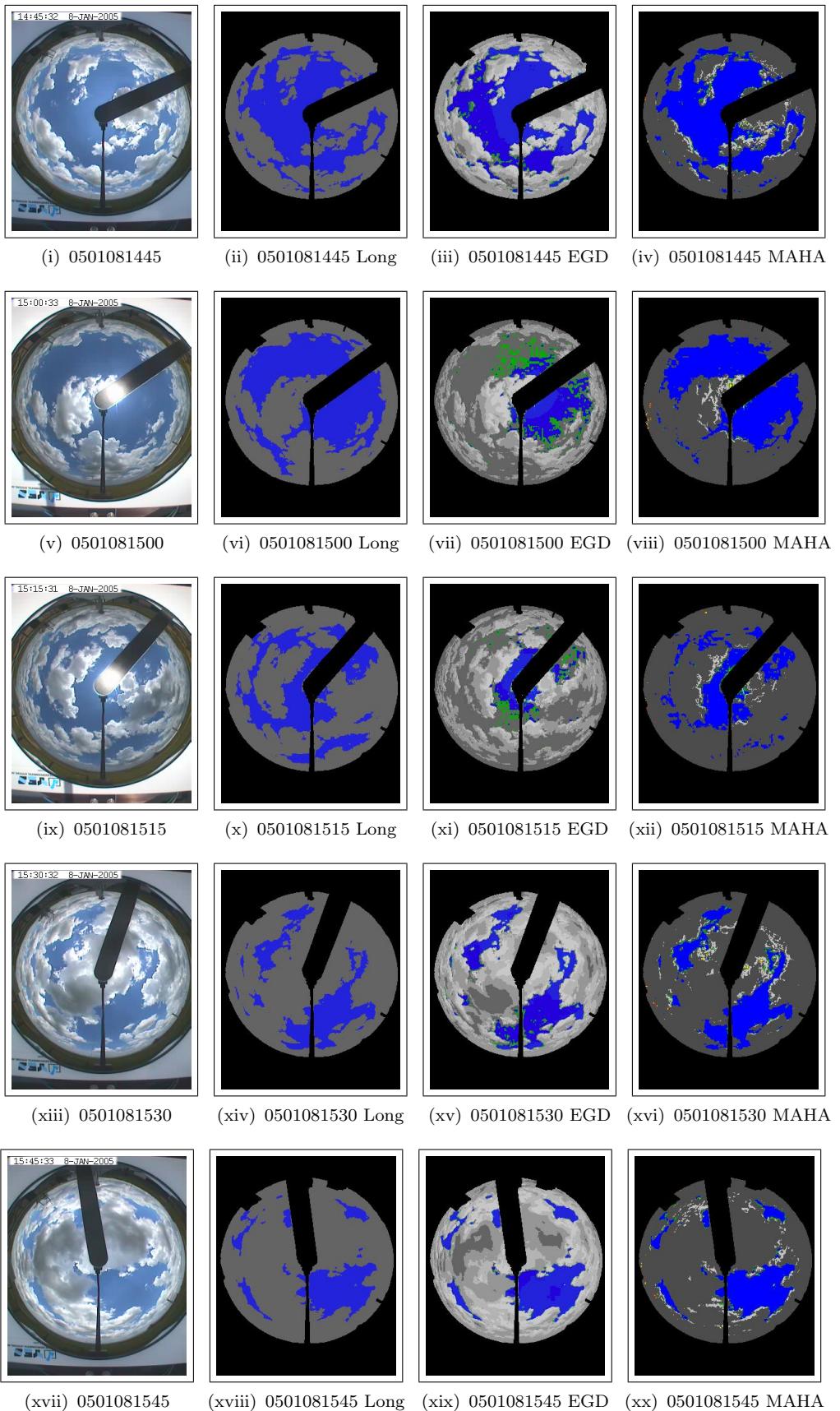


Figure A.91 - Sky images generated from 0501081445 to 0501081545.

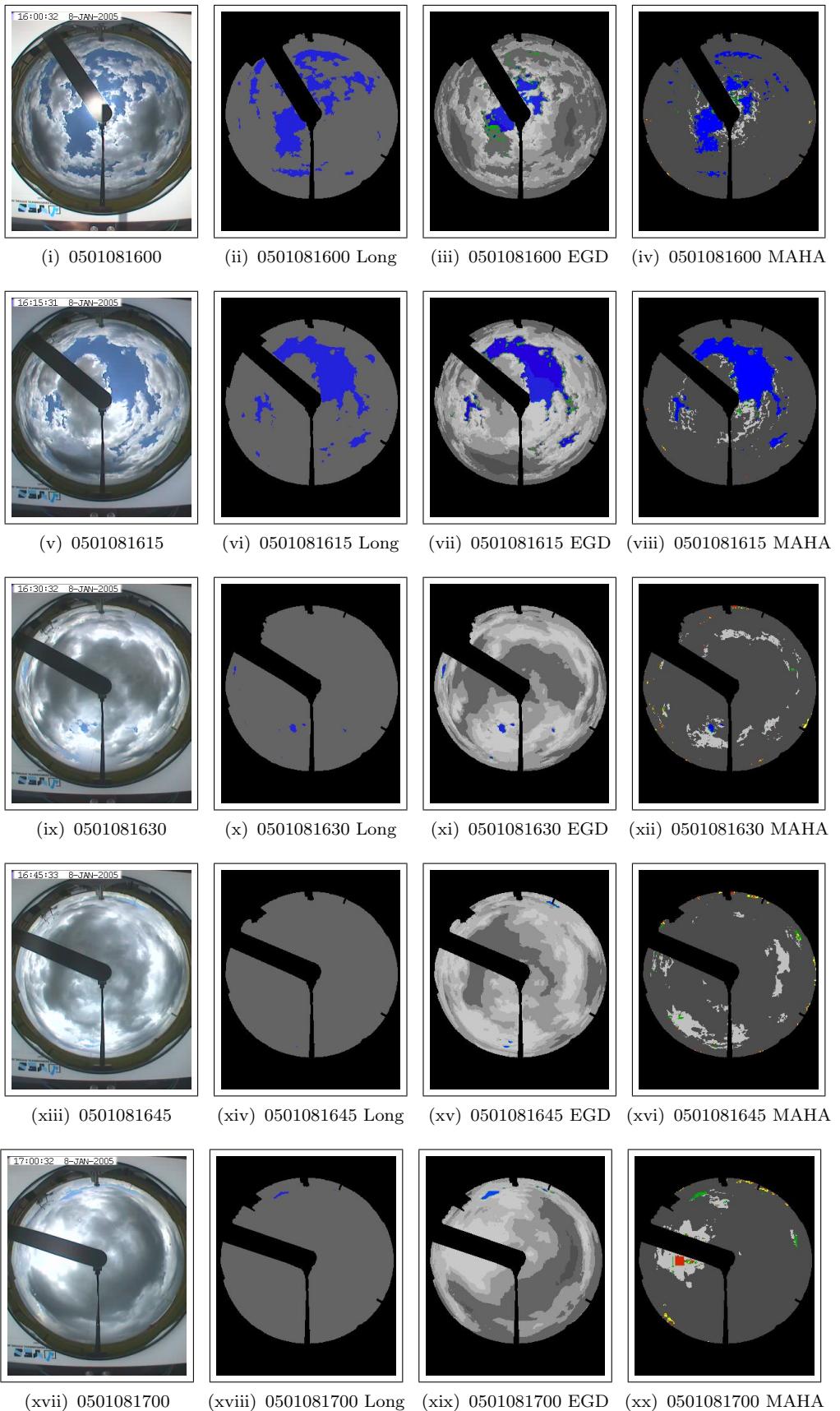


Figure A.92 - Sky images generated from 0501081600 to 0501081700.

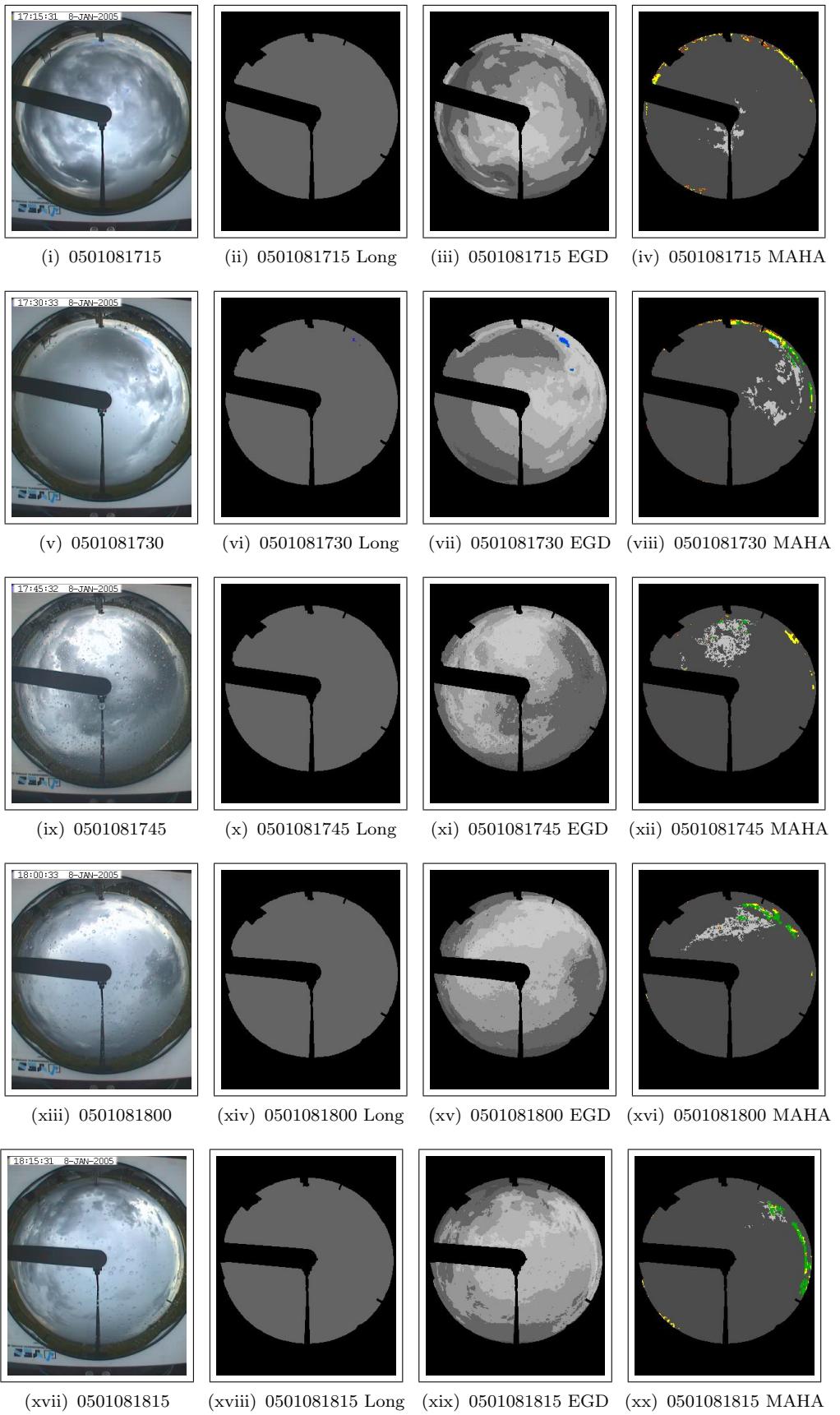


Figure A.93 - Sky images generated from 0501081715 to 0501081815.

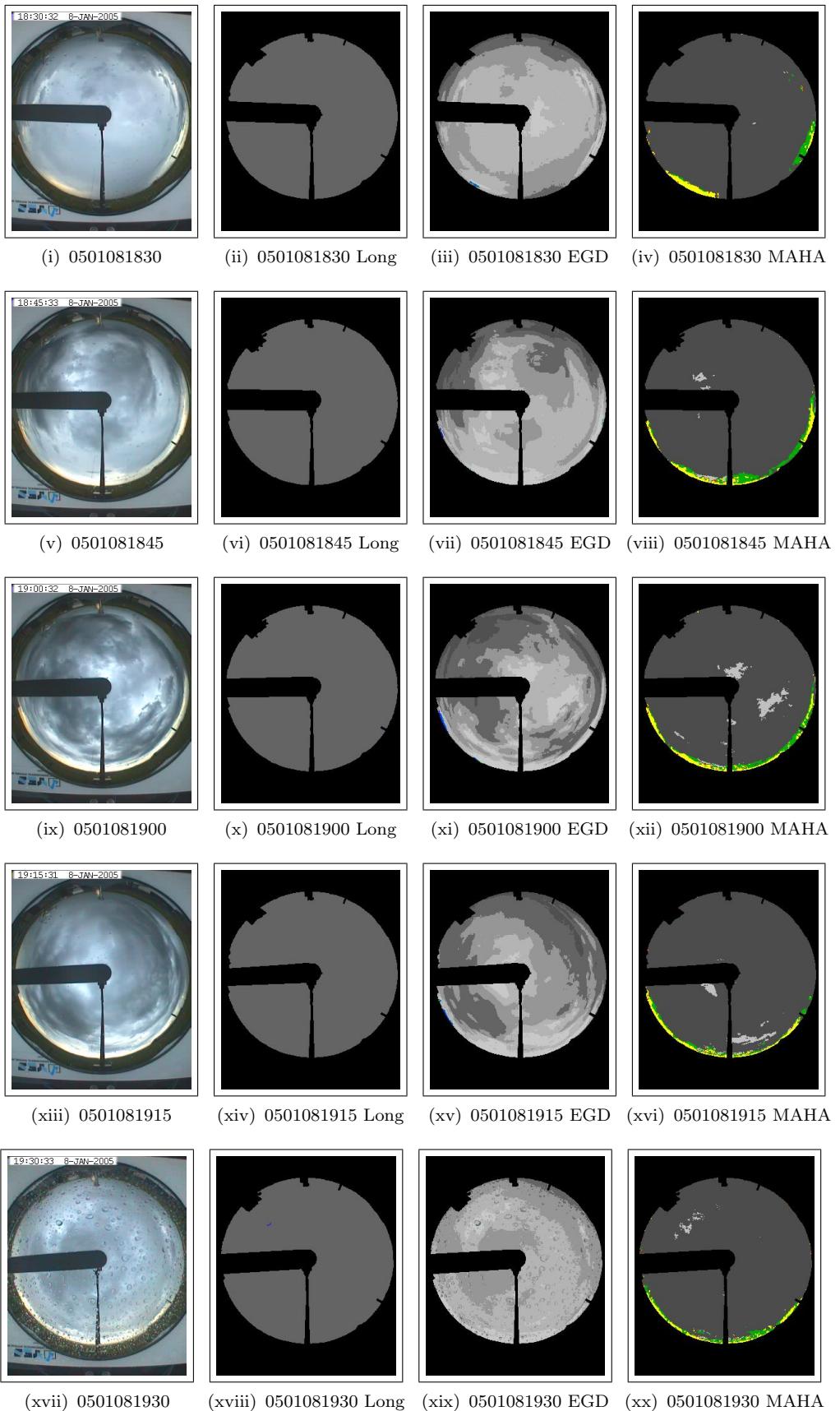


Figure A.94 - Sky images generated from 0501081830 to 0501081930.

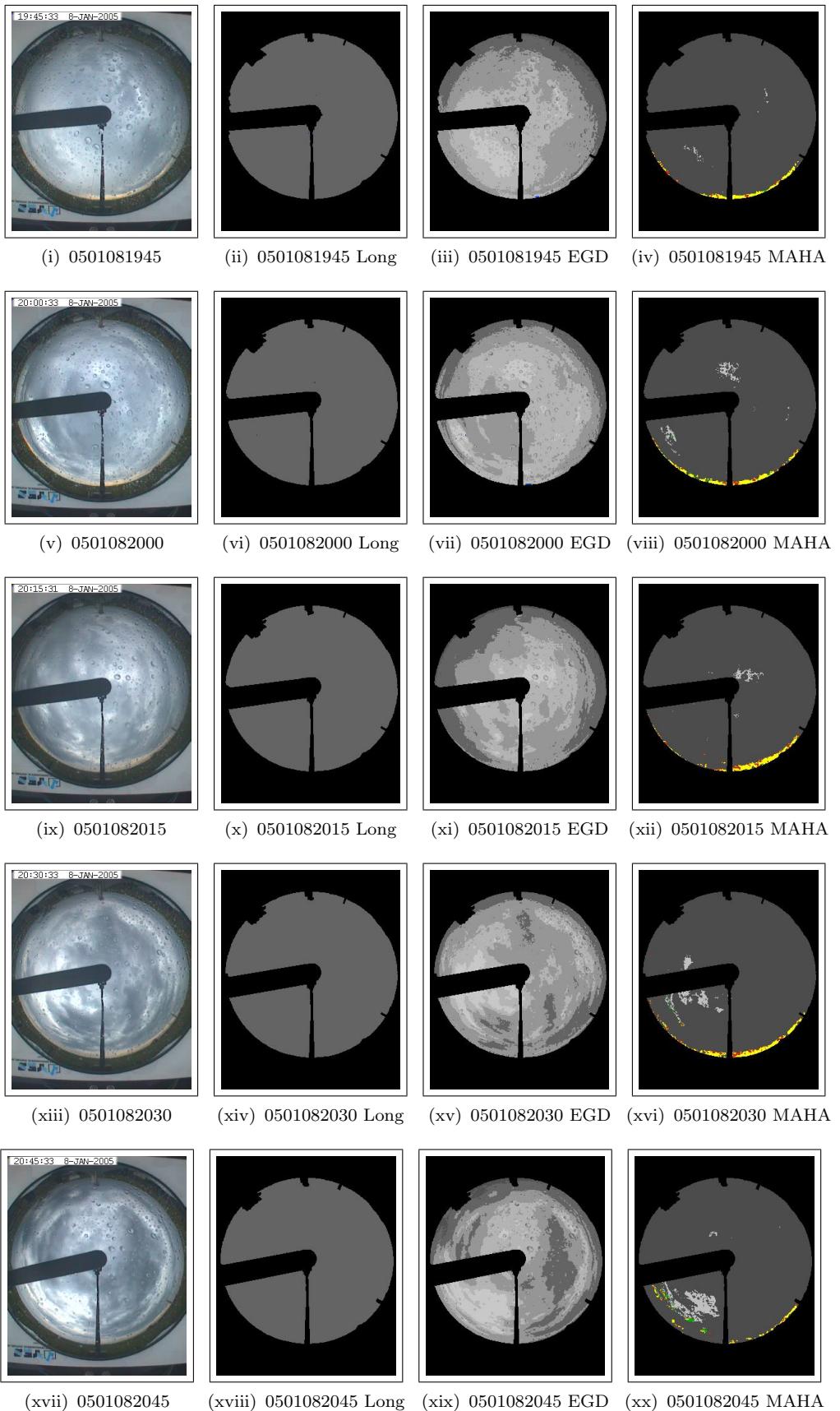


Figure A.95 - Sky images generated from 0501081945 to 0501082045.

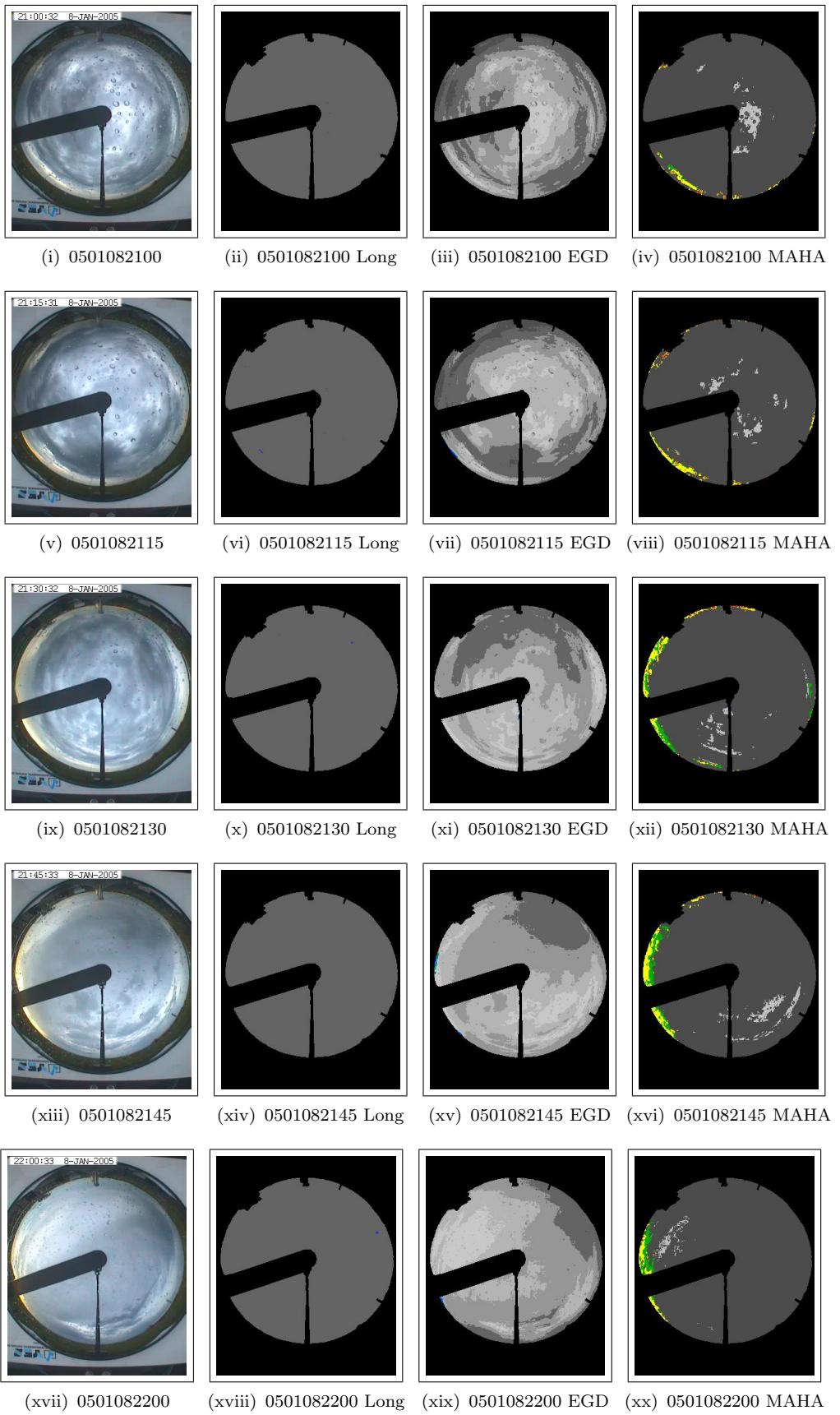


Figure A.96 - Sky images generated from 0501082100 to 0501082200.

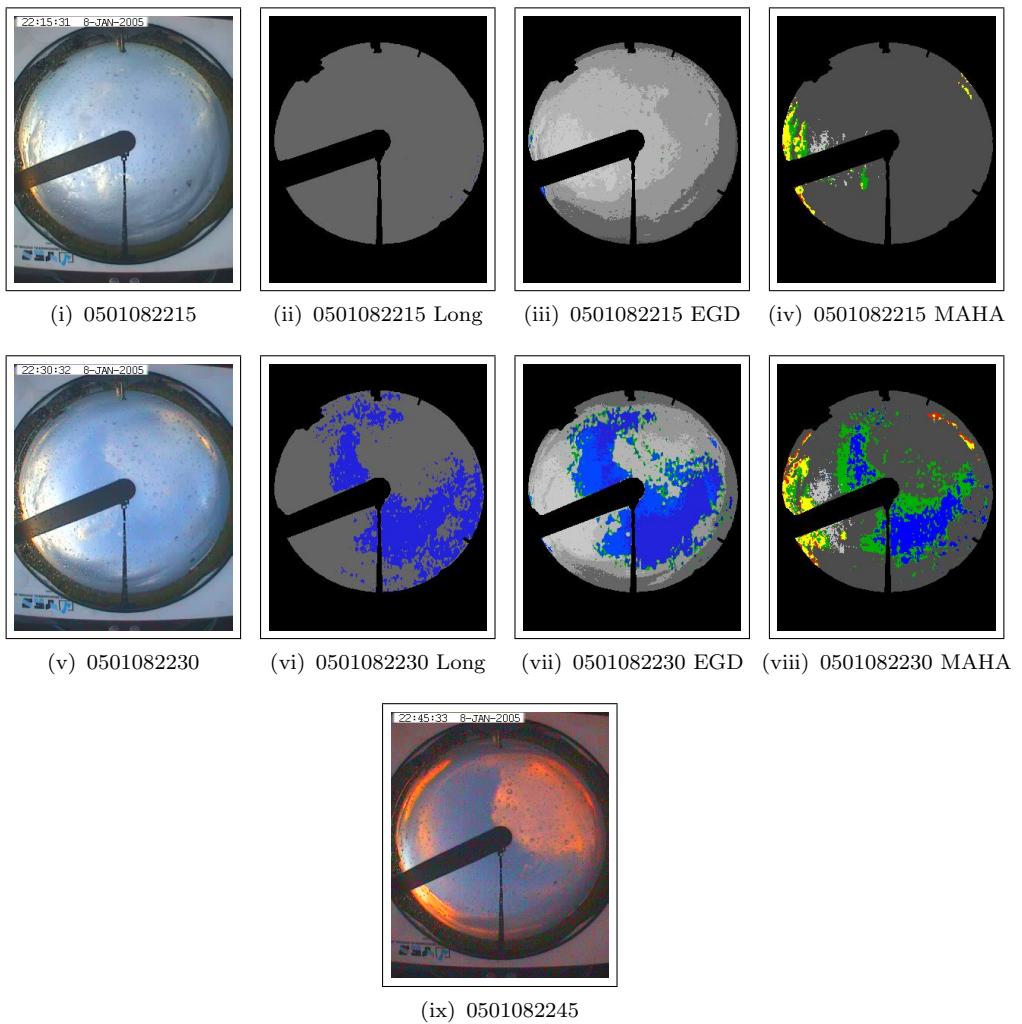


Figure A.97 - Sky images generated from 0501081600 to 0501082245.

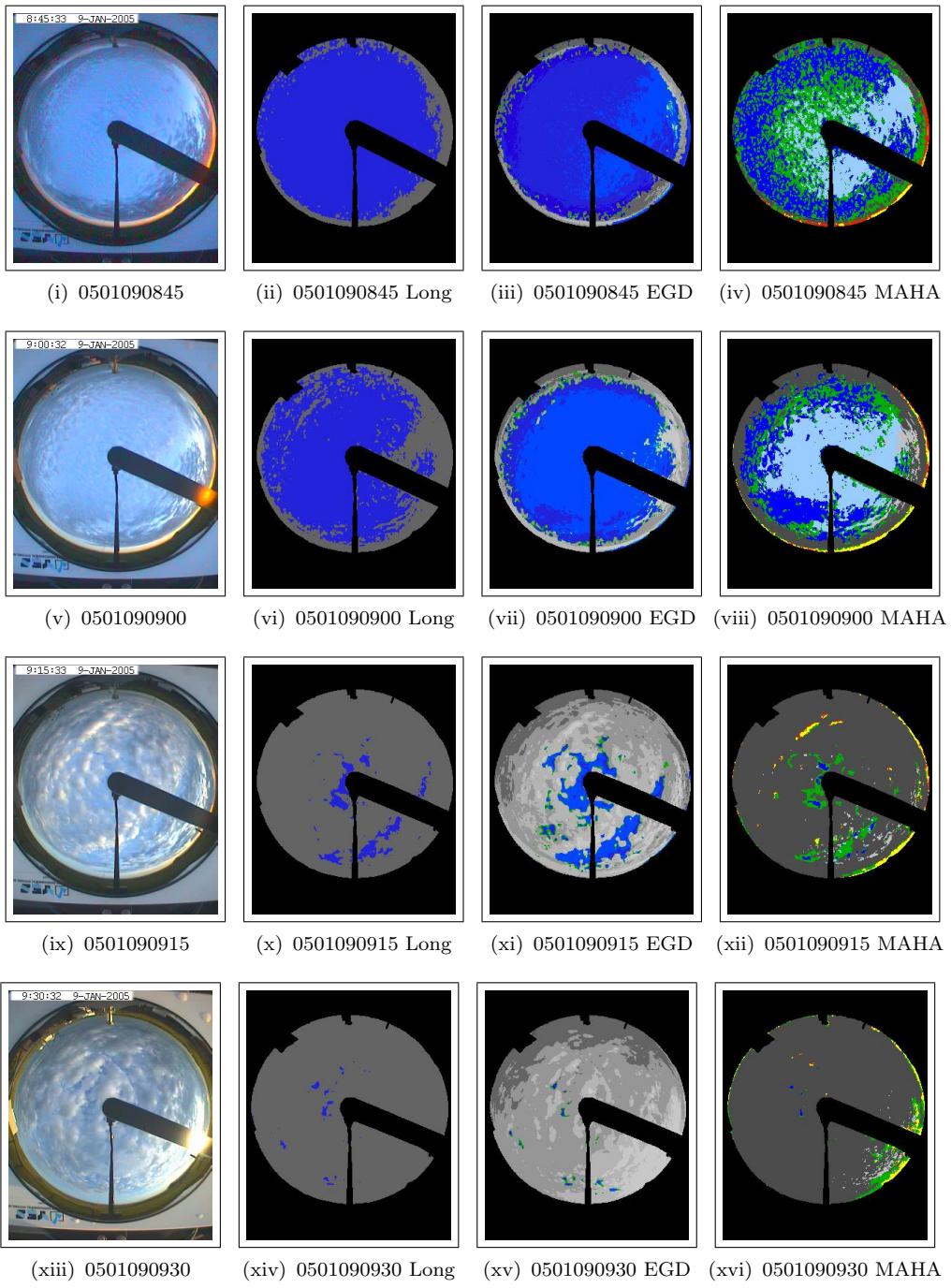


Figure A.98 - Sky images generated from 0501090845 to 0501090930.

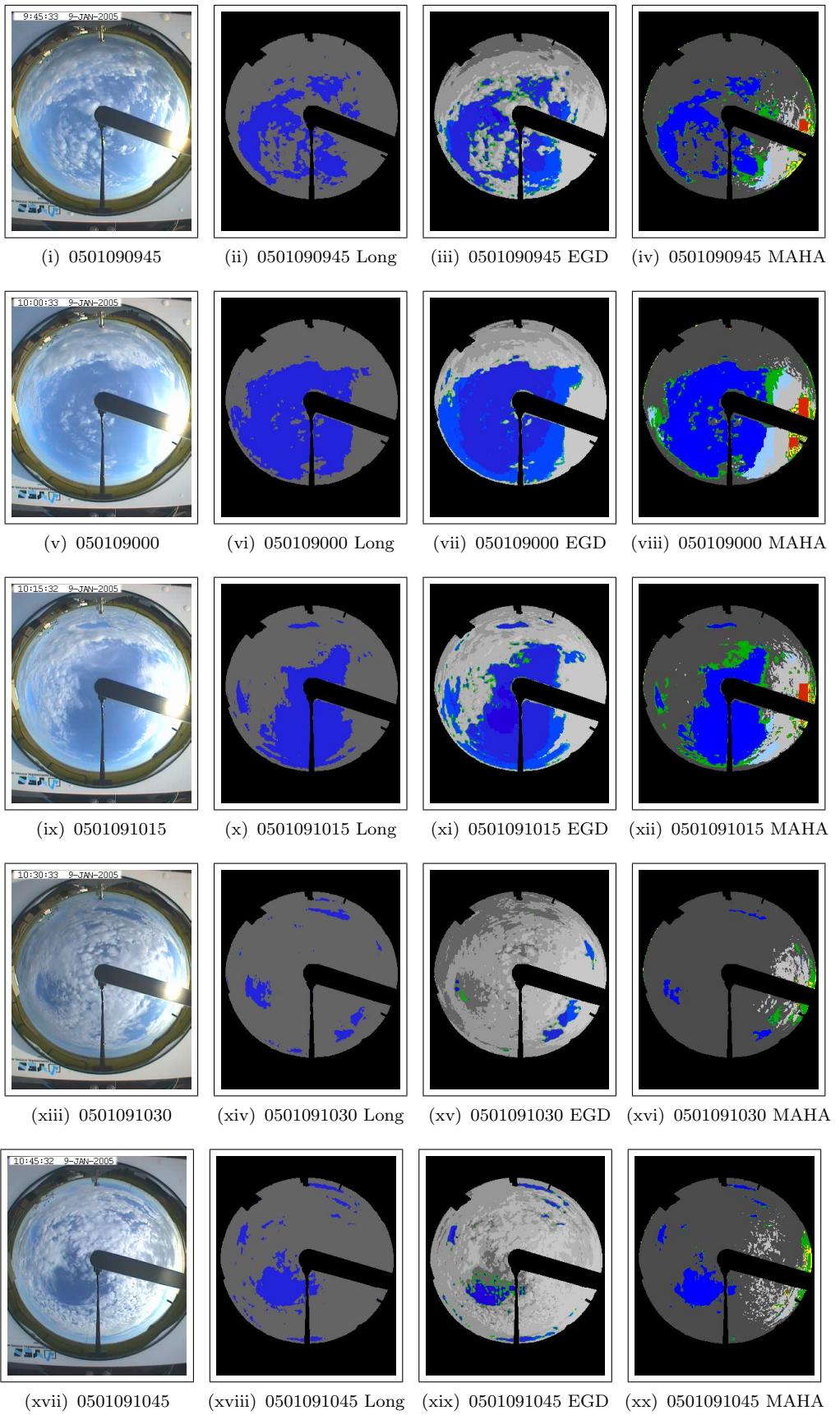


Figure A.99 - Sky images generated from 0501090945 to 0501091045.

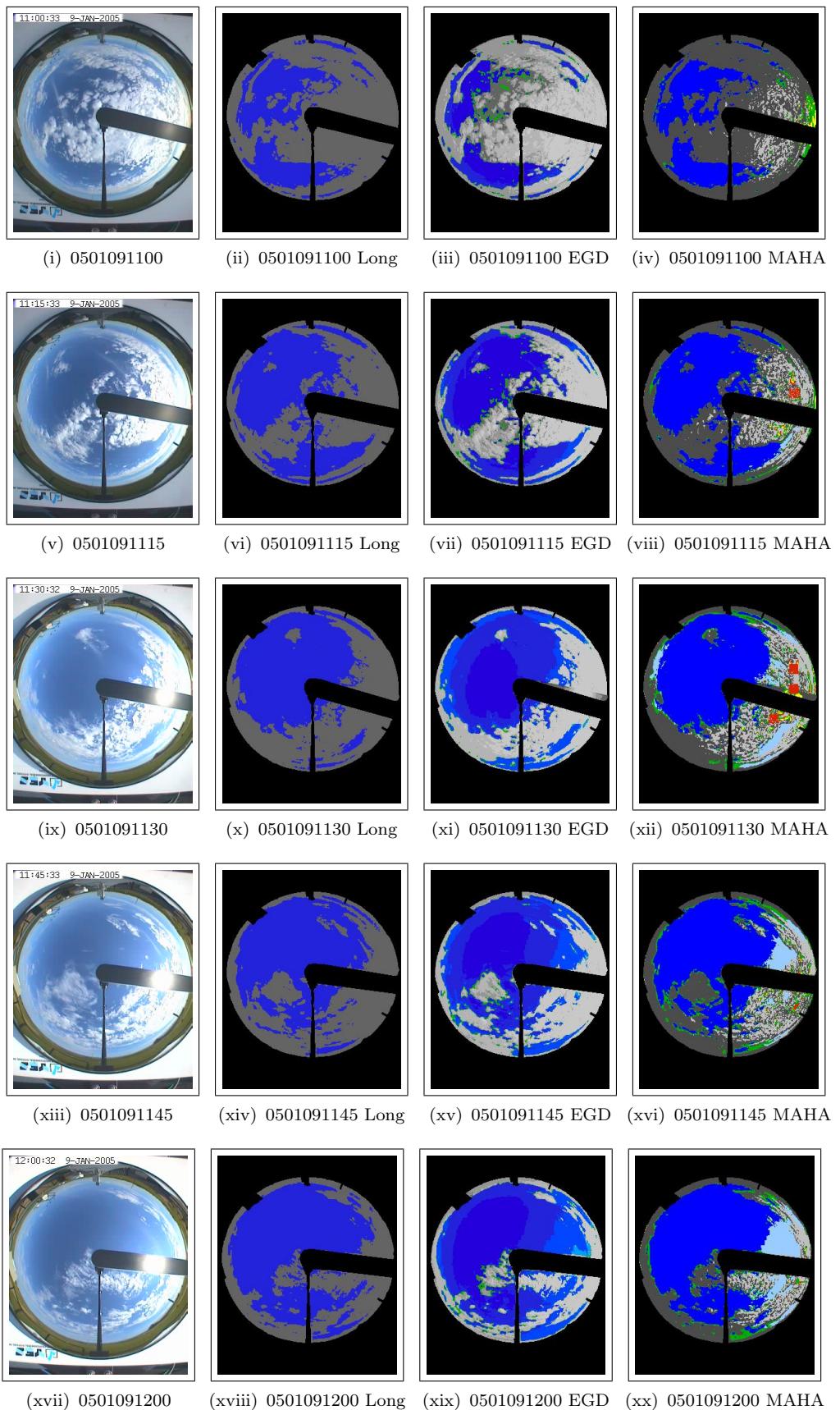


Figure A.100 - Sky images generated from 050109100 to 0501091200.

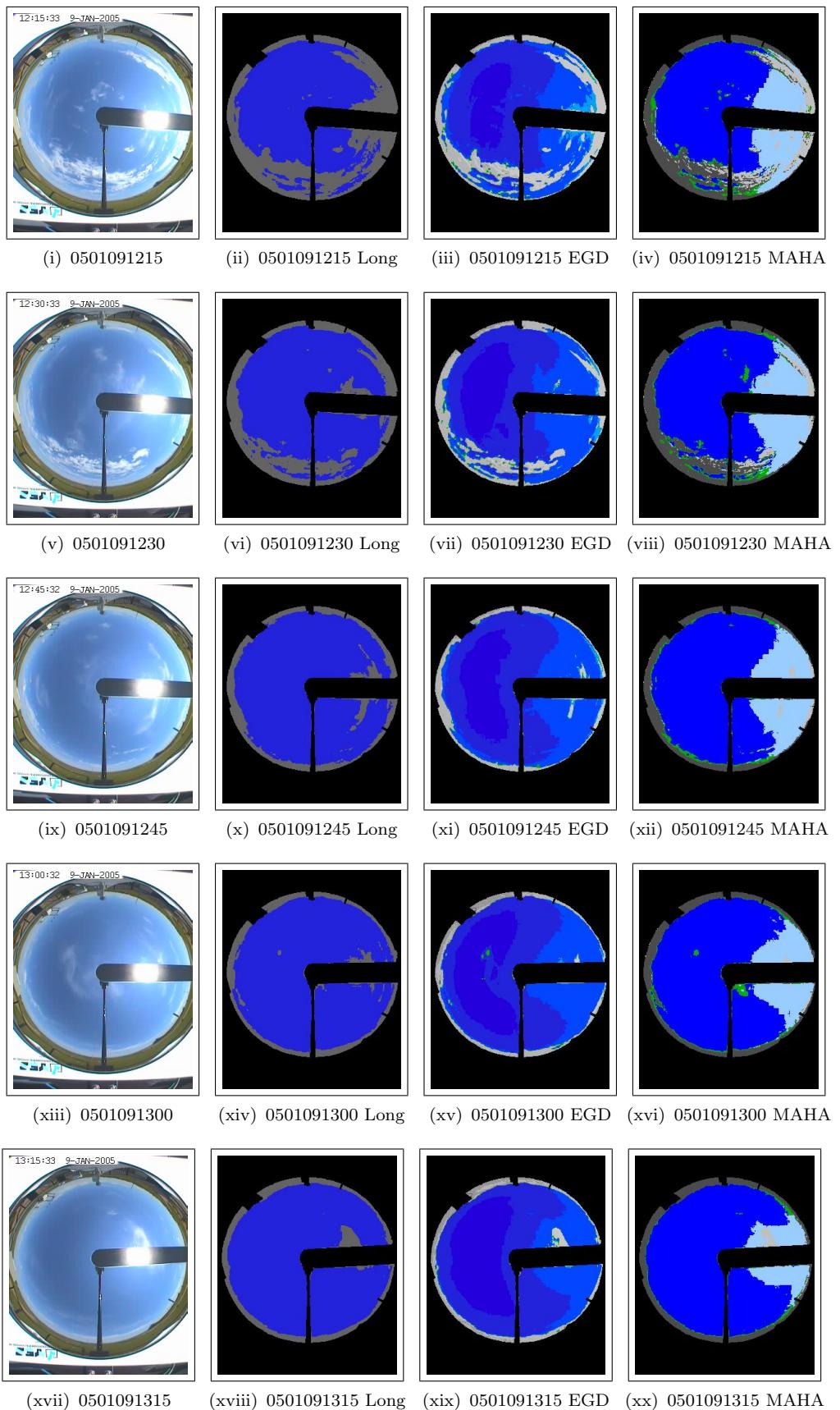


Figure A.101 - Sky images generated from 0501091215 to 0501091315.

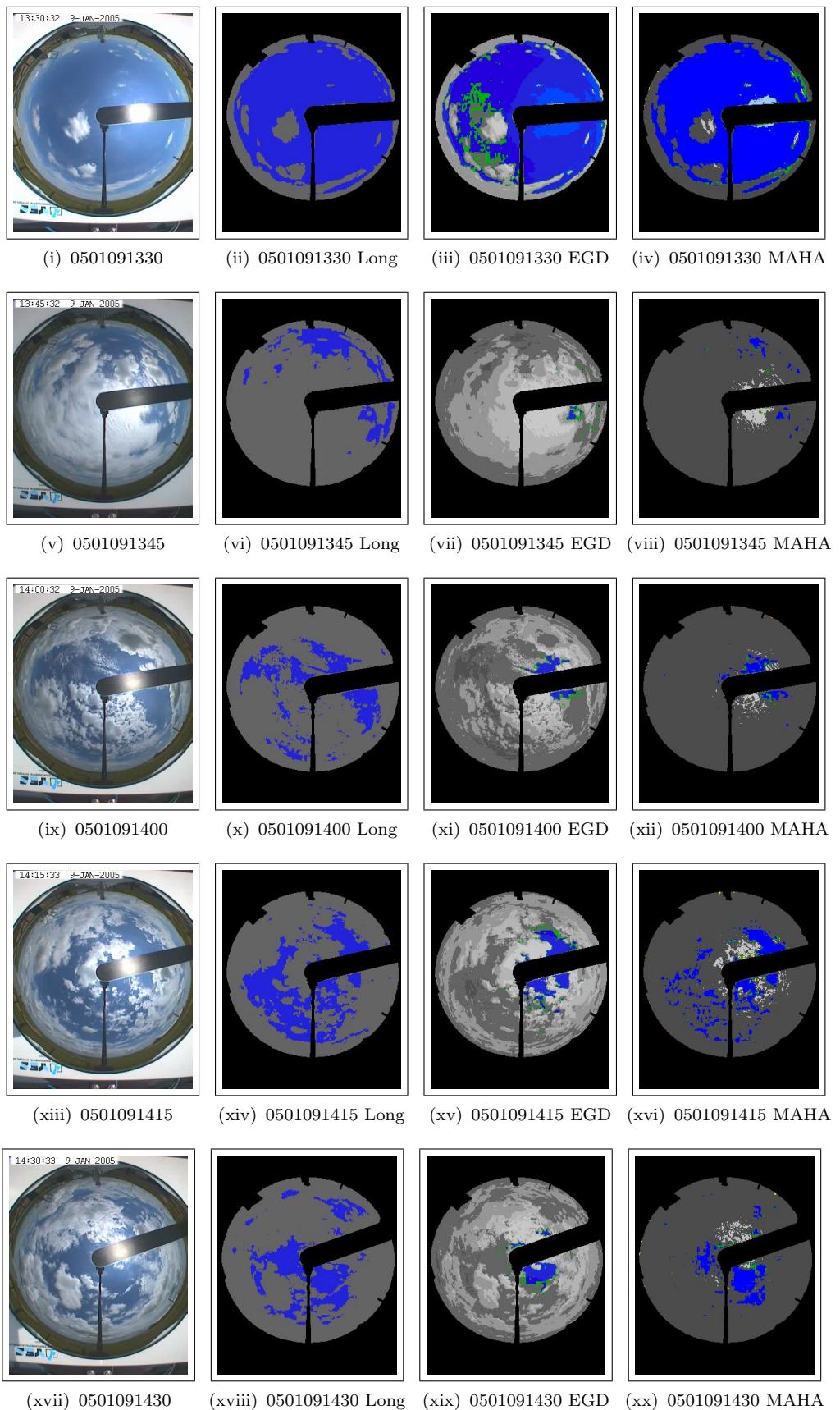


Figure A.102 - Sky images generated from 0501091330 to 0501091430.

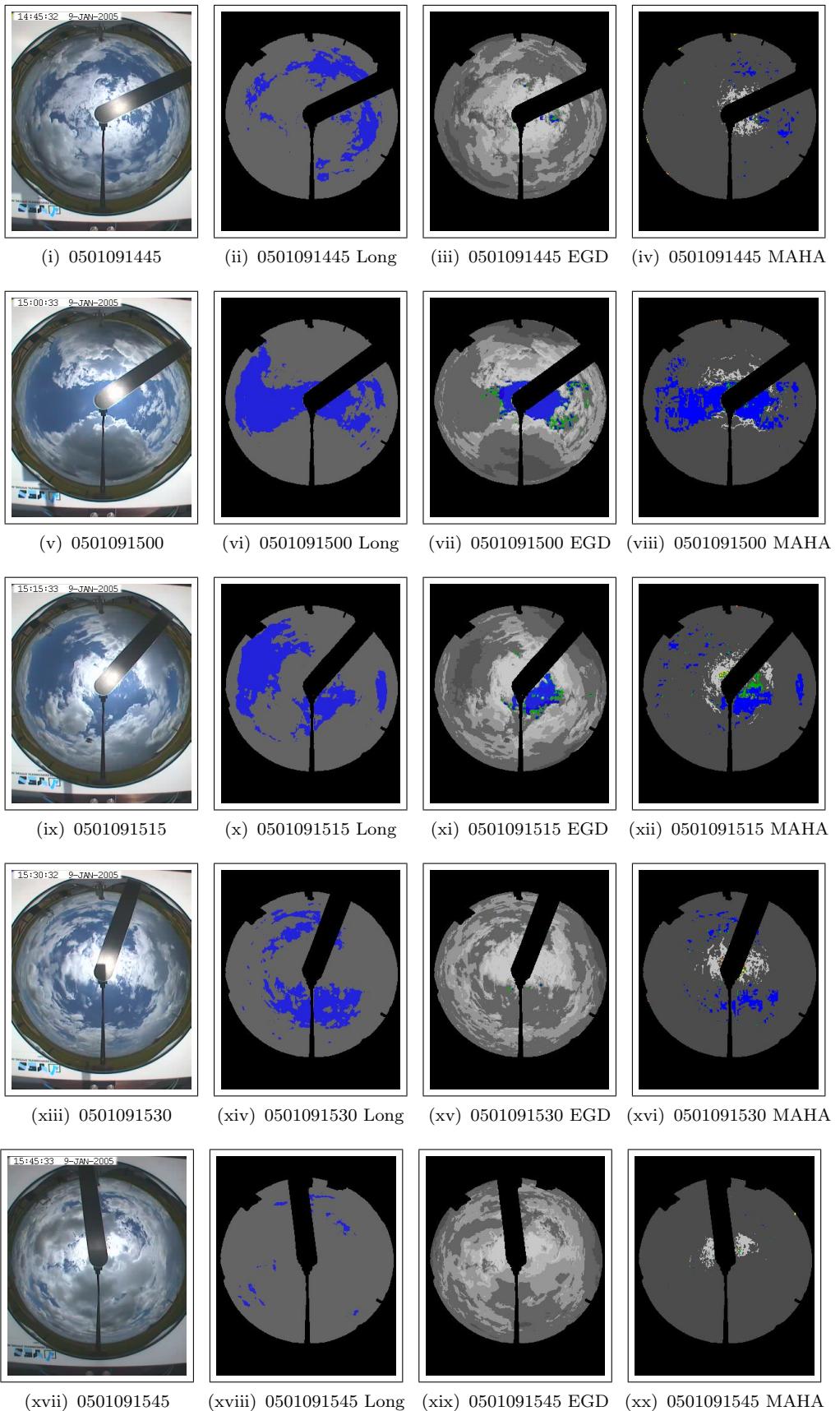


Figure A.103 - Sky images generated from 0501091445 to 0501091545.

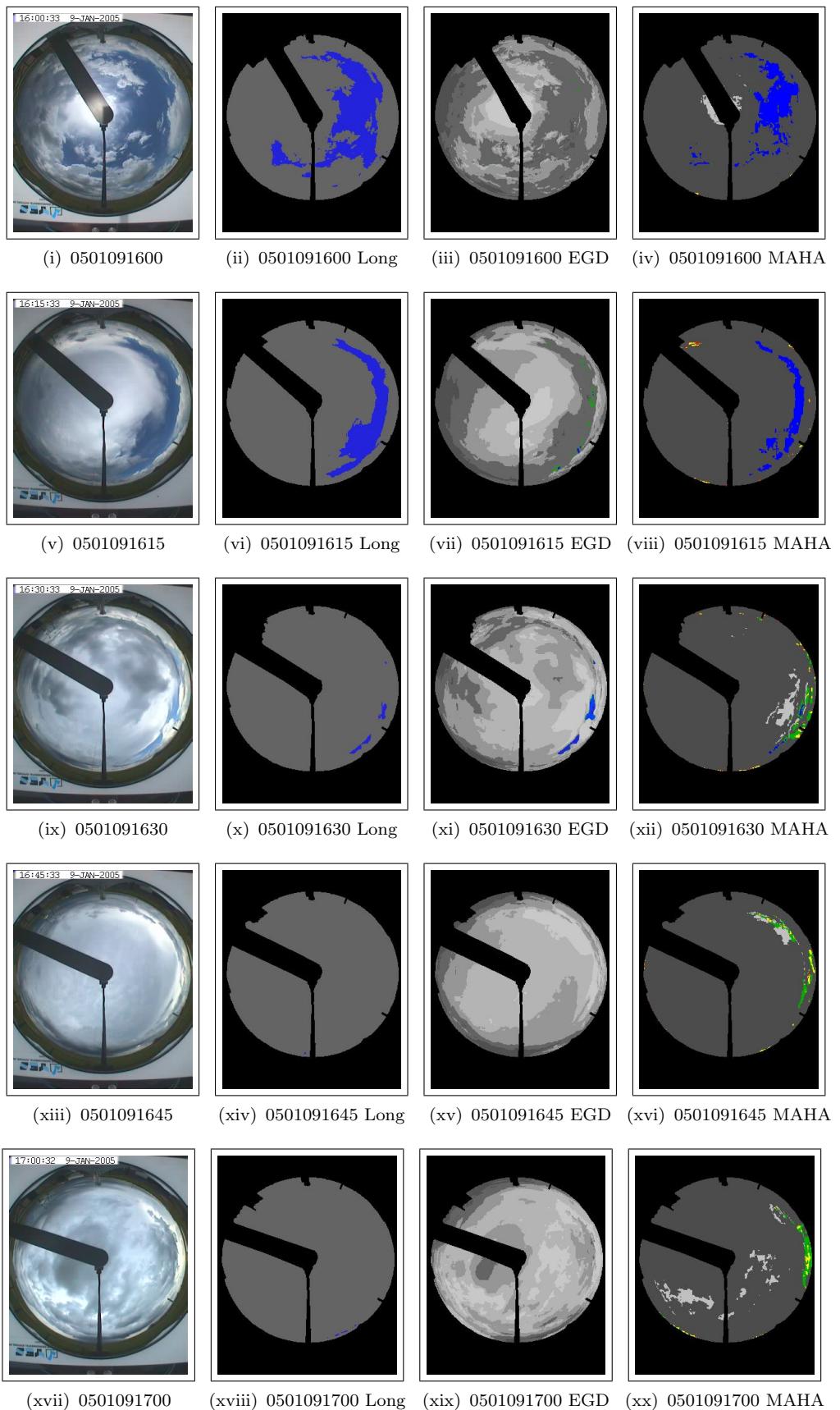


Figure A.104 - Sky images generated from 0501091600 to 0501091700.

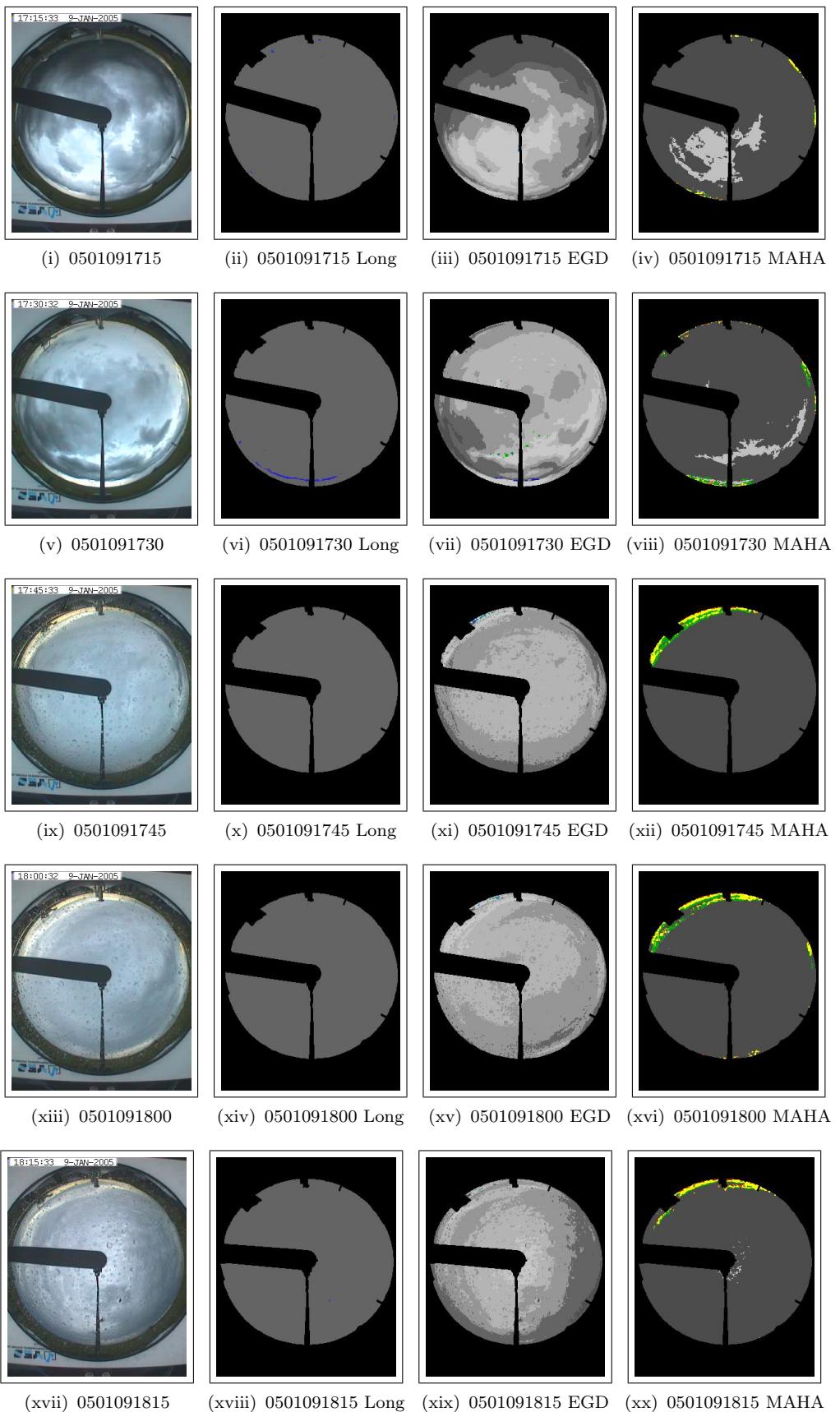


Figure A.105 - Sky images generated from 0501091715 to 0501091815.

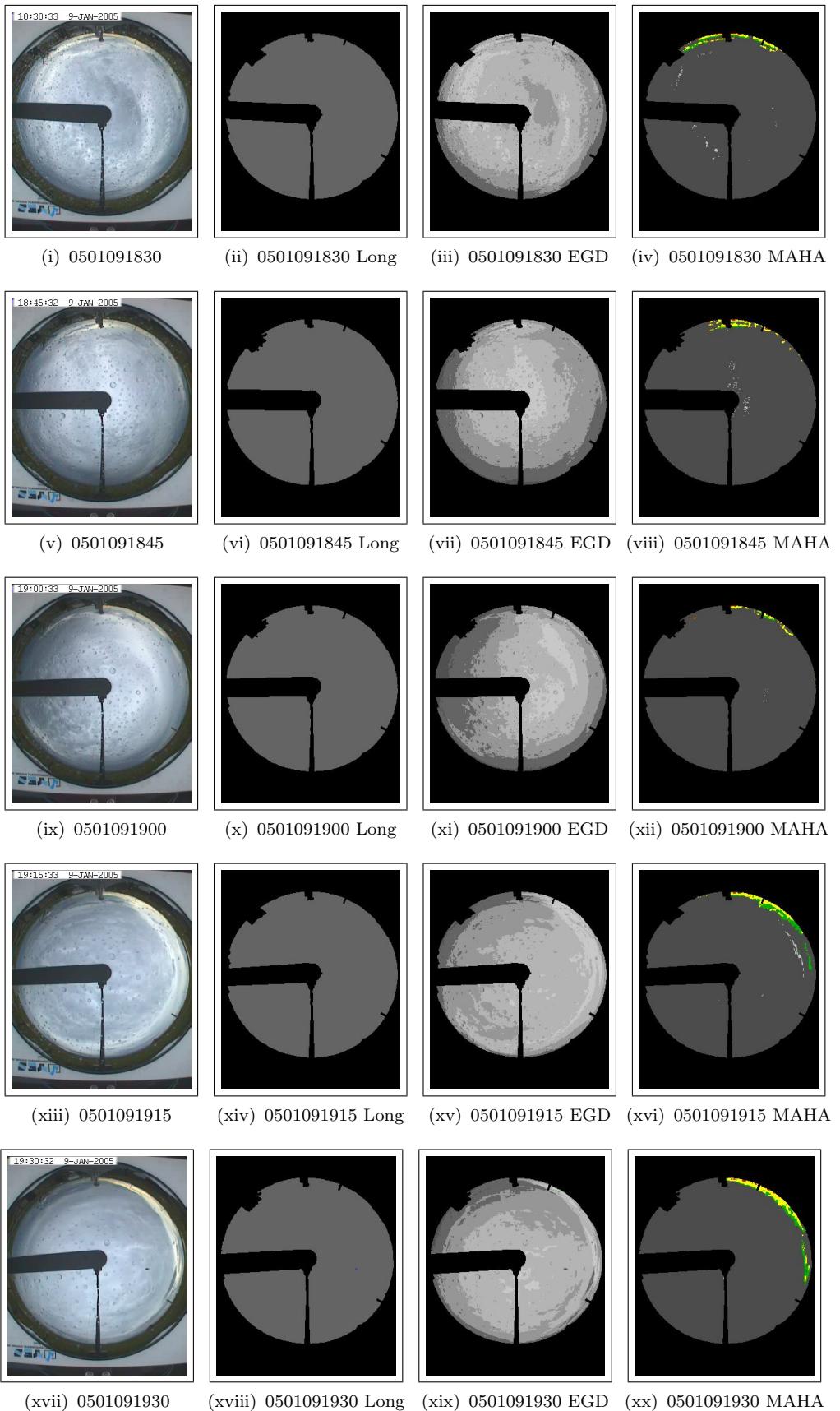


Figure A.106 - Sky images generated from 0501091830 to 0501091930.

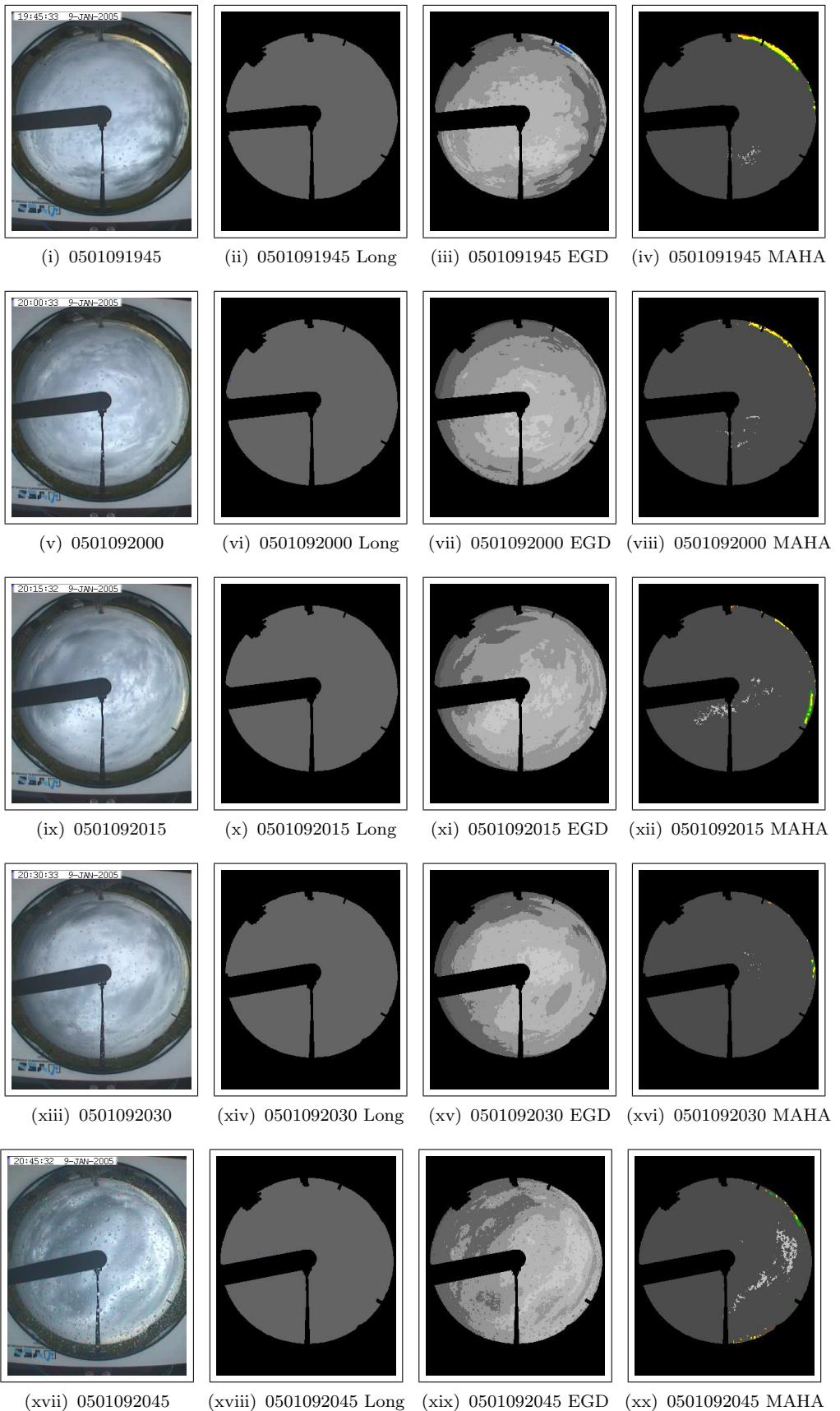


Figure A.107 - Sky images generated from 0501091945 to 0501092045.

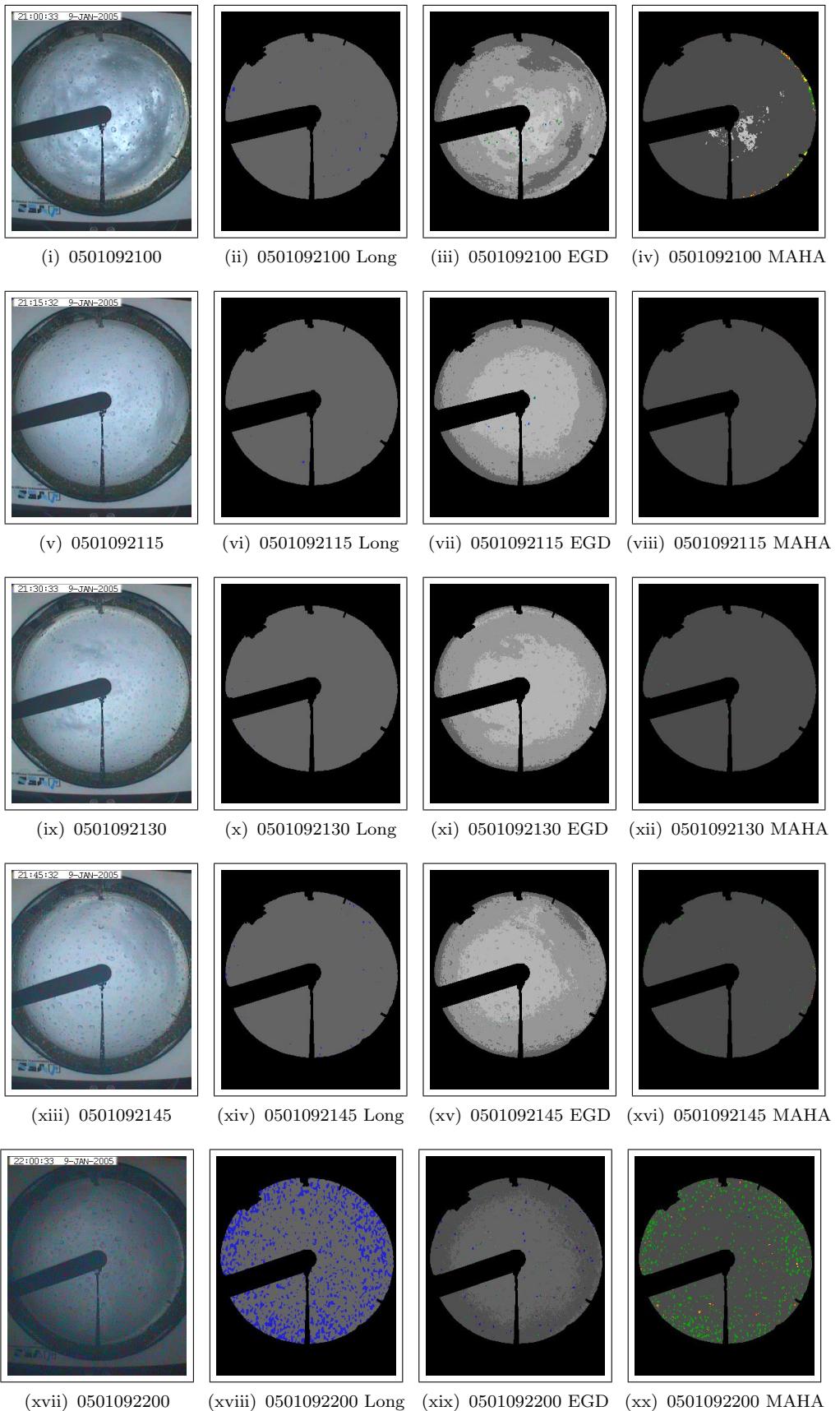


Figure A.108 - Sky images generated from 0501092100 to 0501092200.

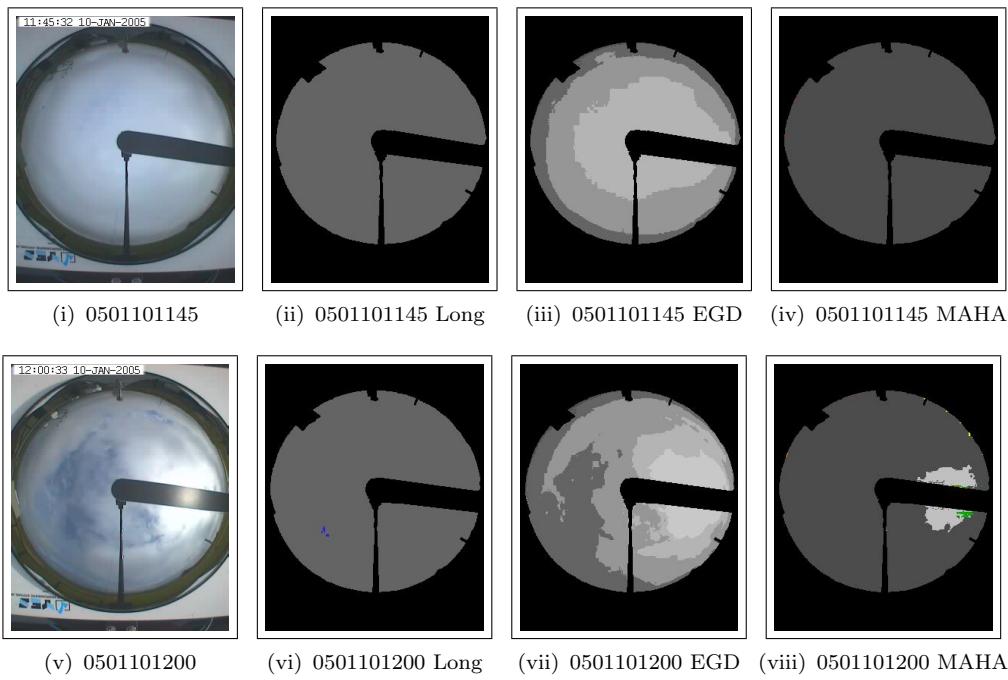


Figure A.109 - Sky images generated from 0501101145 to 0501101200.

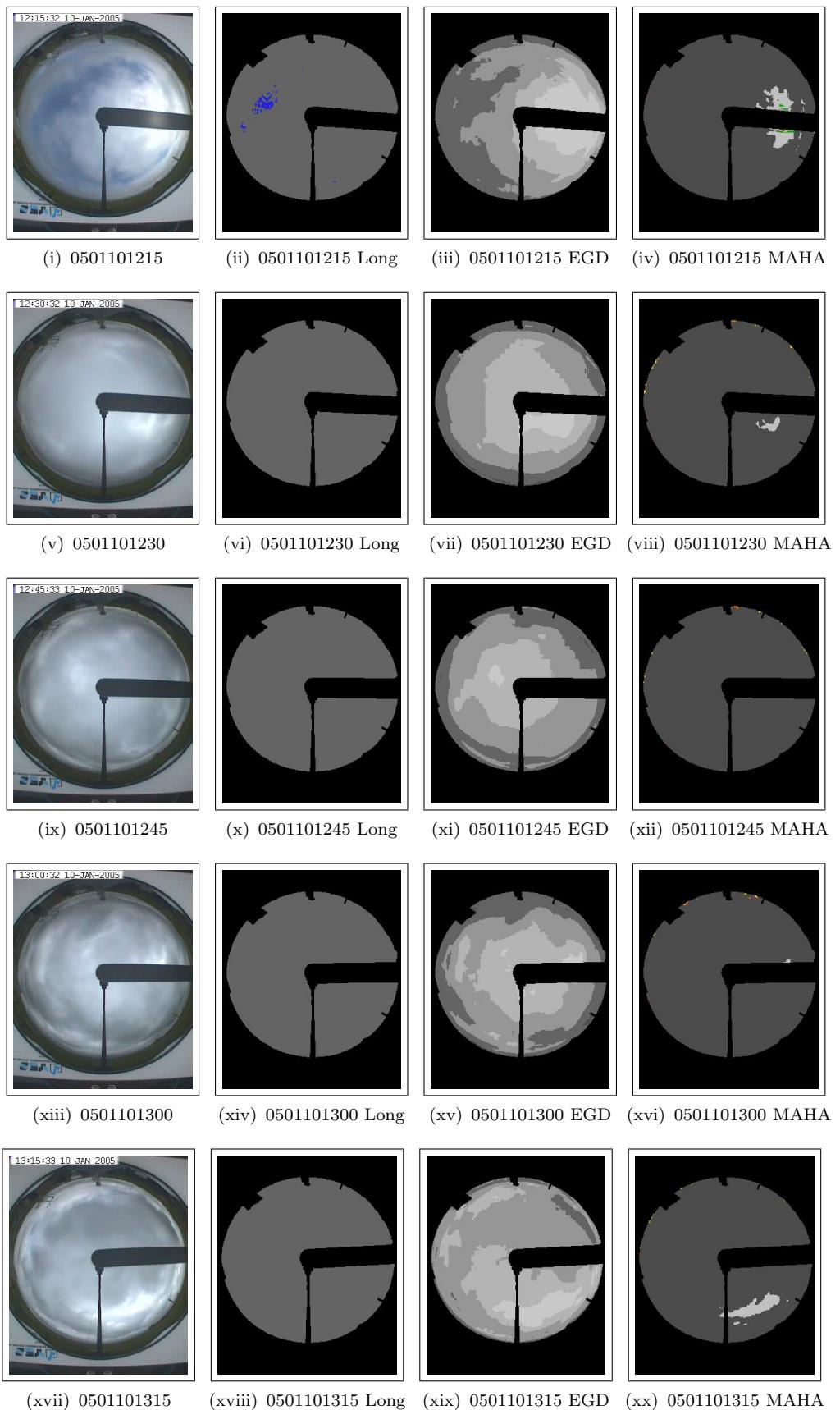


Figure A.110 - Sky images generated from 0501101215 to 0501101315.

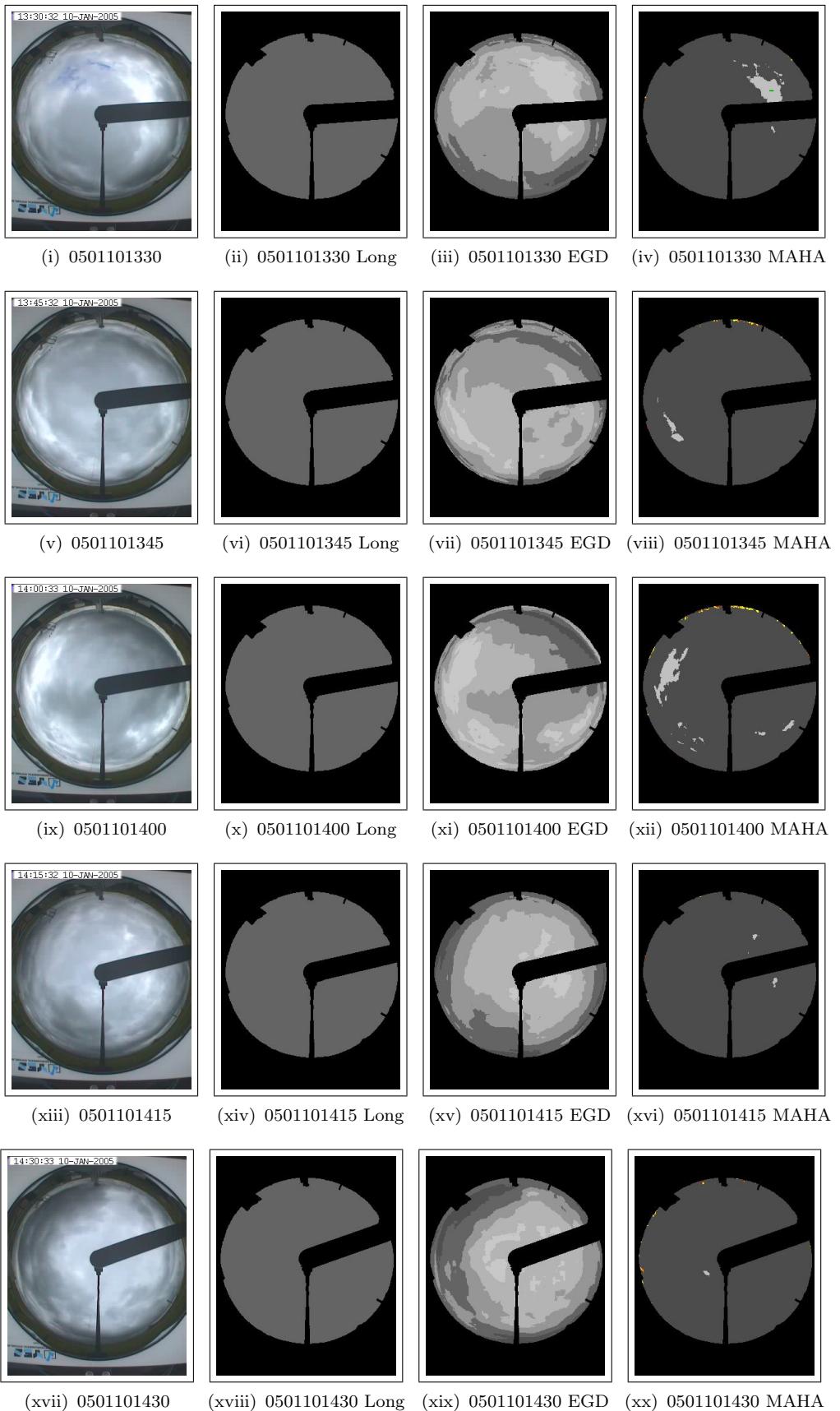


Figure A.111 - Sky images generated from 0501101330 to 0501101430.

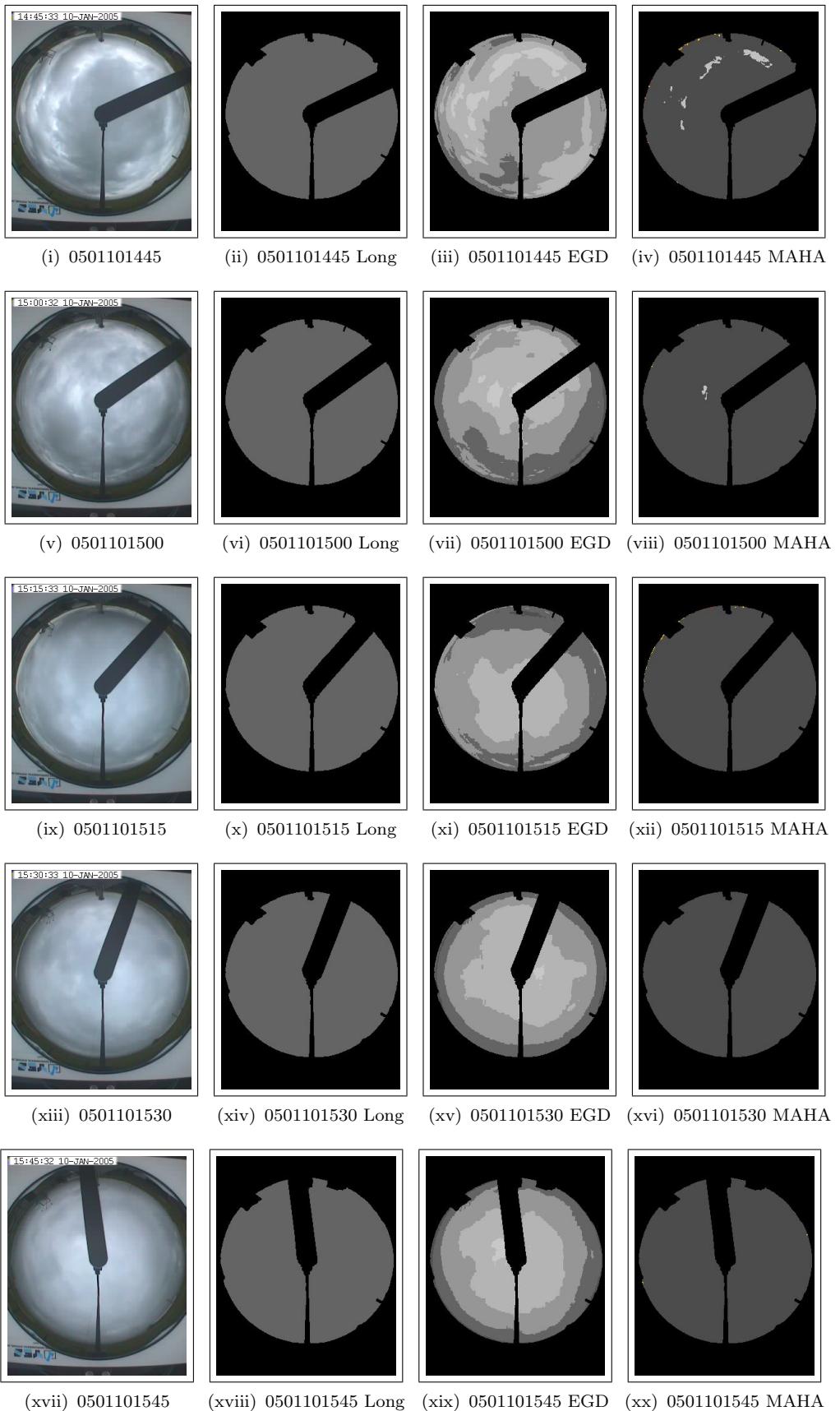


Figure A.112 - Sky images generated from 0501101445 to 0501101545.

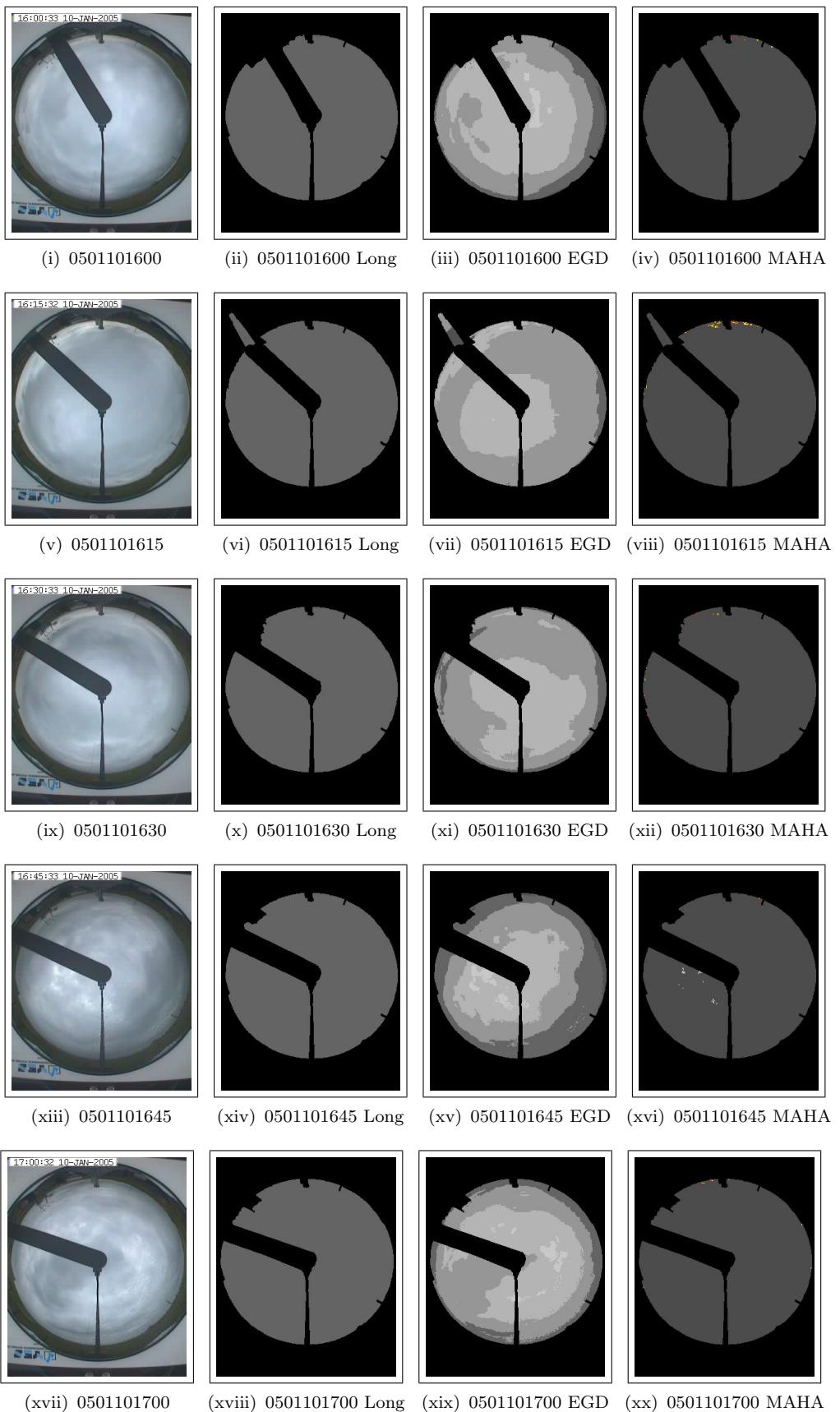


Figure A.113 - Sky images generated from 0501101600 to 0501101700.

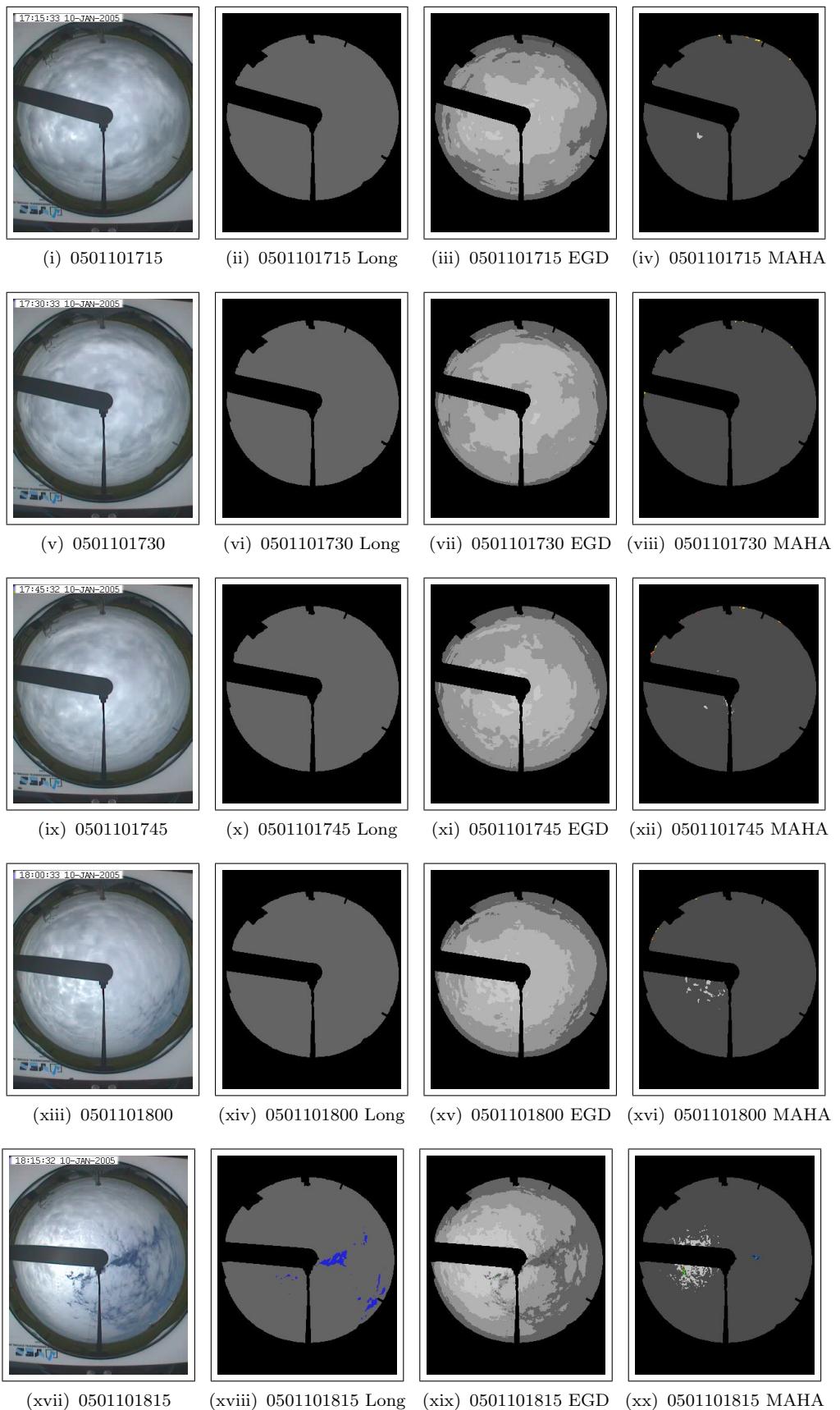


Figure A.114 - Sky images generated from 0501101715 to 0501101815.

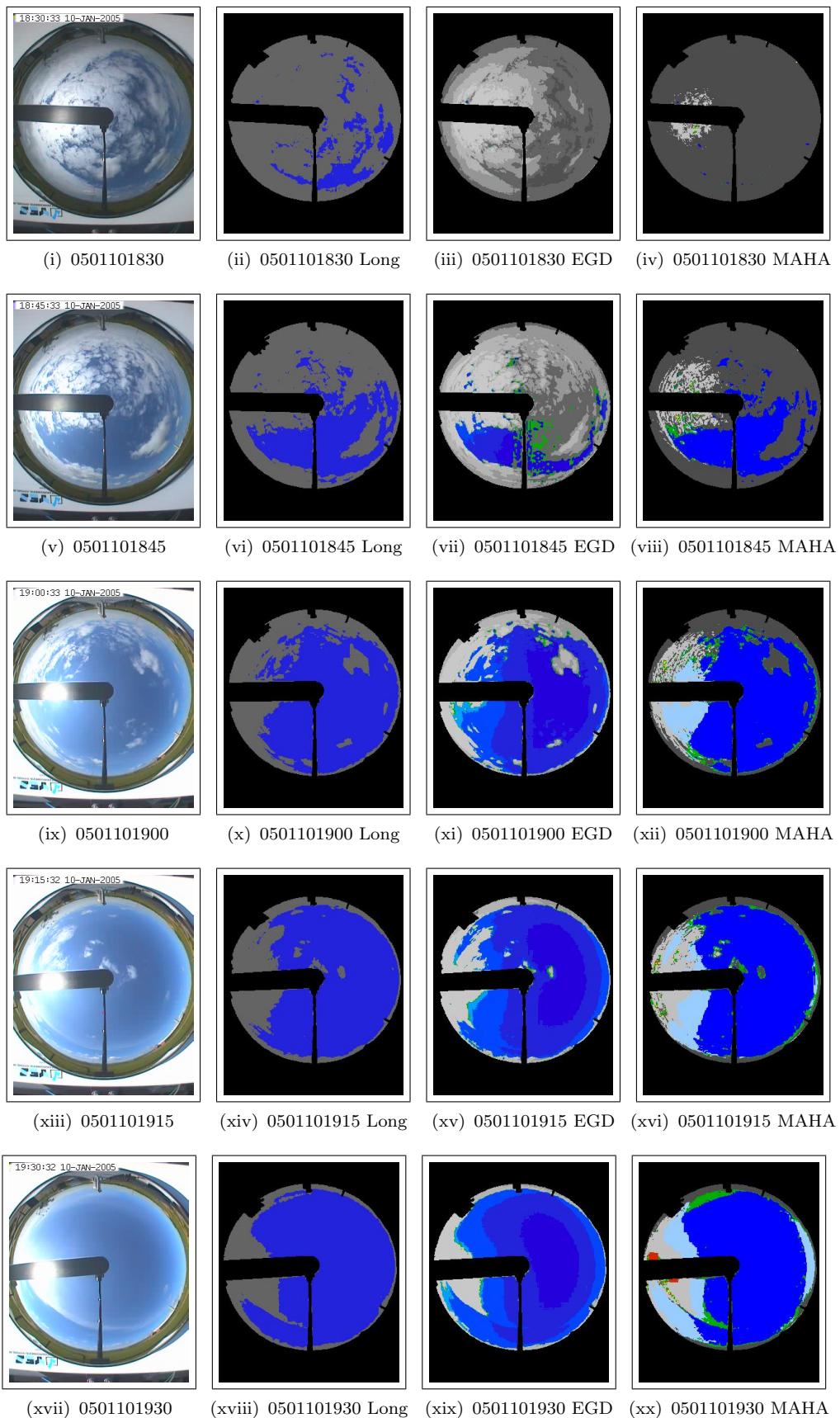


Figure A.115 - Sky images generated from 0501101830 to 0501101930.

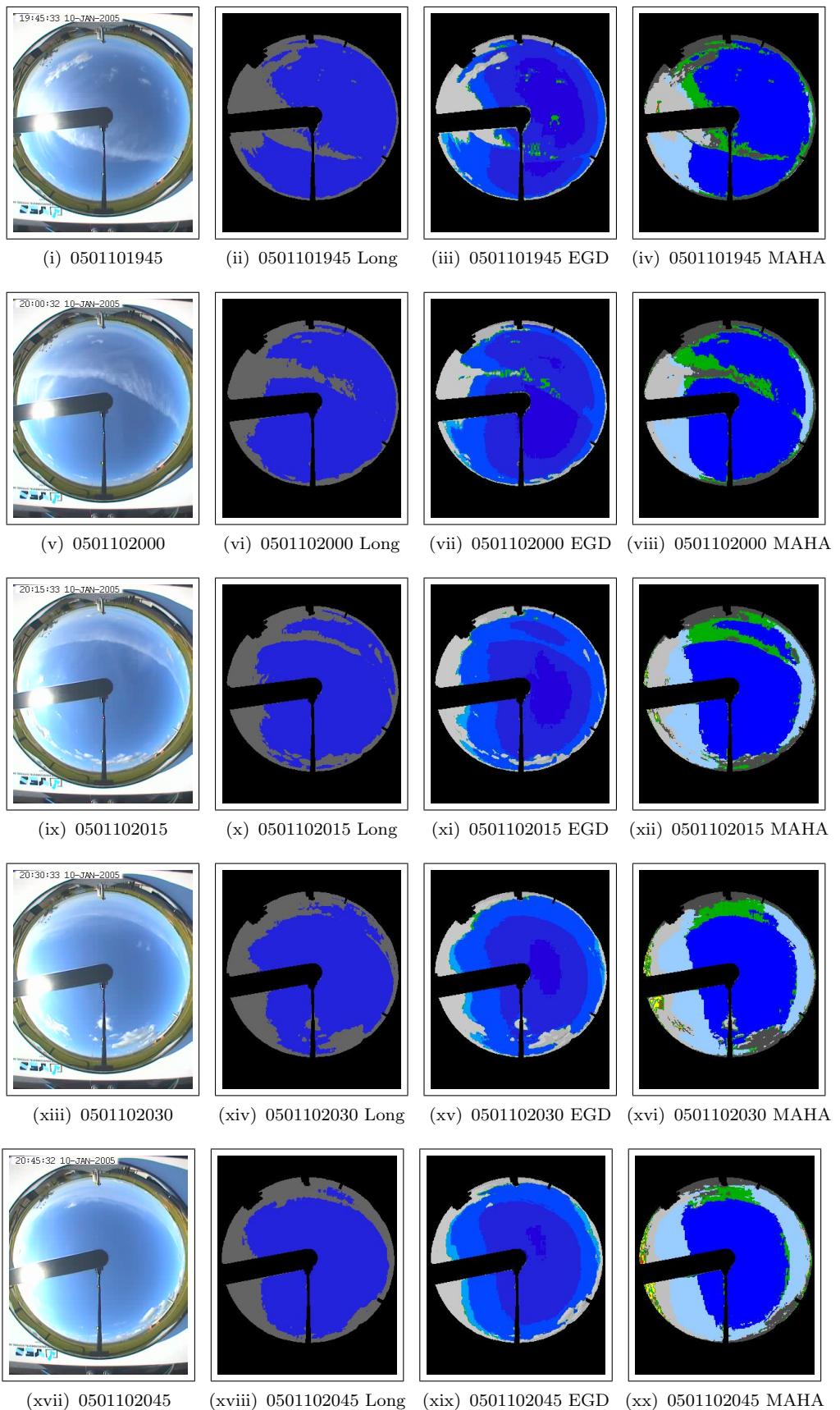


Figure A.116 - Sky images generated from 0501101945 to 0501102045.

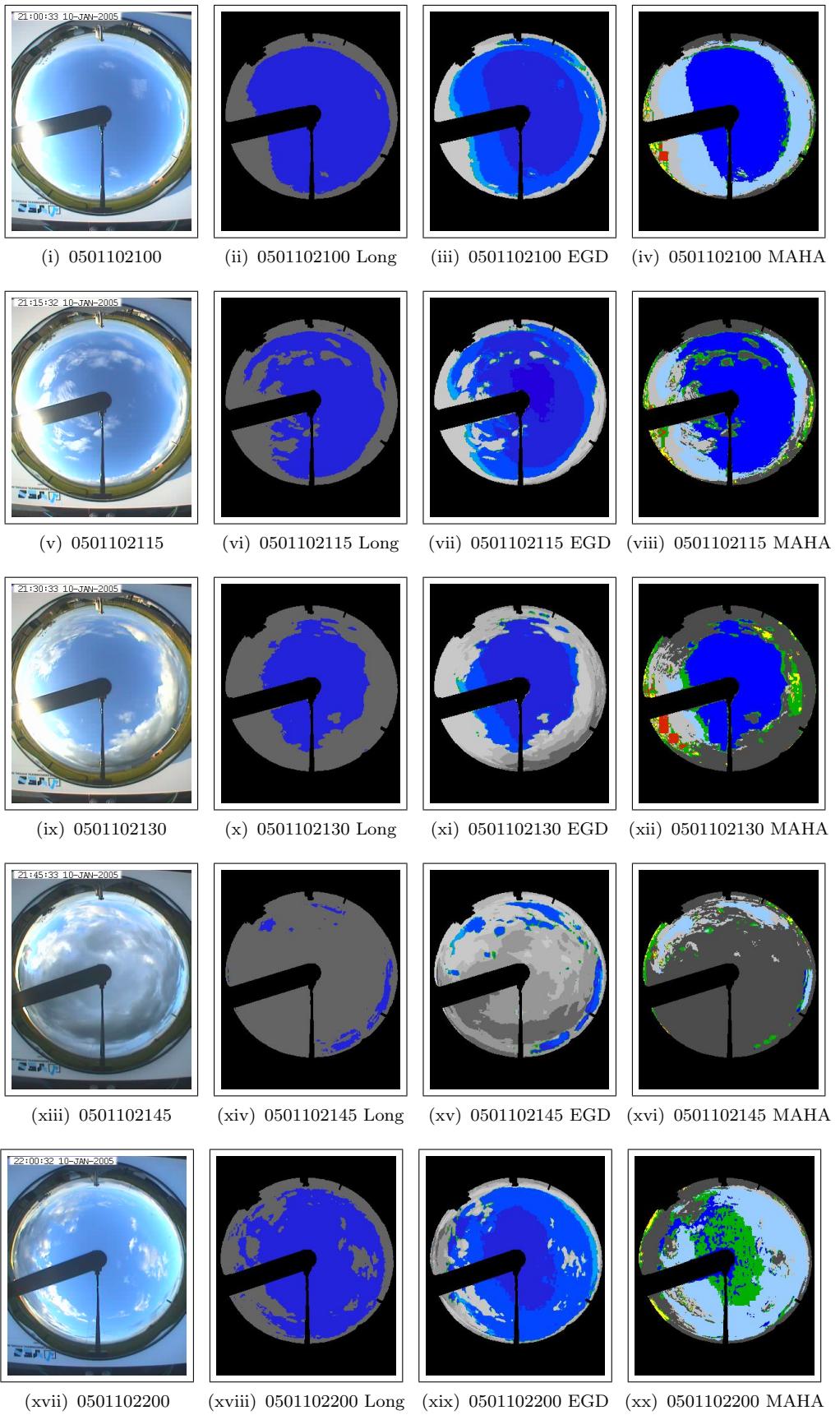


Figure A.117 - Sky images generated from 0501102100 to 0501102200.

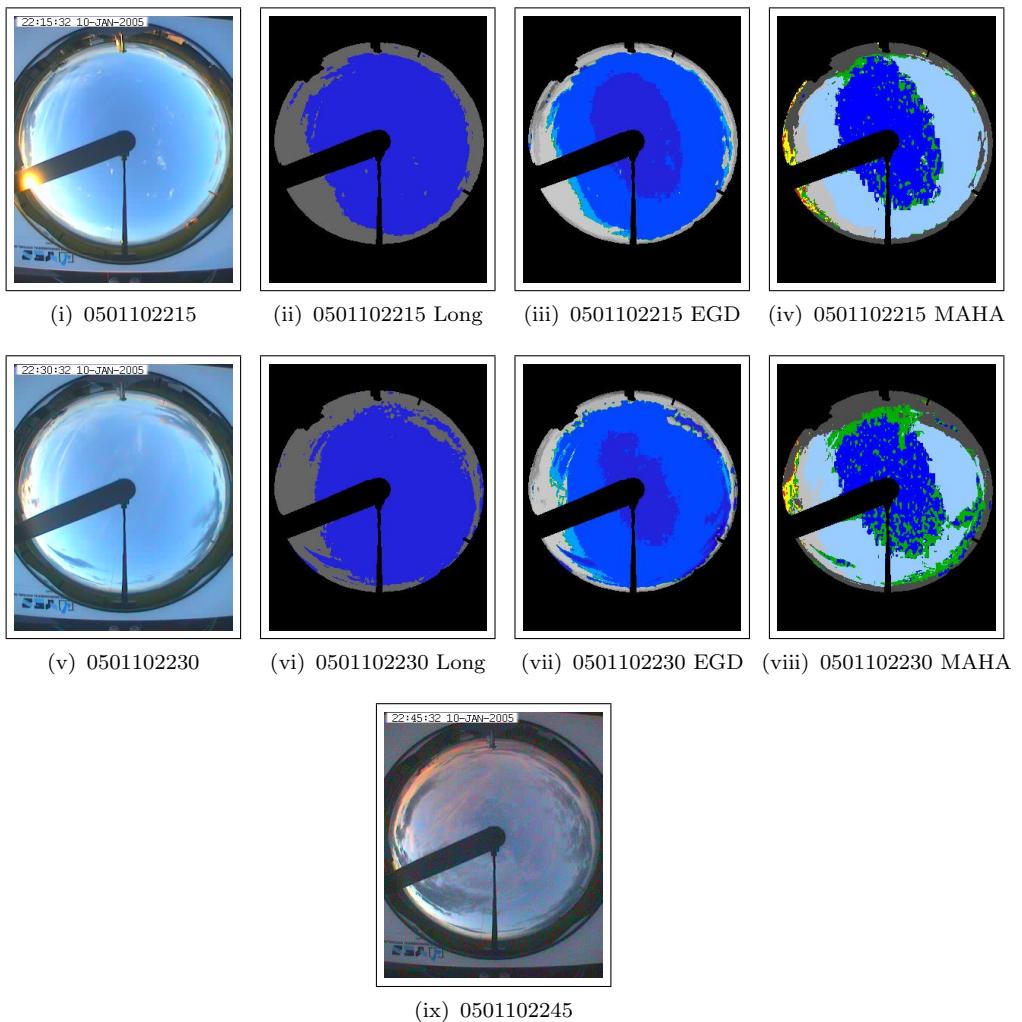


Figure A.118 - Sky images generated from 0501101600 to 0501102245.

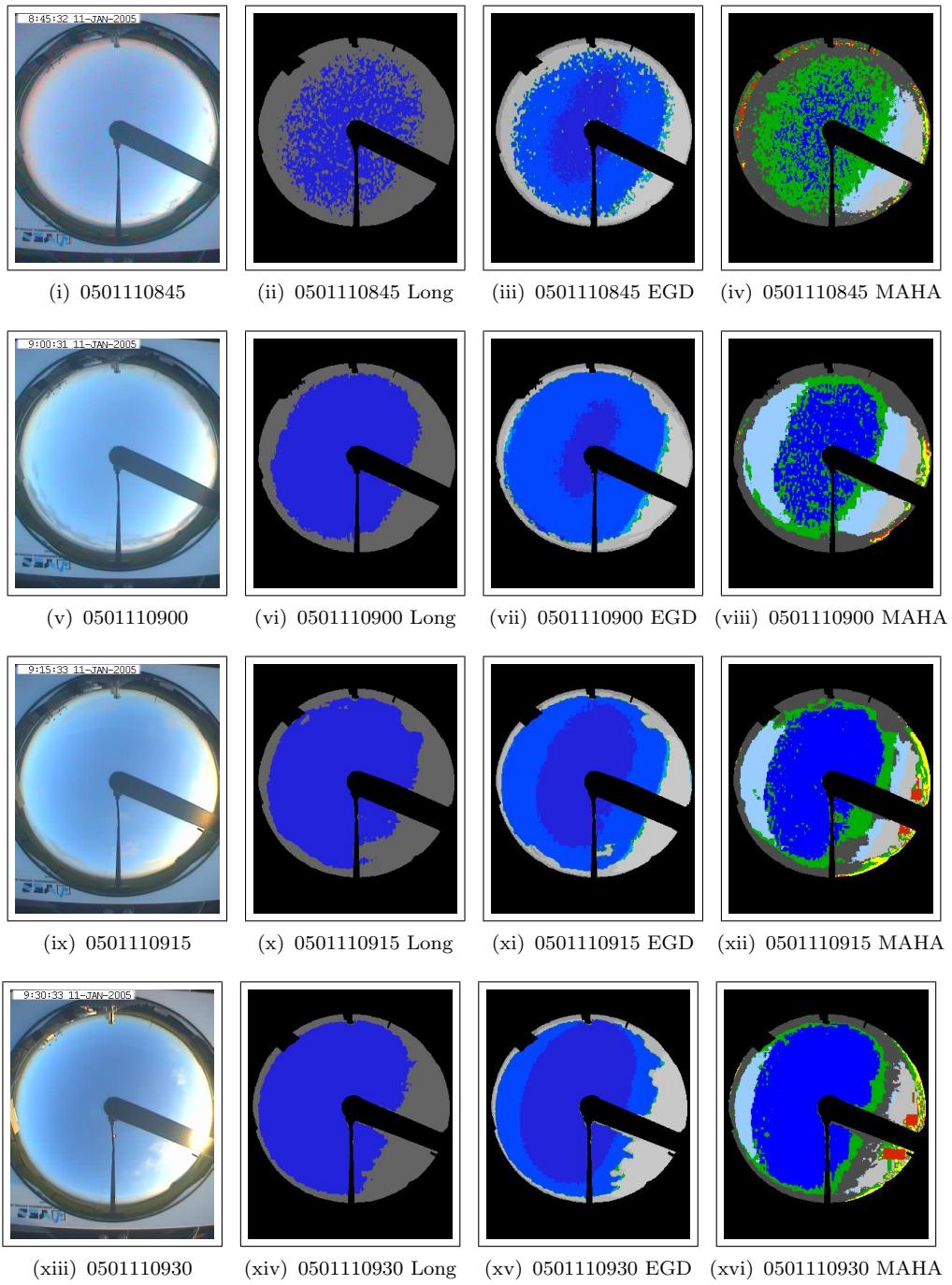


Figure A.119 - Sky images generated from 0501110845 to 0501110930.

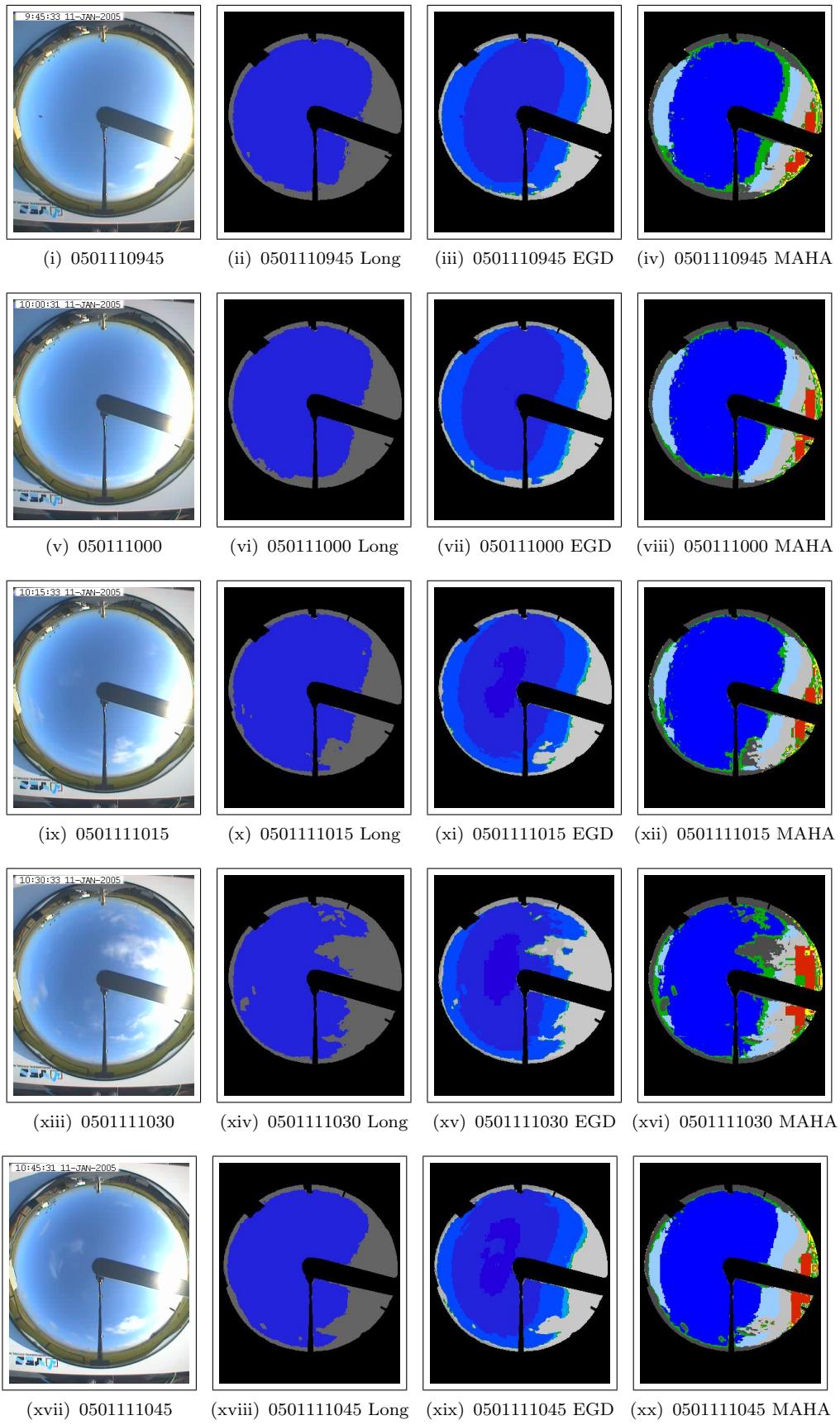


Figure A.120 - Sky images generated from 0501110945 to 050111045.

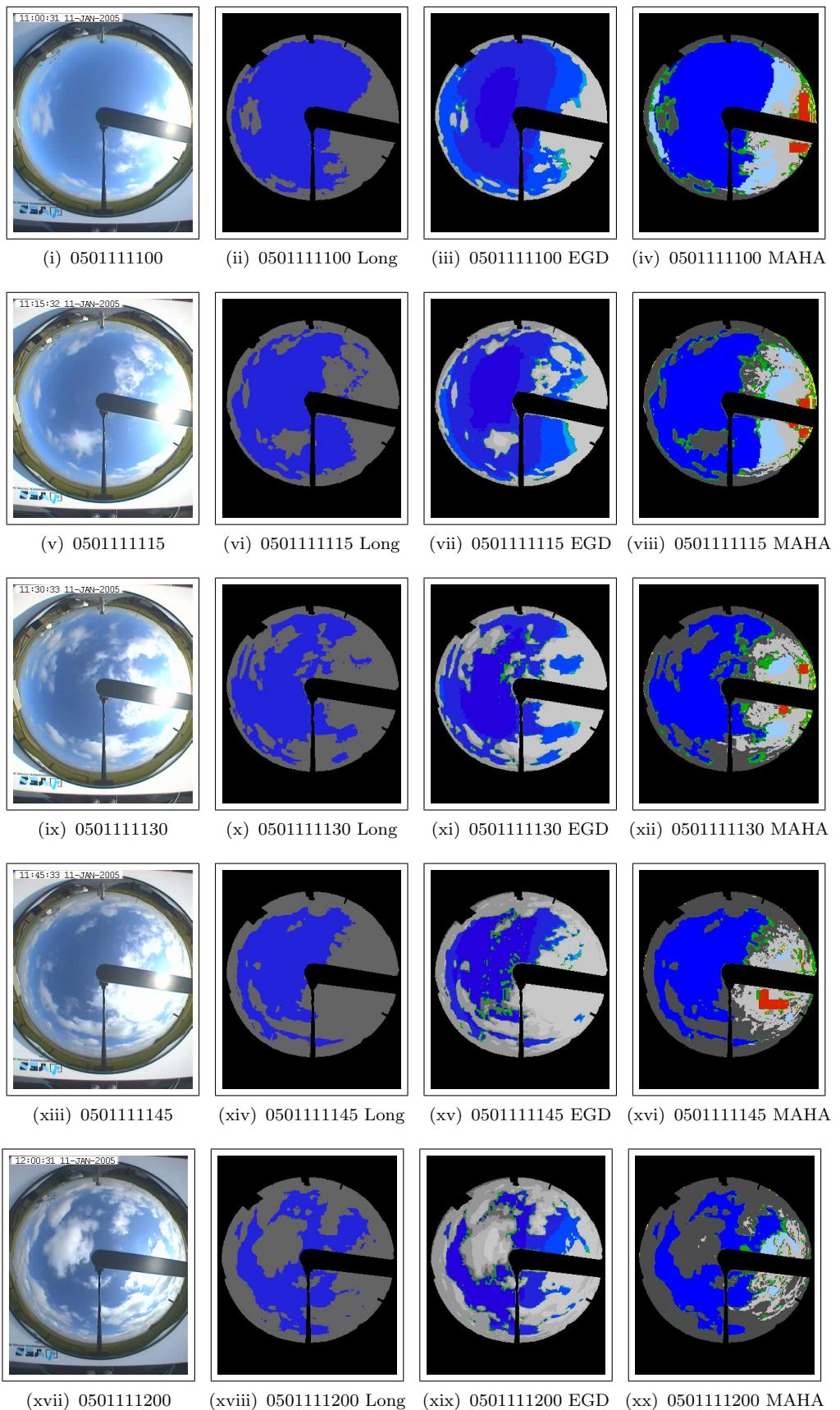


Figure A.121 - Sky images generated from 050111100 to 050111200.

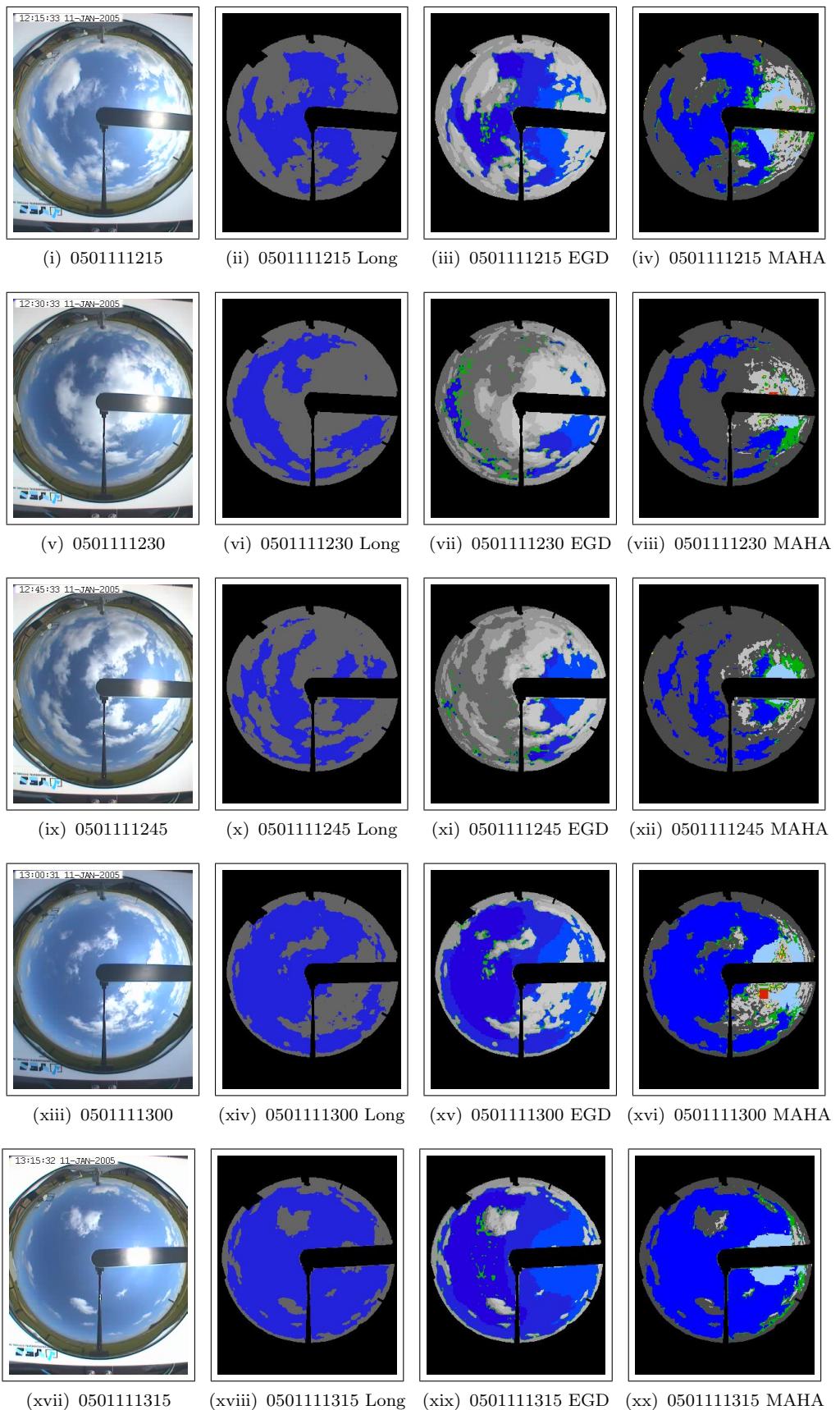


Figure A.122 - Sky images generated from 0501111215 to 0501111315.

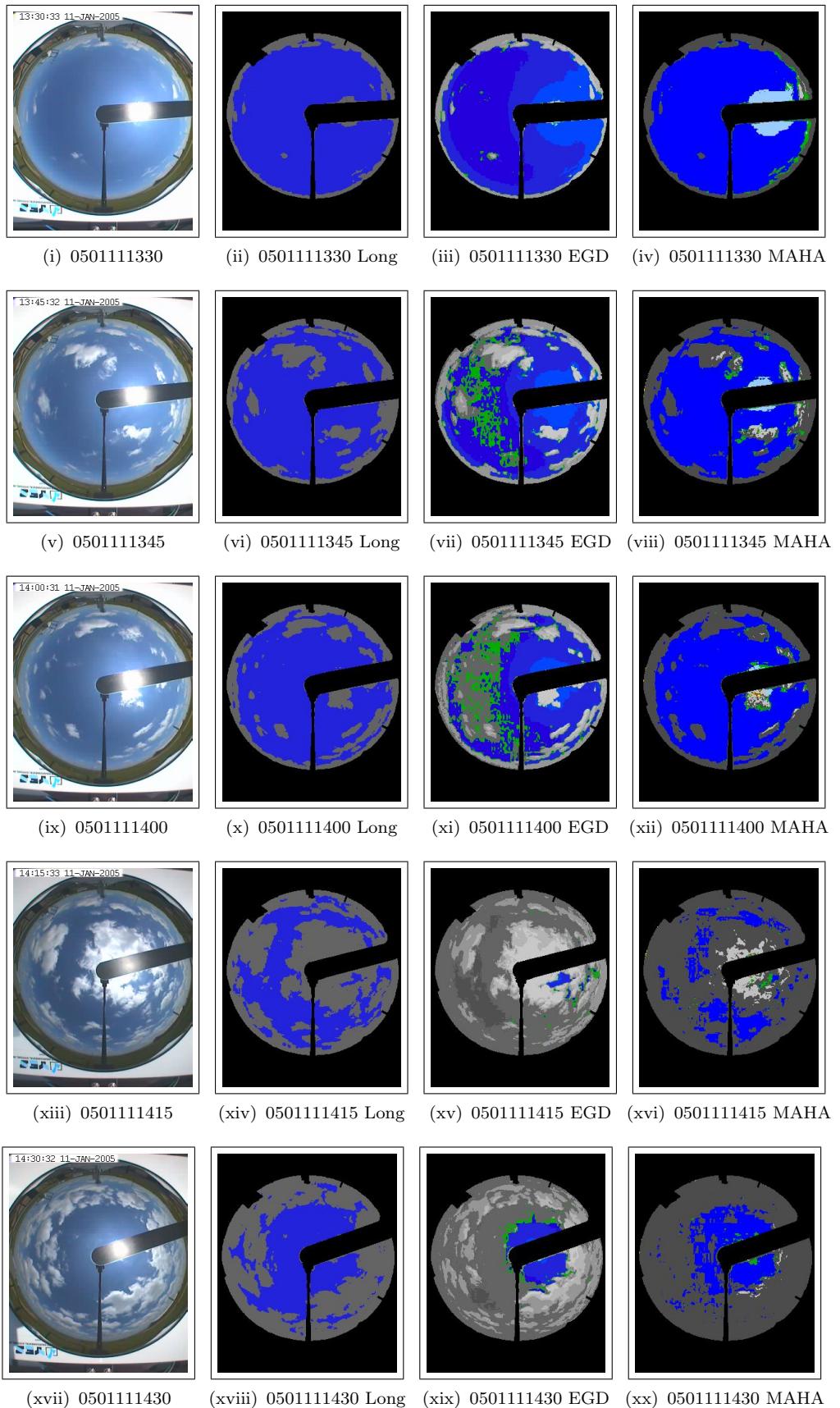


Figure A.123 - Sky images generated from 0501111330 to 0501111430.

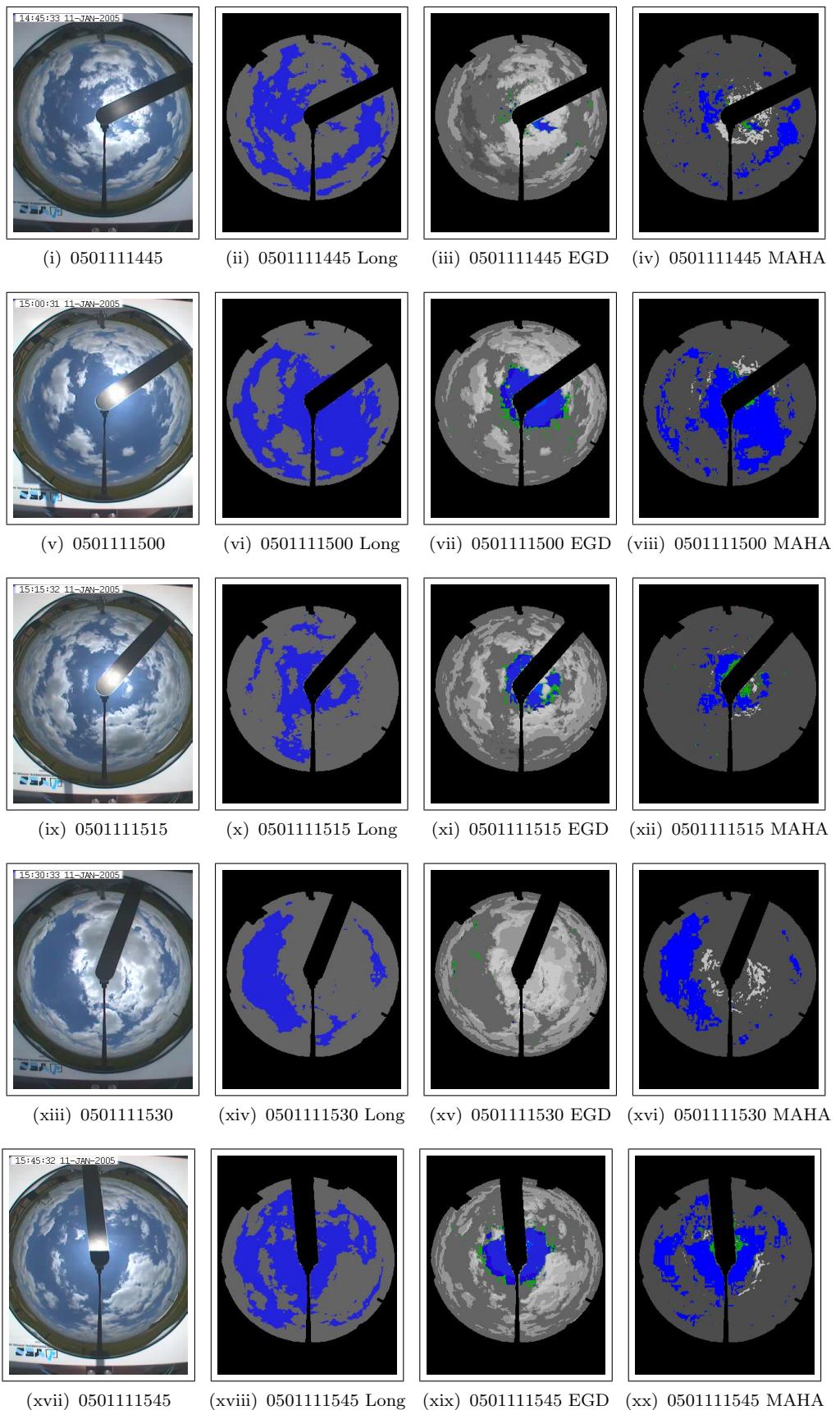


Figure A.124 - Sky images generated from 0501111445 to 0501111545.

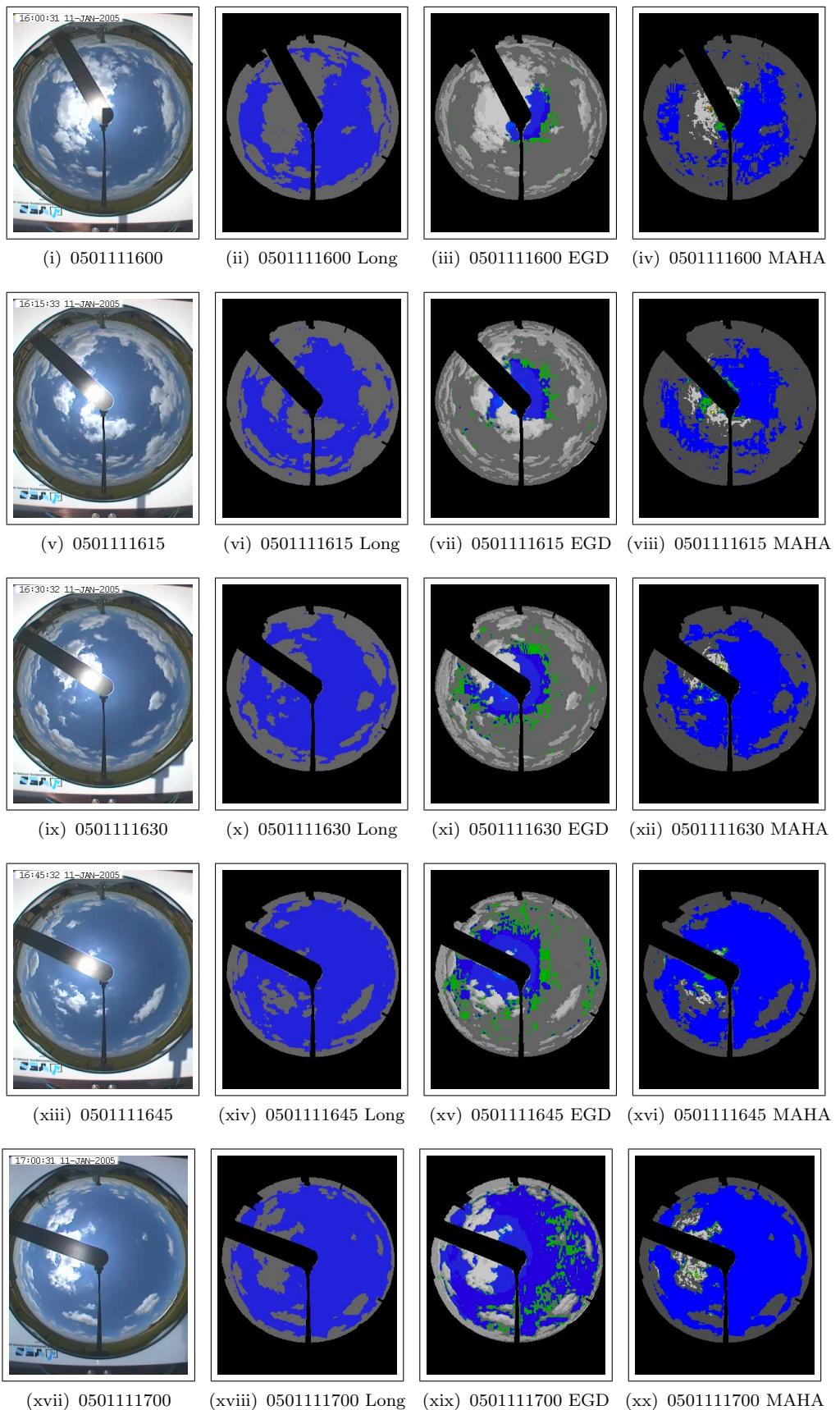


Figure A.125 - Sky images generated from 0501111600 to 0501111700.

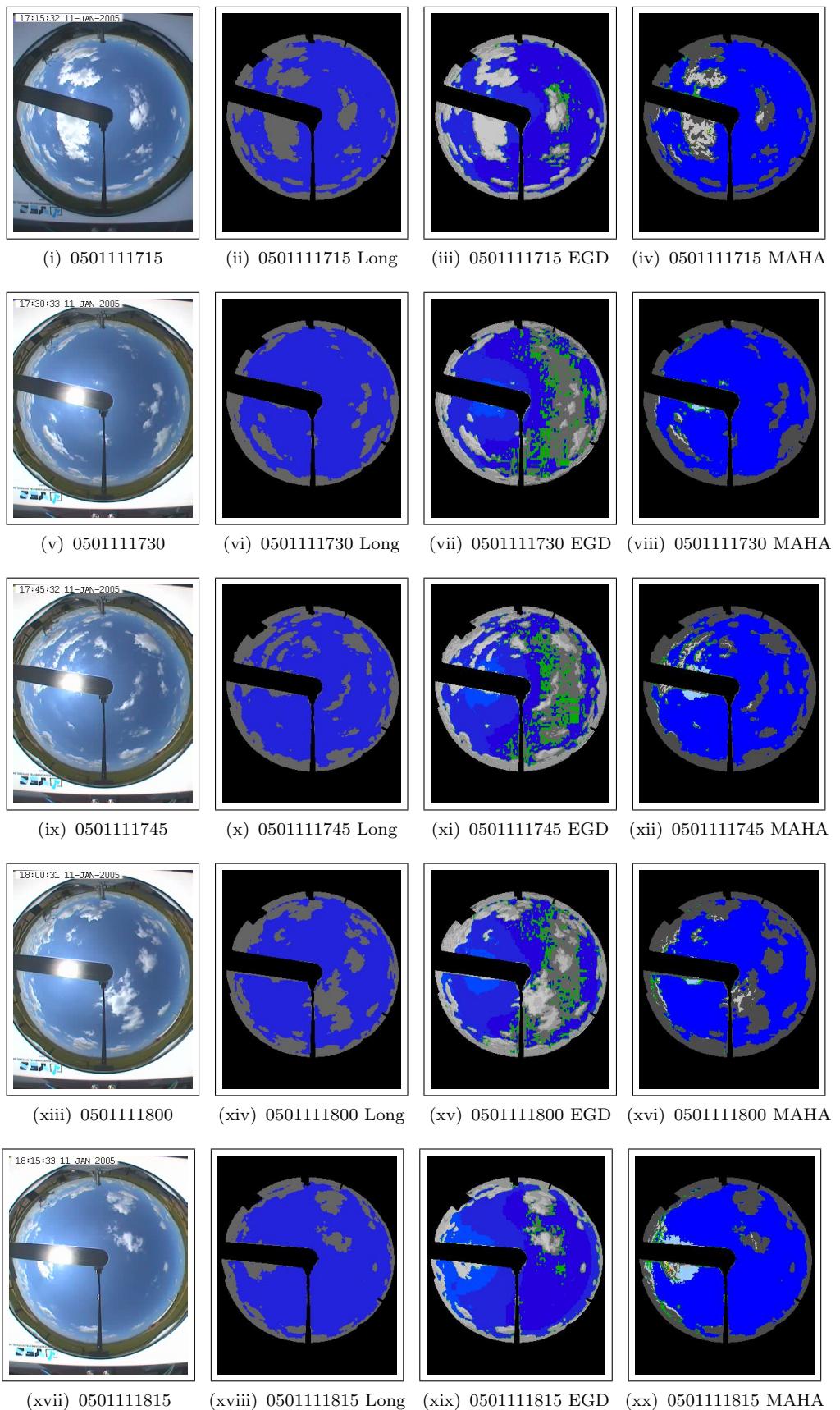


Figure A.126 - Sky images generated from 0501111715 to 0501111815.

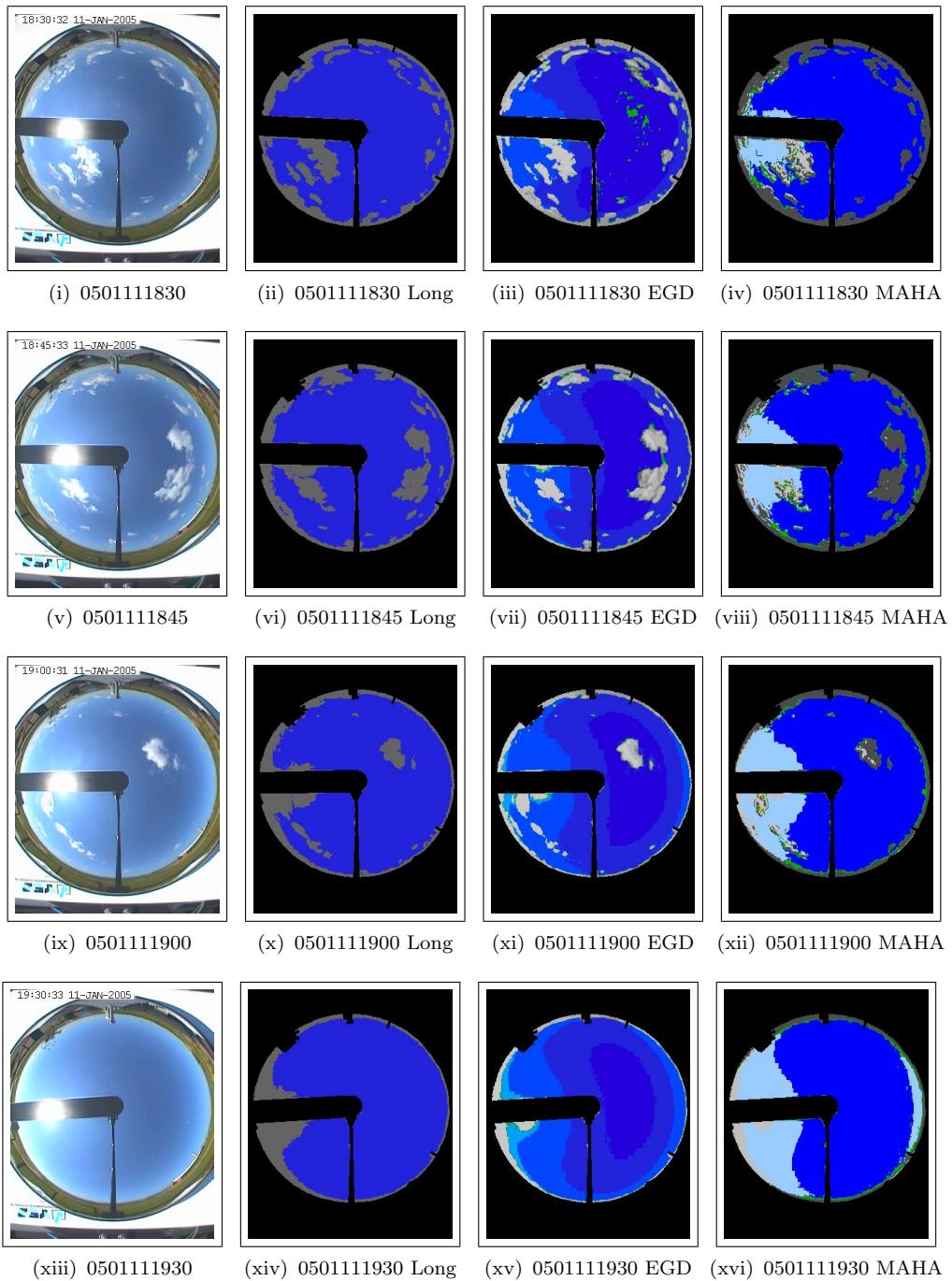


Figure A.127 - Sky images generated from 0501111830 to 0501111930. Image 0501111930 is missing.

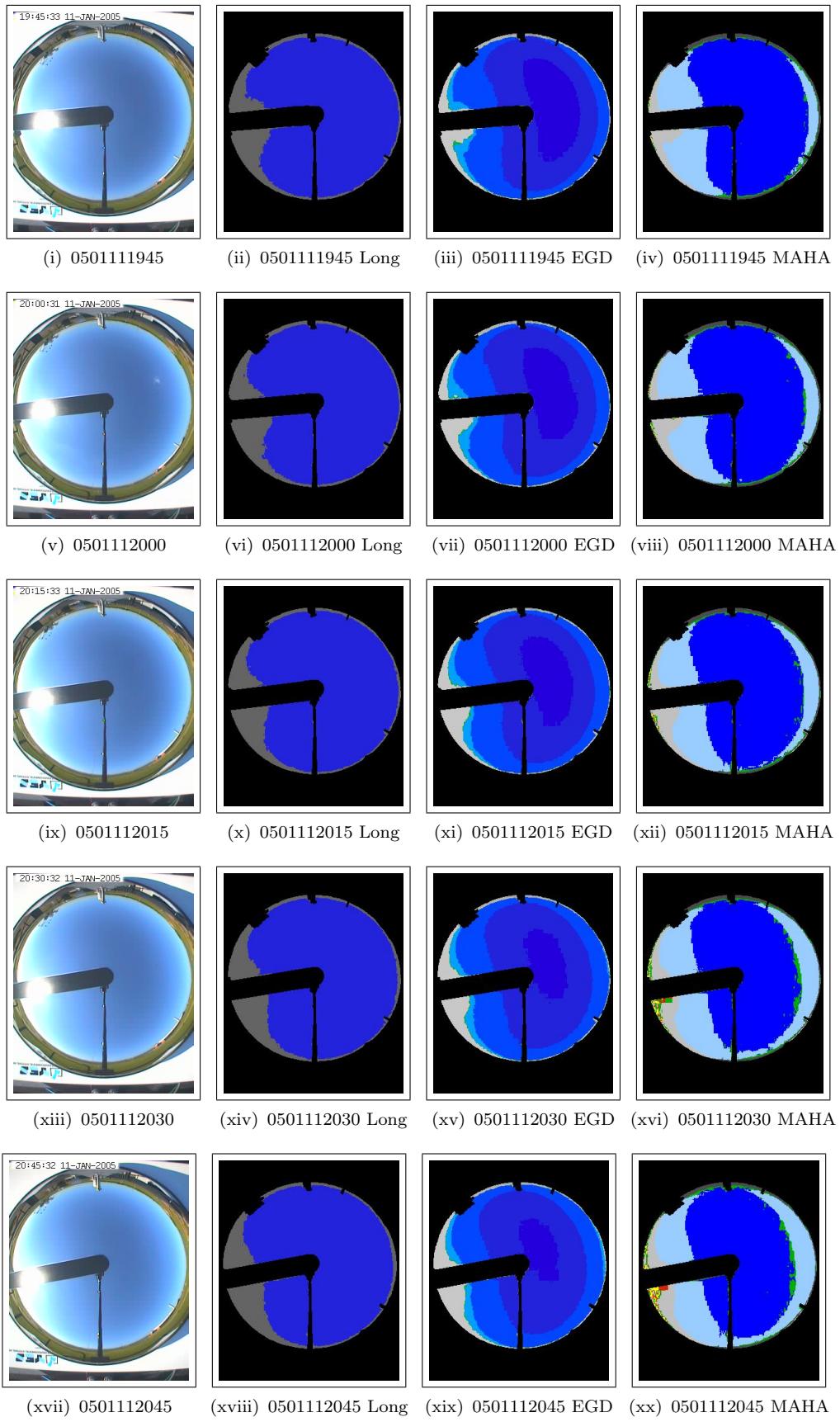


Figure A.128 - Sky images generated from 0501111945 to 0501112045.

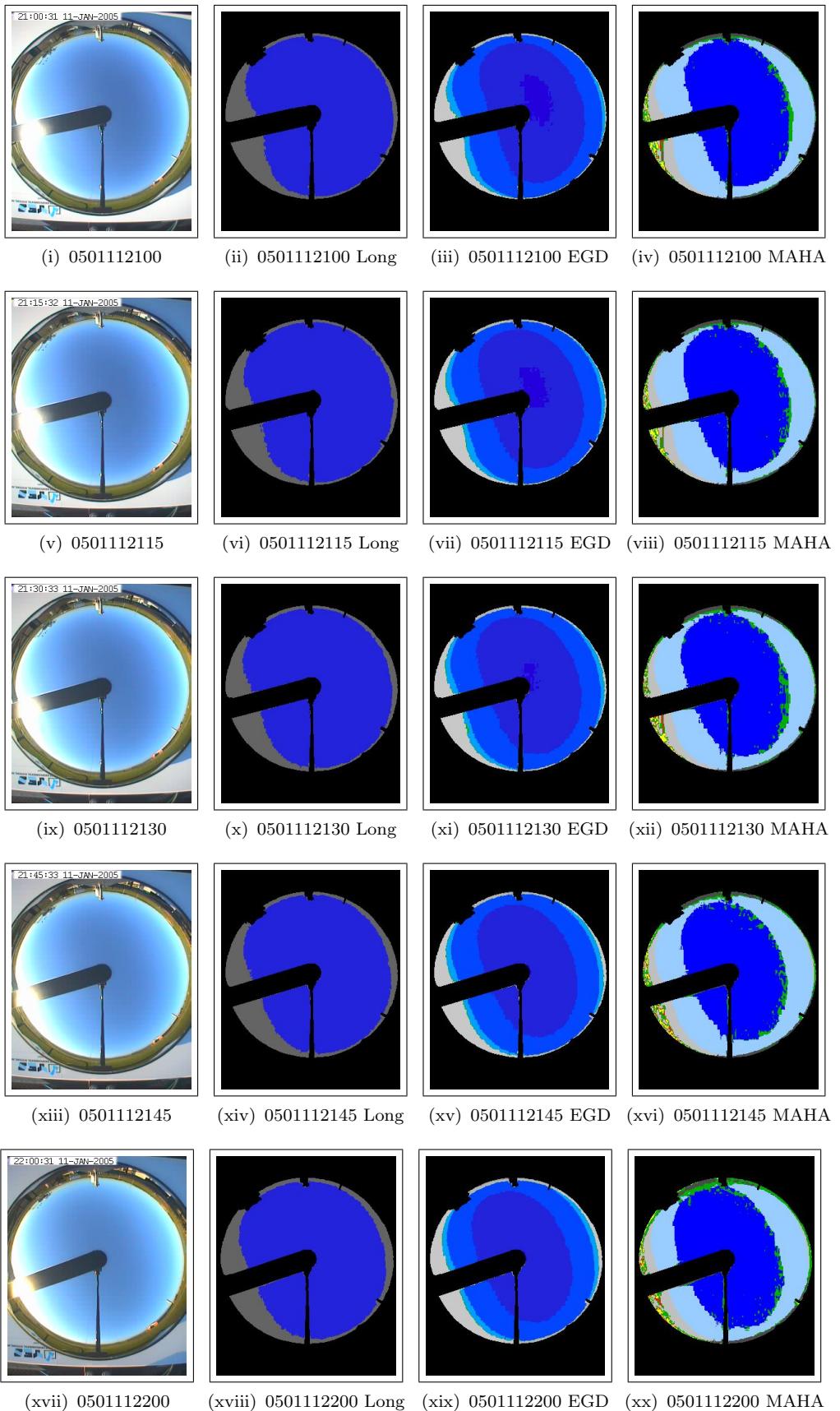


Figure A.129 - Sky images generated from 0501112100 to 0501112200.

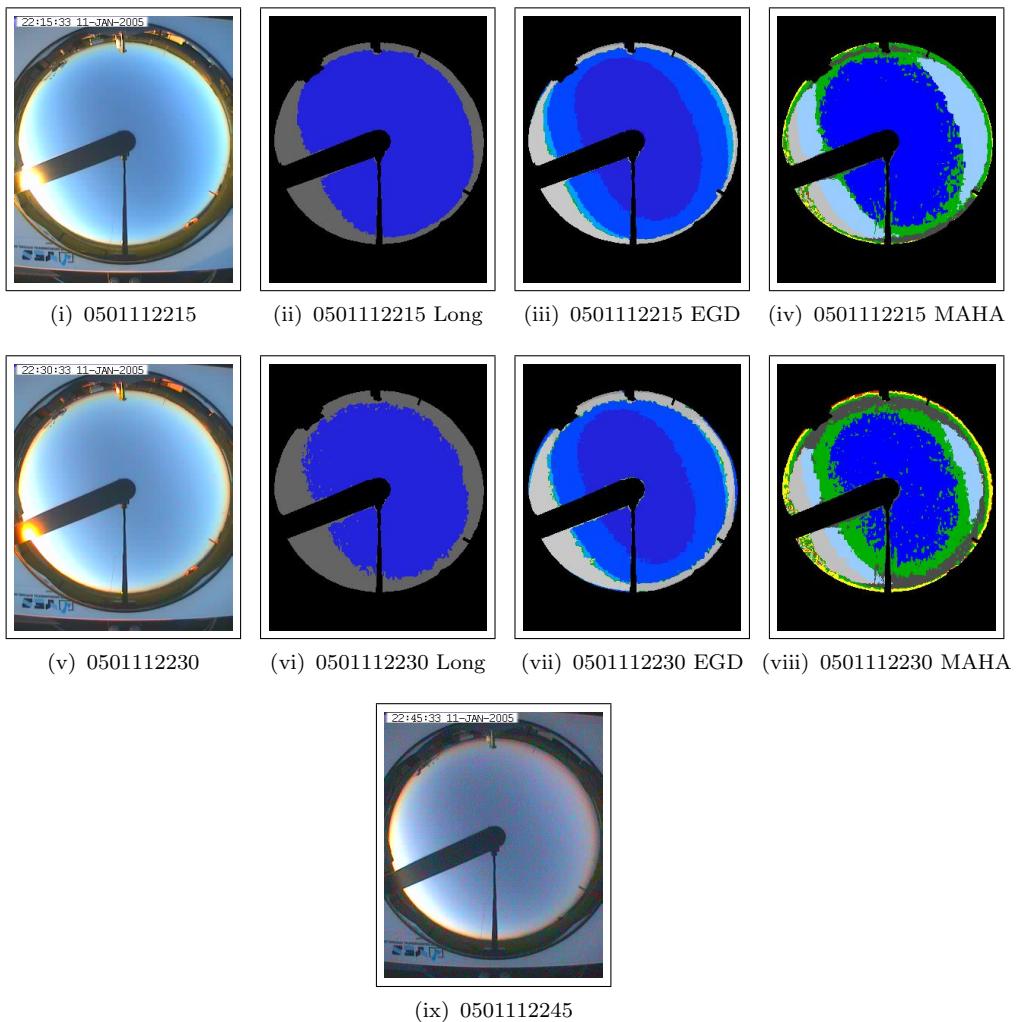


Figure A.130 - Sky images generated from 0501111600 to 0501112245.

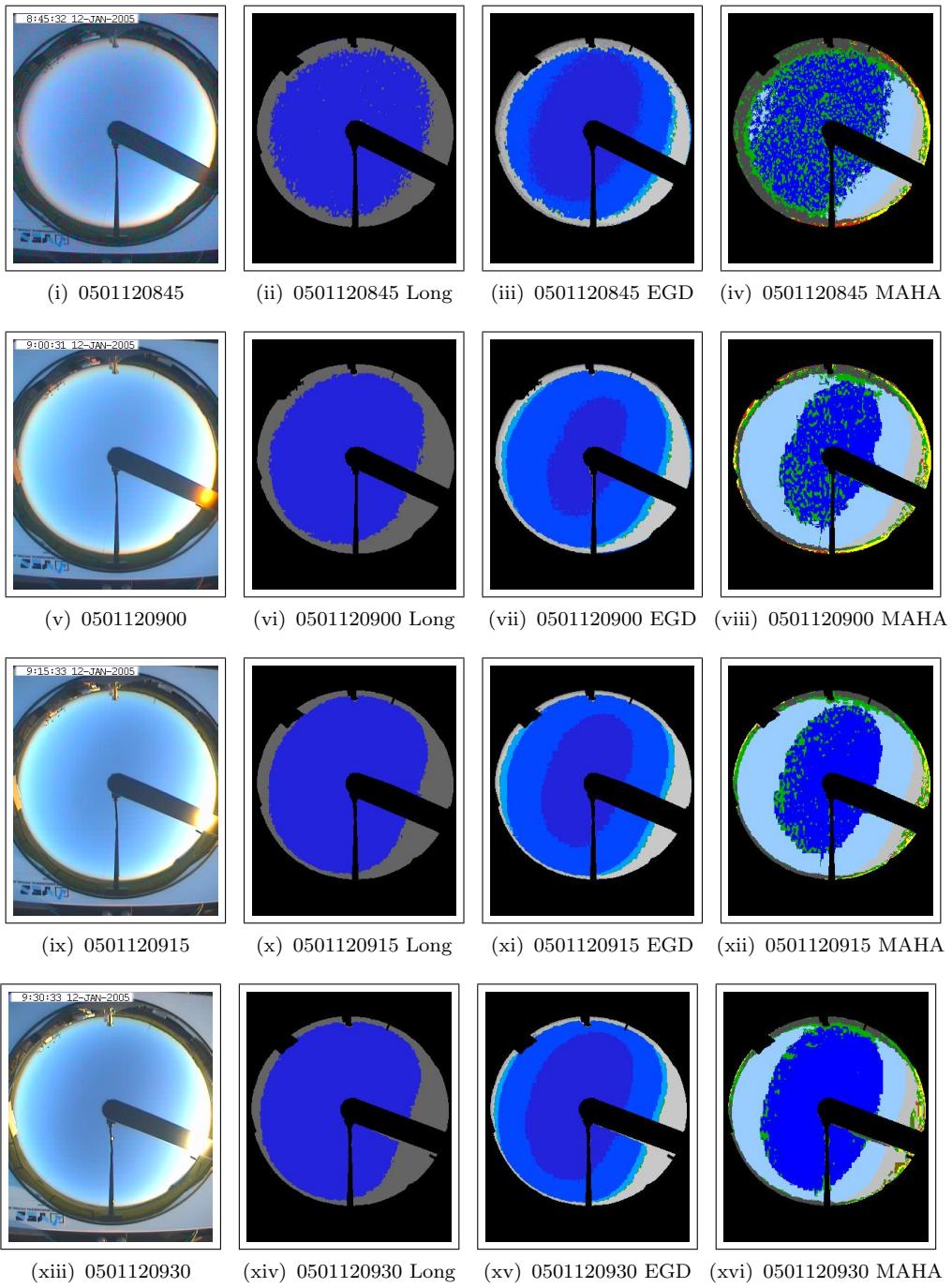


Figure A.131 - Sky images generated from 0501120845 to 0501120930.

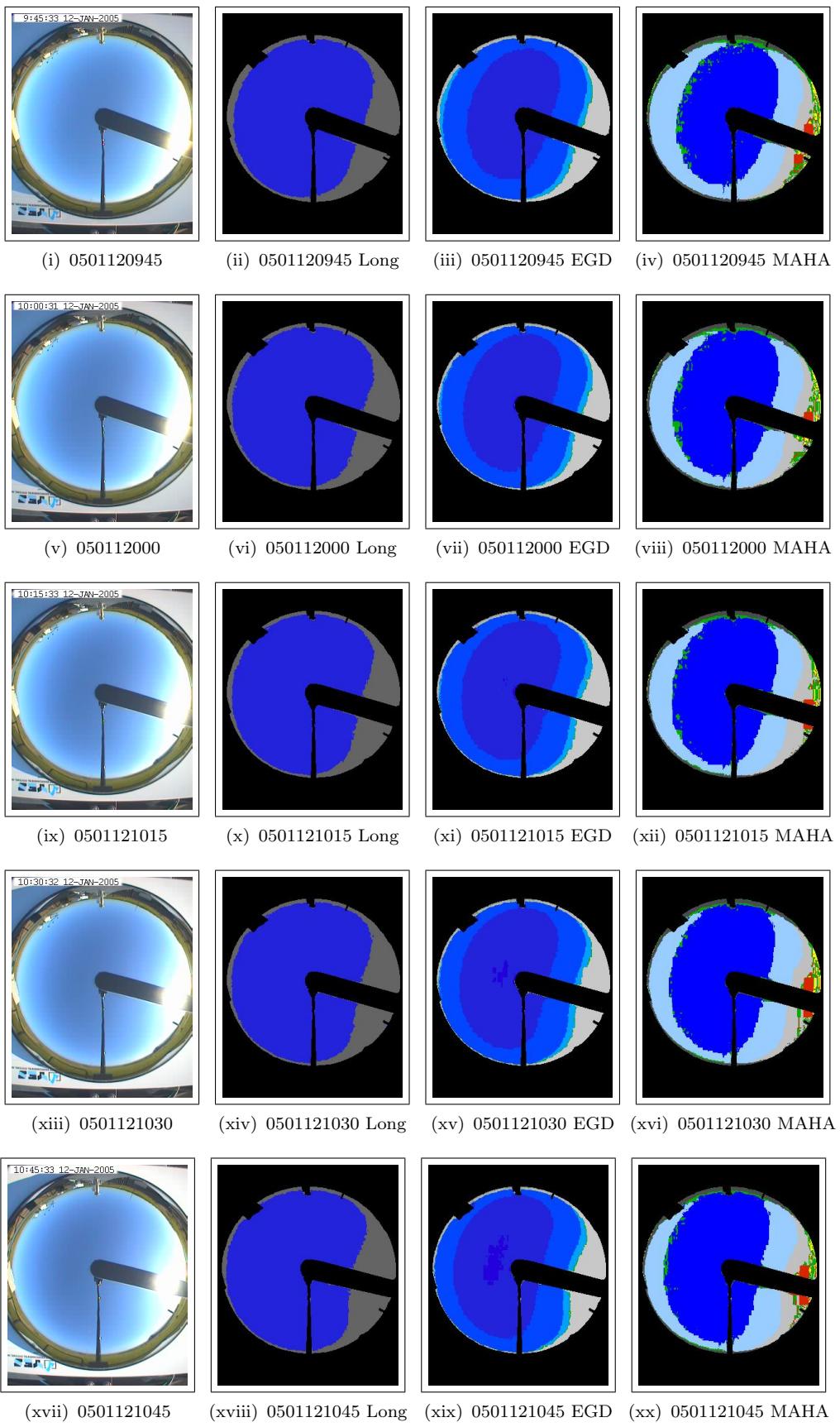


Figure A.132 - Sky images generated from 0501120945 to 0501121045.

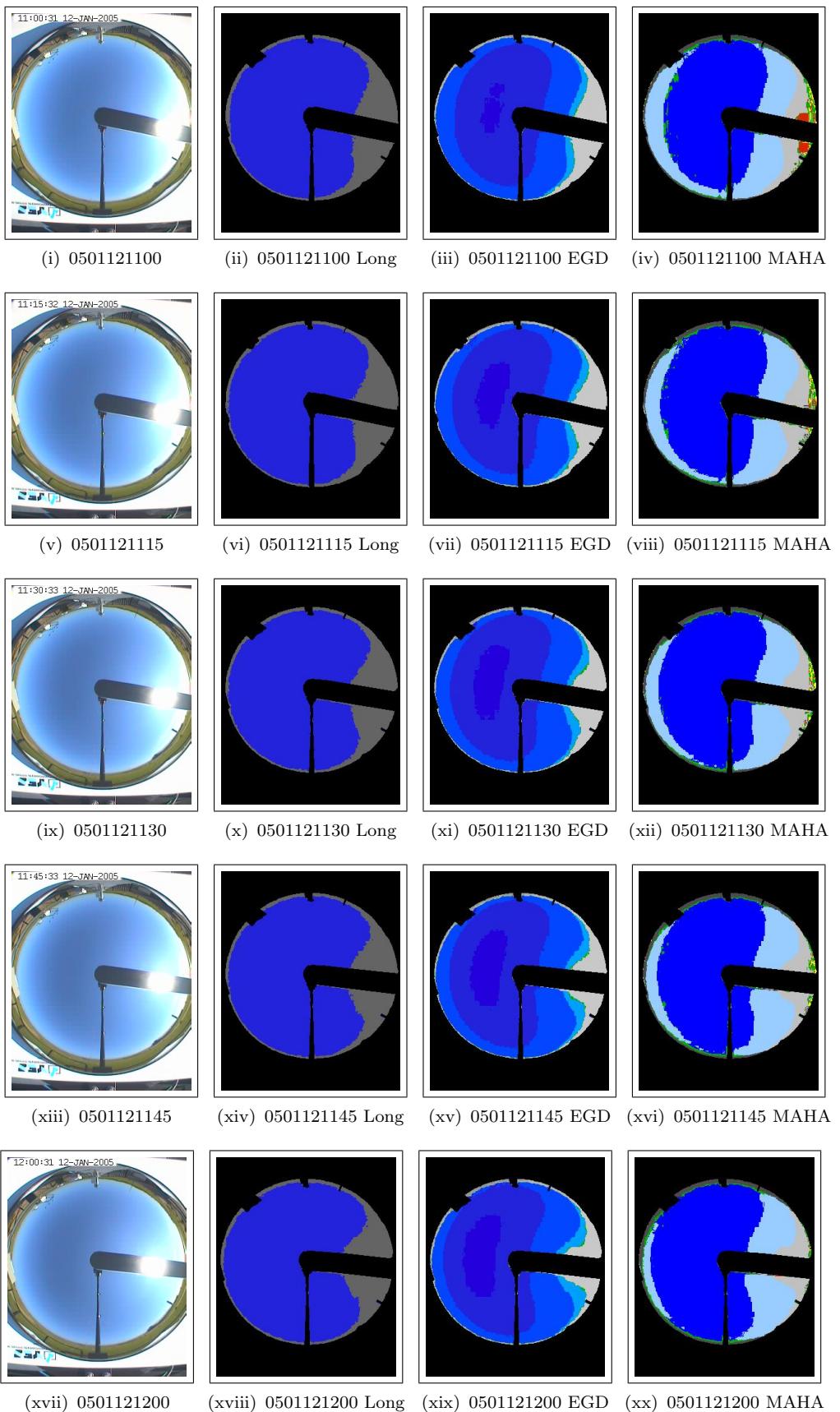


Figure A.133 - Sky images generated from 050112100 to 0501121200.

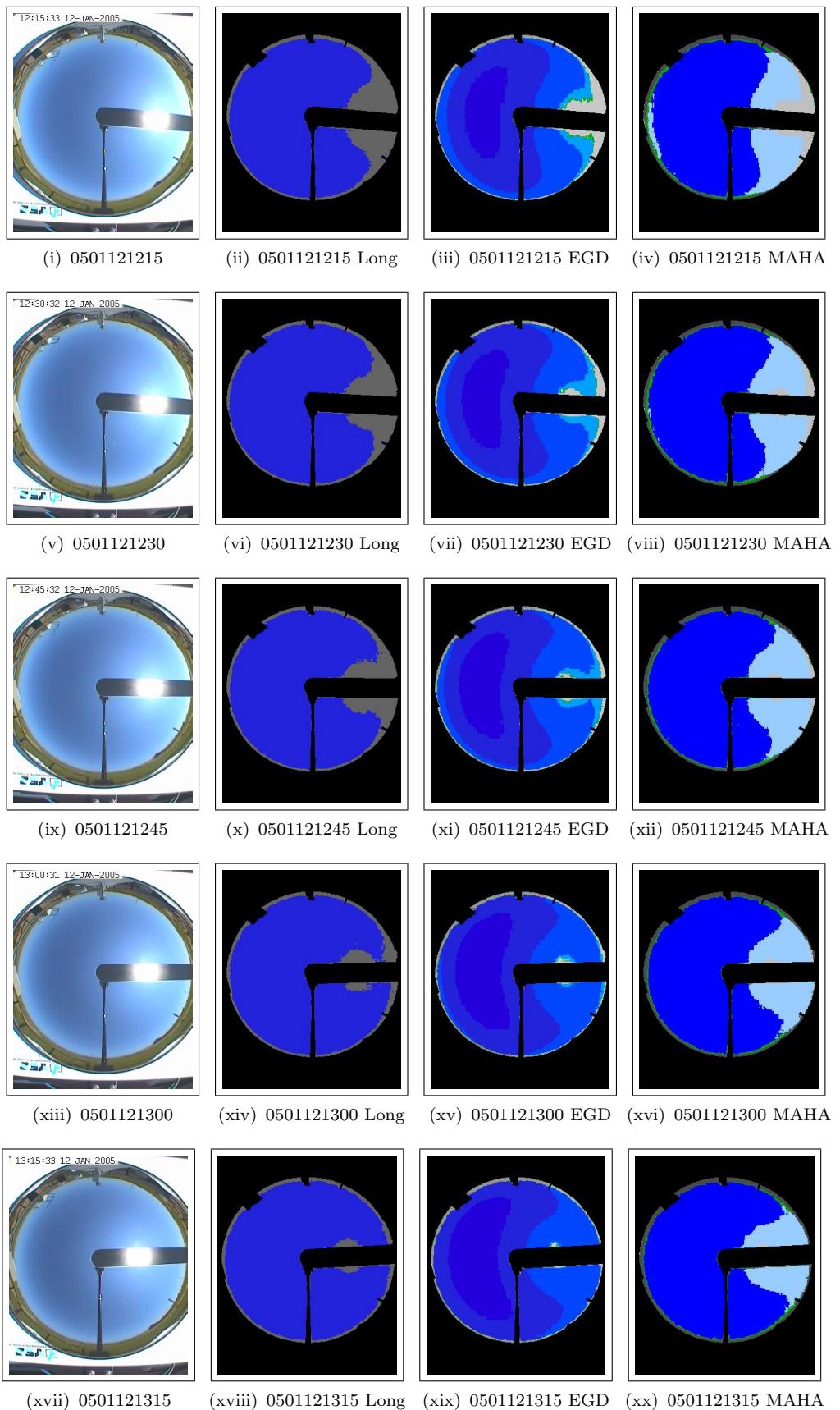


Figure A.134 - Sky images generated from 0501121215 to 0501121315.

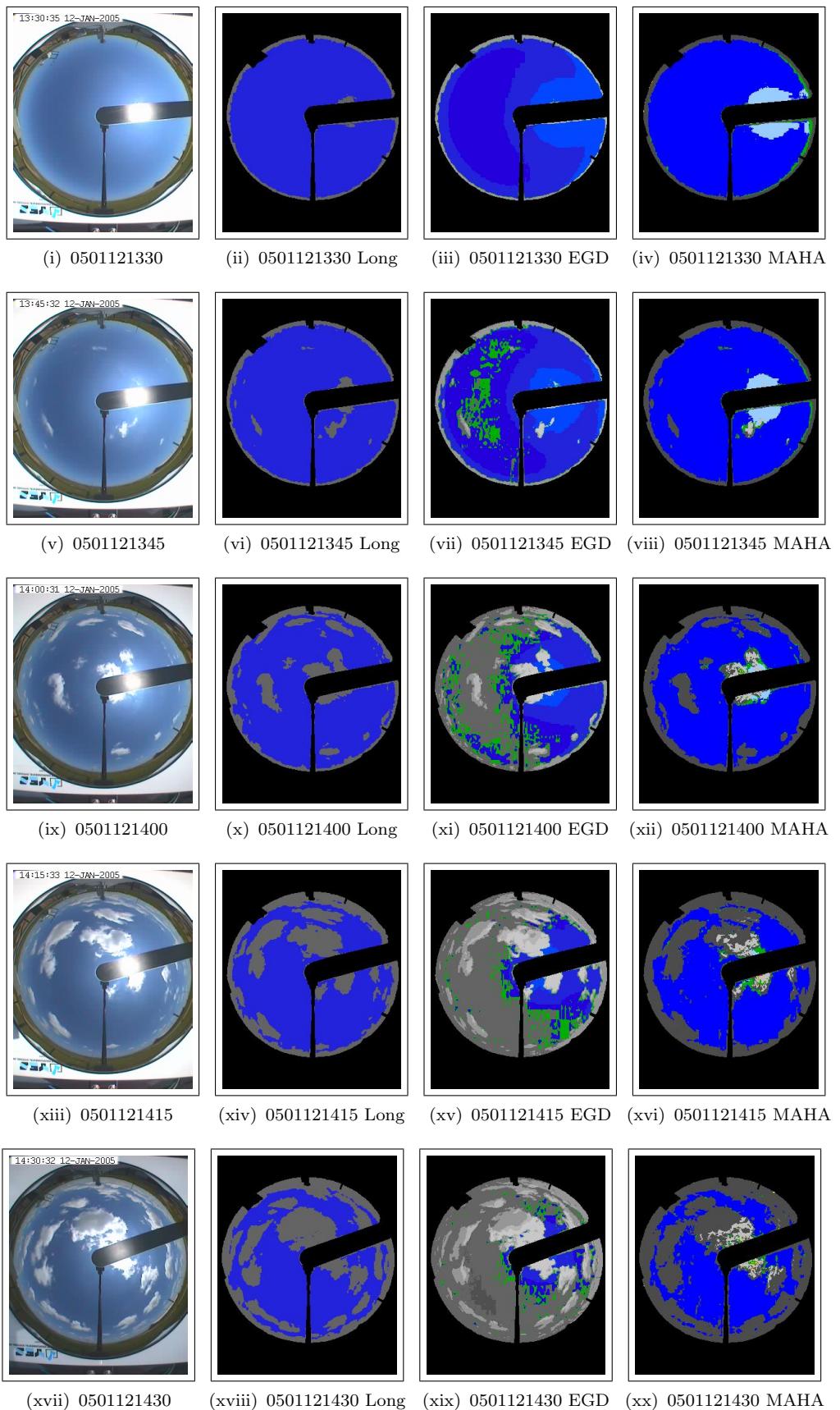


Figure A.135 - Sky images generated from 0501121330 to 0501121430.

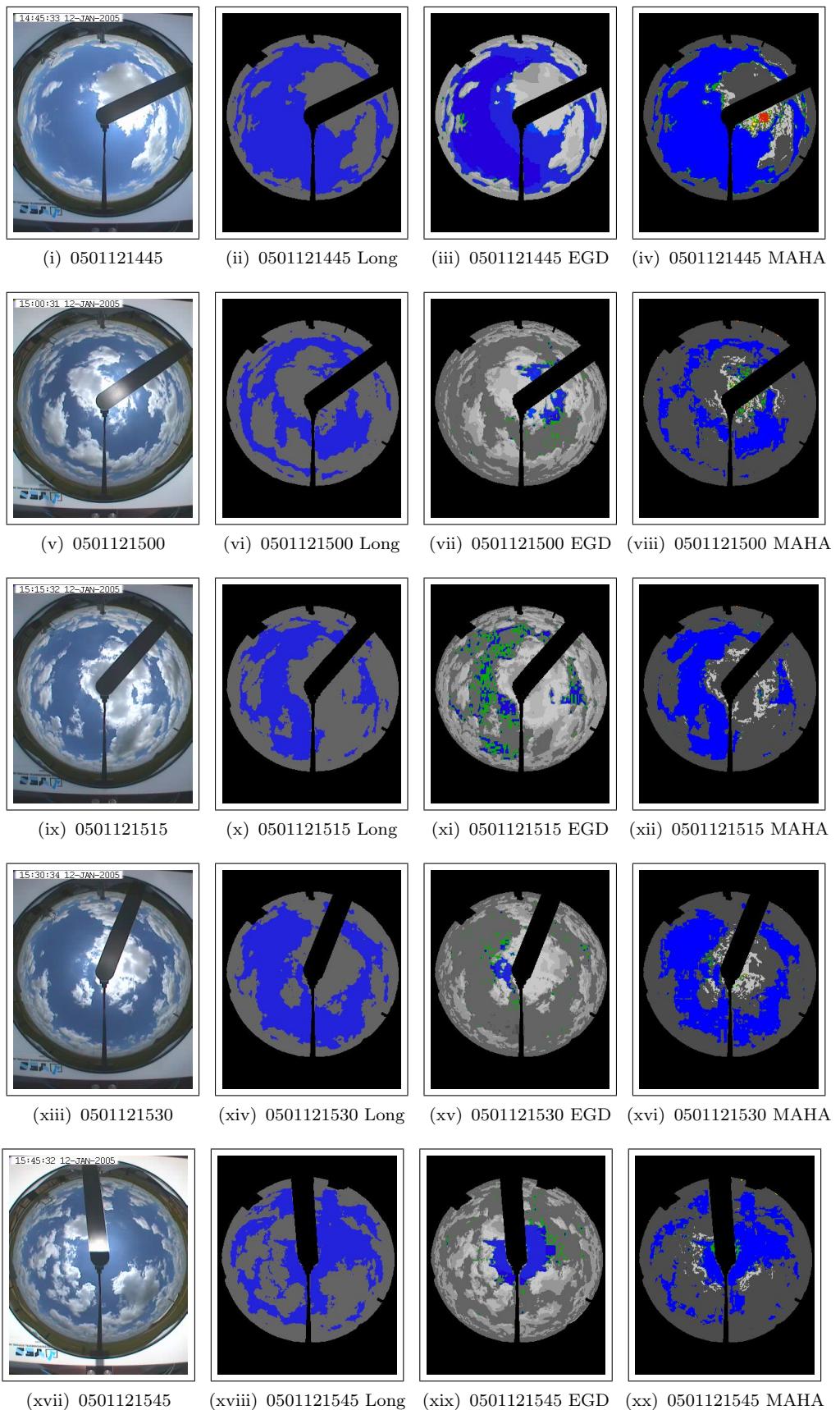


Figure A.136 - Sky images generated from 0501121445 to 0501121545.

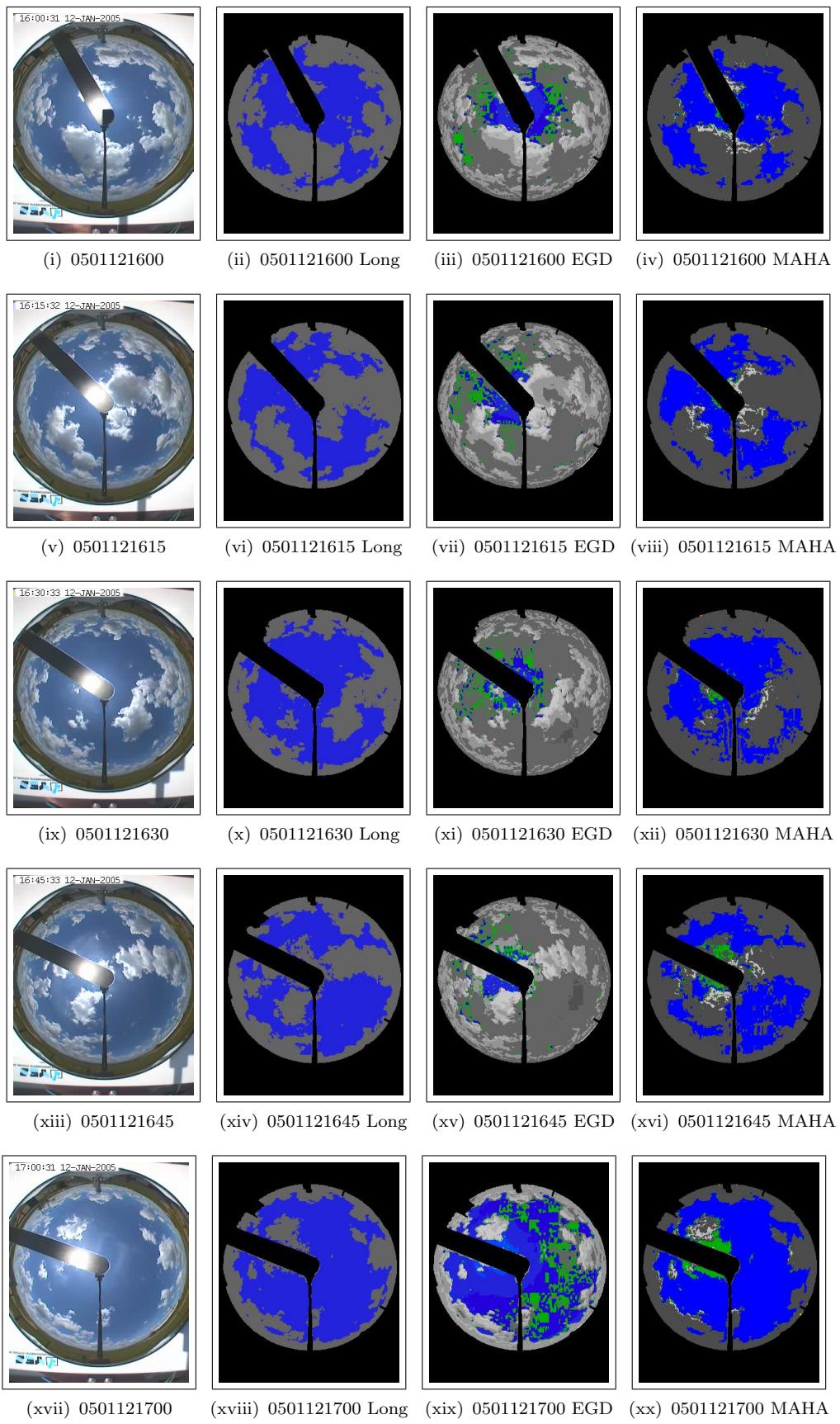


Figure A.137 - Sky images generated from 0501121600 to 0501121700.

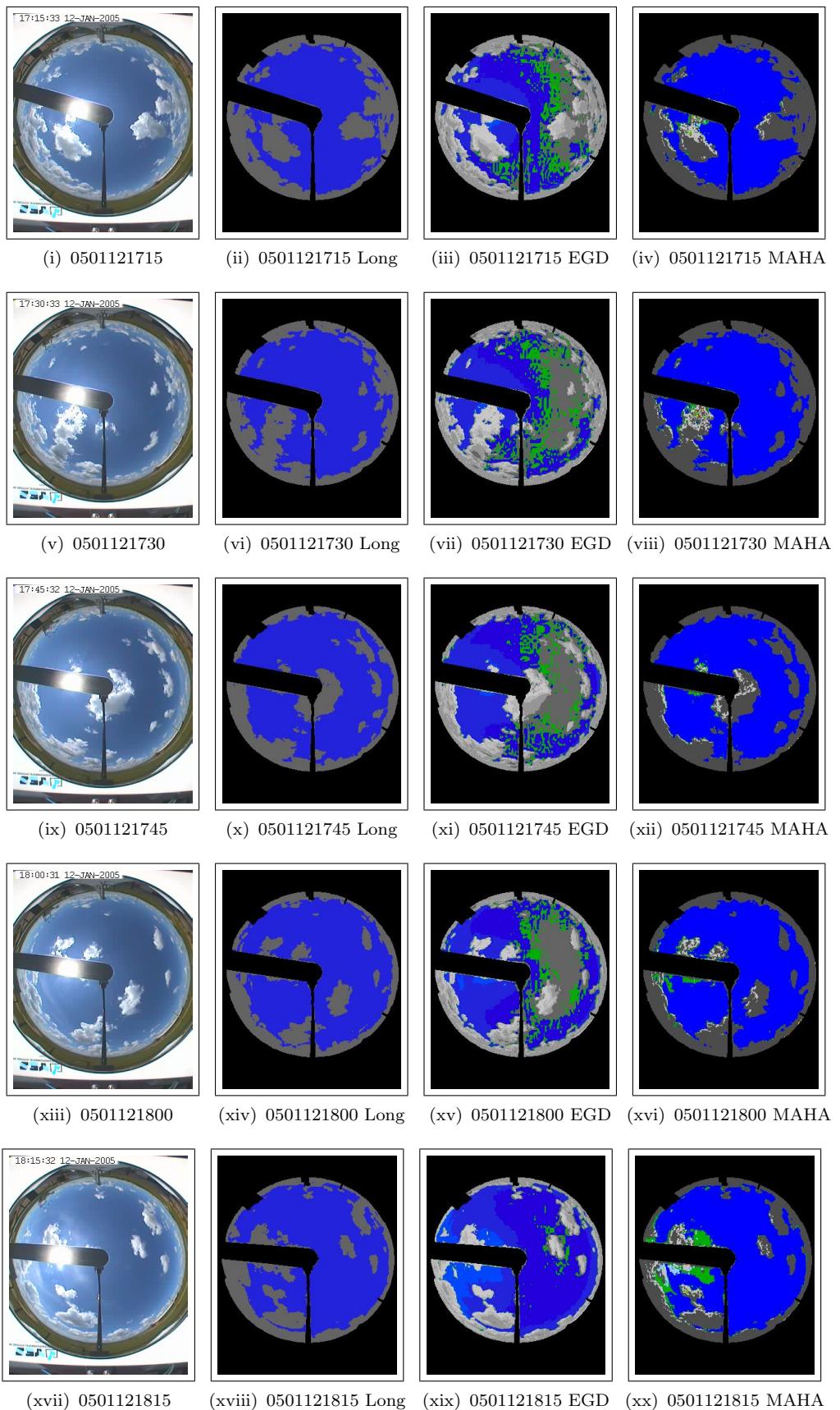


Figure A.138 - Sky images generated from 0501121715 to 0501121815.

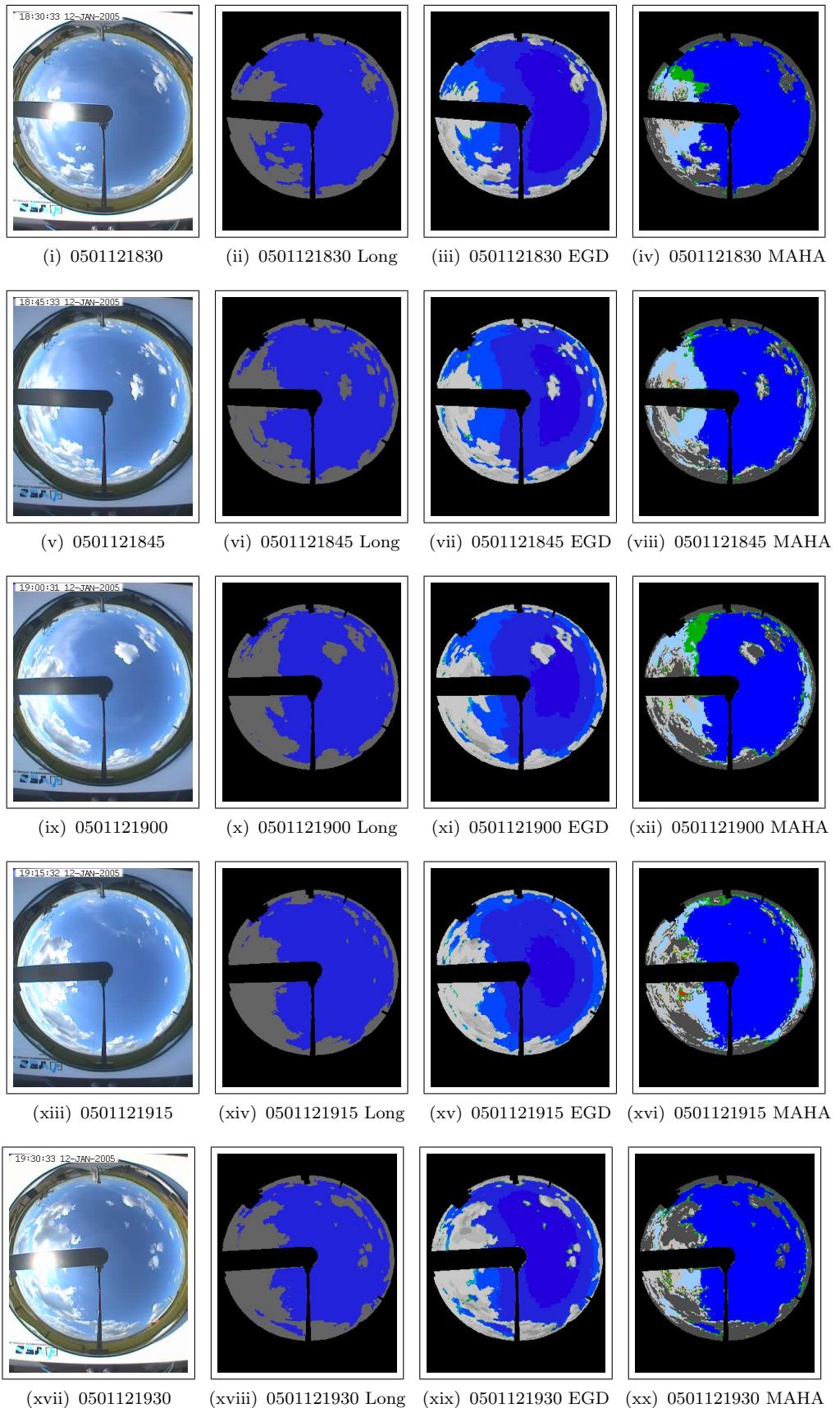


Figure A.139 - Sky images generated from 0501121830 to 0501121930.

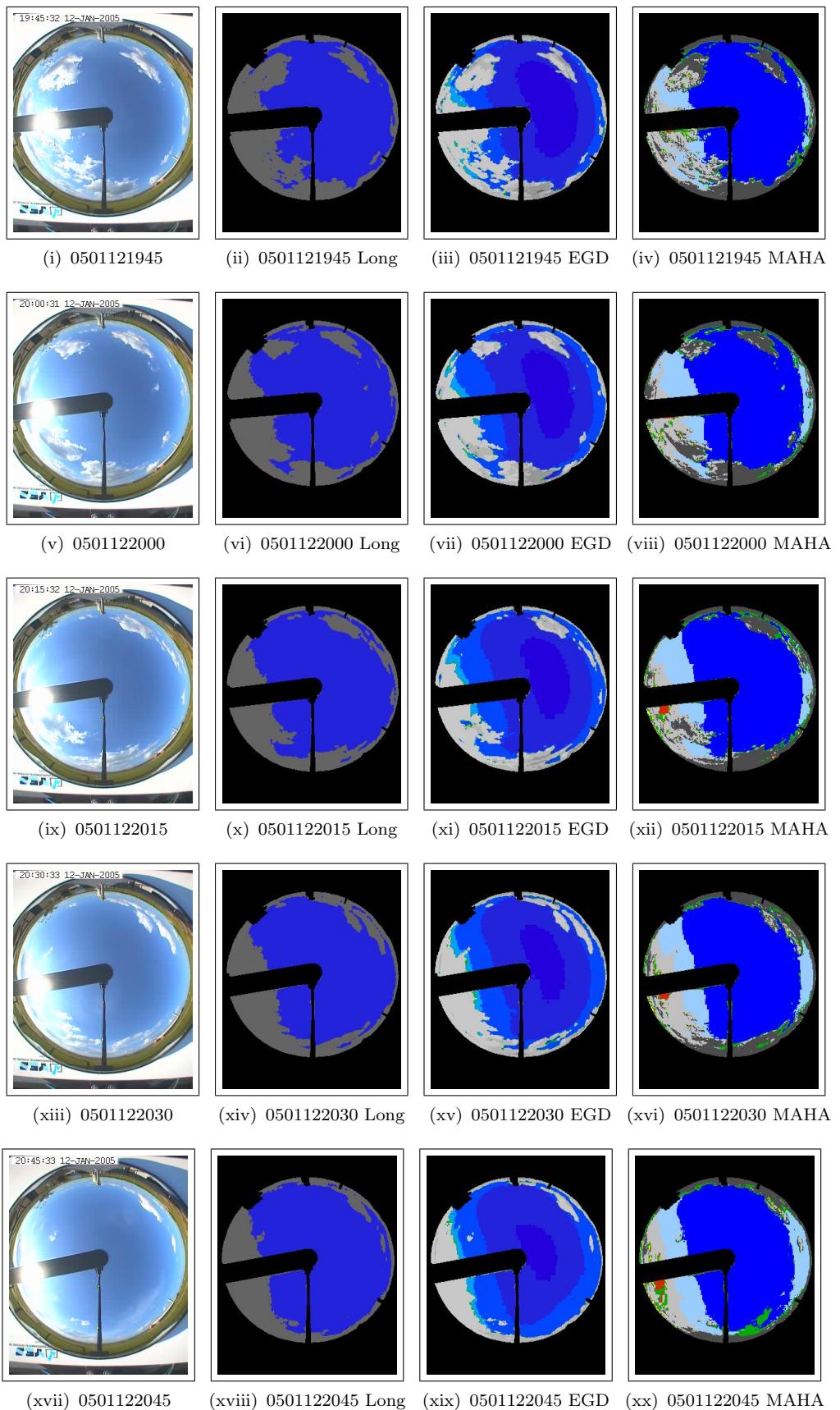


Figure A.140 - Sky images generated from 0501121945 to 0501122045.

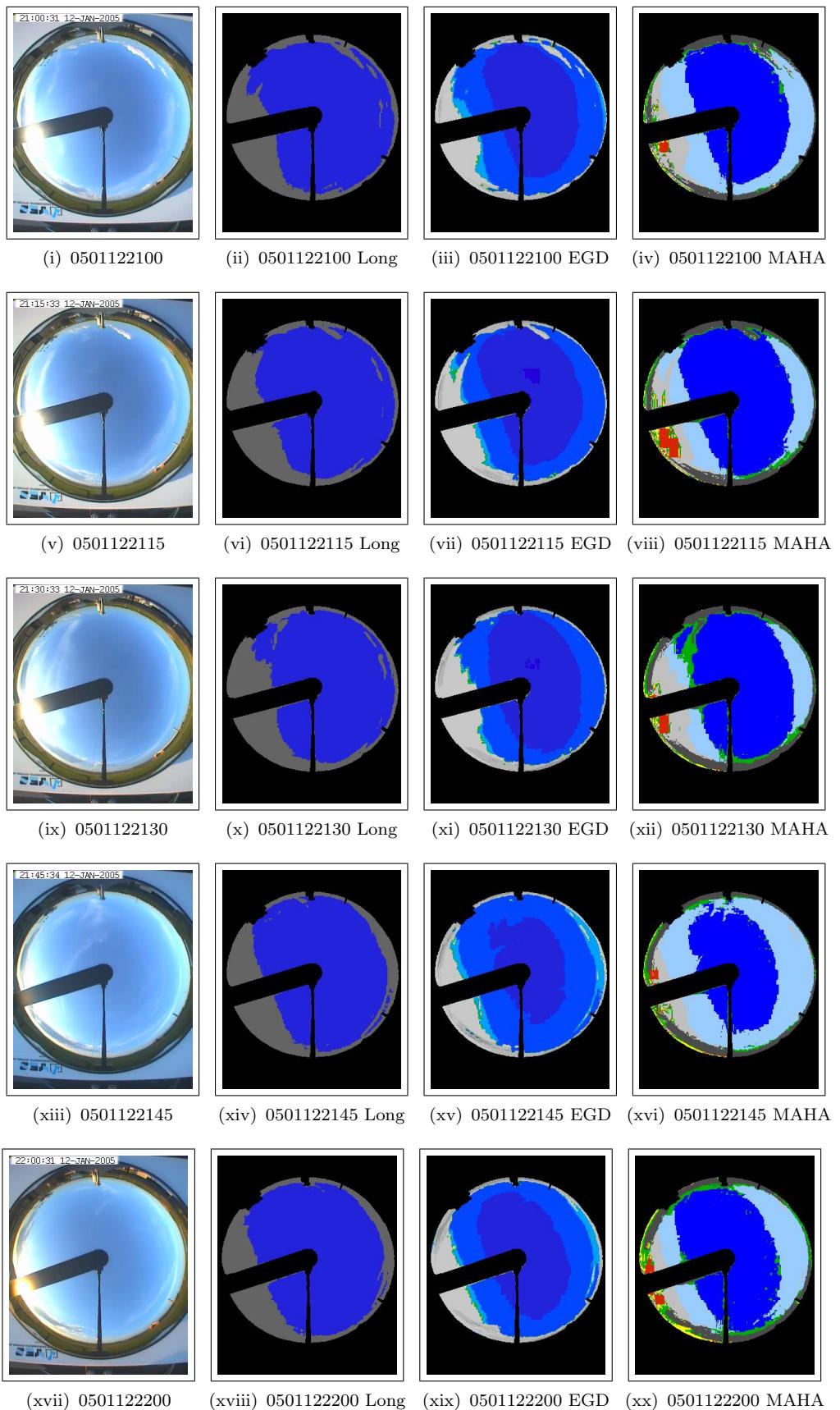


Figure A.141 - Sky images generated from 0501122100 to 0501122200.

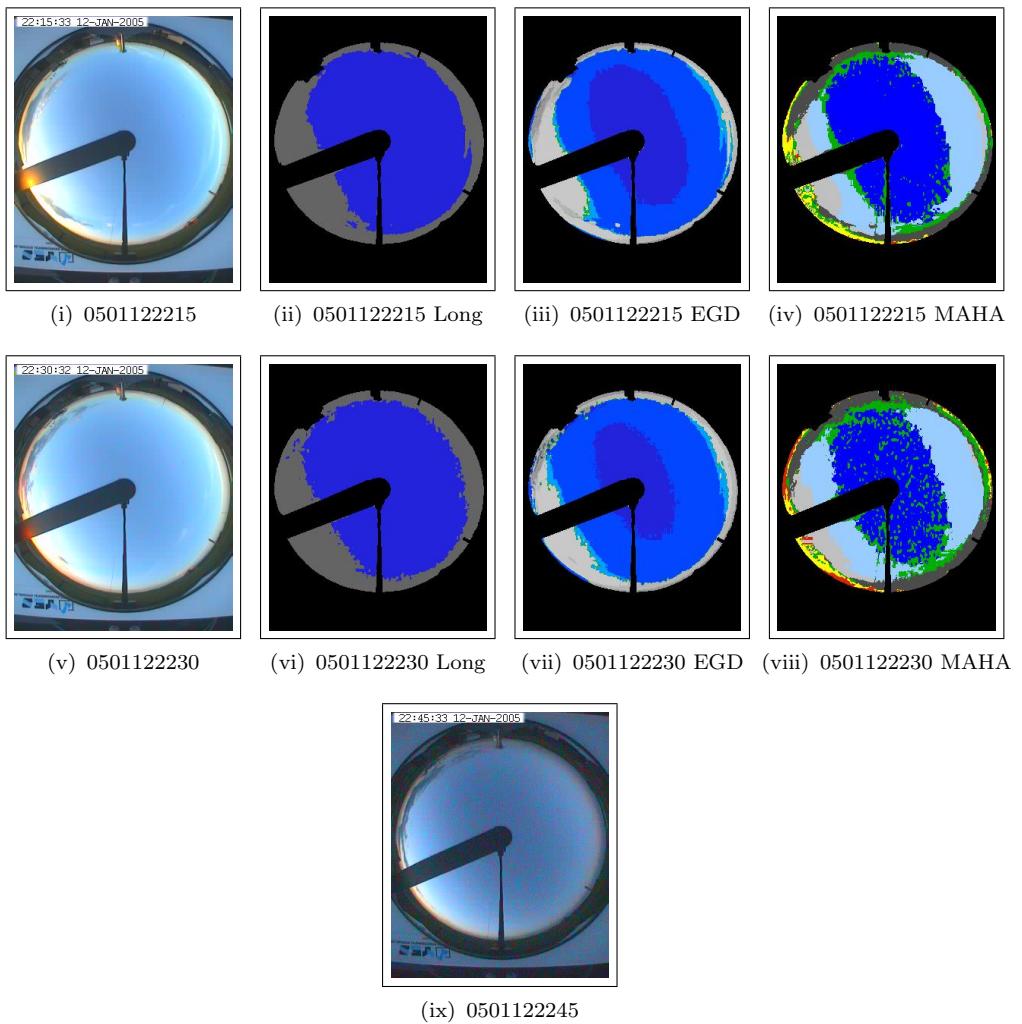


Figure A.142 - Sky images generated from 0501121600 to 0501122245.

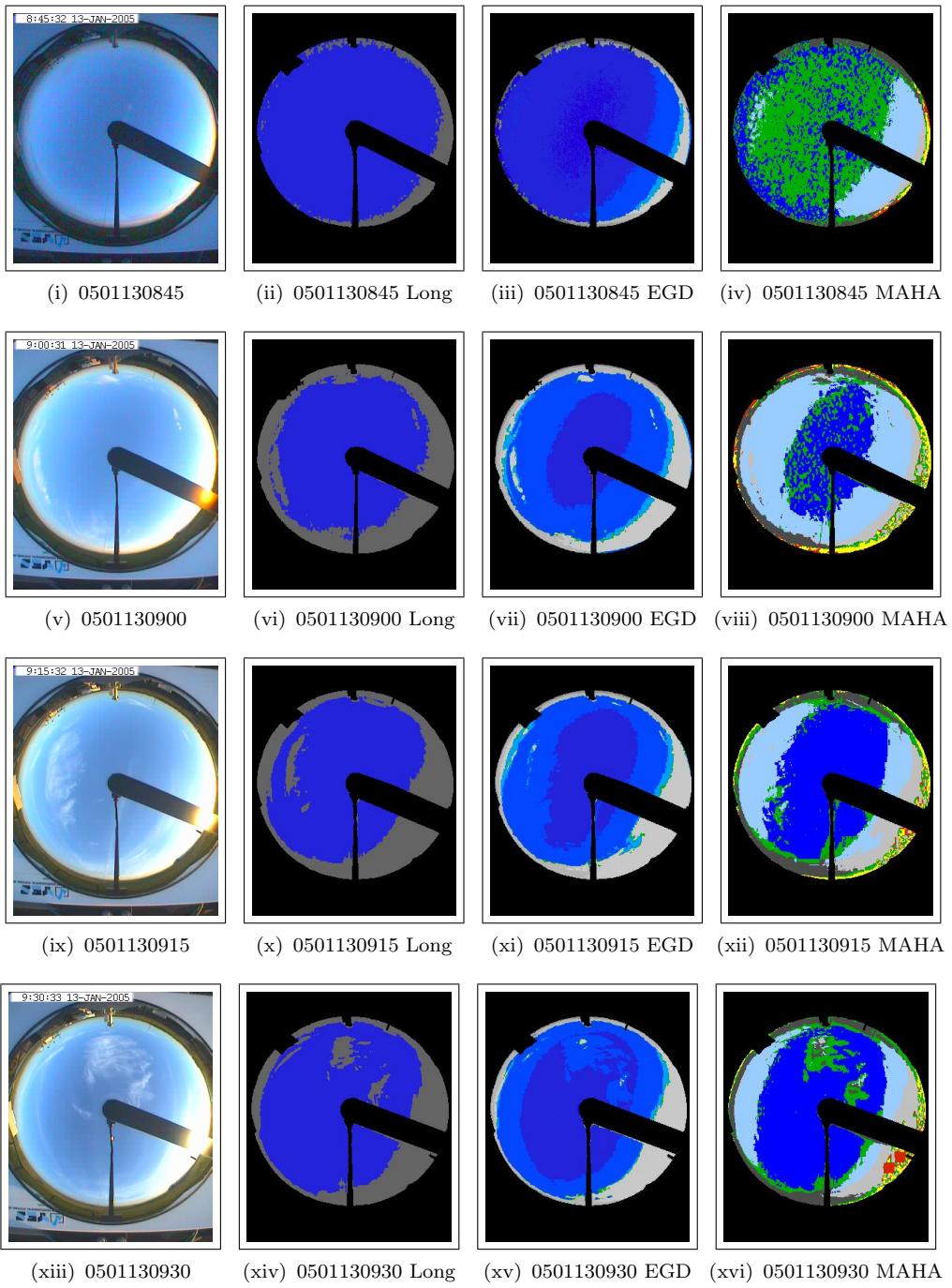


Figure A.143 - Sky images generated from 0501130845 to 0501130930.

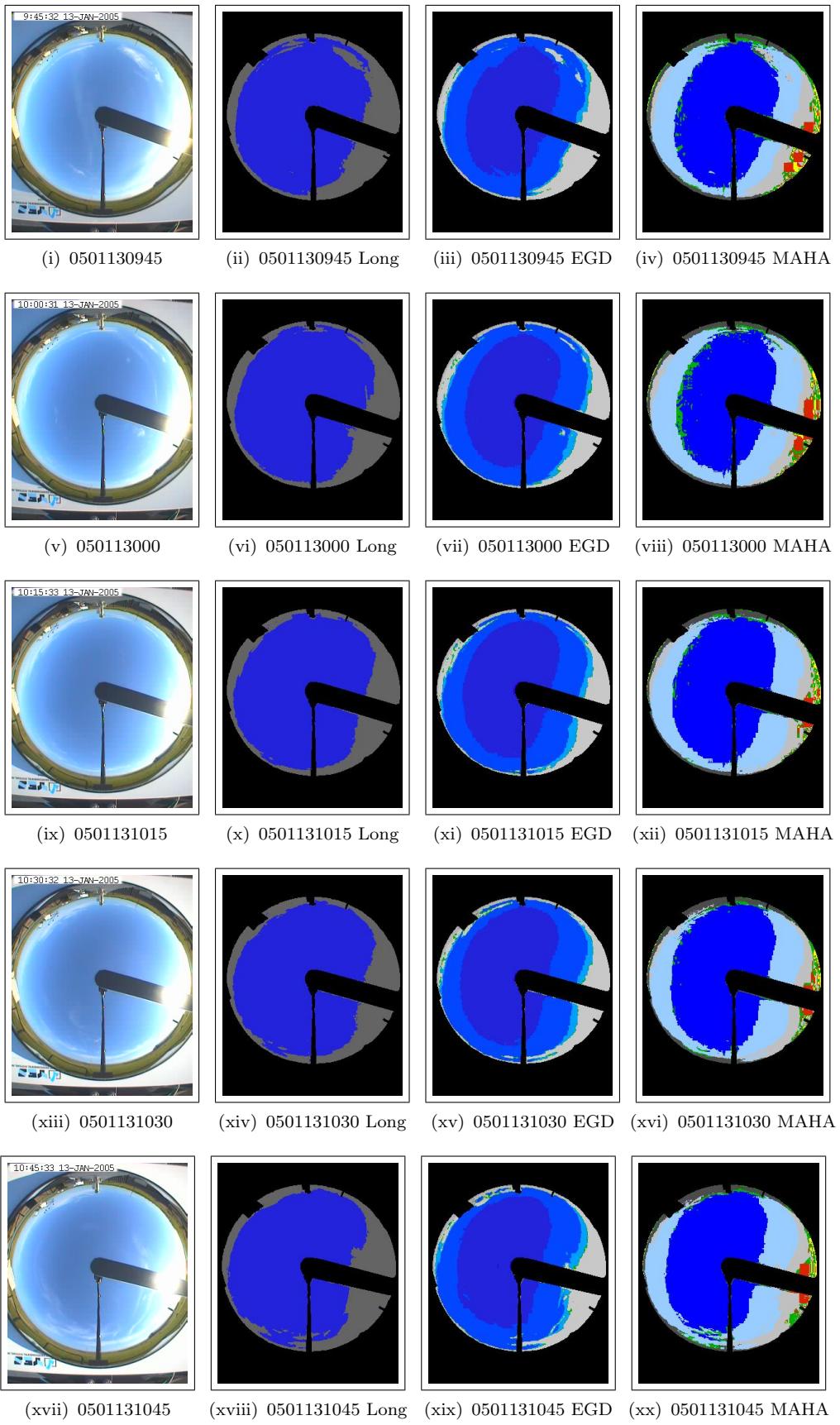


Figure A.144 - Sky images generated from 0501130945 to 0501131045.

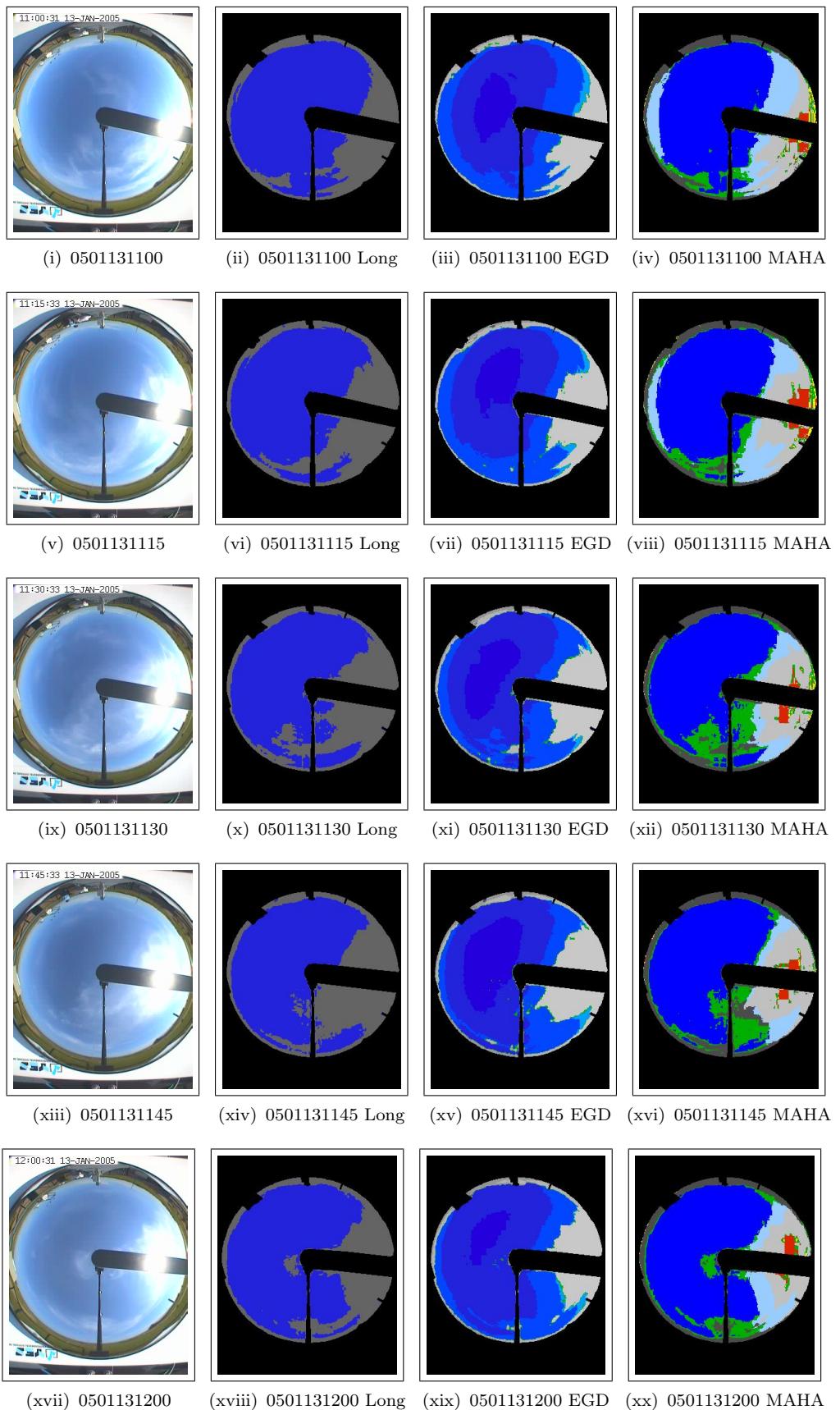


Figure A.145 - Sky images generated from 050113100 to 0501131200.

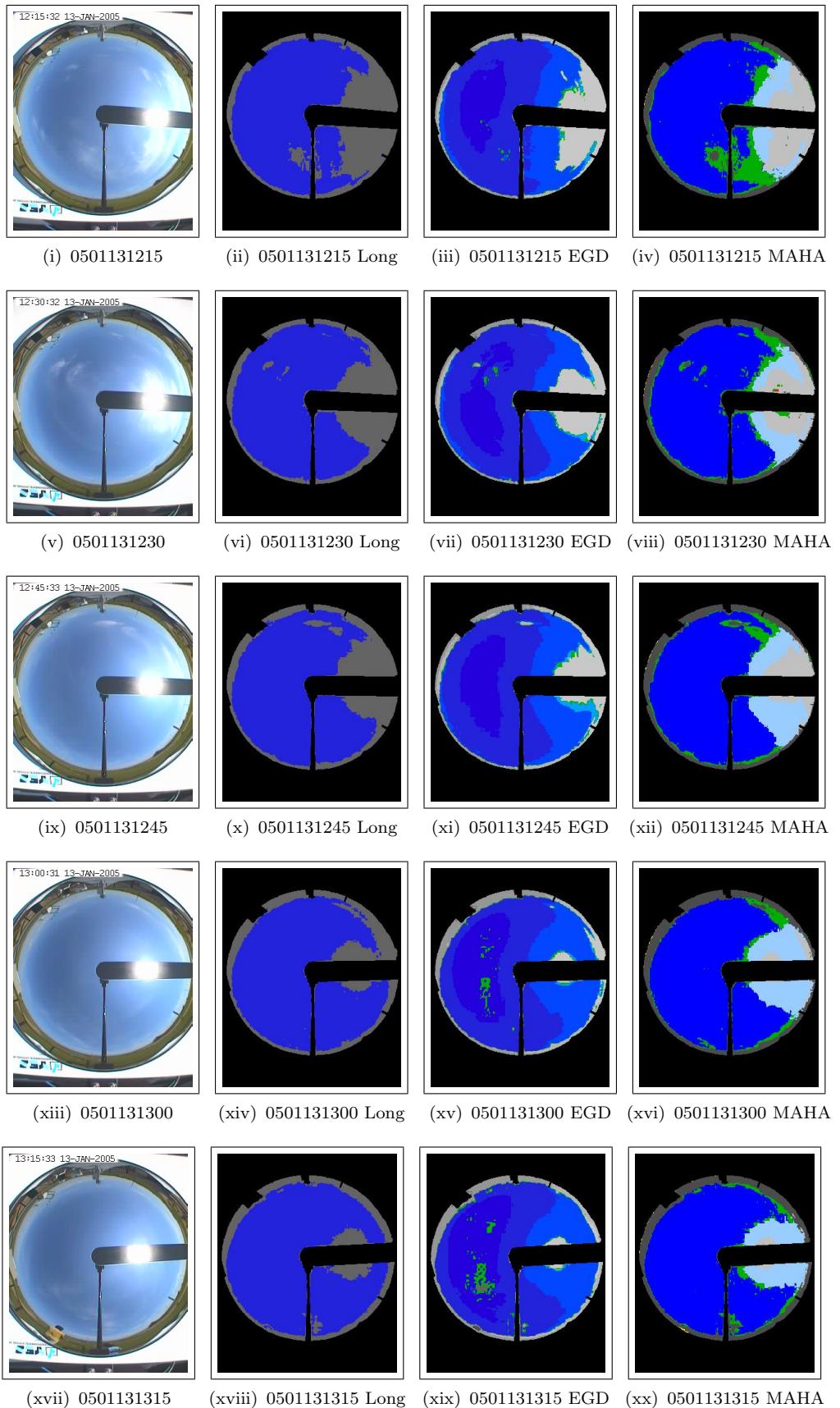


Figure A.146 - Sky images generated from 0501131215 to 0501131315.

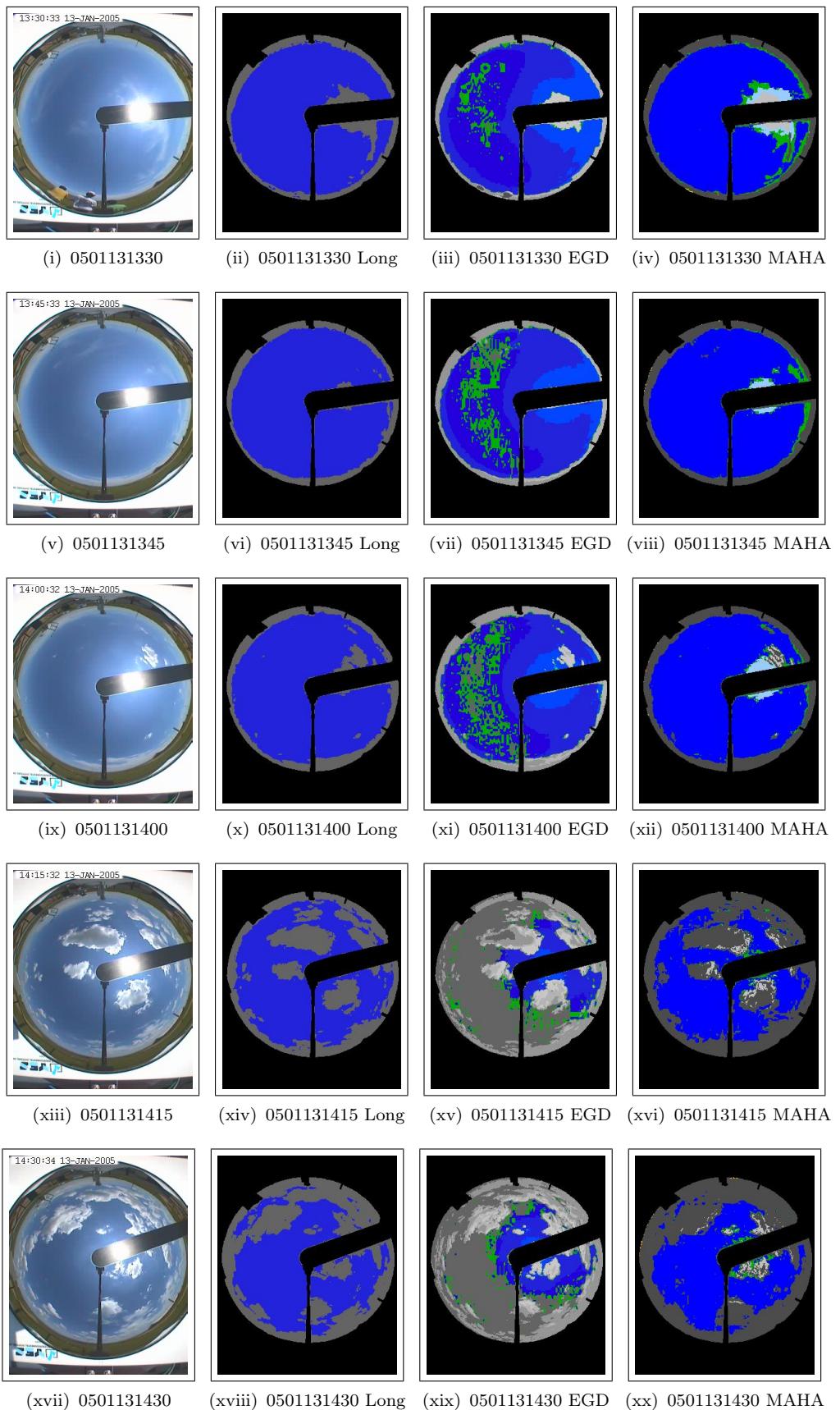


Figure A.147 - Sky images generated from 0501131330 to 0501131430.

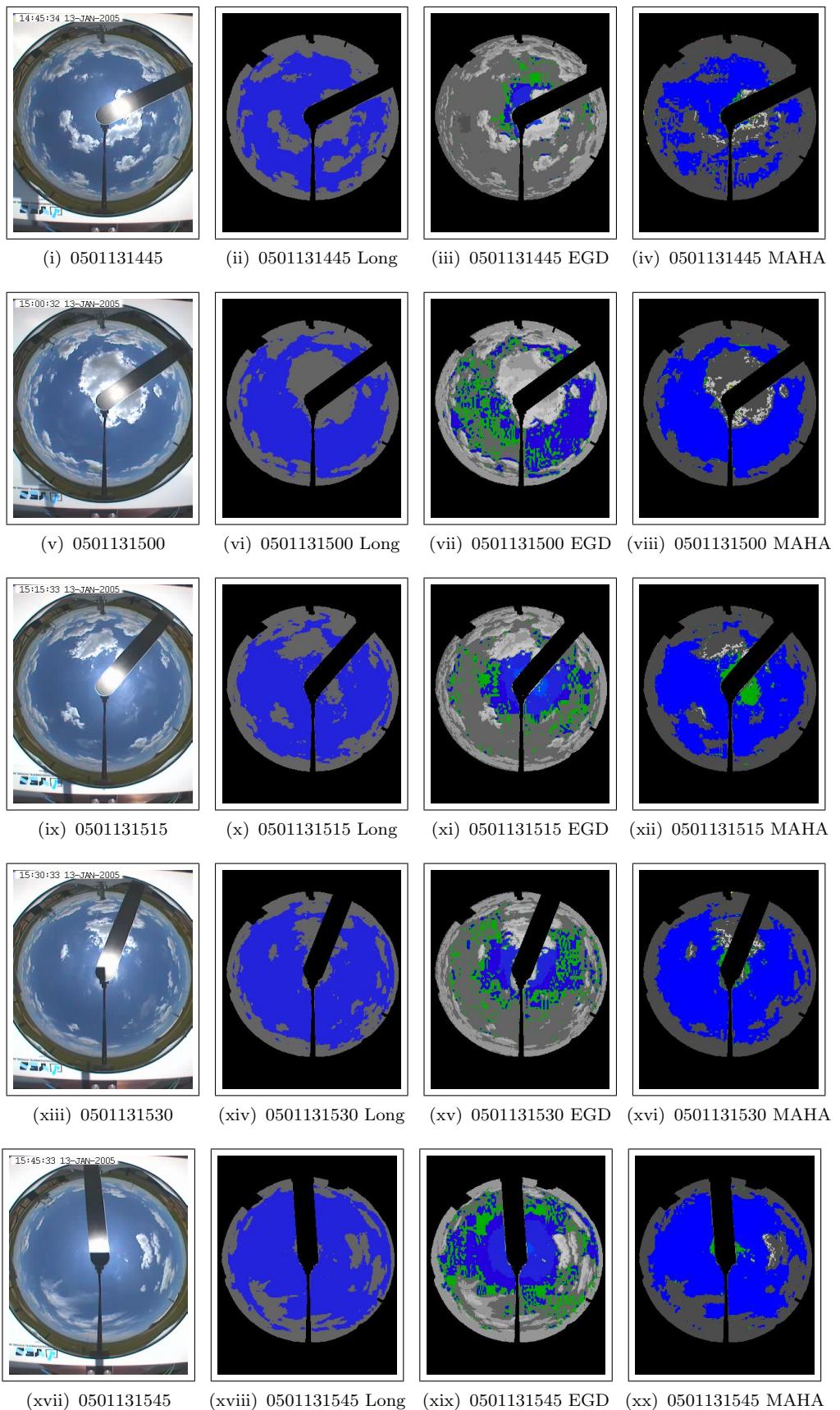


Figure A.148 - Sky images generated from 0501131445 to 0501131545.

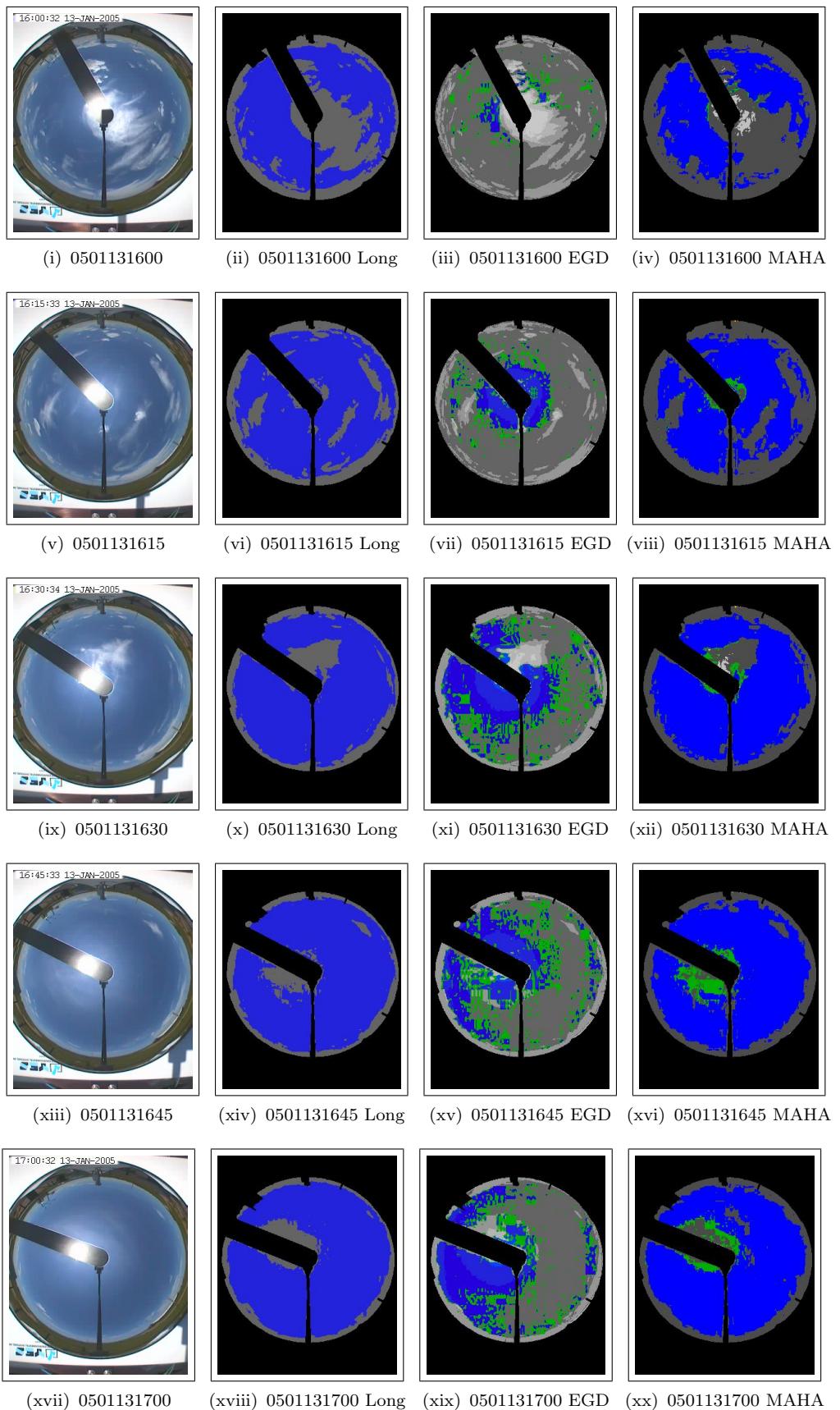


Figure A.149 - Sky images generated from 0501131600 to 0501131700.

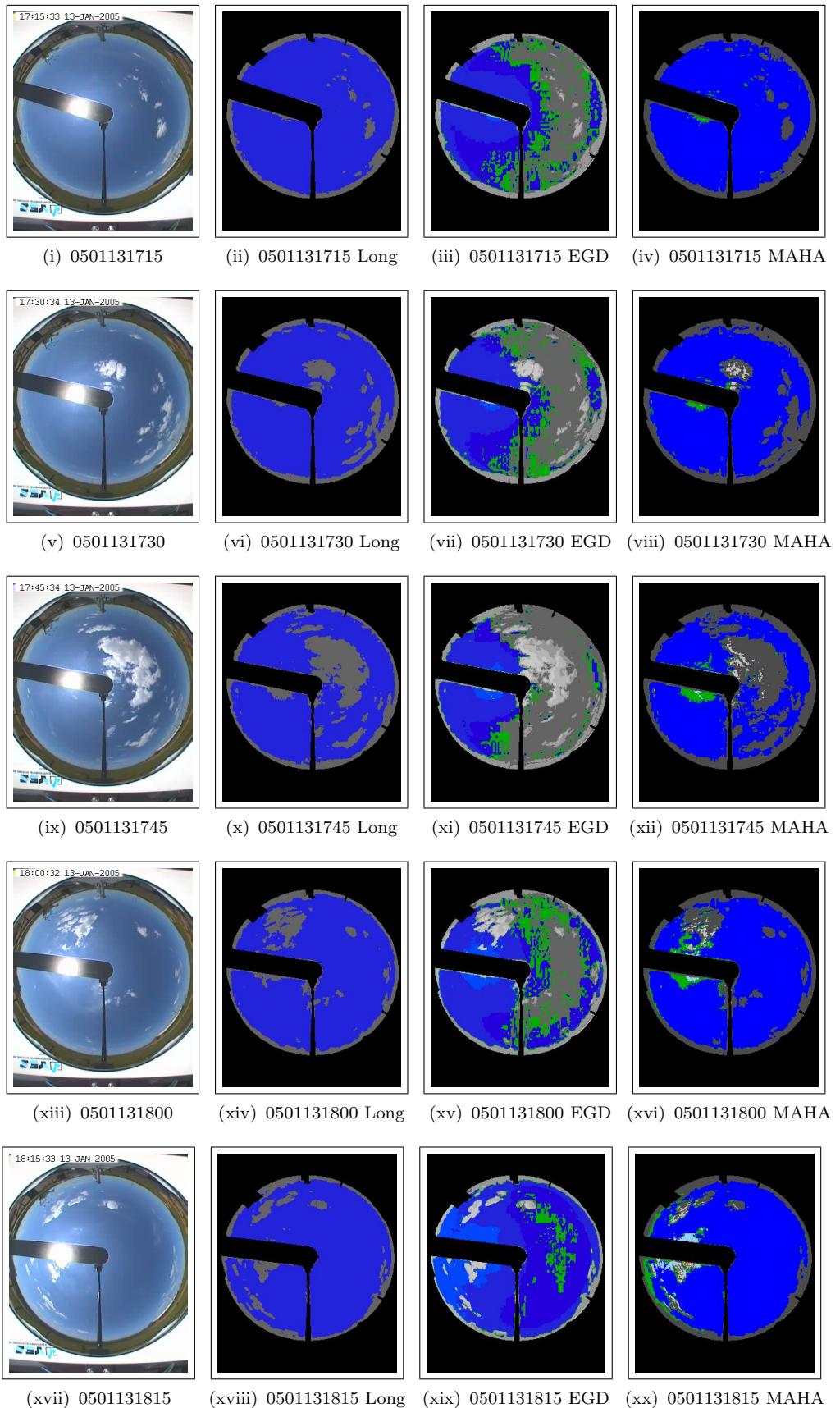


Figure A.150 - Sky images generated from 0501131715 to 0501131815.

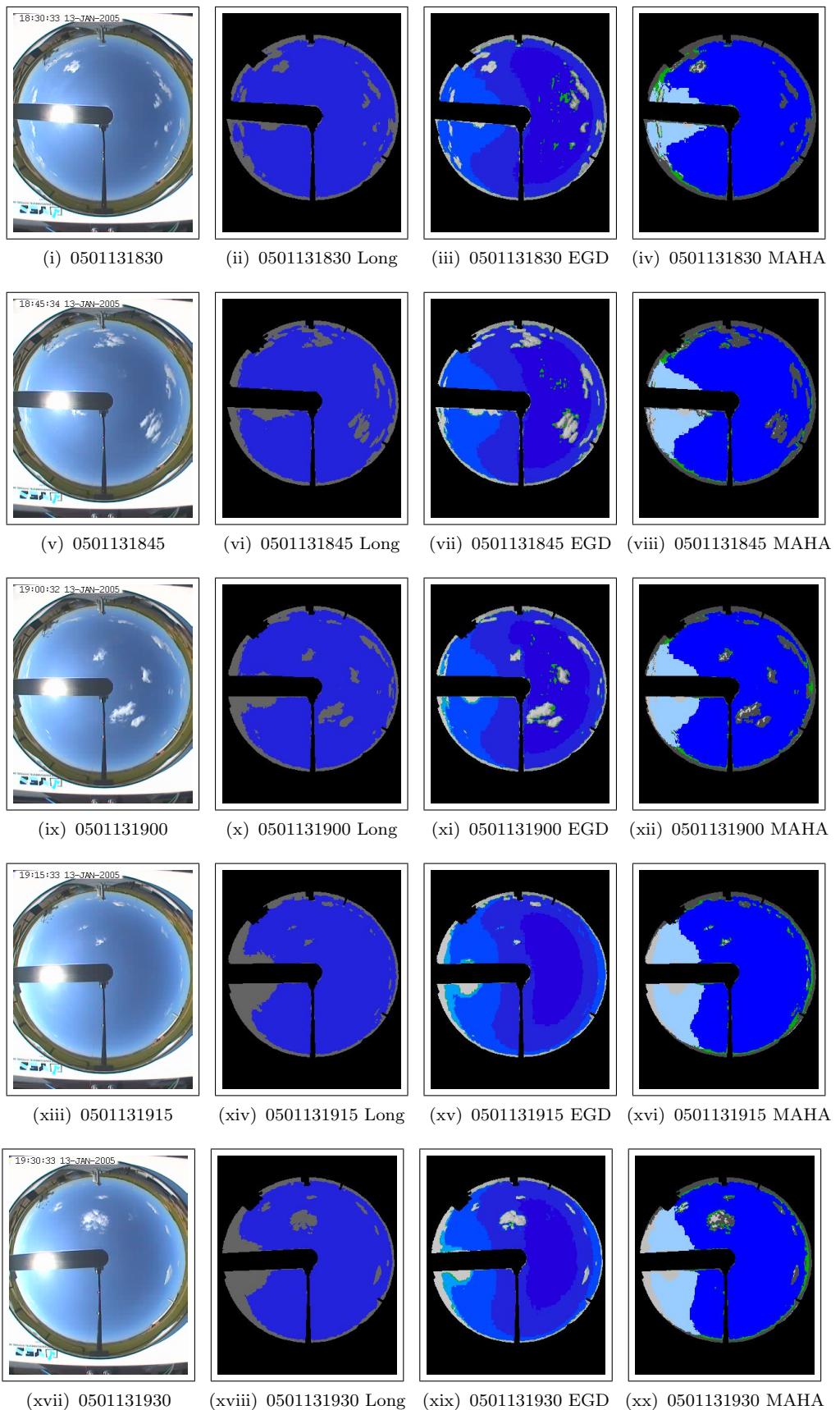


Figure A.151 - Sky images generated from 0501131830 to 0501131930.

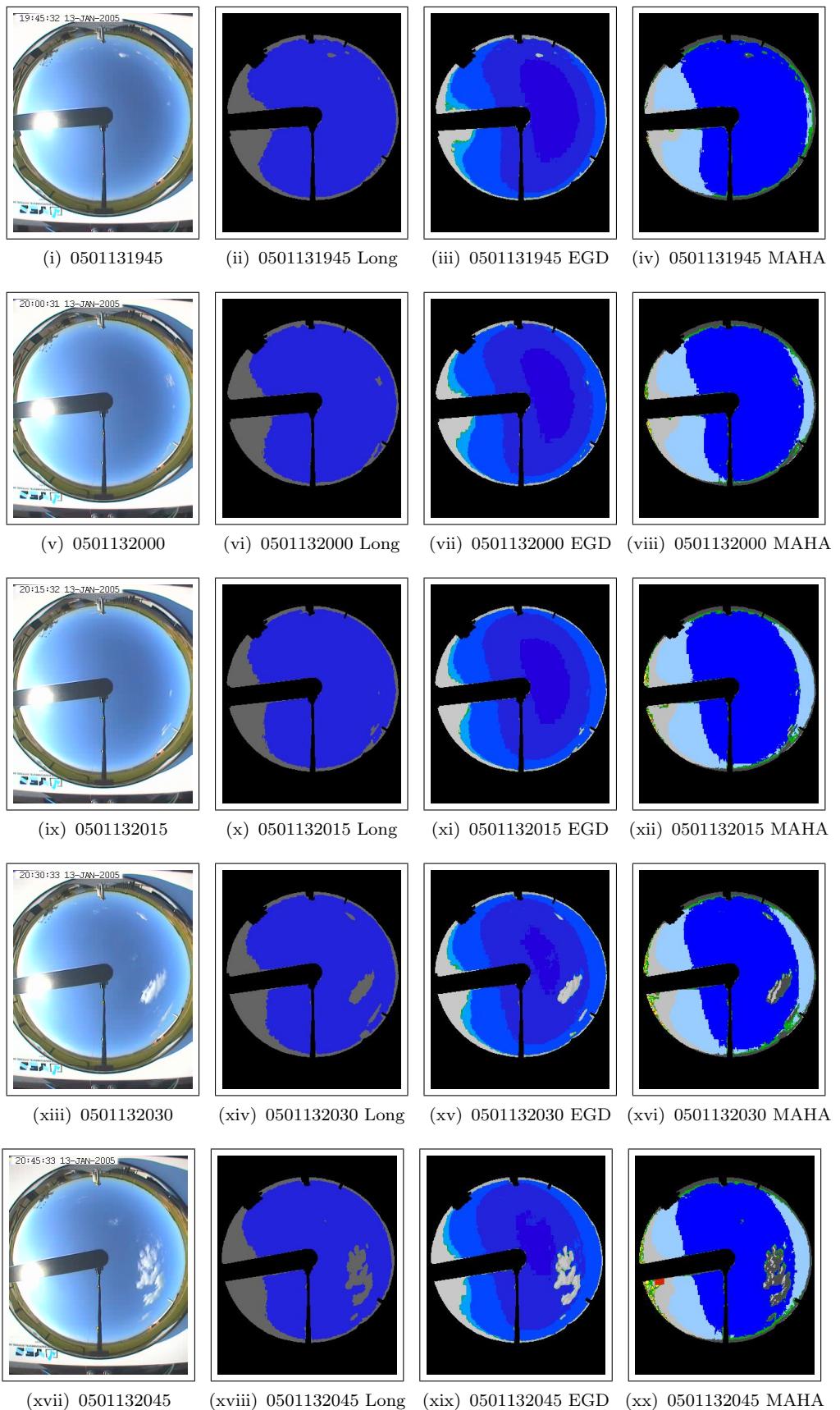


Figure A.152 - Sky images generated from 0501131945 to 0501132045.

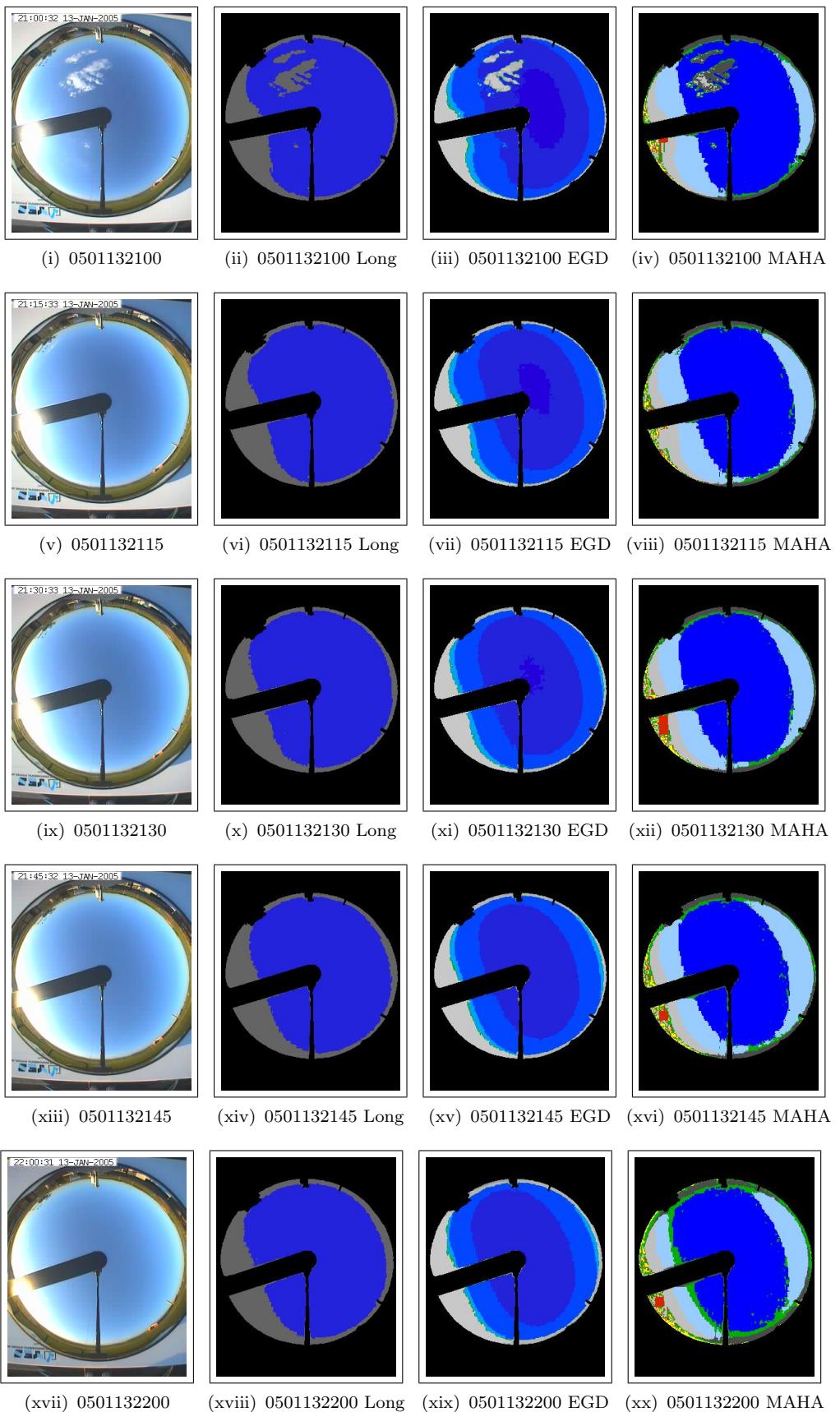


Figure A.153 - Sky images generated from 0501132100 to 0501132200.

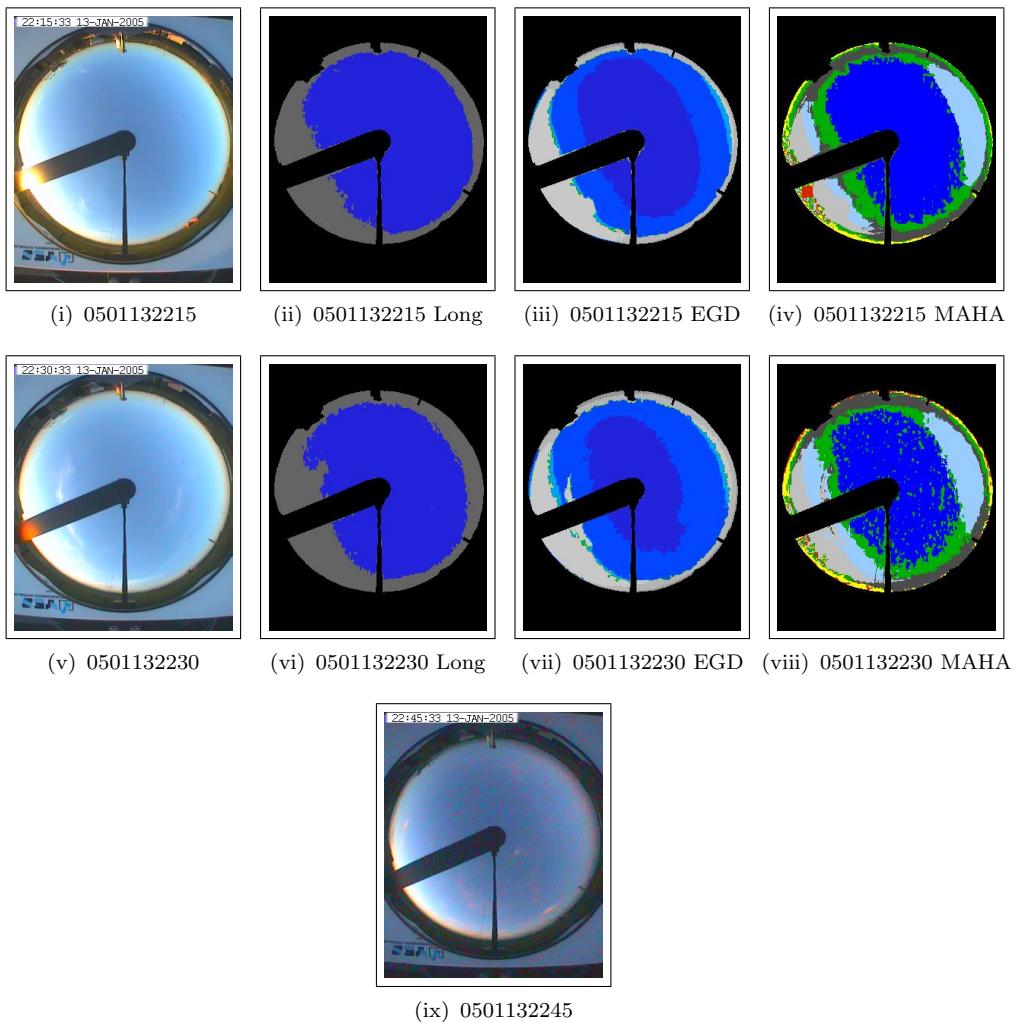


Figure A.154 - Sky images generated from 0501131600 to 0501132245.

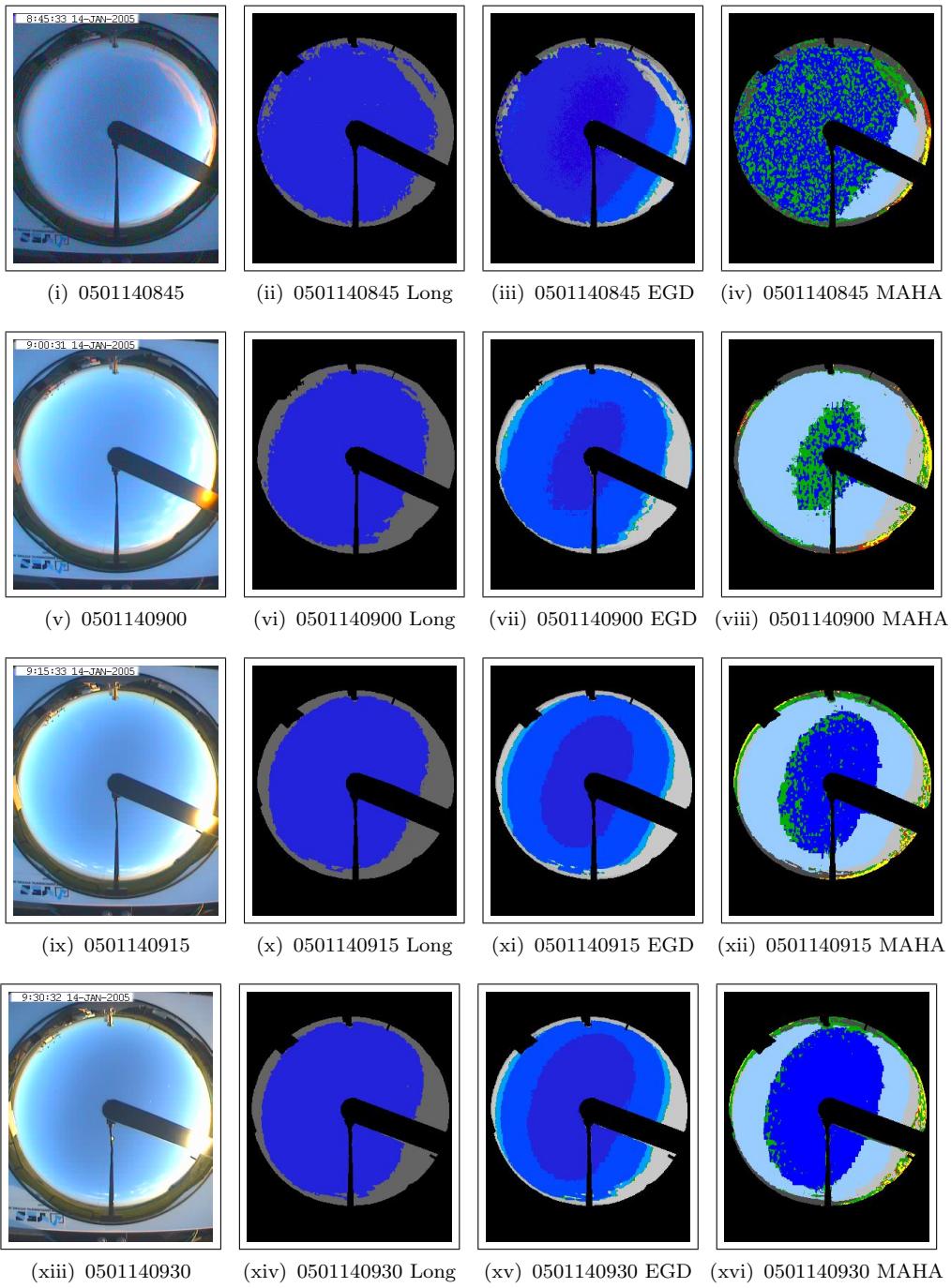


Figure A.155 - Sky images generated from 0501140845 to 0501140930.

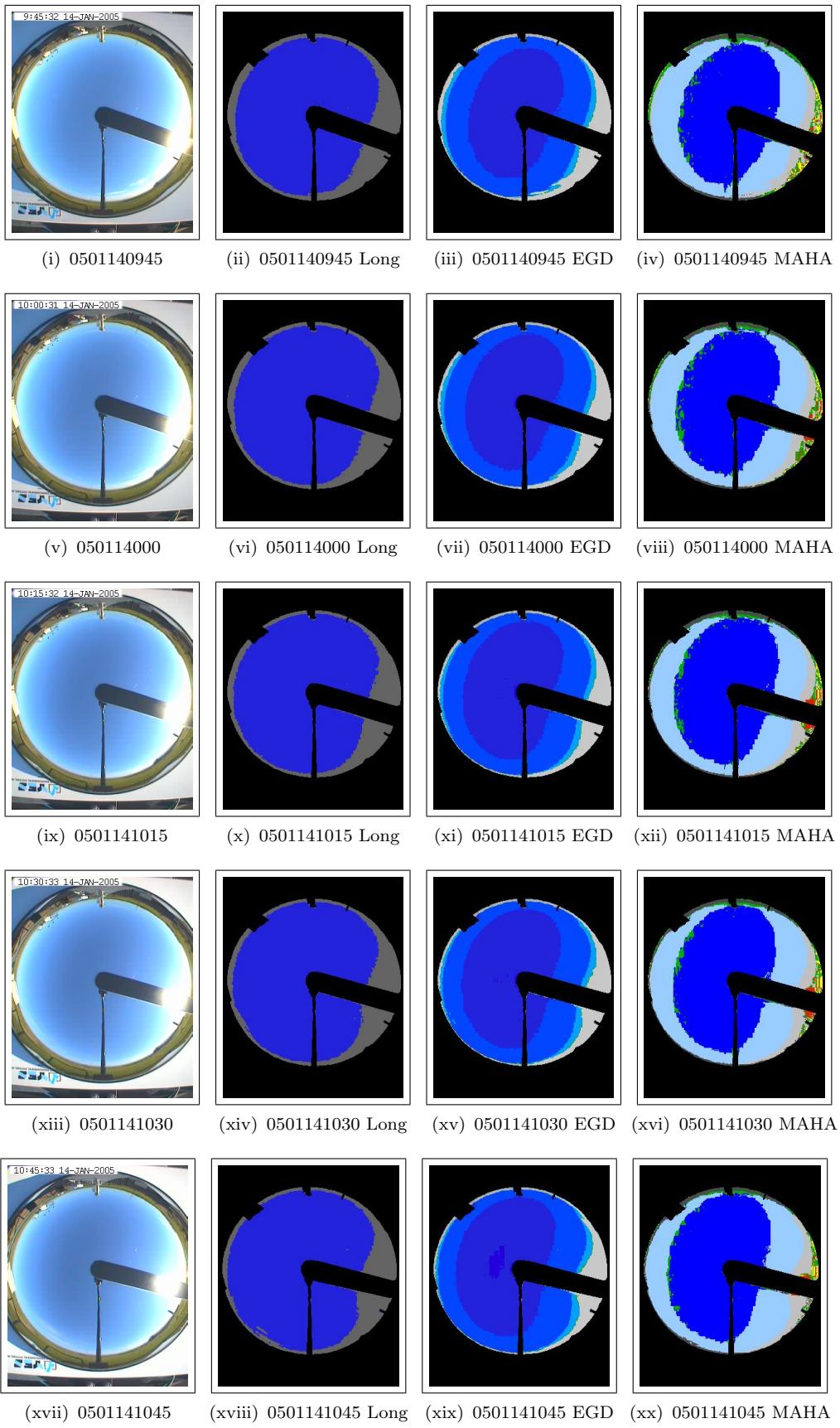


Figure A.156 - Sky images generated from 0501140945 to 0501141045.

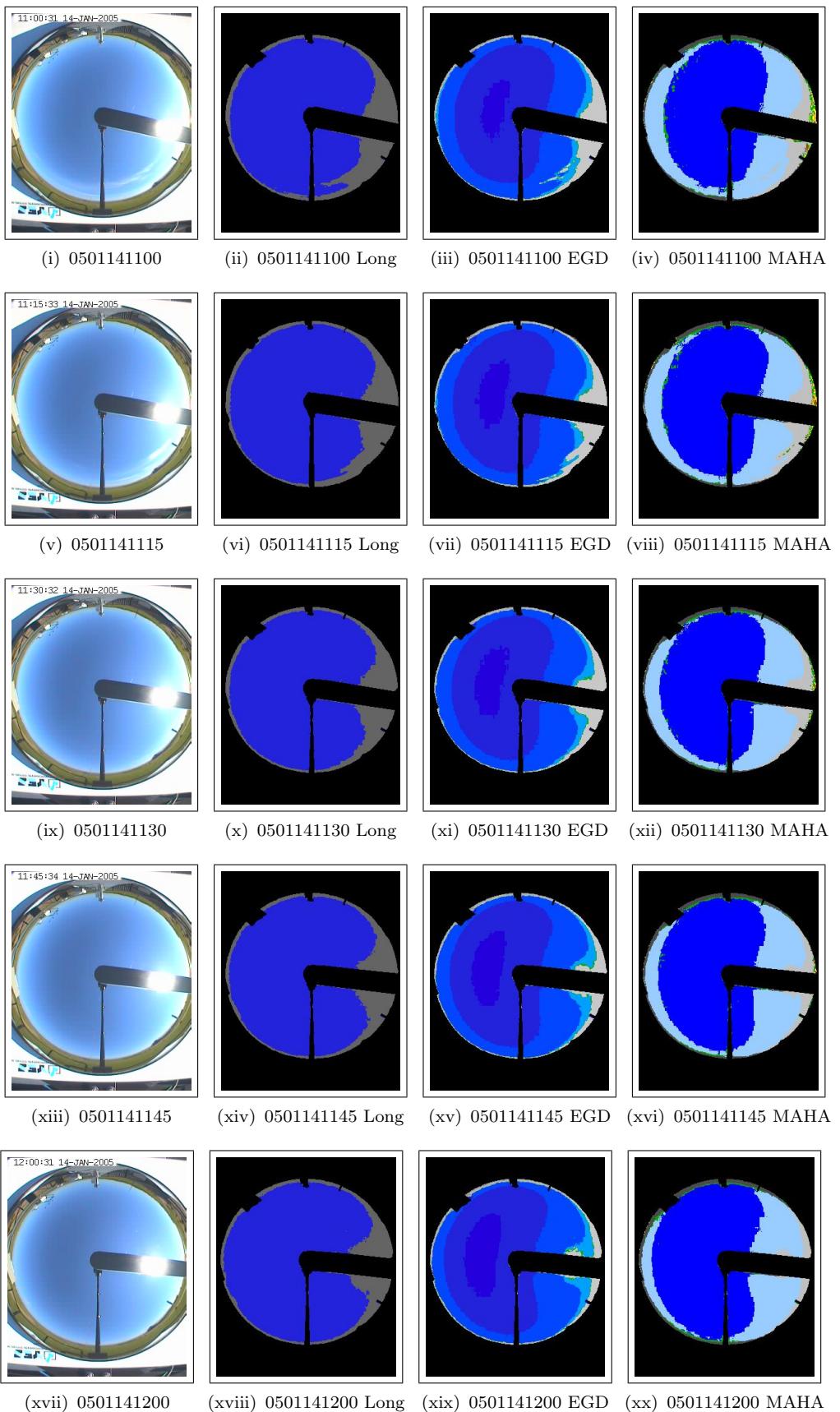


Figure A.157 - Sky images generated from 050114100 to 0501141200.

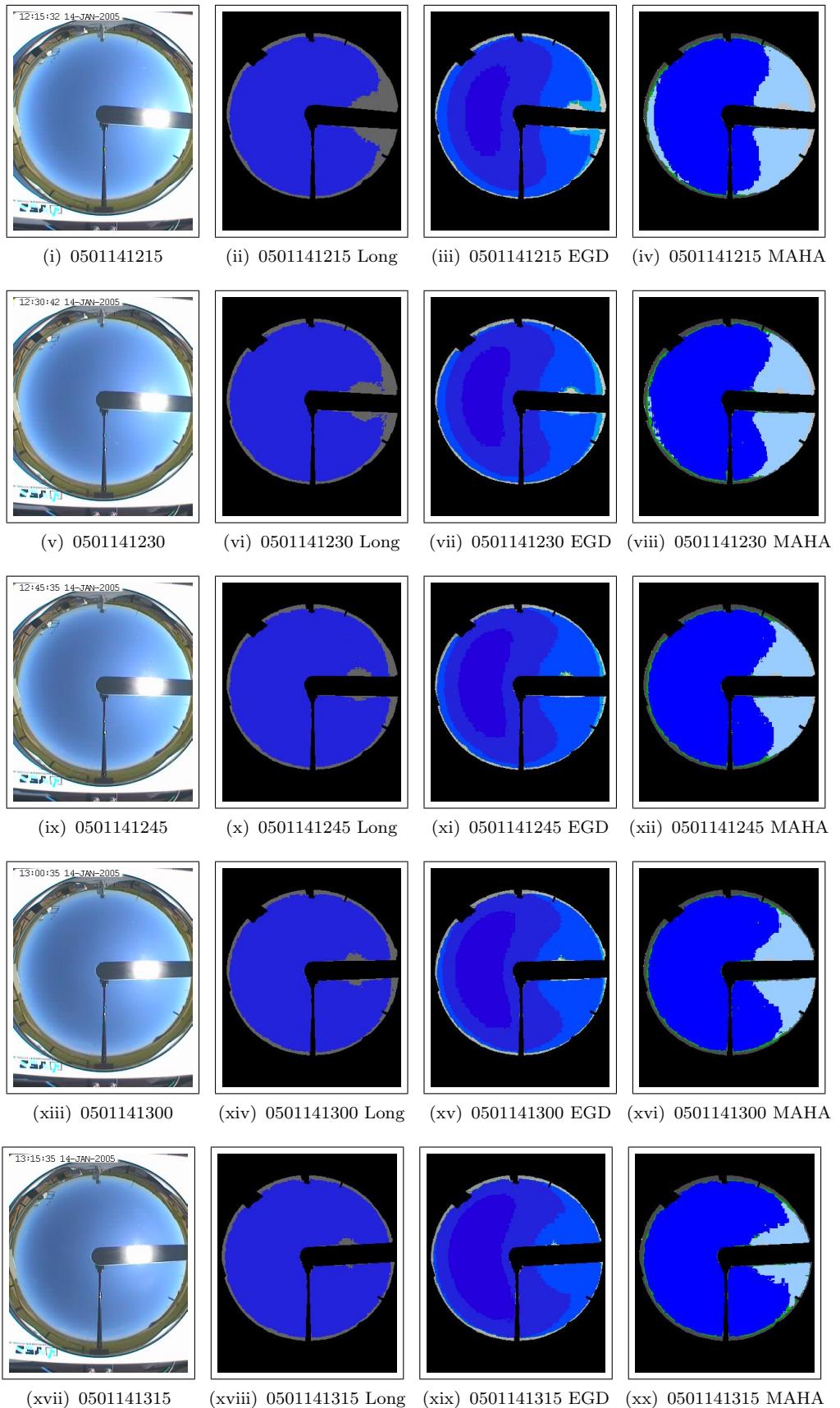


Figure A.158 - Sky images generated from 0501141215 to 0501141315.

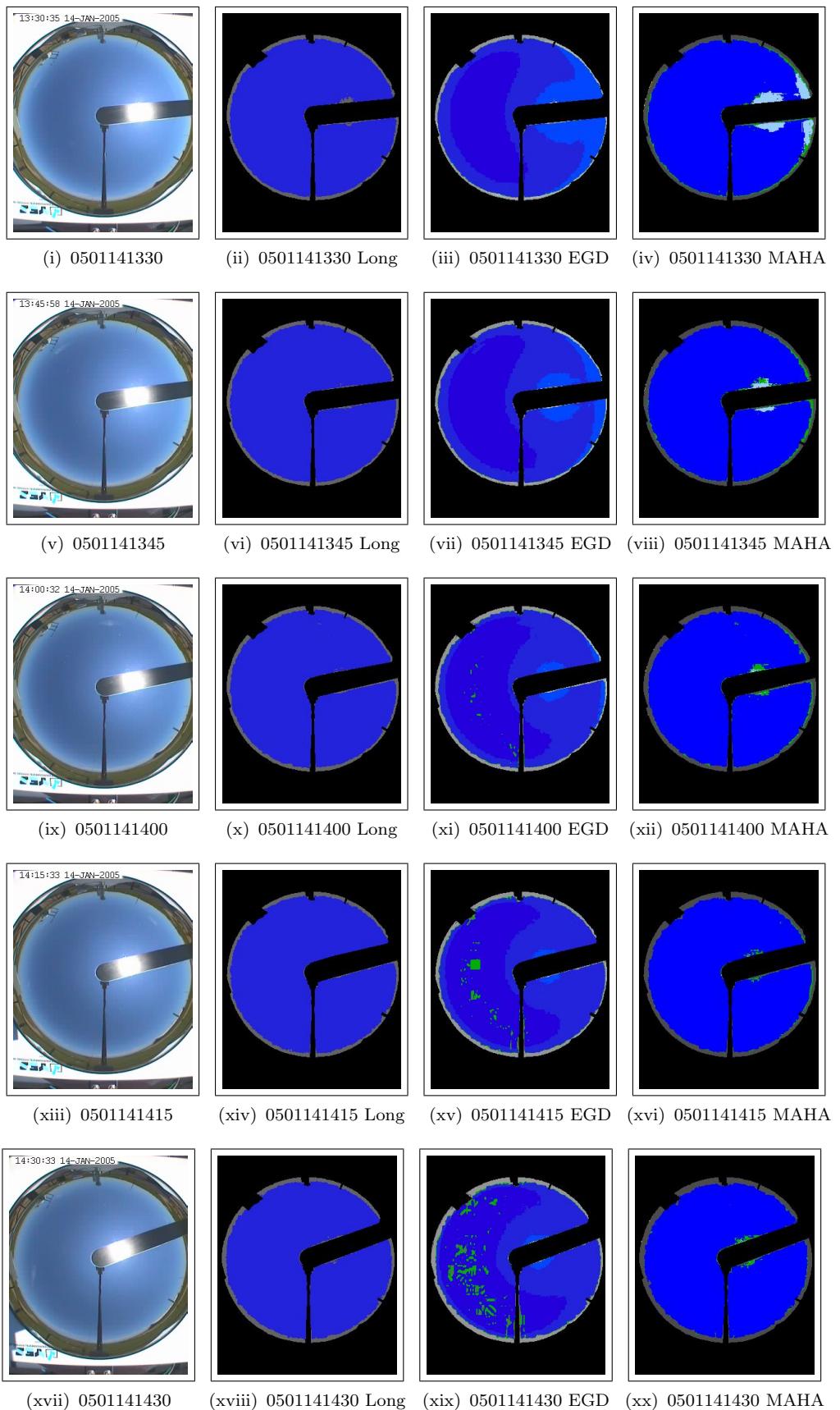


Figure A.159 - Sky images generated from 0501141330 to 0501141430.

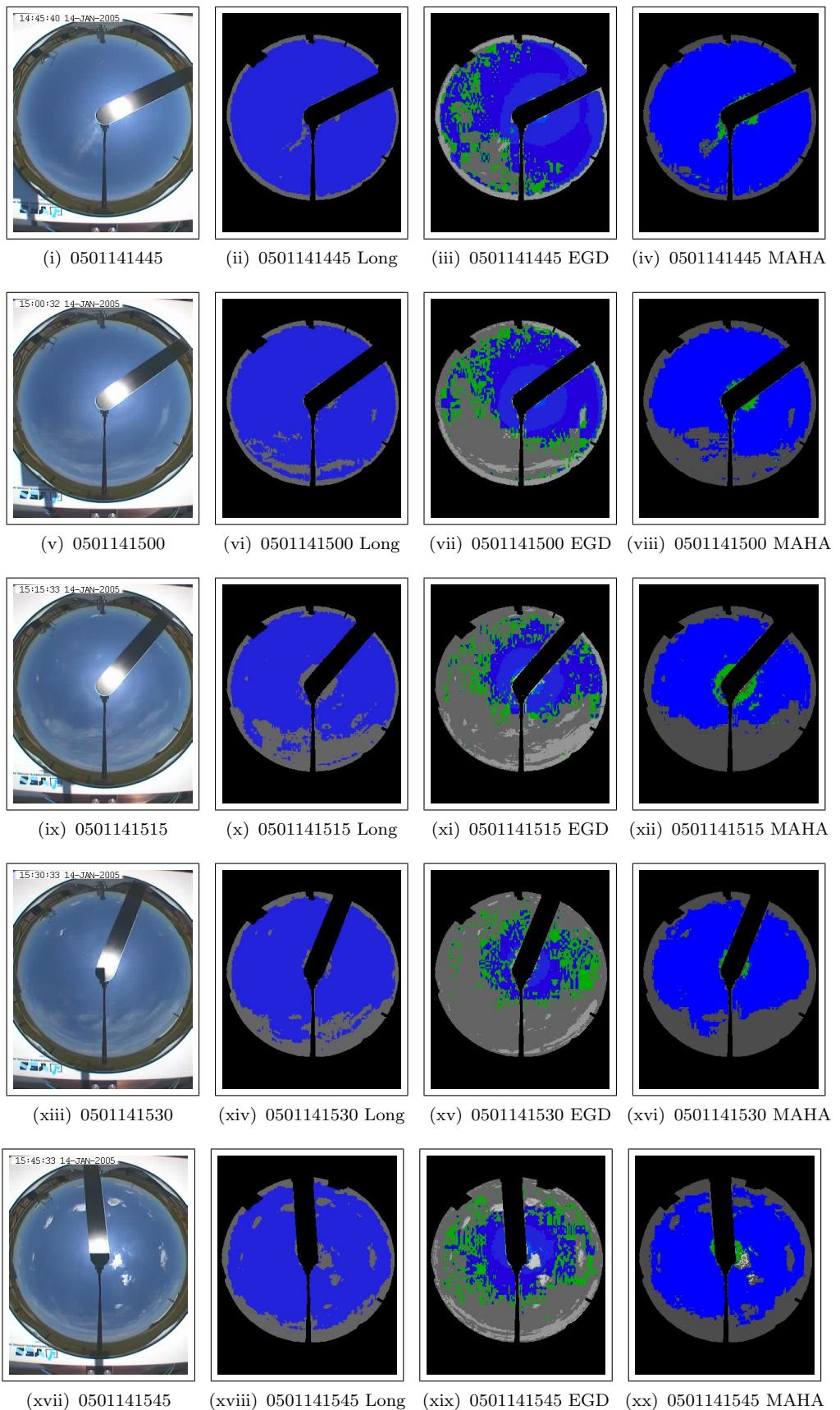


Figure A.160 - Sky images generated from 0501141445 to 0501141545.

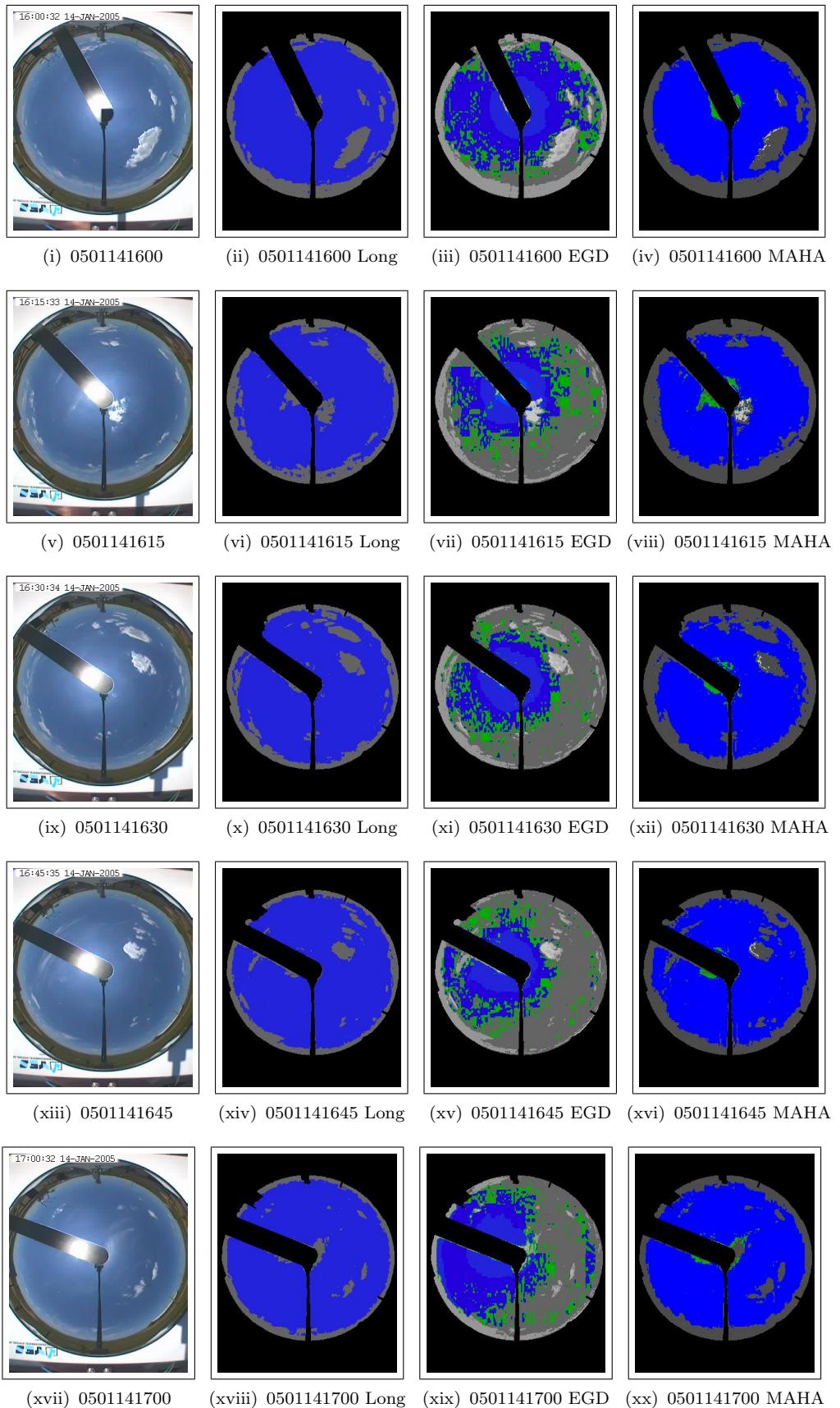


Figure A.161 - Sky images generated from 0501141600 to 0501141700.

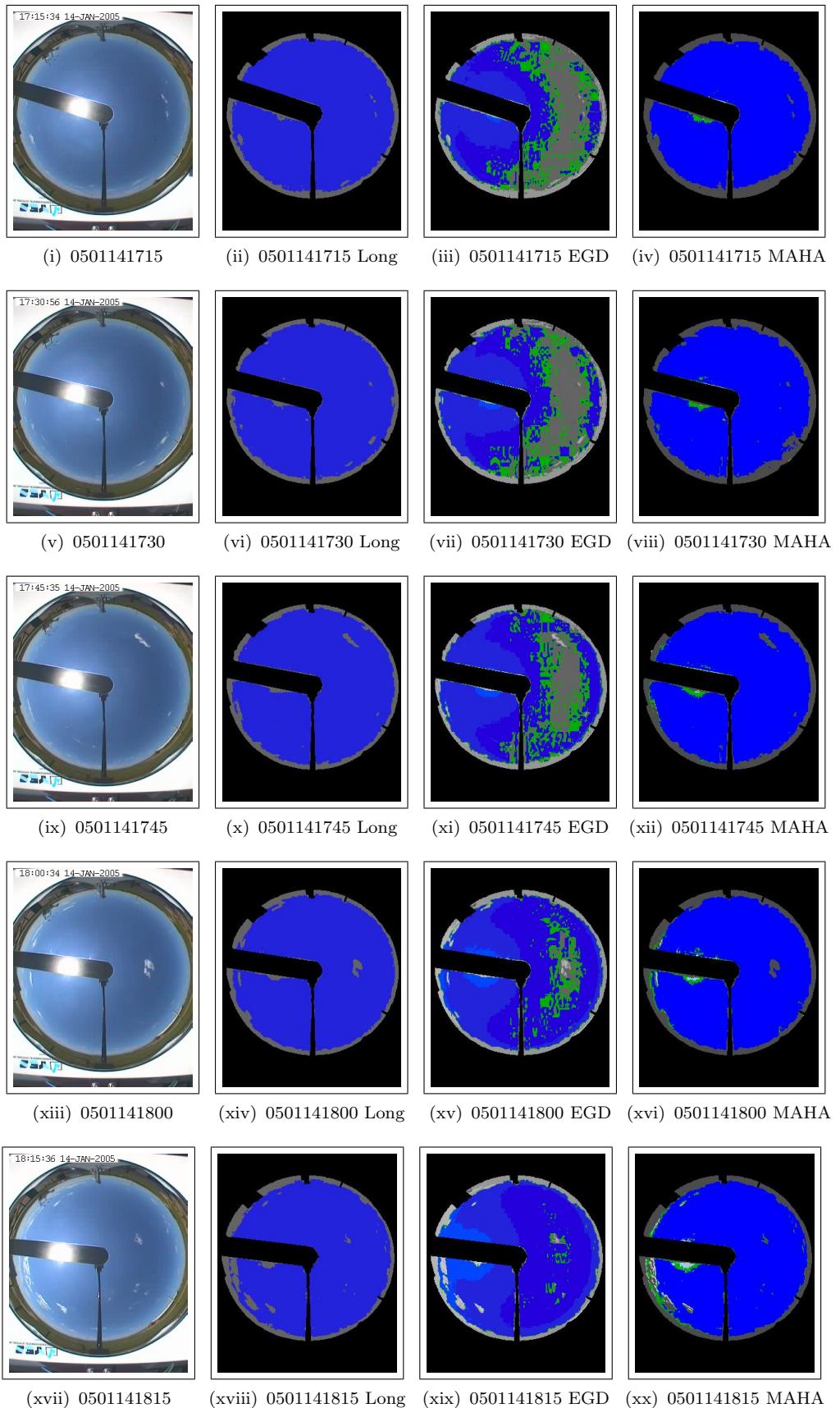


Figure A.162 - Sky images generated from 0501141715 to 0501141815.

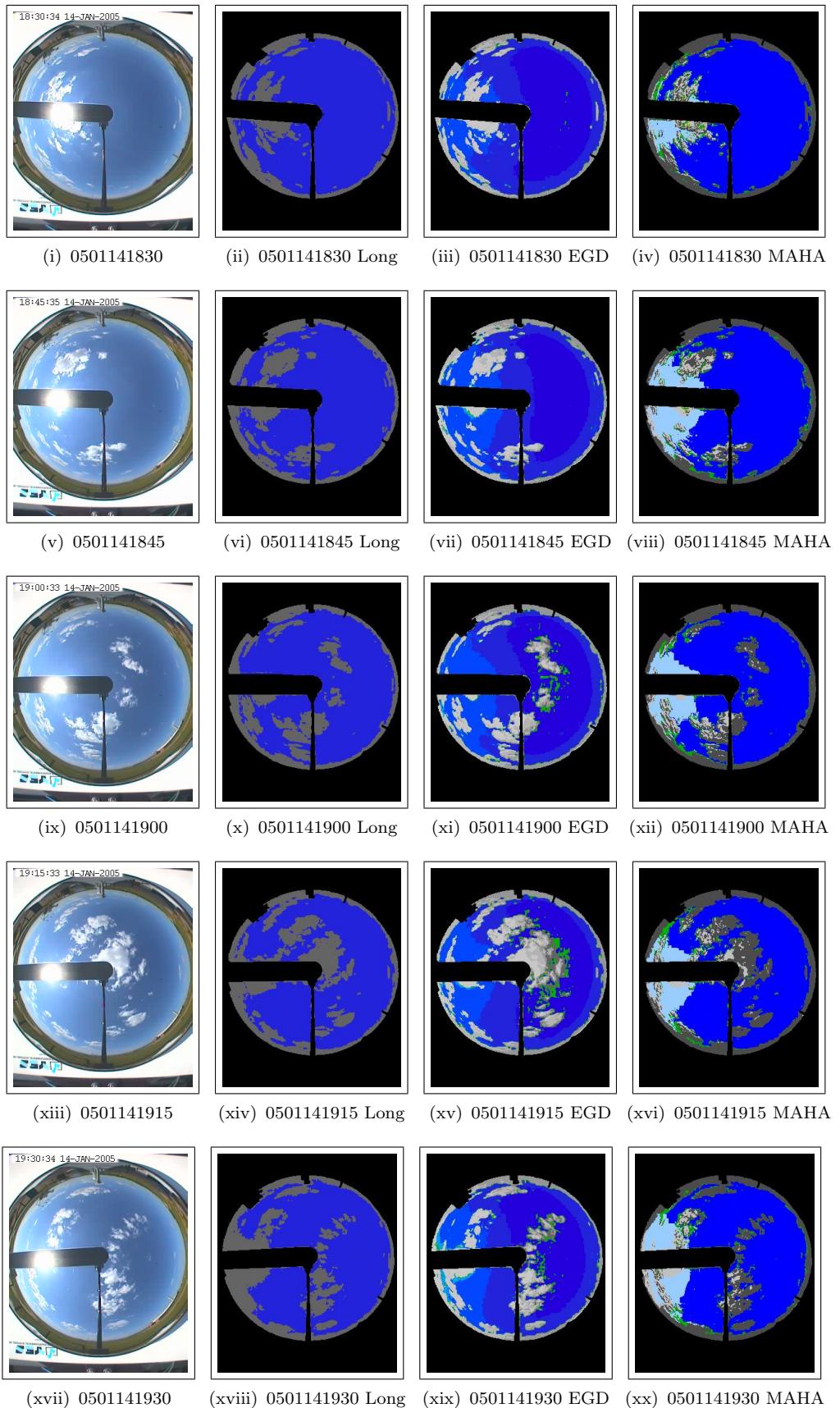


Figure A.163 - Sky images generated from 0501141830 to 0501141930.

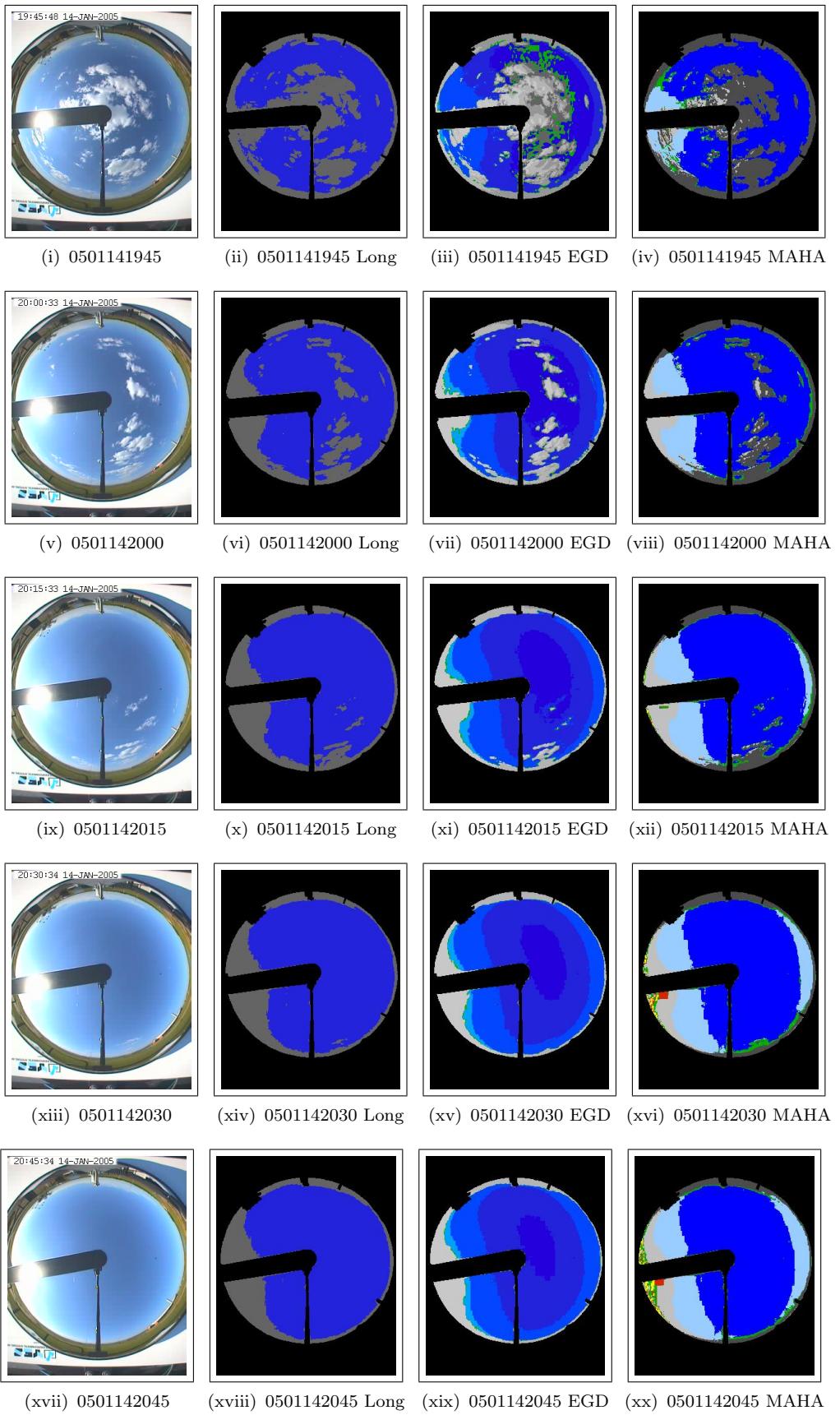


Figure A.164 - Sky images generated from 0501141945 to 0501142045.

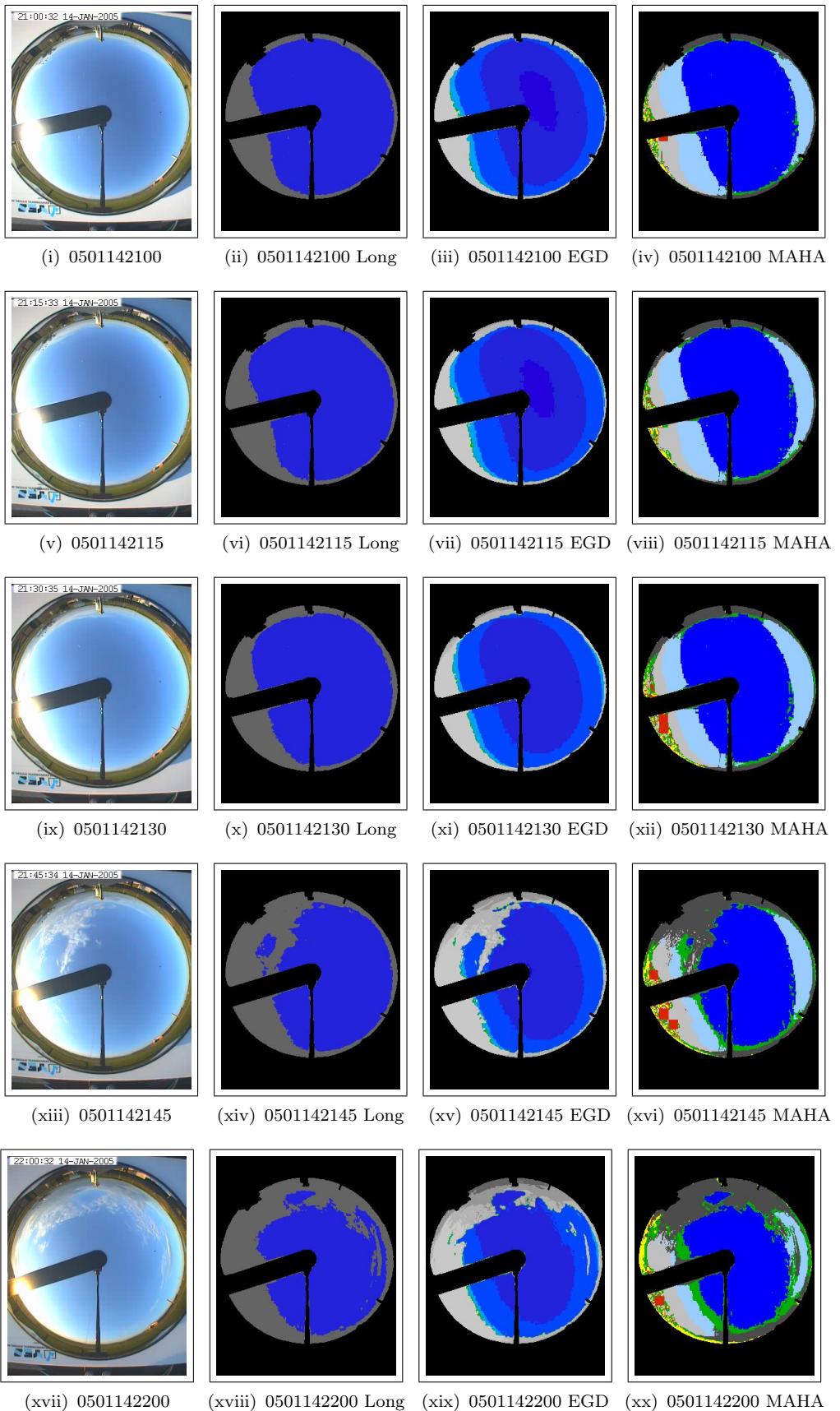


Figure A.165 - Sky images generated from 0501142100 to 0501142200.

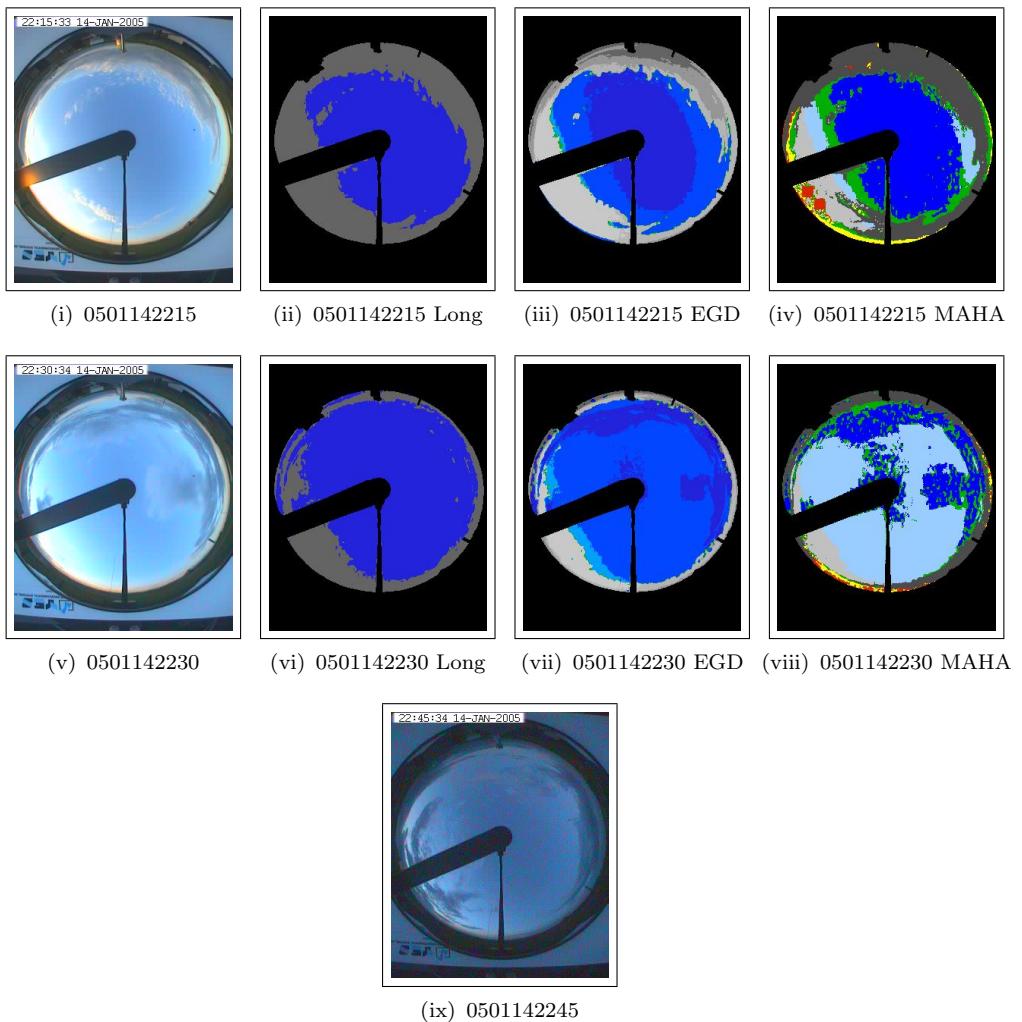


Figure A.166 - Sky images generated from 0501142215 to 0501142245.

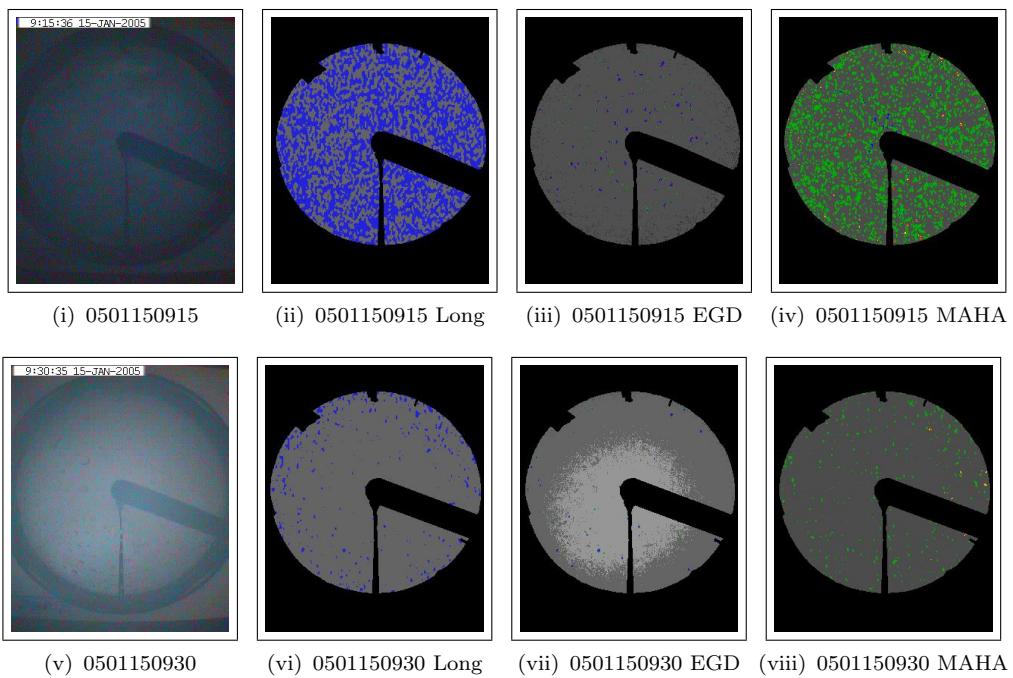


Figure A.167 - Sky images generated from 0501150915 to 0501150930.

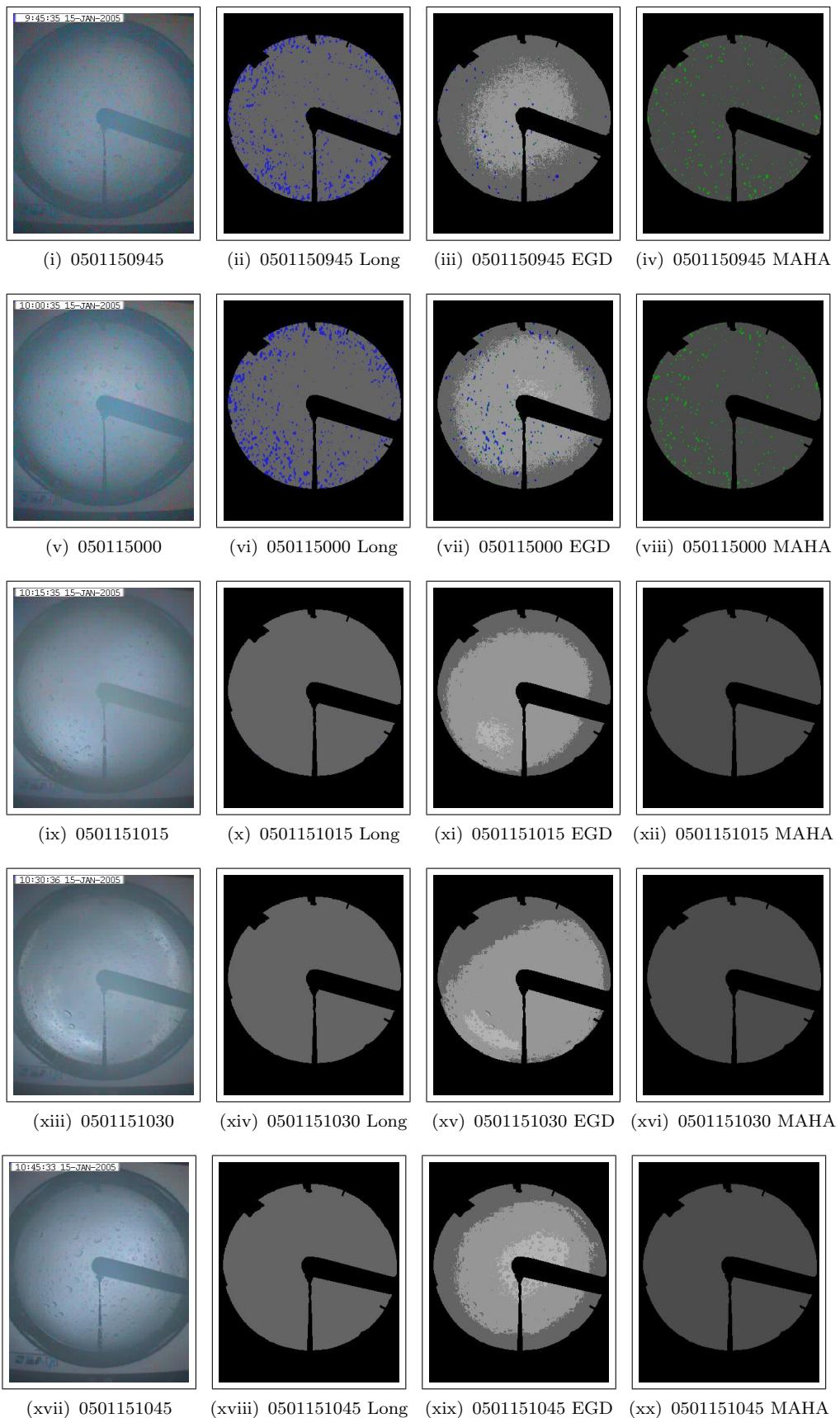


Figure A.168 - Sky images generated from 0501150945 to 0501151045.

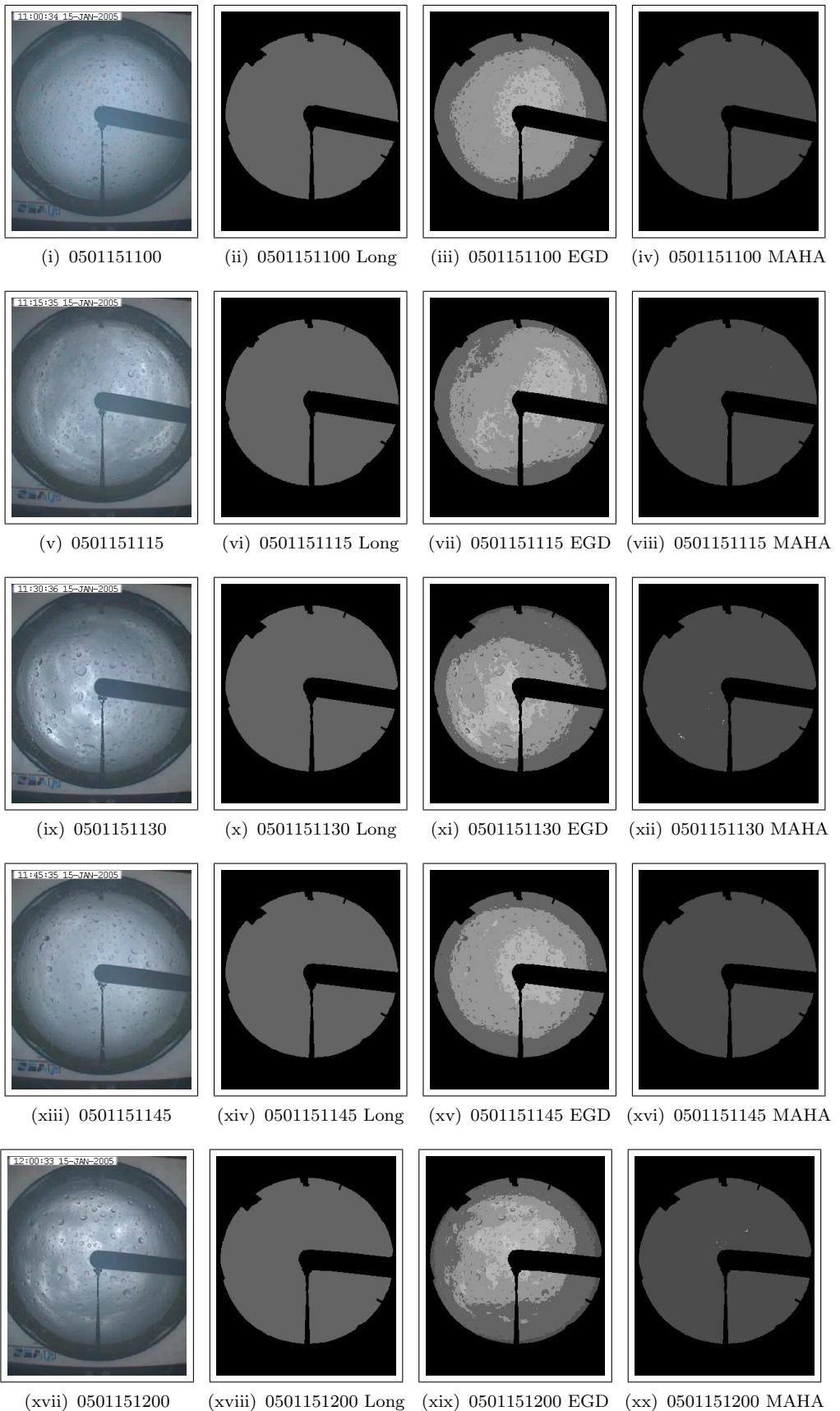


Figure A.169 - Sky images generated from 050115100 to 0501151200.

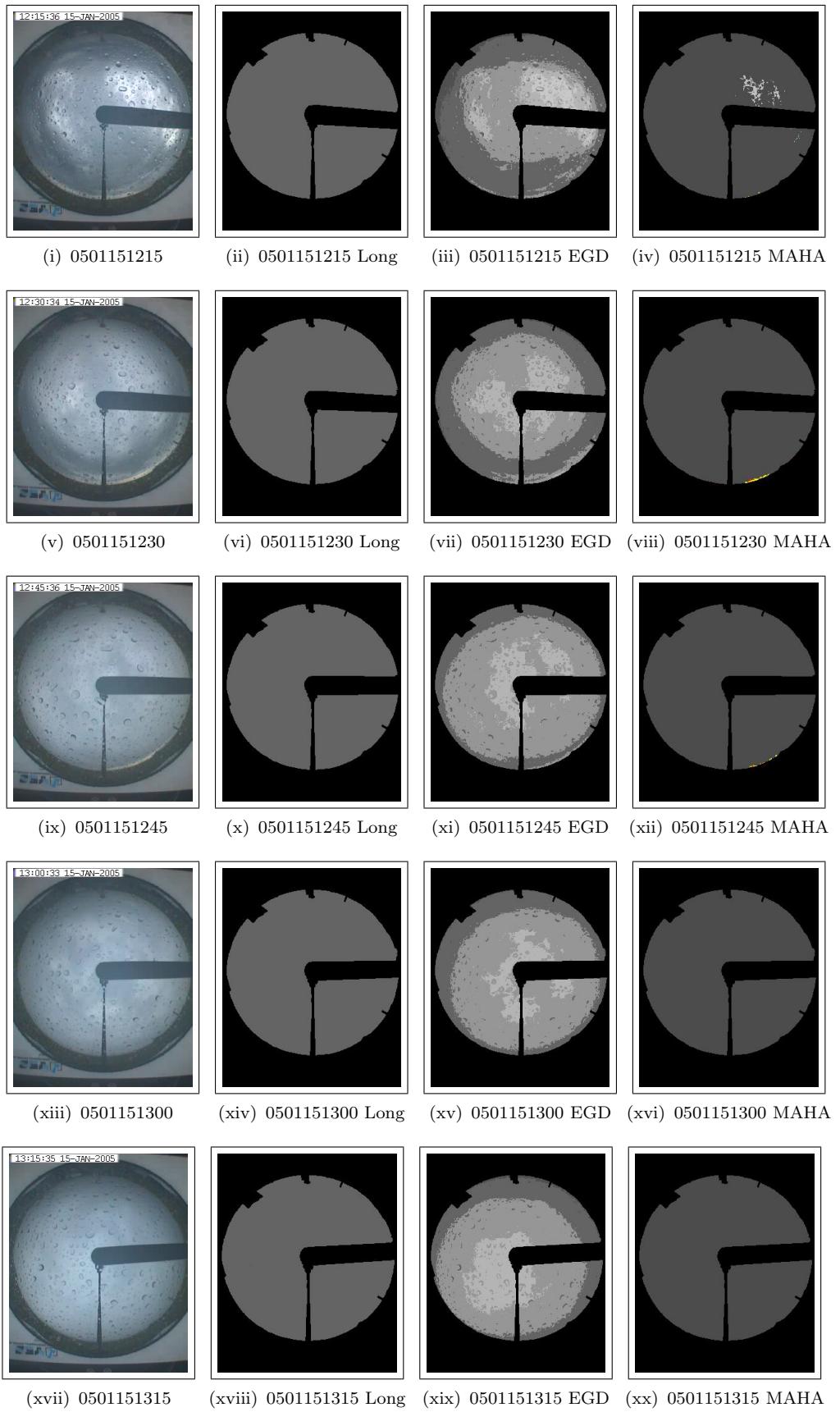


Figure A.170 - Sky images generated from 0501151215 to 0501151315.

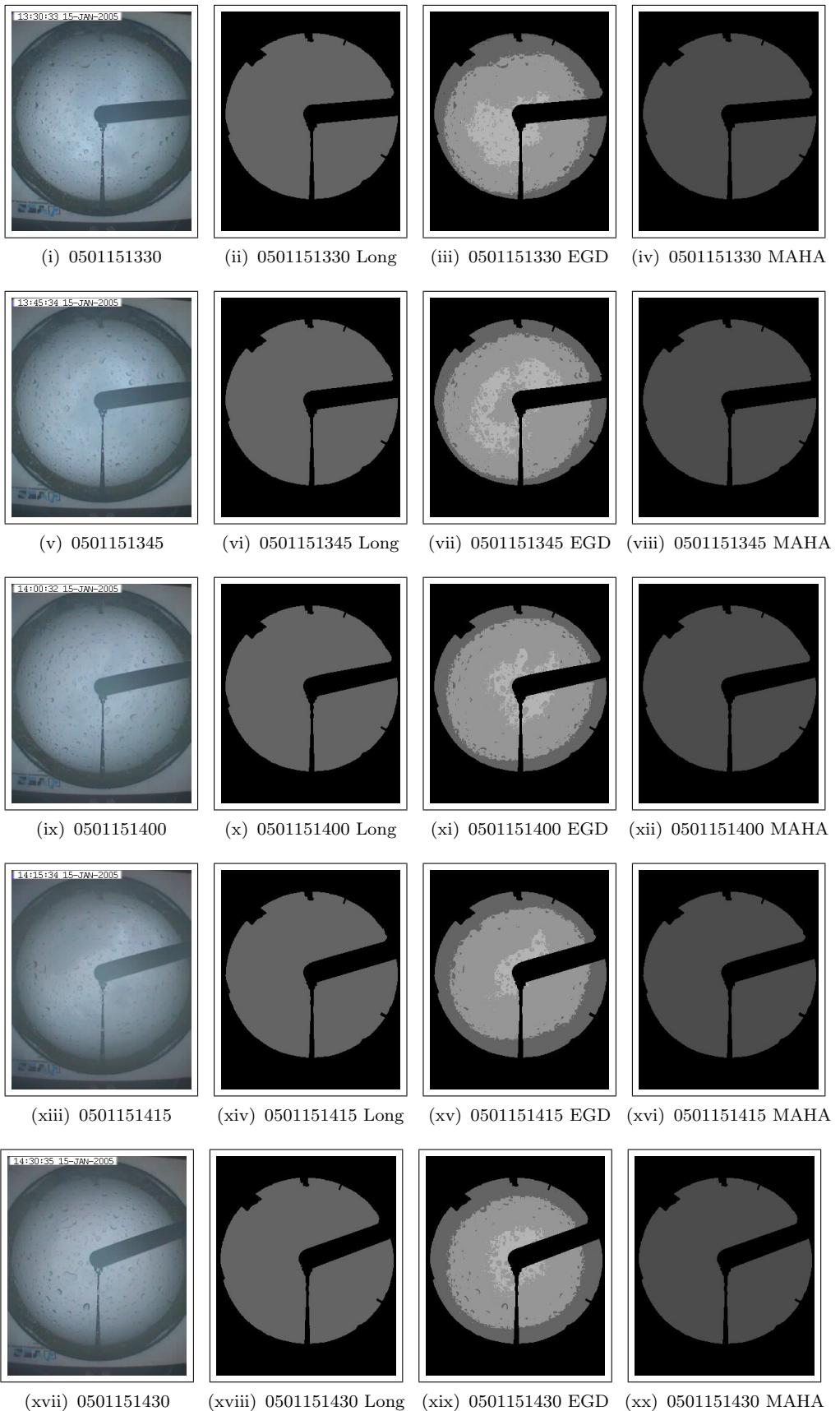


Figure A.171 - Sky images generated from 0501151330 to 0501151430.

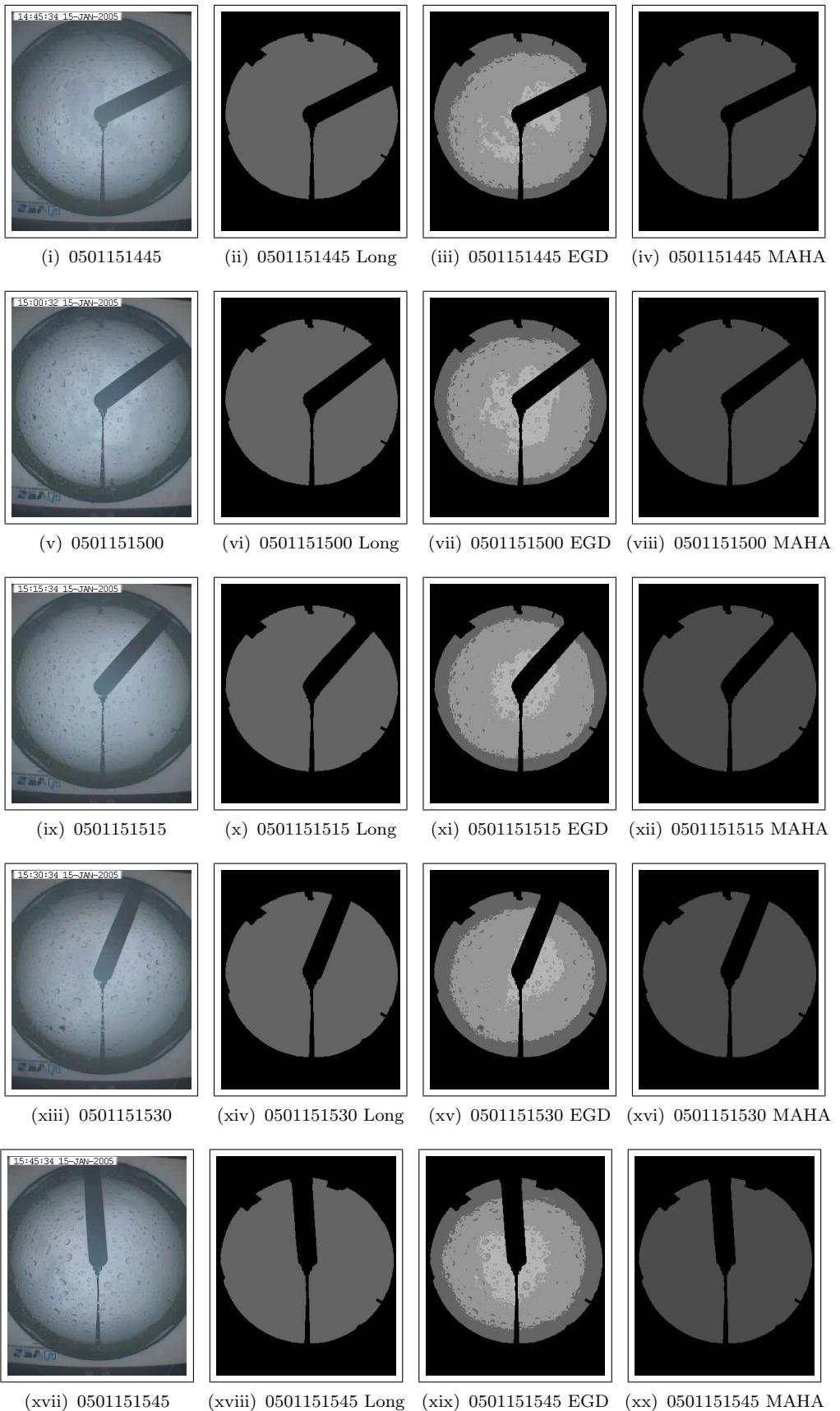


Figure A.172 - Sky images generated from 0501151445 to 0501151545.

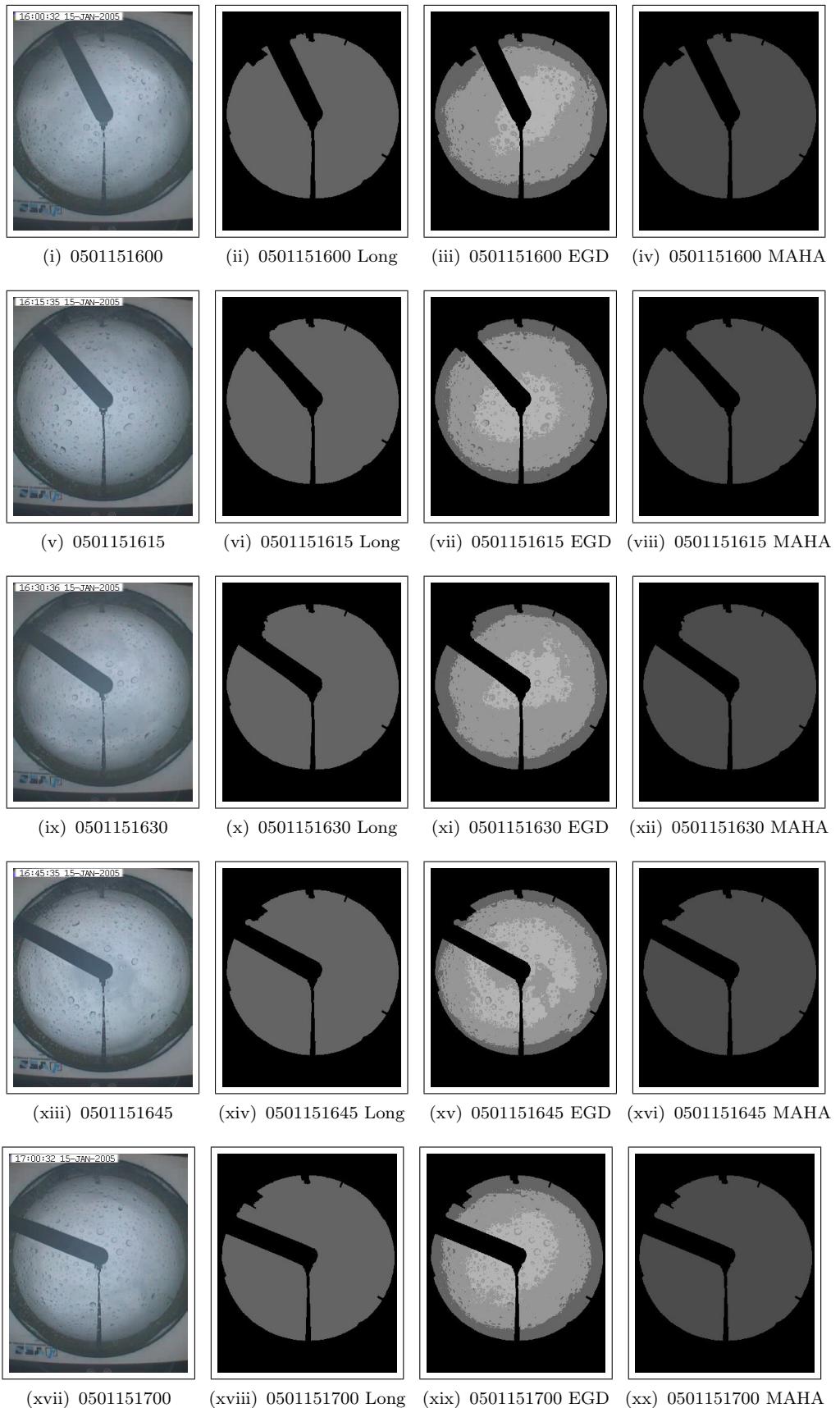


Figure A.173 - Sky images generated from 0501151600 to 0501151700.

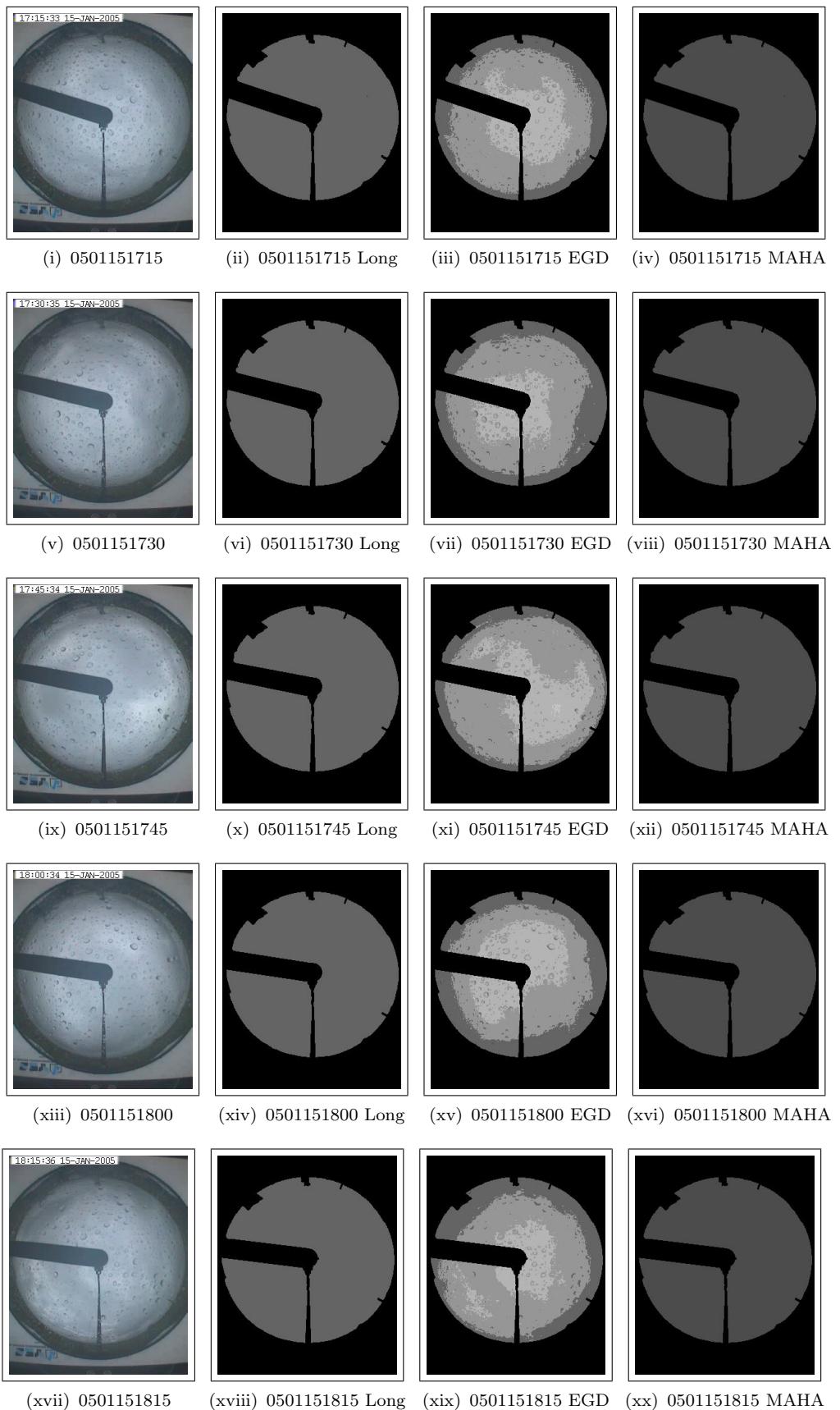


Figure A.174 - Sky images generated from 0501151715 to 0501151815.

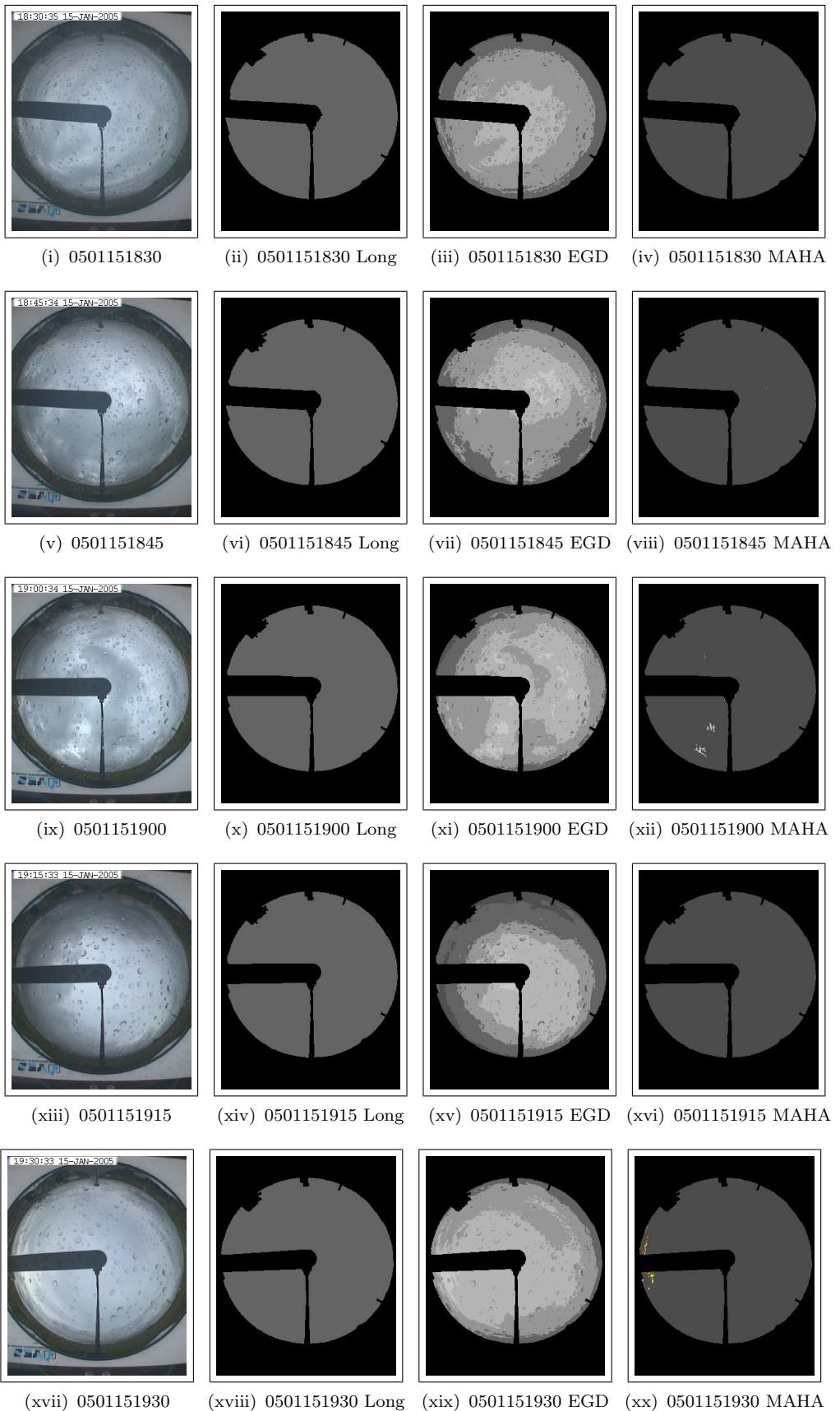


Figure A.175 - Sky images generated from 0501151830 to 0501151930.

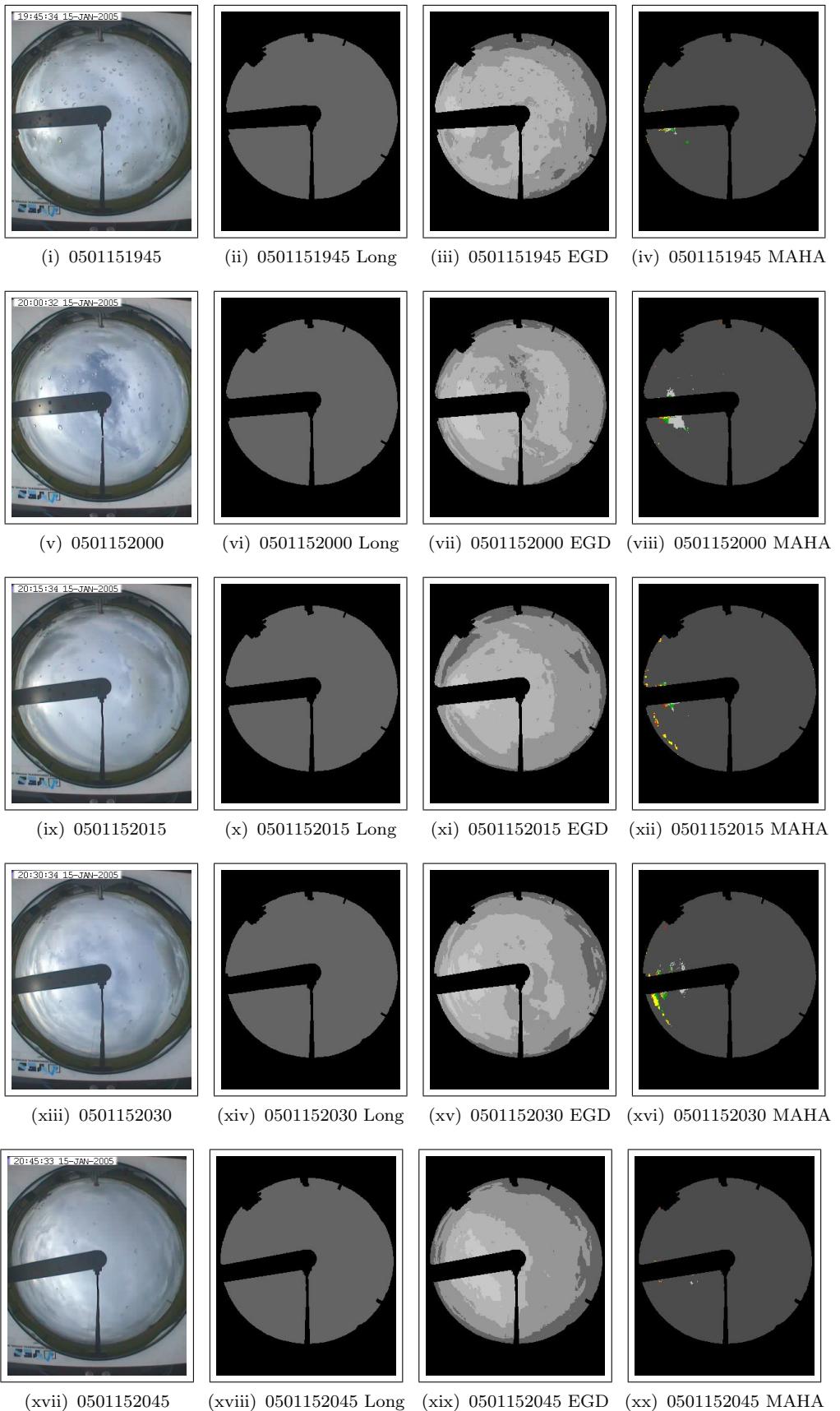


Figure A.176 - Sky images generated from 0501151945 to 0501152045.

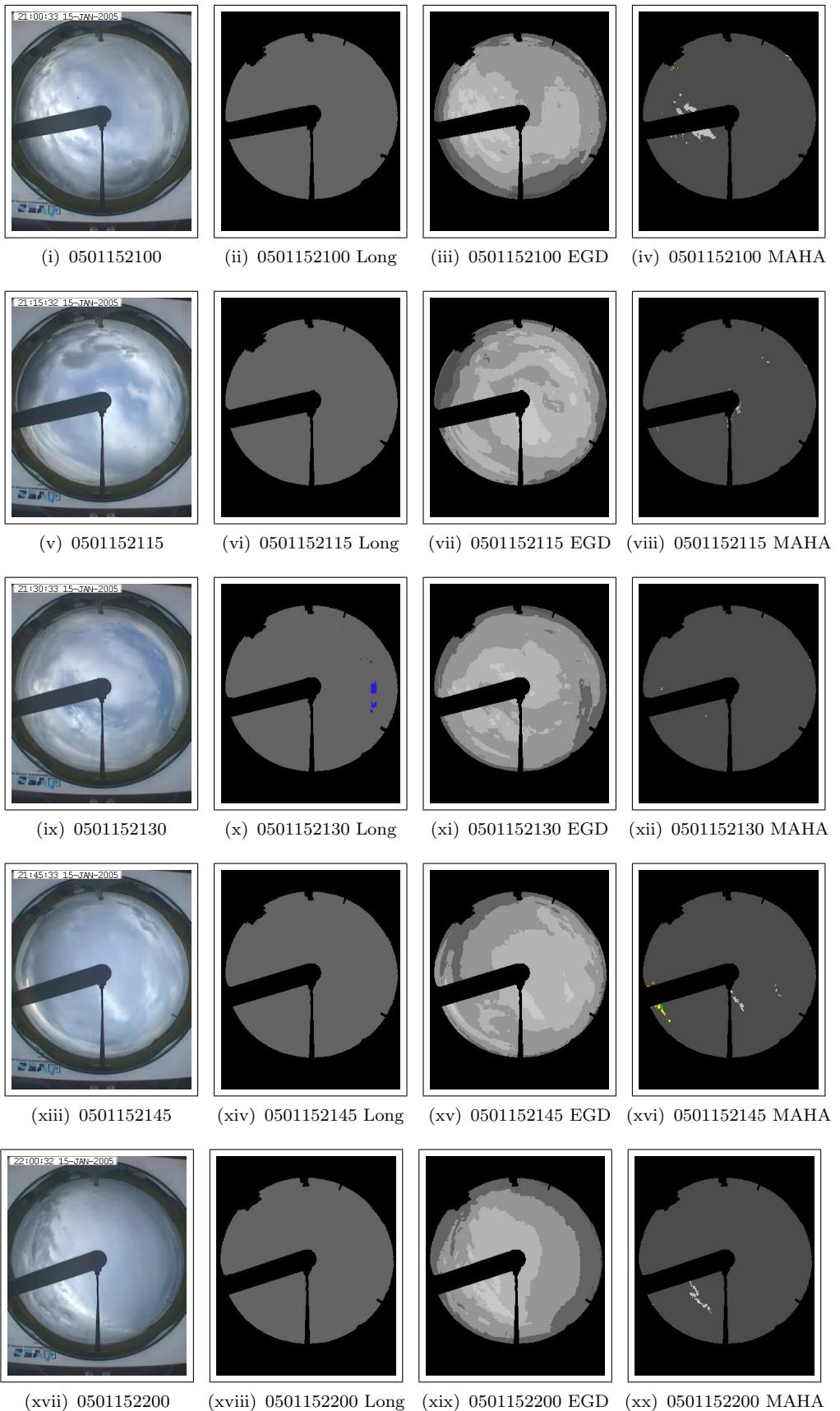


Figure A.177 - Sky images generated from 0501152100 to 0501152200.

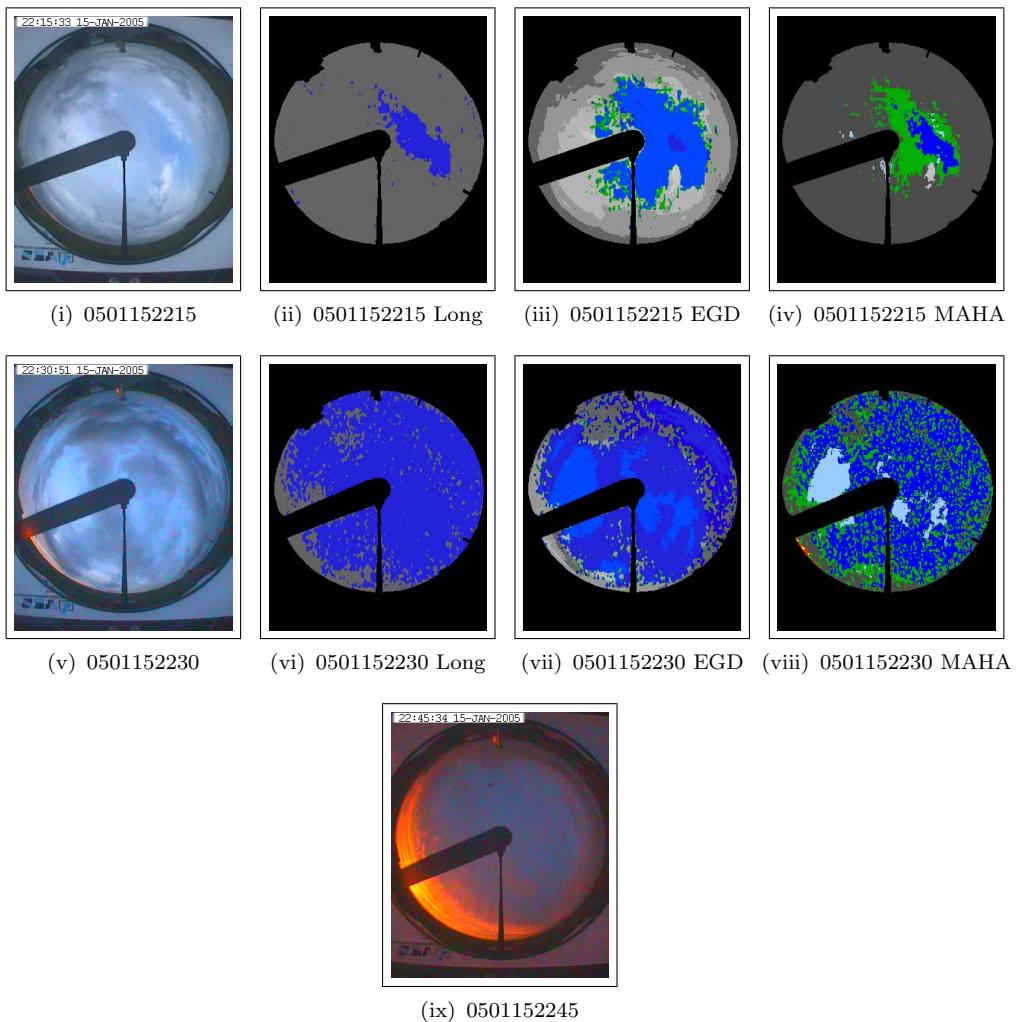


Figure A.178 - Sky images generated from 0501151600 to 0501152245.

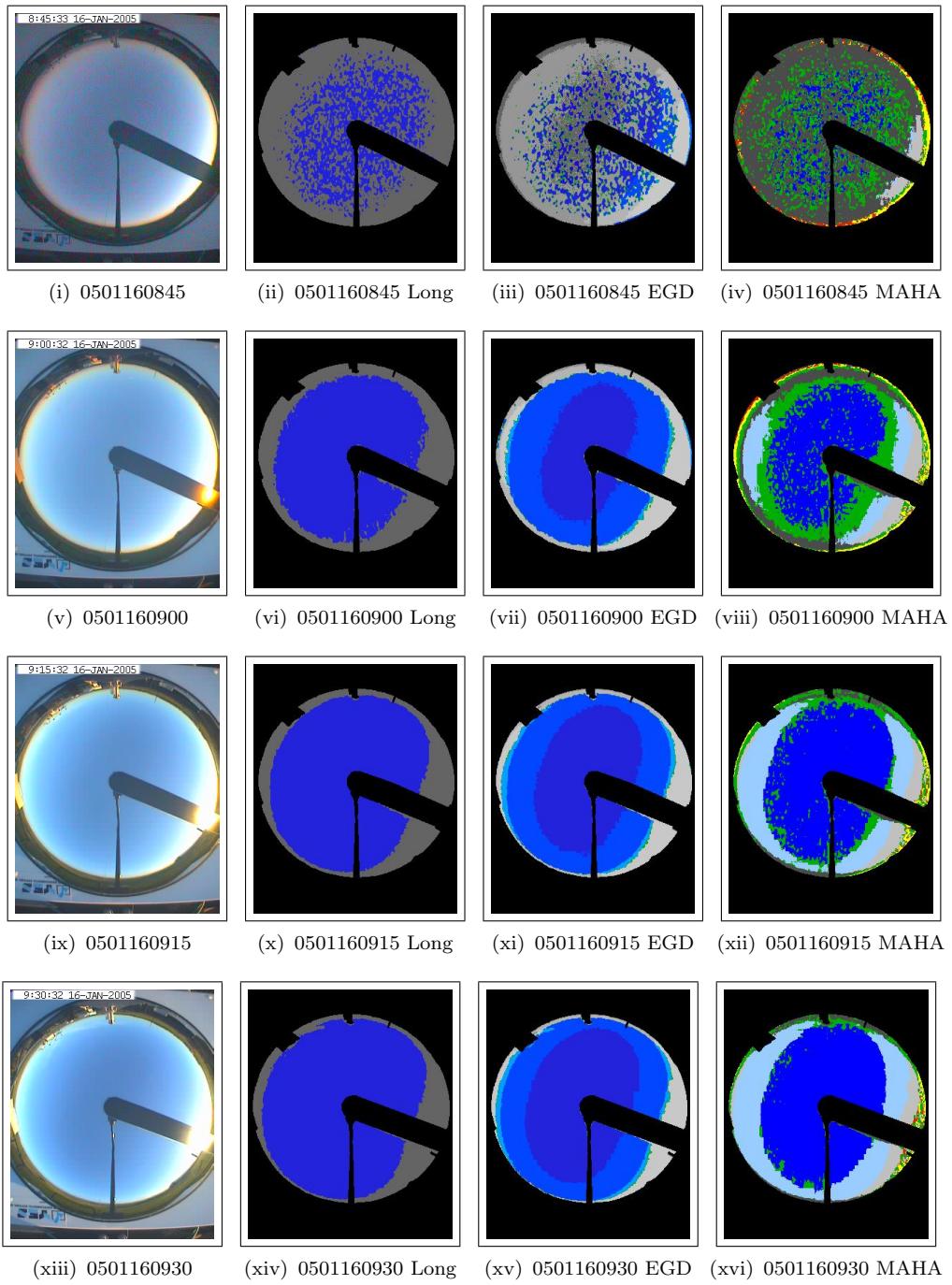


Figure A.179 - Sky images generated from 0501160845 to 0501160930.

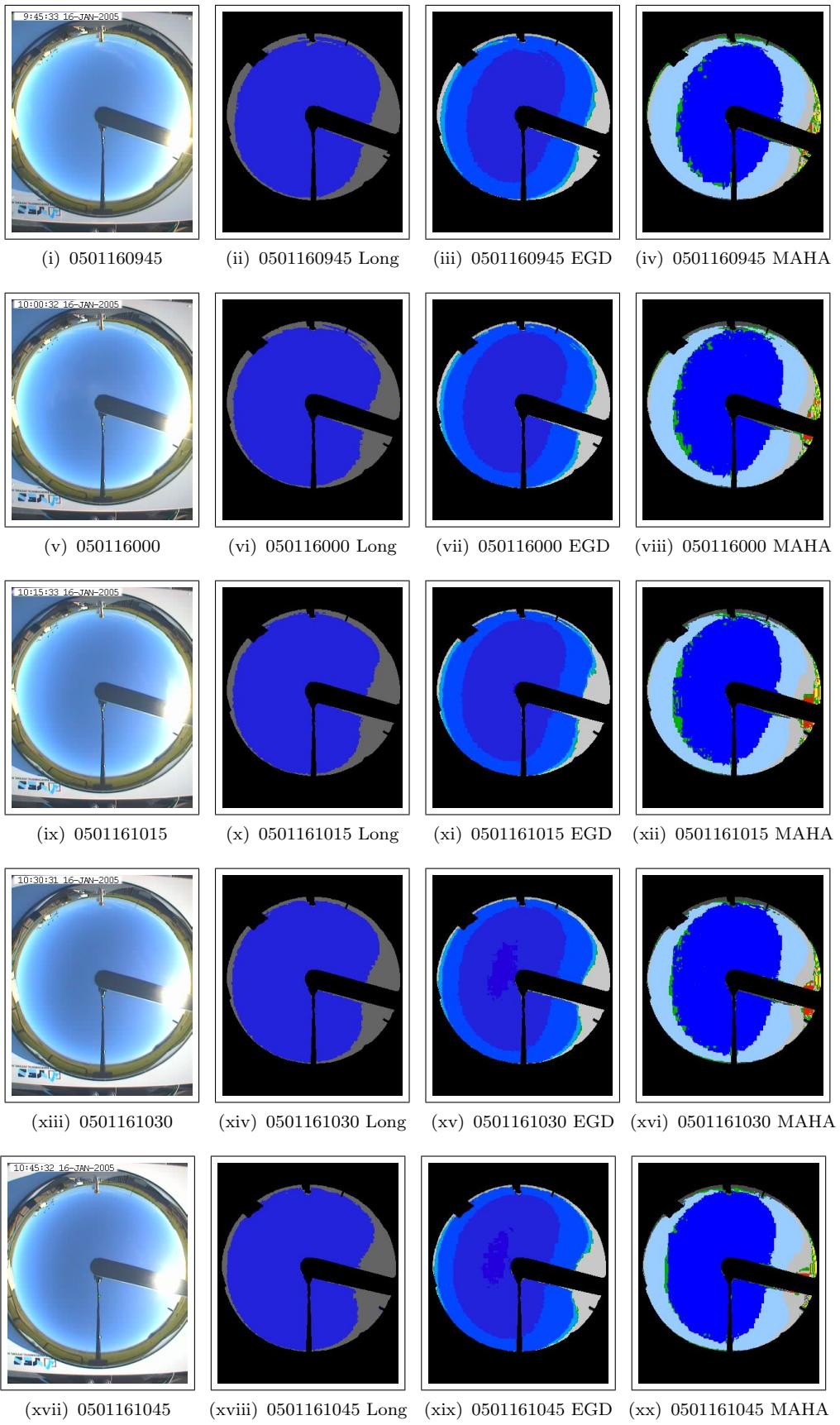


Figure A.180 - Sky images generated from 0501160945 to 0501161045.

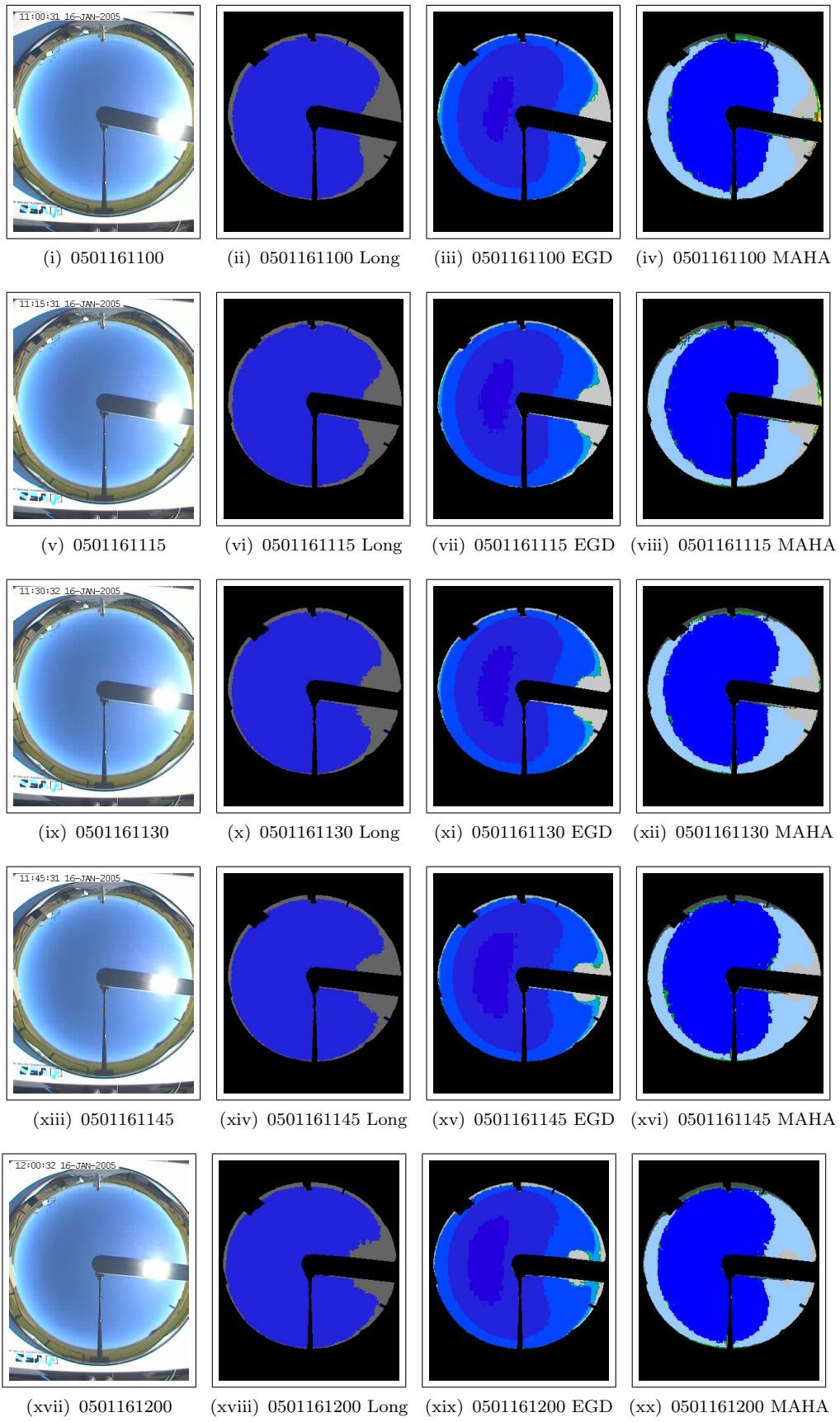


Figure A.181 - Sky images generated from 050116100 to 0501161200.

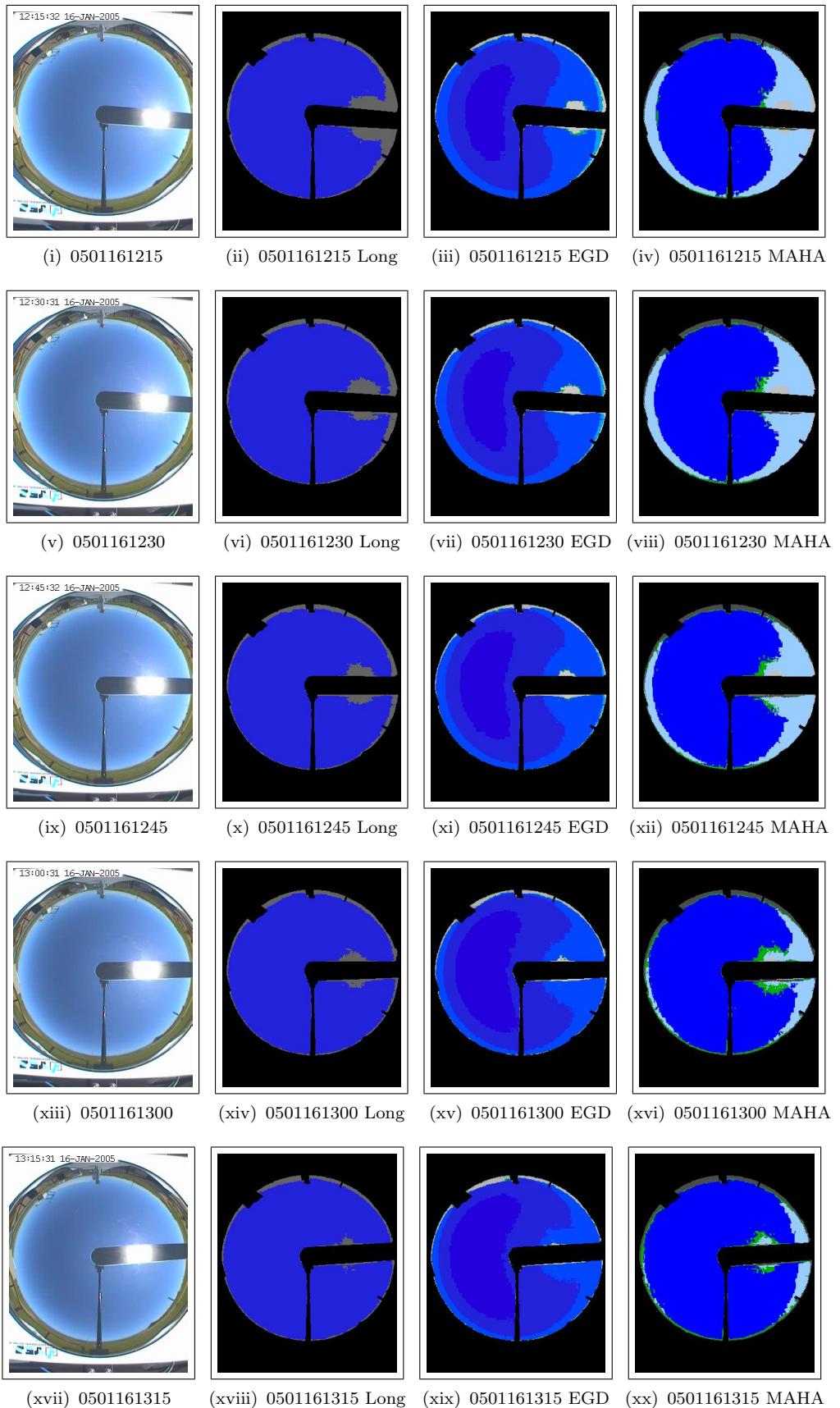


Figure A.182 - Sky images generated from 0501161215 to 0501161315.

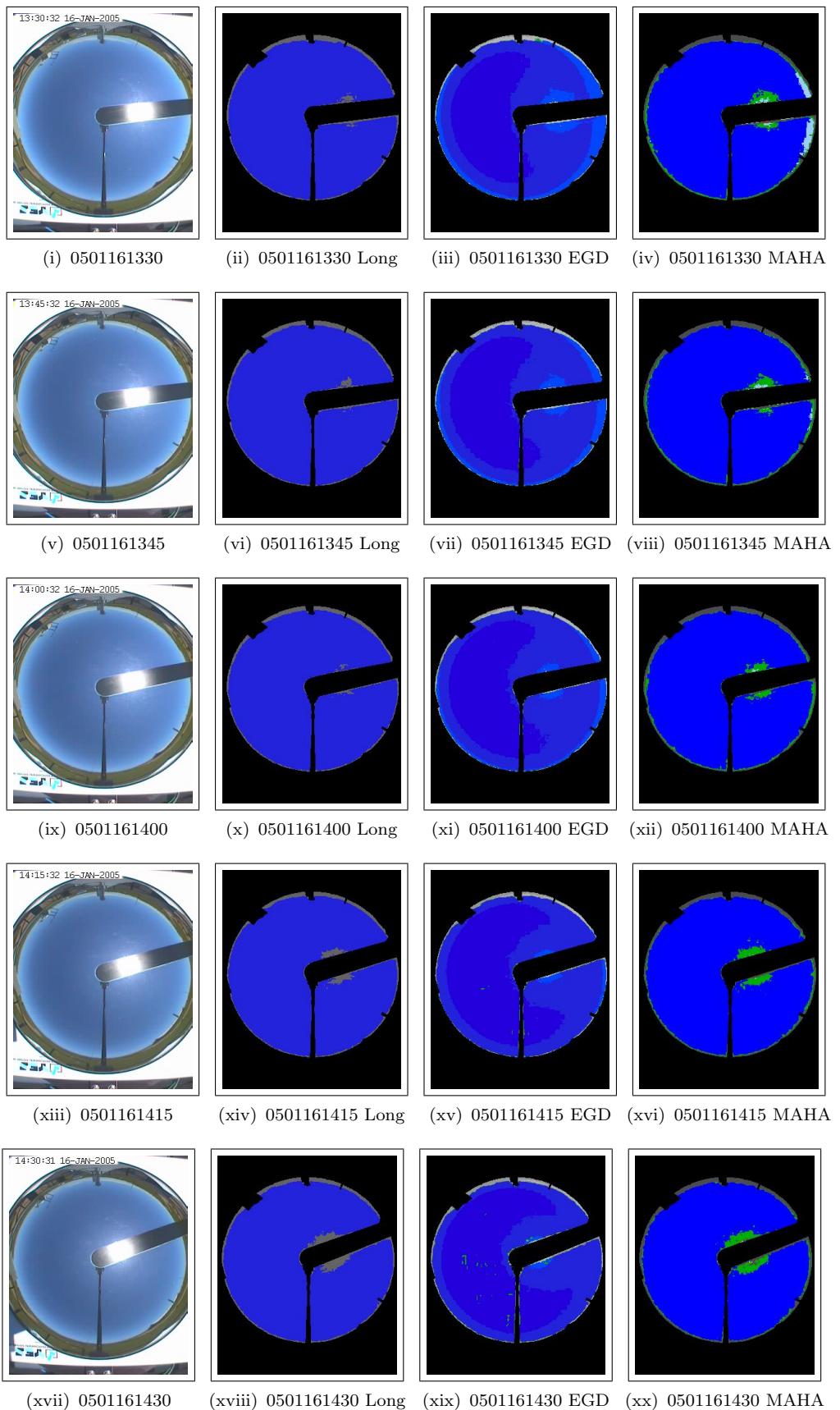


Figure A.183 - Sky images generated from 0501161330 to 0501161430.

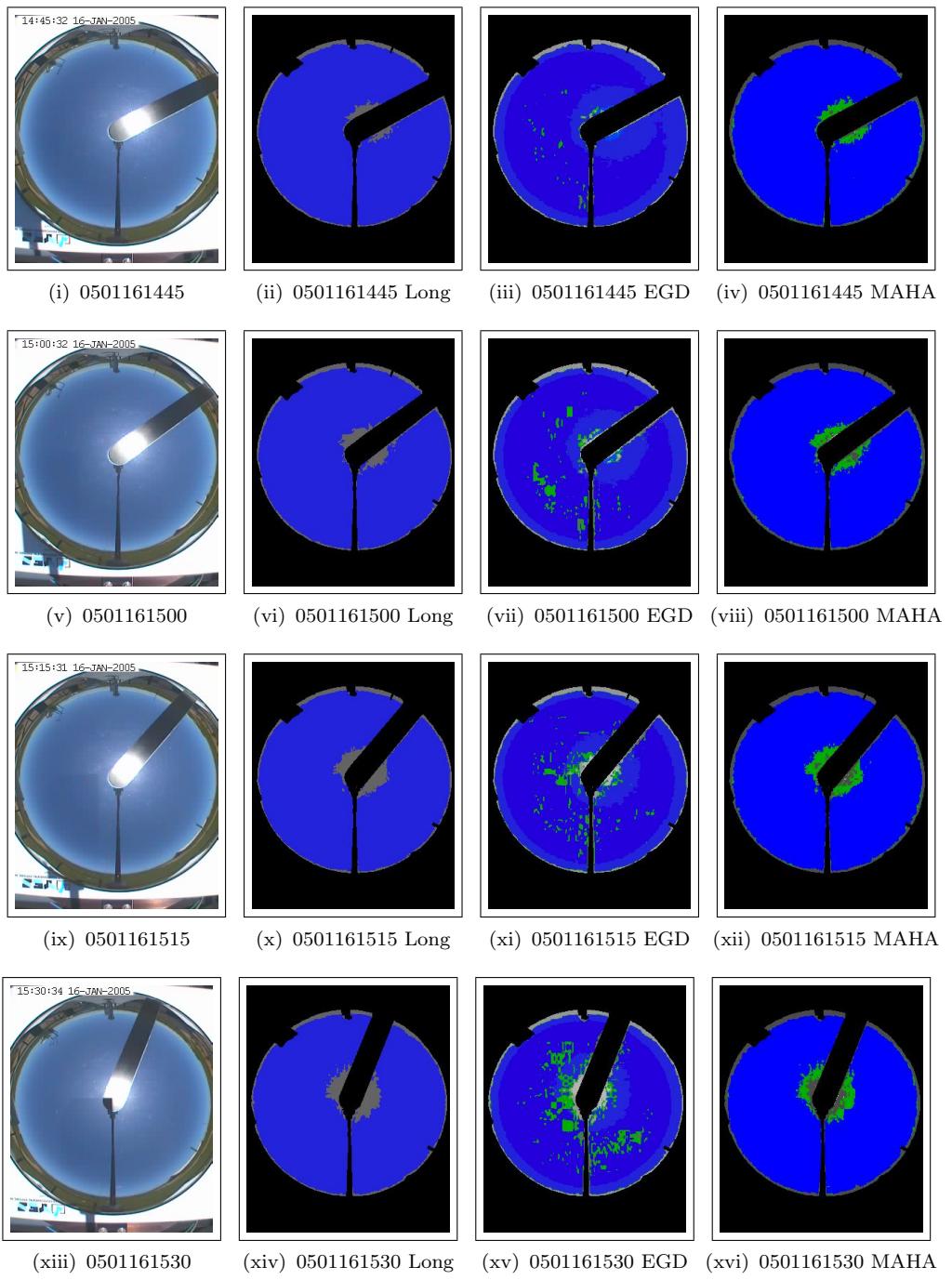


Figure A.184 - Sky images generated from 0501161445 to 0501161530.

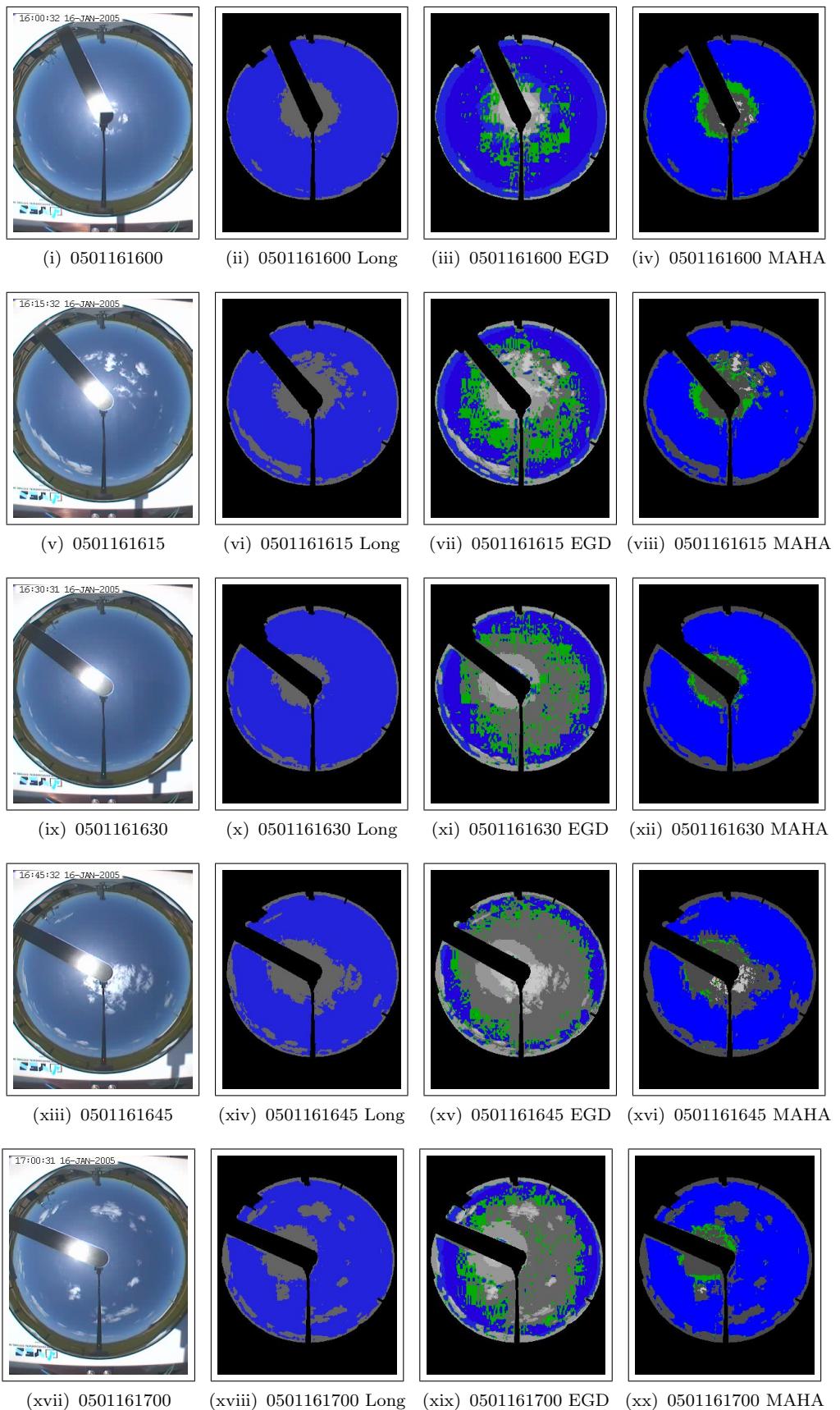


Figure A.185 - Sky images generated from 0501161600 to 0501161700.

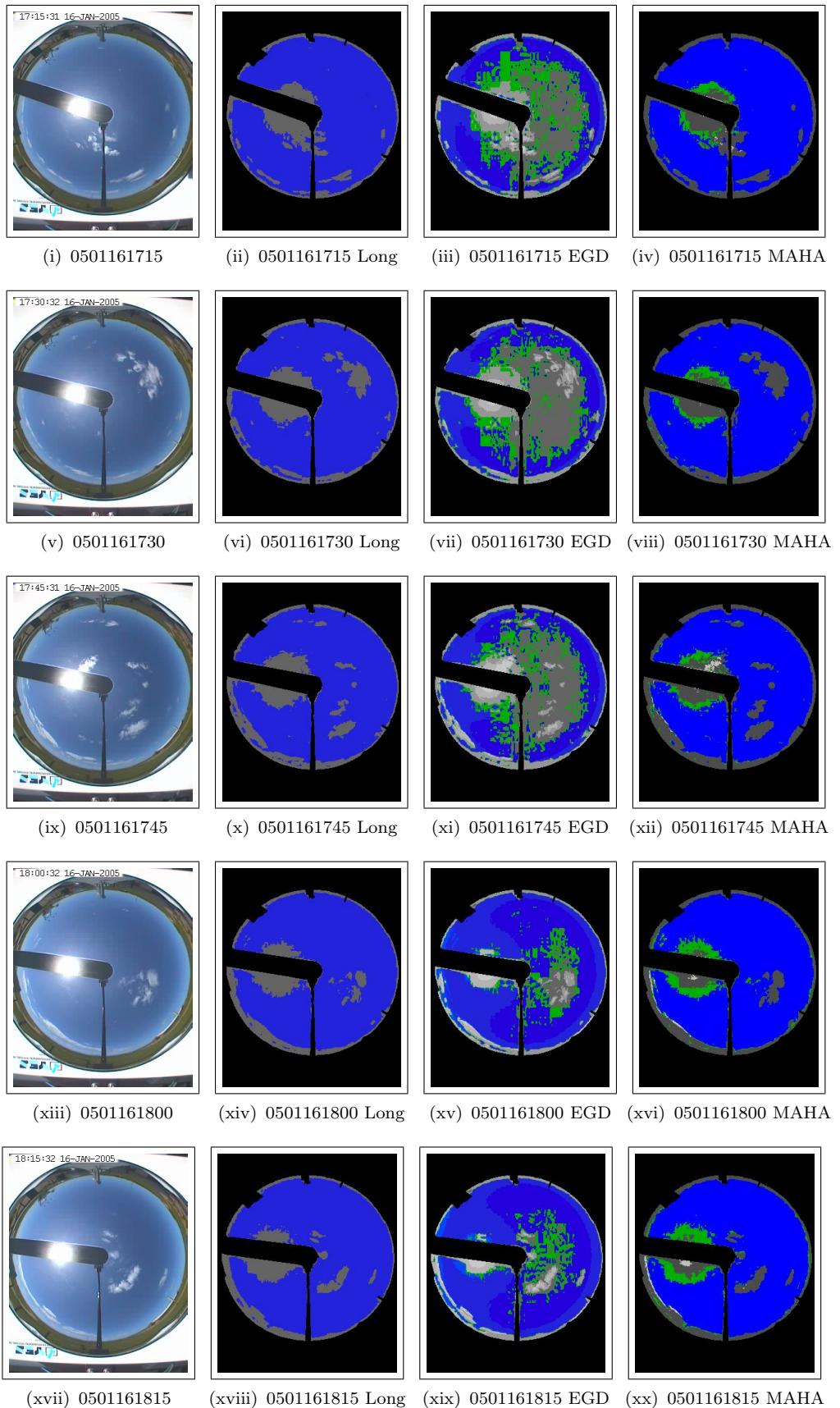


Figure A.186 - Sky images generated from 0501161715 to 0501161815.

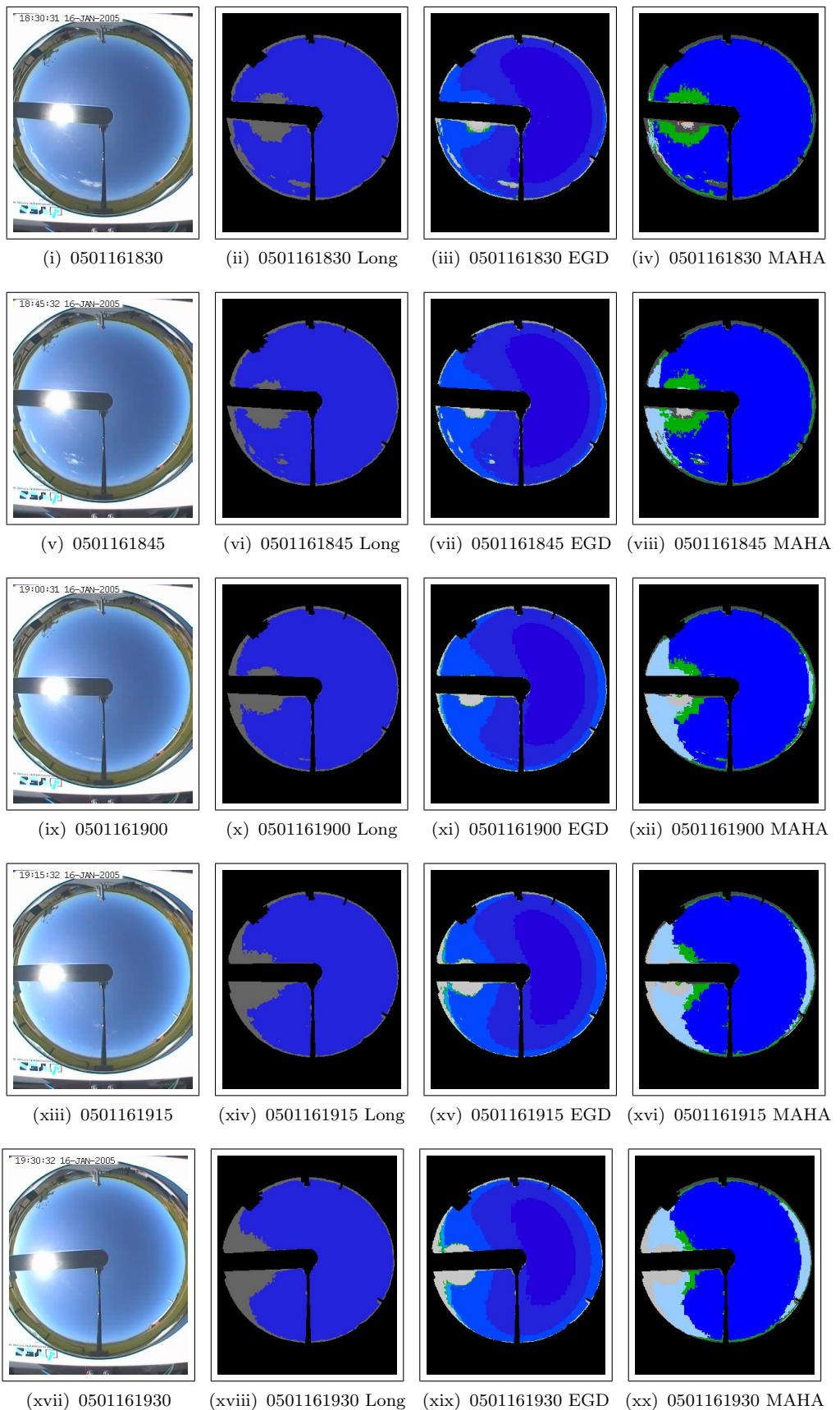


Figure A.187 - Sky images generated from 0501161830 to 0501161930.

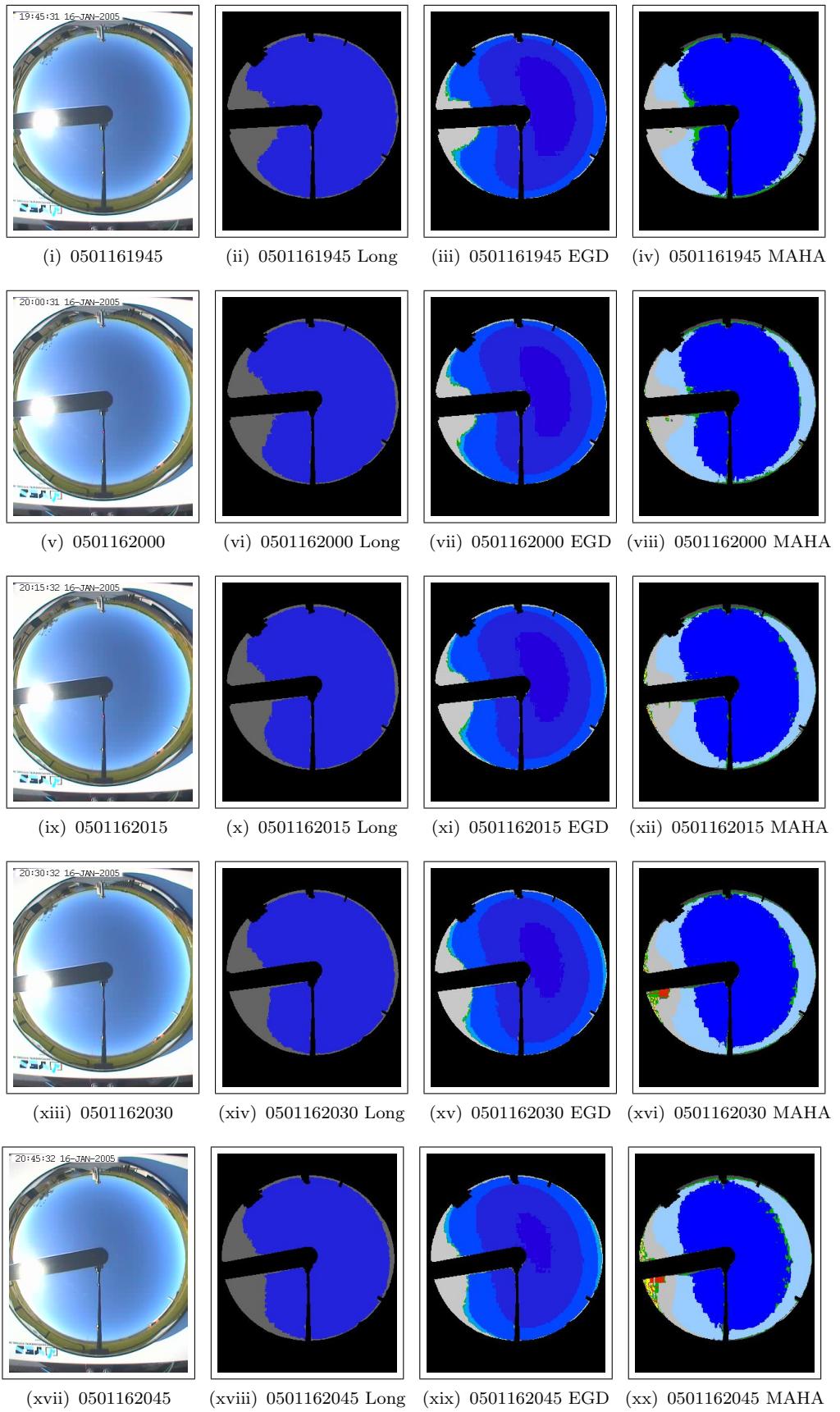


Figure A.188 - Sky images generated from 0501161945 to 0501162045.

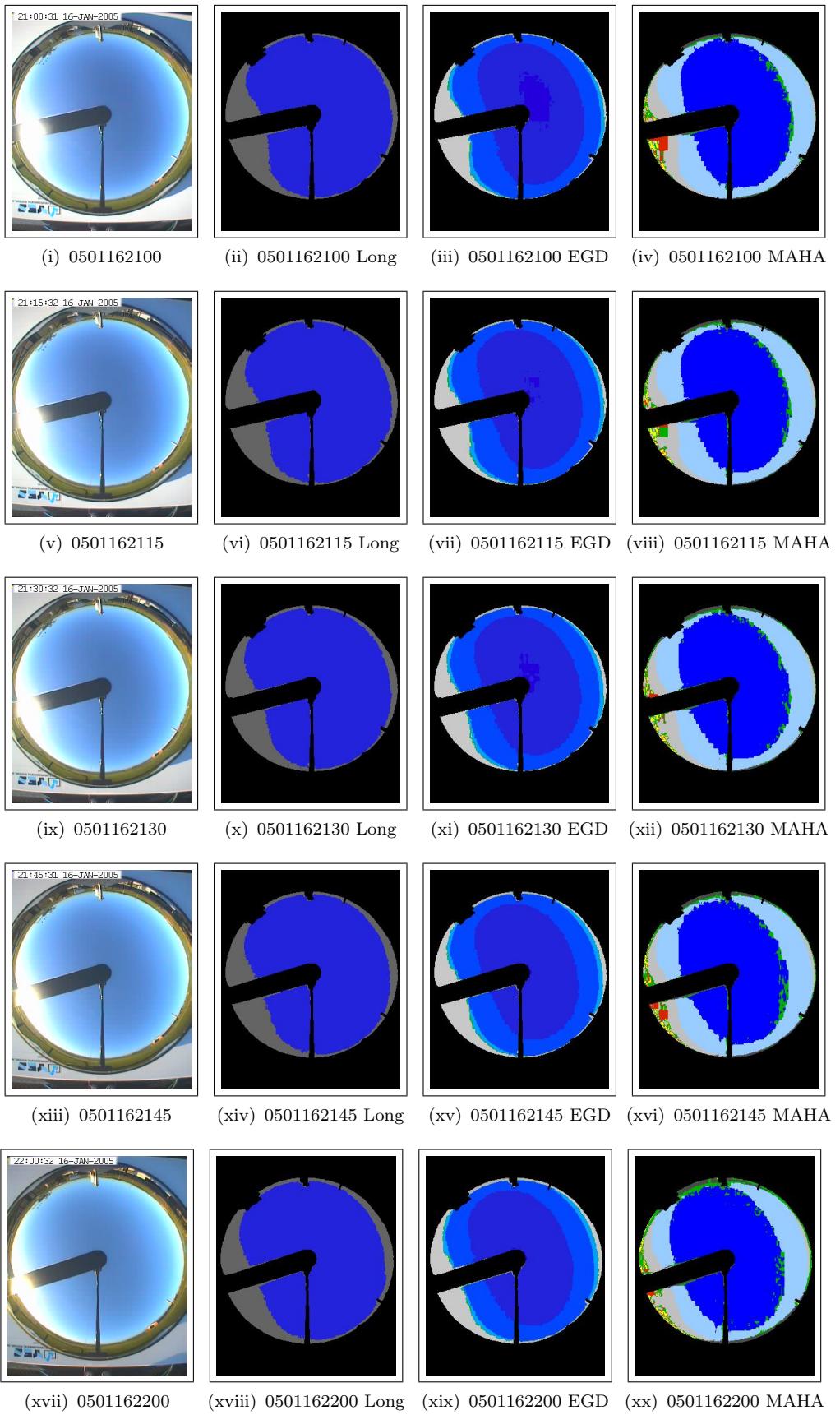


Figure A.189 - Sky images generated from 0501162100 to 0501162200.

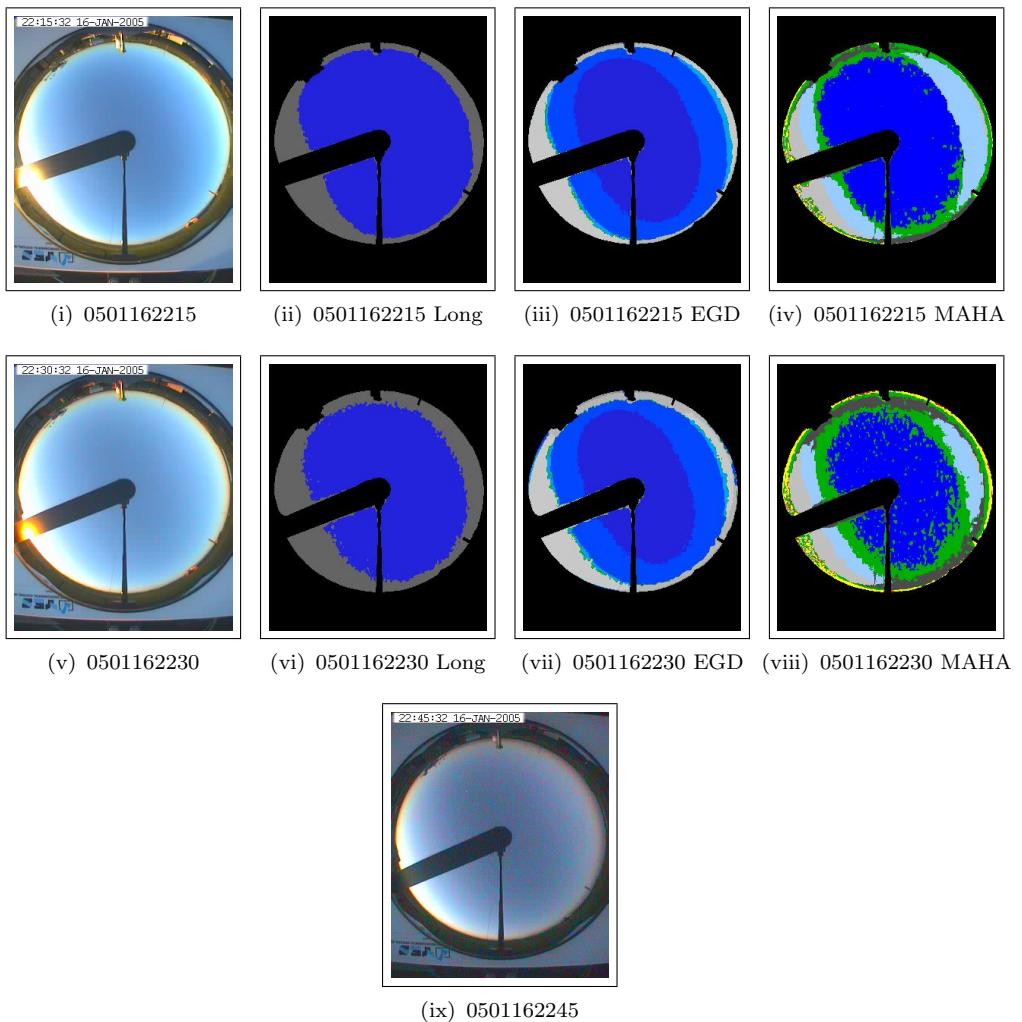


Figure A.190 - Sky images generated from 0501161600 to 0501162245.

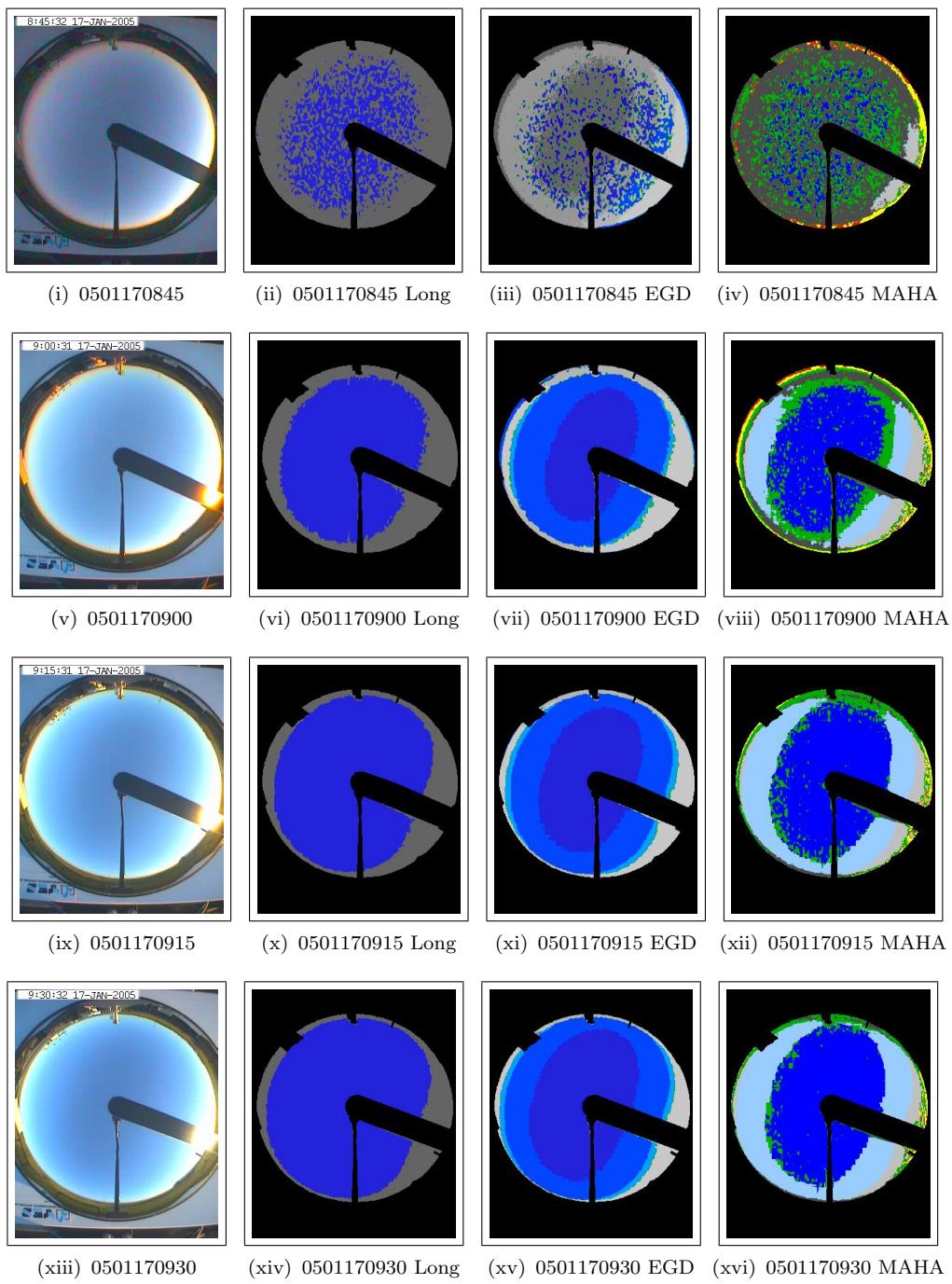


Figure A.191 - Sky images generated from 0501170845 to 0501170930.

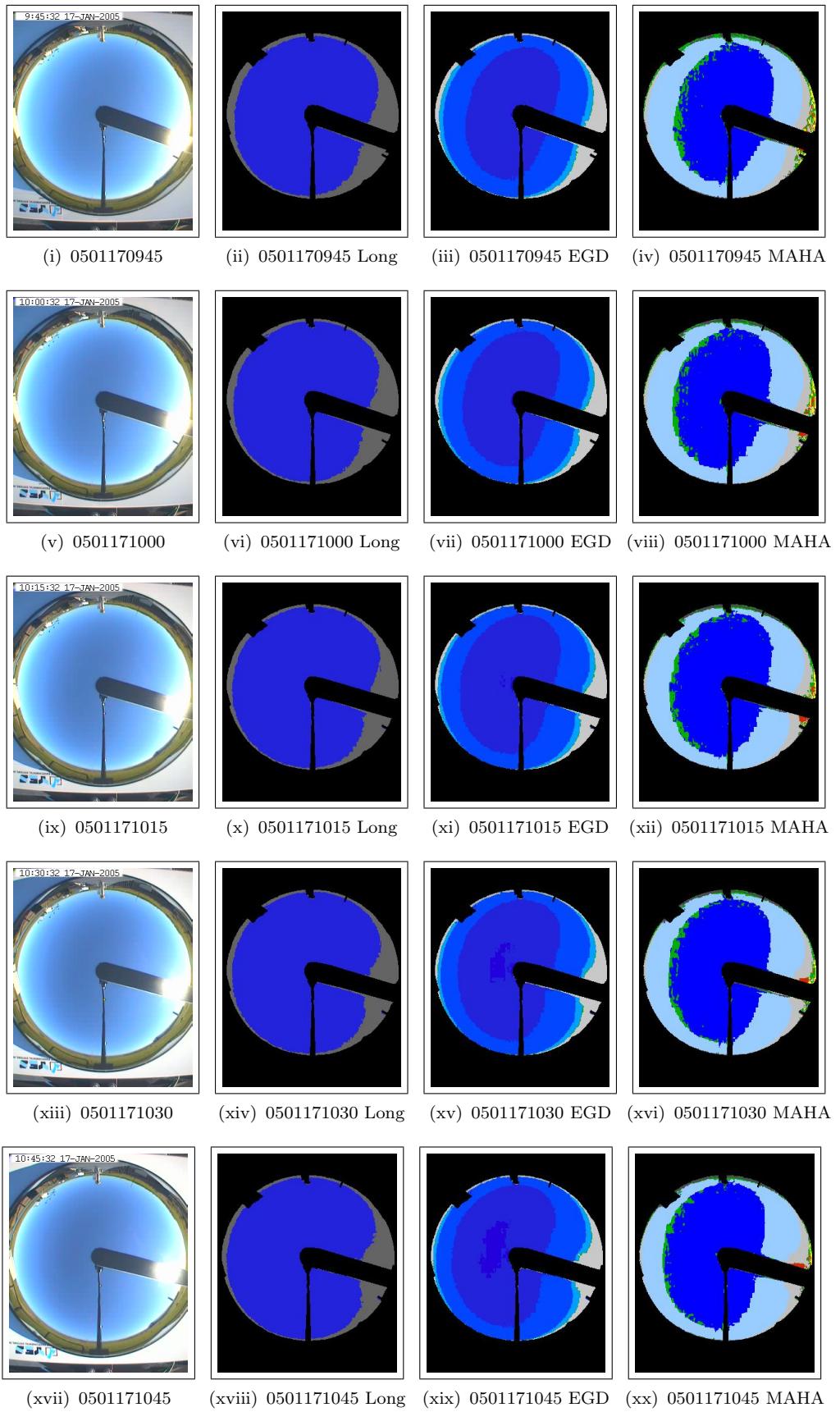


Figure A.192 - Sky images generated from 0501170945 to 0501171045.

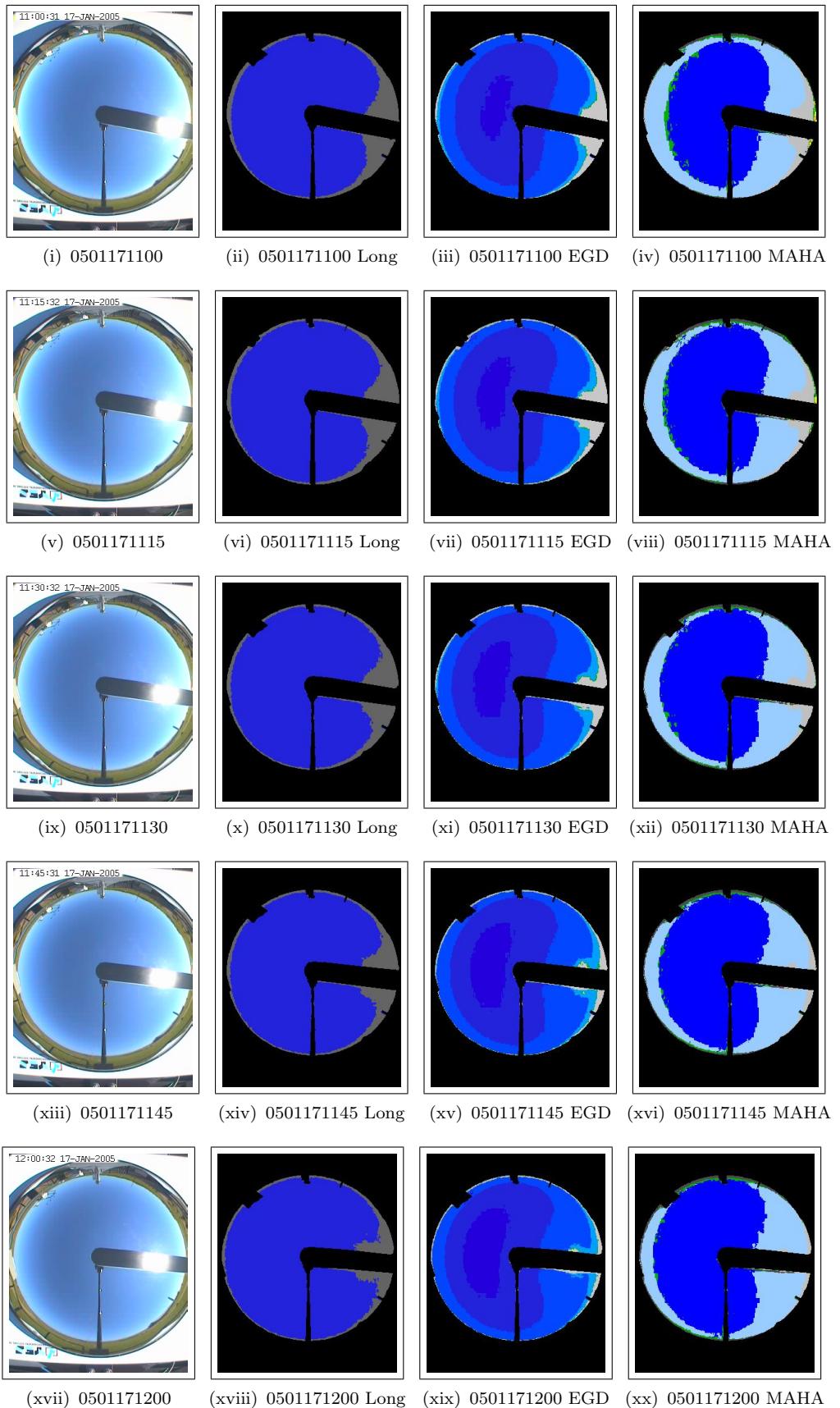
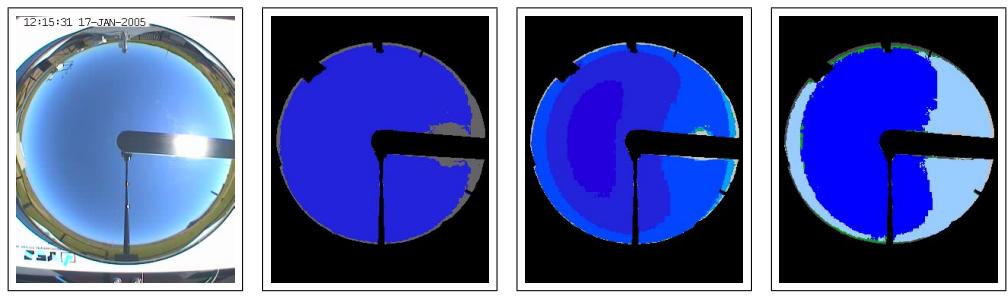
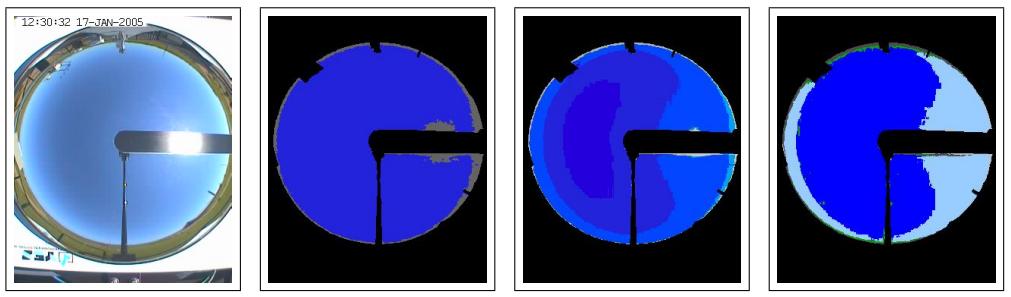


Figure A.193 - Sky images generated from 050117100 to 0501171200.



(i) 0501171215 (ii) 0501171215 Long (iii) 0501171215 EGD (iv) 0501171215 MAHA



(v) 0501171230 (vi) 0501171230 Long (vii) 0501171230 EGD (viii) 0501171230 MAHA

Figure A.194 - Sky images generated from 0501171215 to 0501171230.

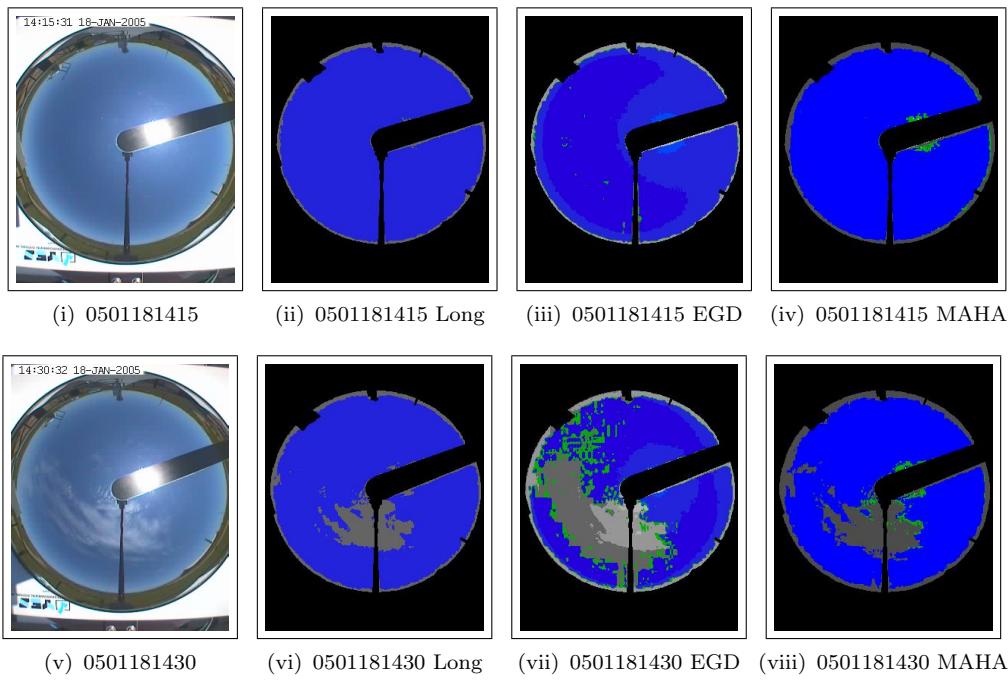


Figure A.195 - Sky images generated from 0501181415 to 0501181430.

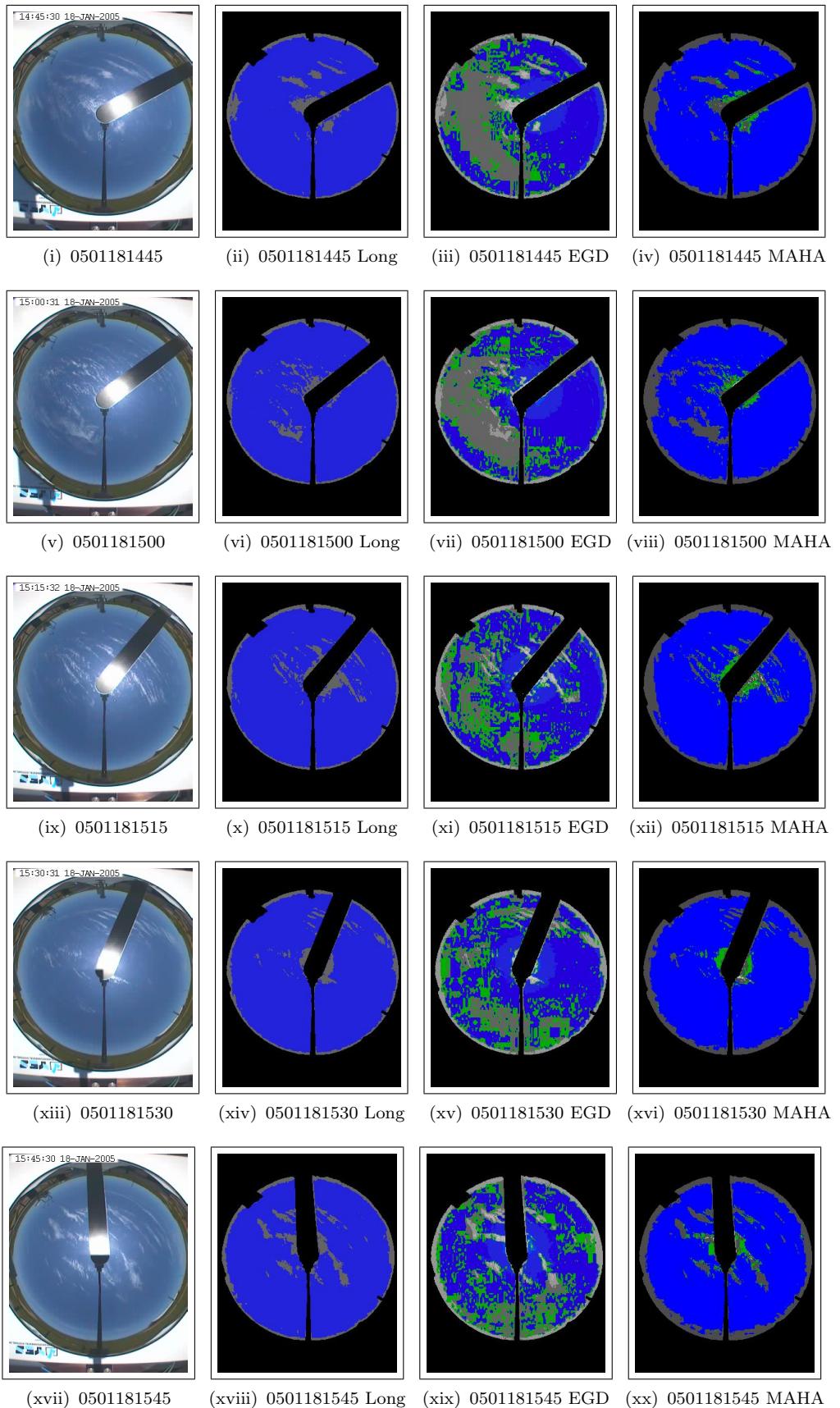


Figure A.196 - Sky images generated from 0501181445 to 0501181545.

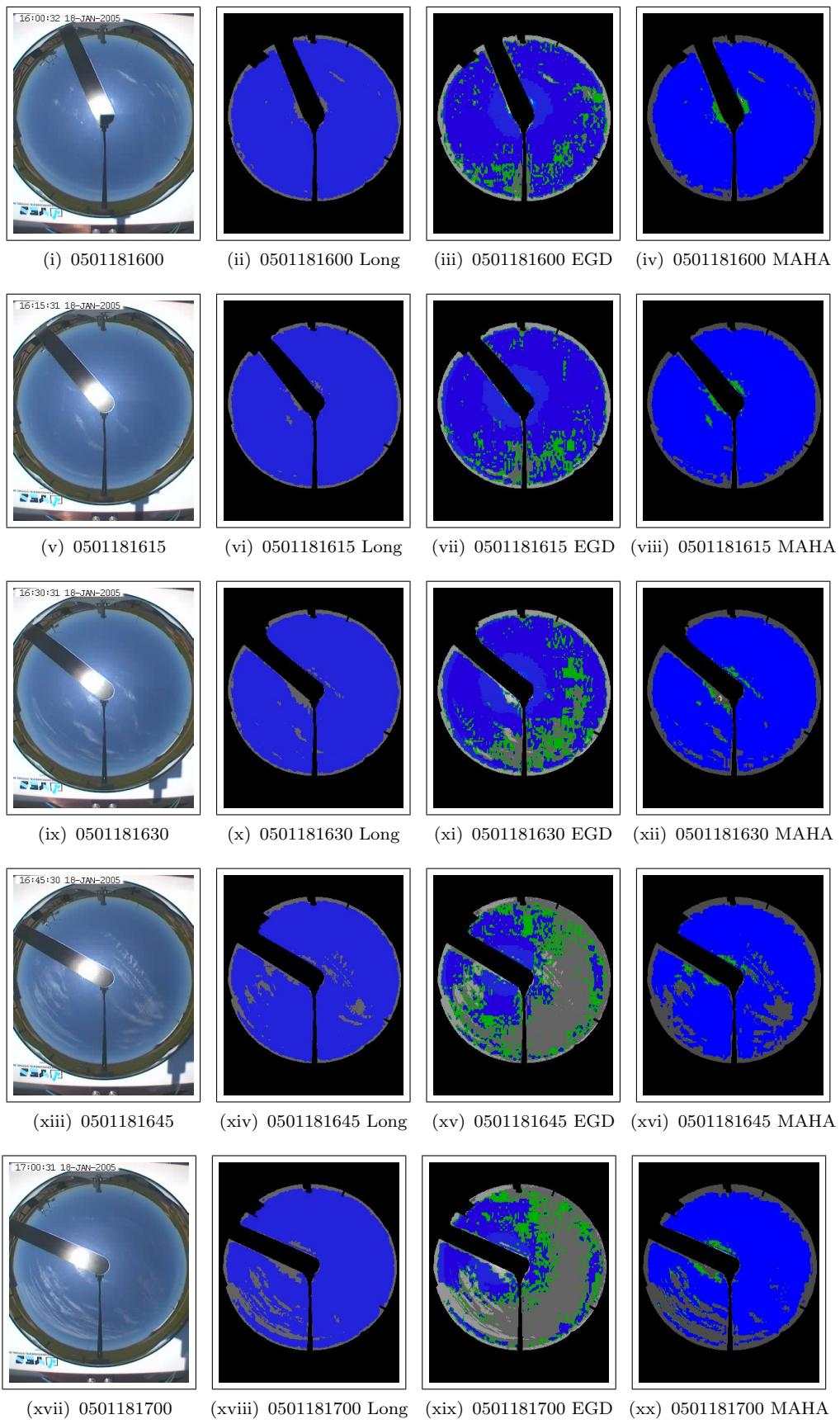


Figure A.197 - Sky images generated from 0501181600 to 0501181700.

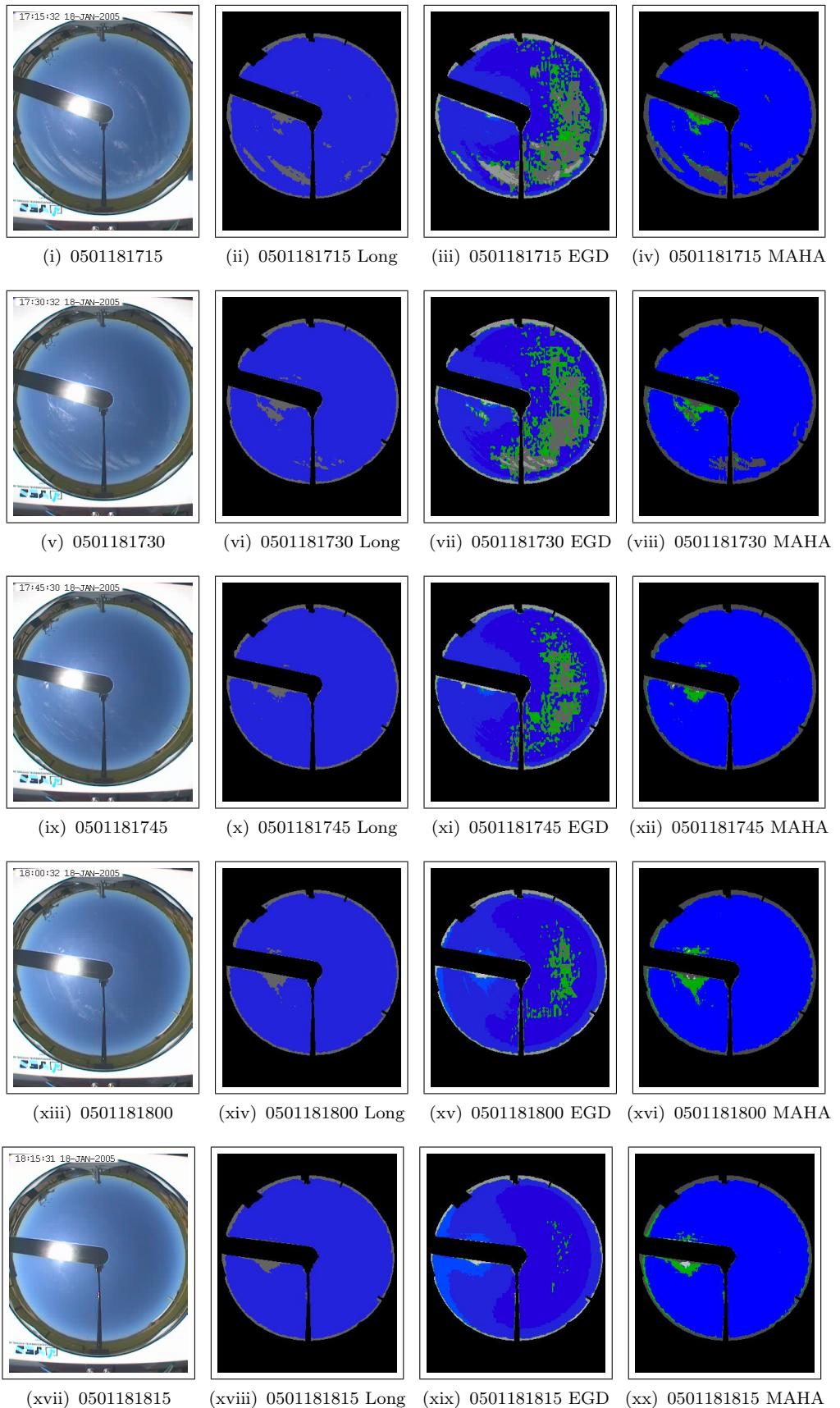


Figure A.198 - Sky images generated from 0501181715 to 0501181815.

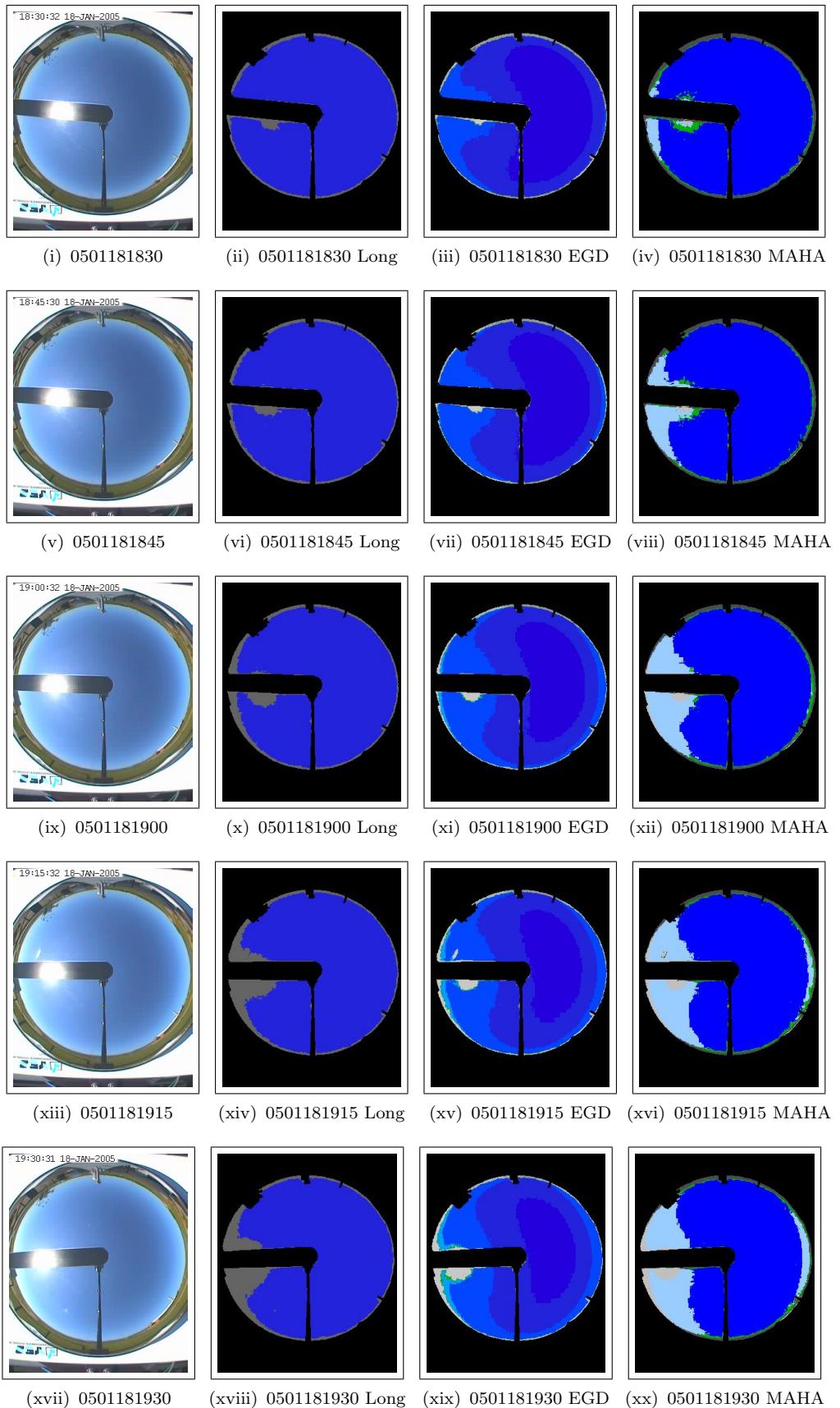


Figure A.199 - Sky images generated from 0501181830 to 0501181930.

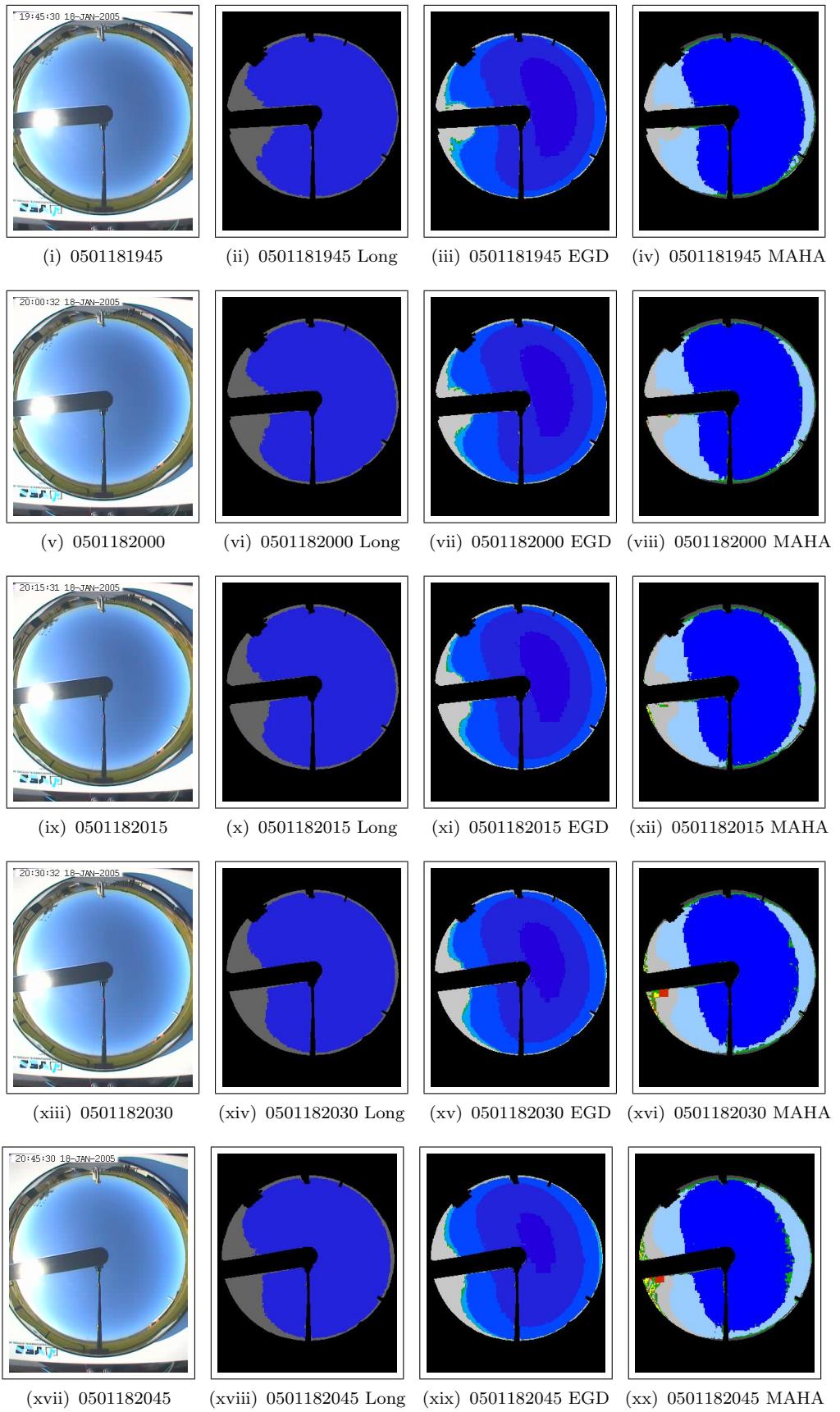


Figure A.200 - Sky images generated from 0501181945 to 0501182045.

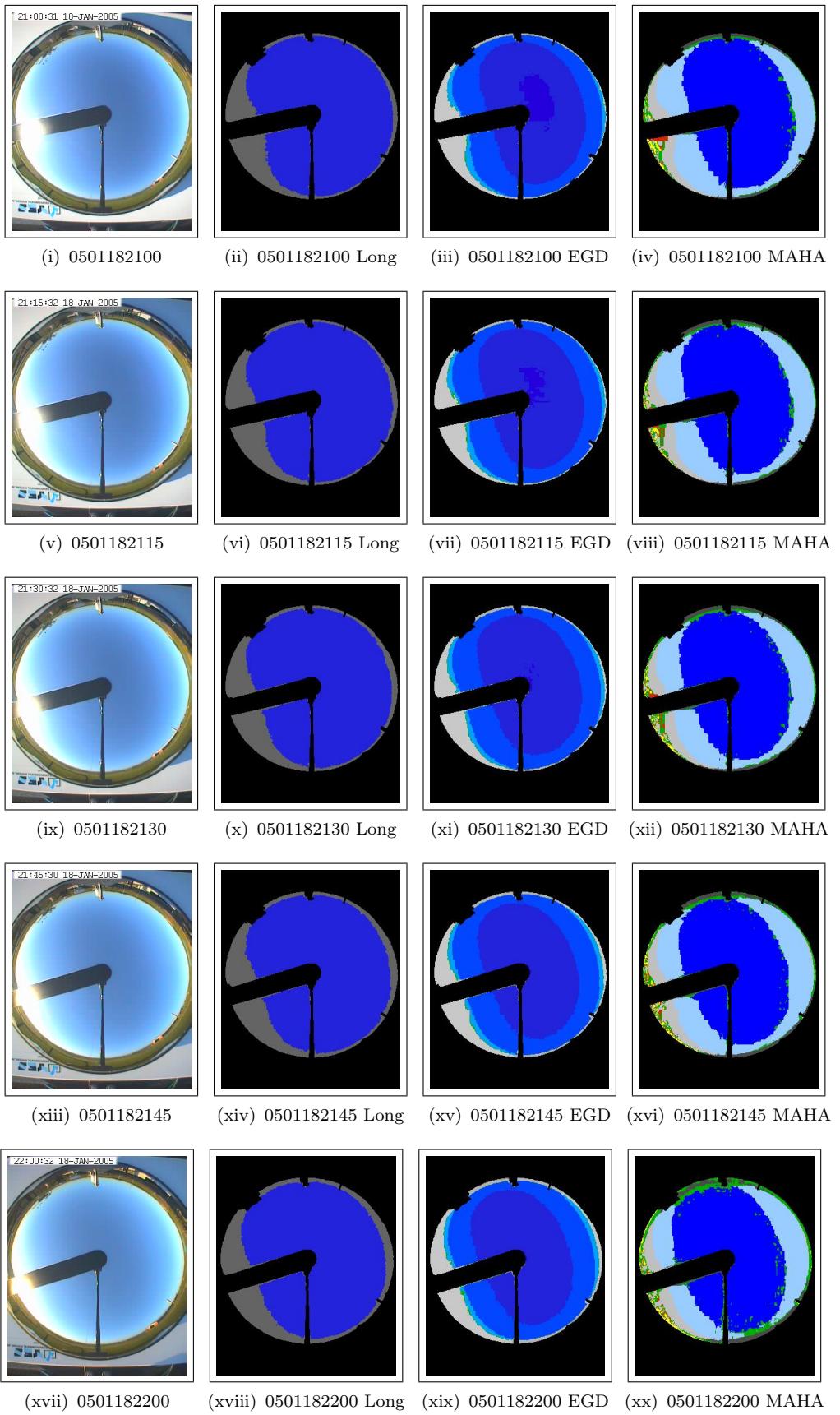


Figure A.201 - Sky images generated from 0501182100 to 0501182200.

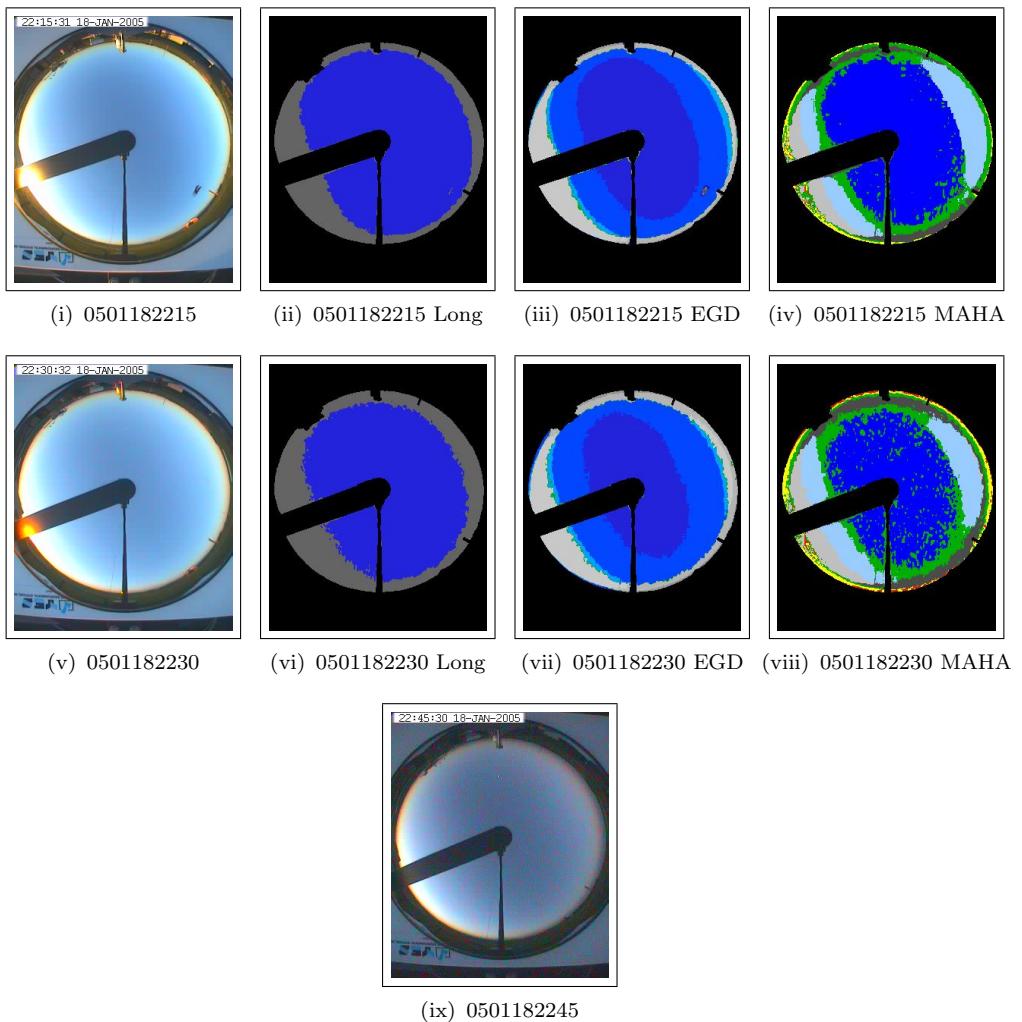


Figure A.202 - Sky images generated from 0501181600 to 0501182245.

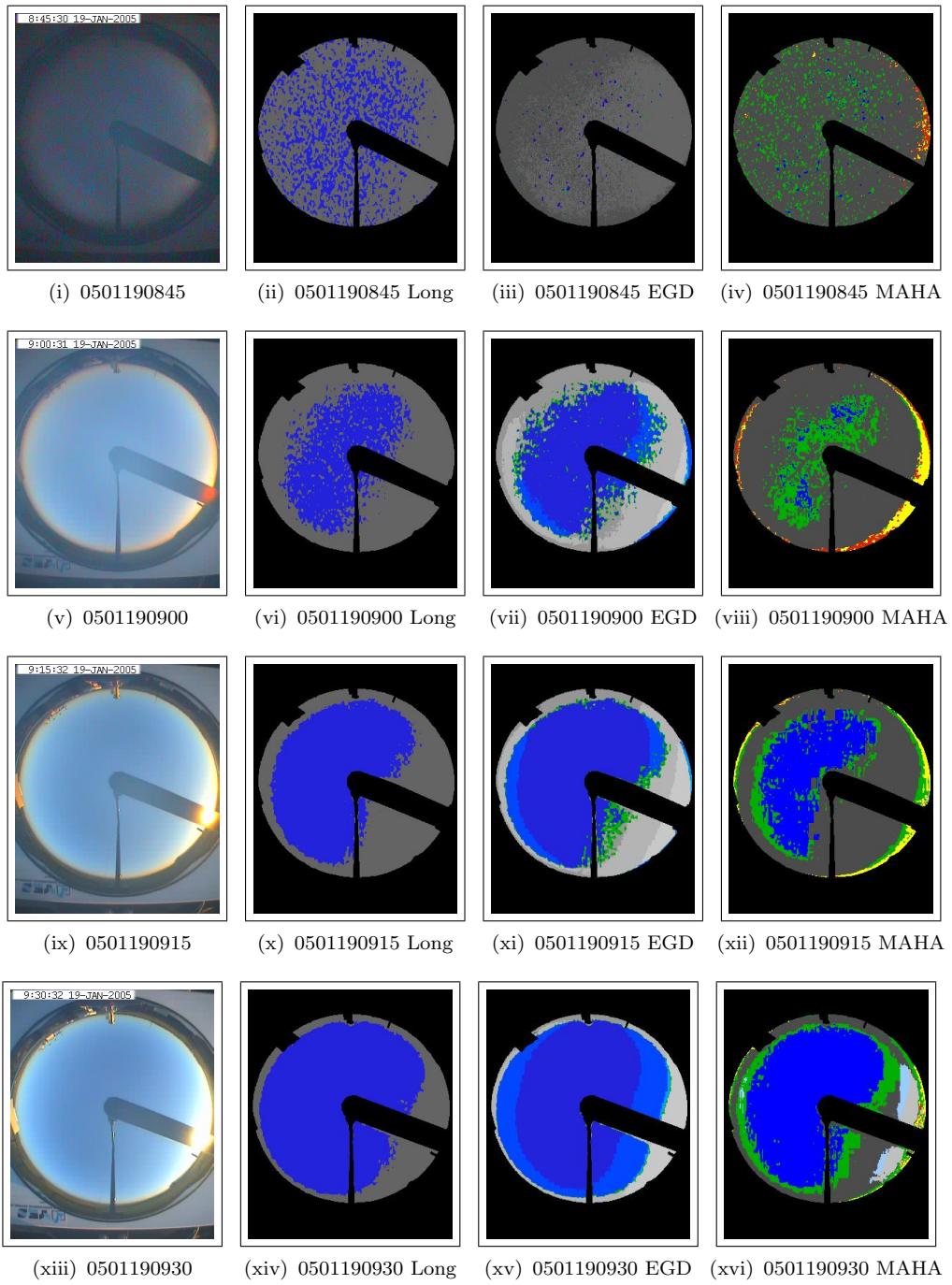


Figure A.203 - Sky images generated from 0501190845 to 0501190930.

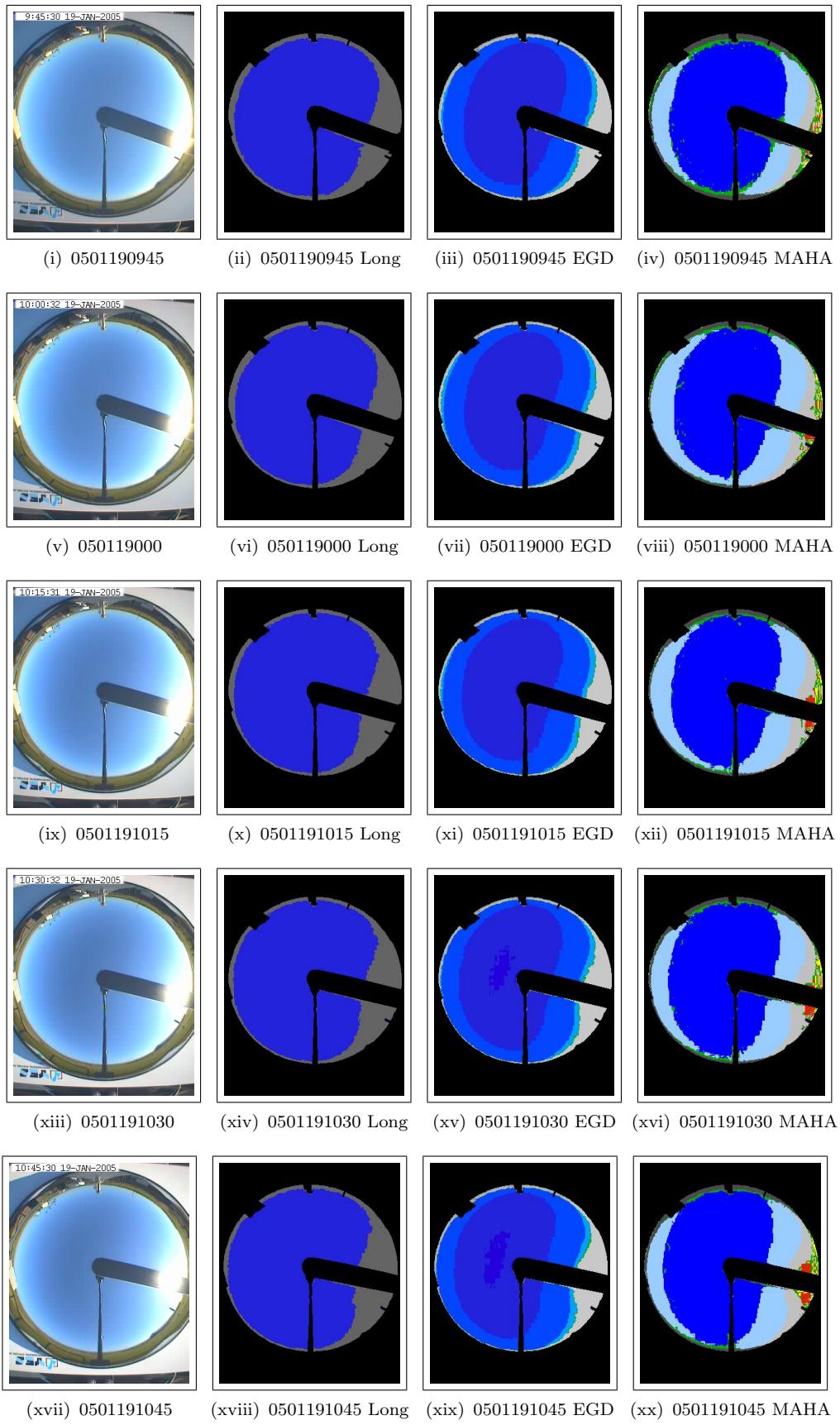


Figure A.204 - Sky images generated from 0501190945 to 0501191045.

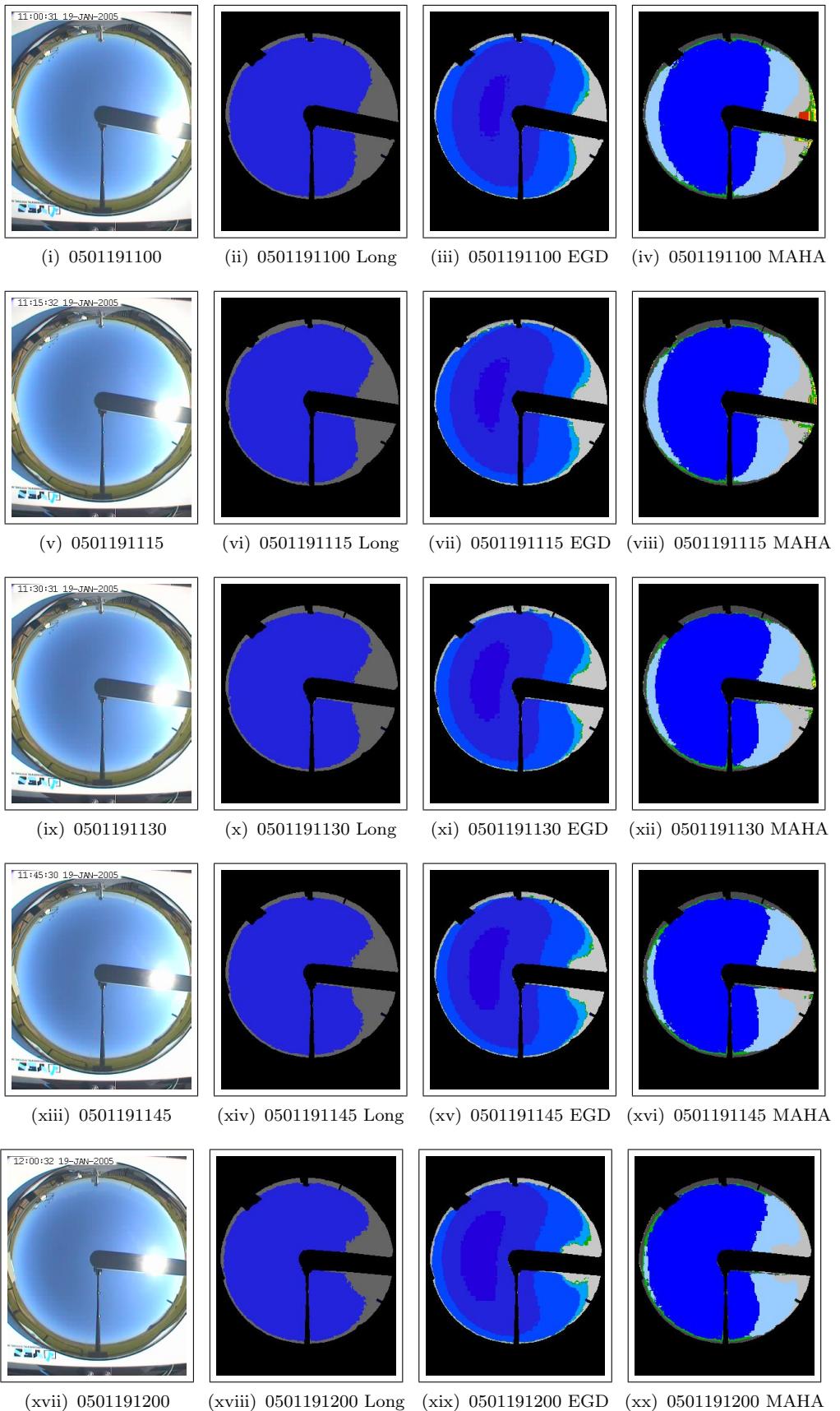


Figure A.205 - Sky images generated from 050119100 to 0501191200.

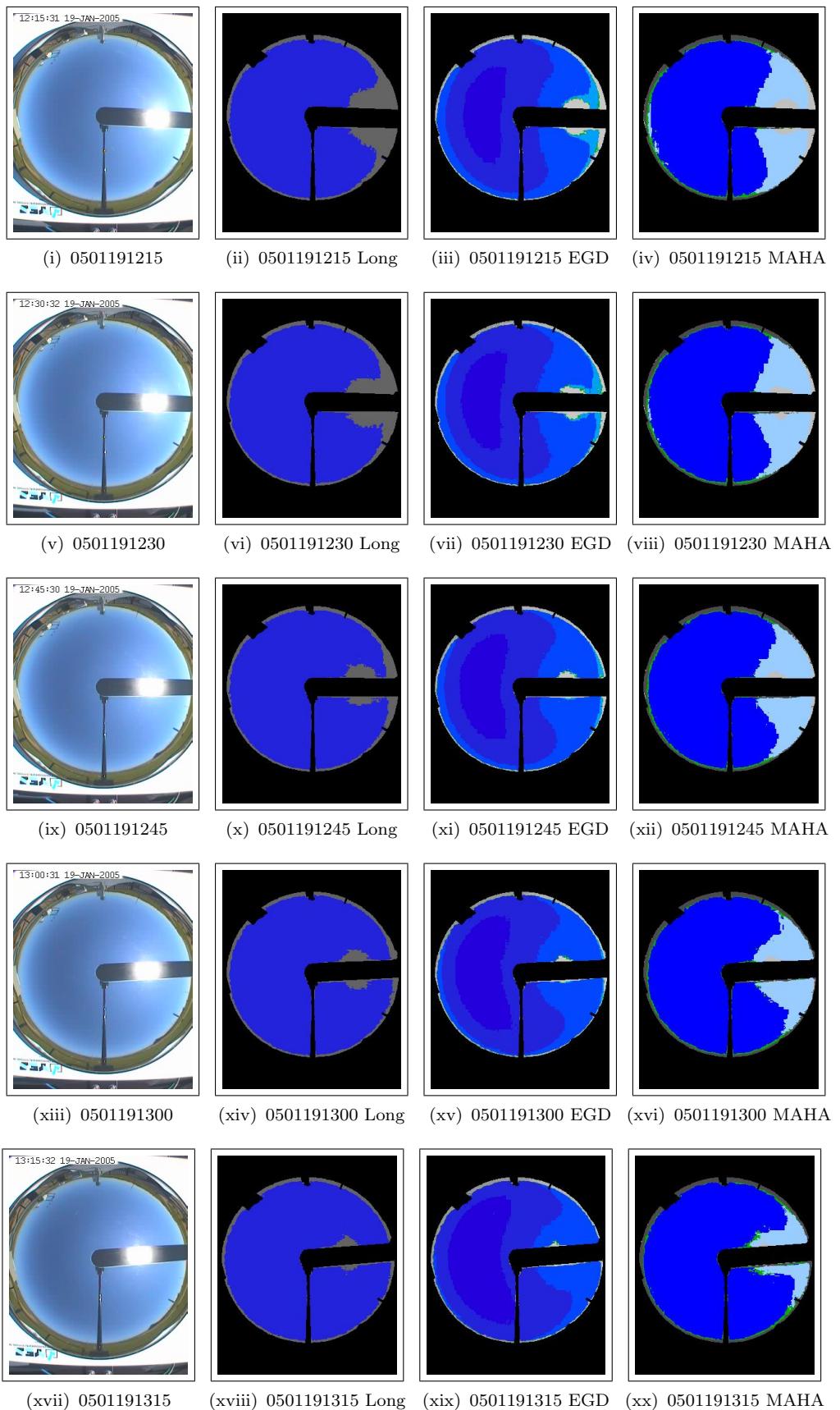


Figure A.206 - Sky images generated from 0501191215 to 0501191315.

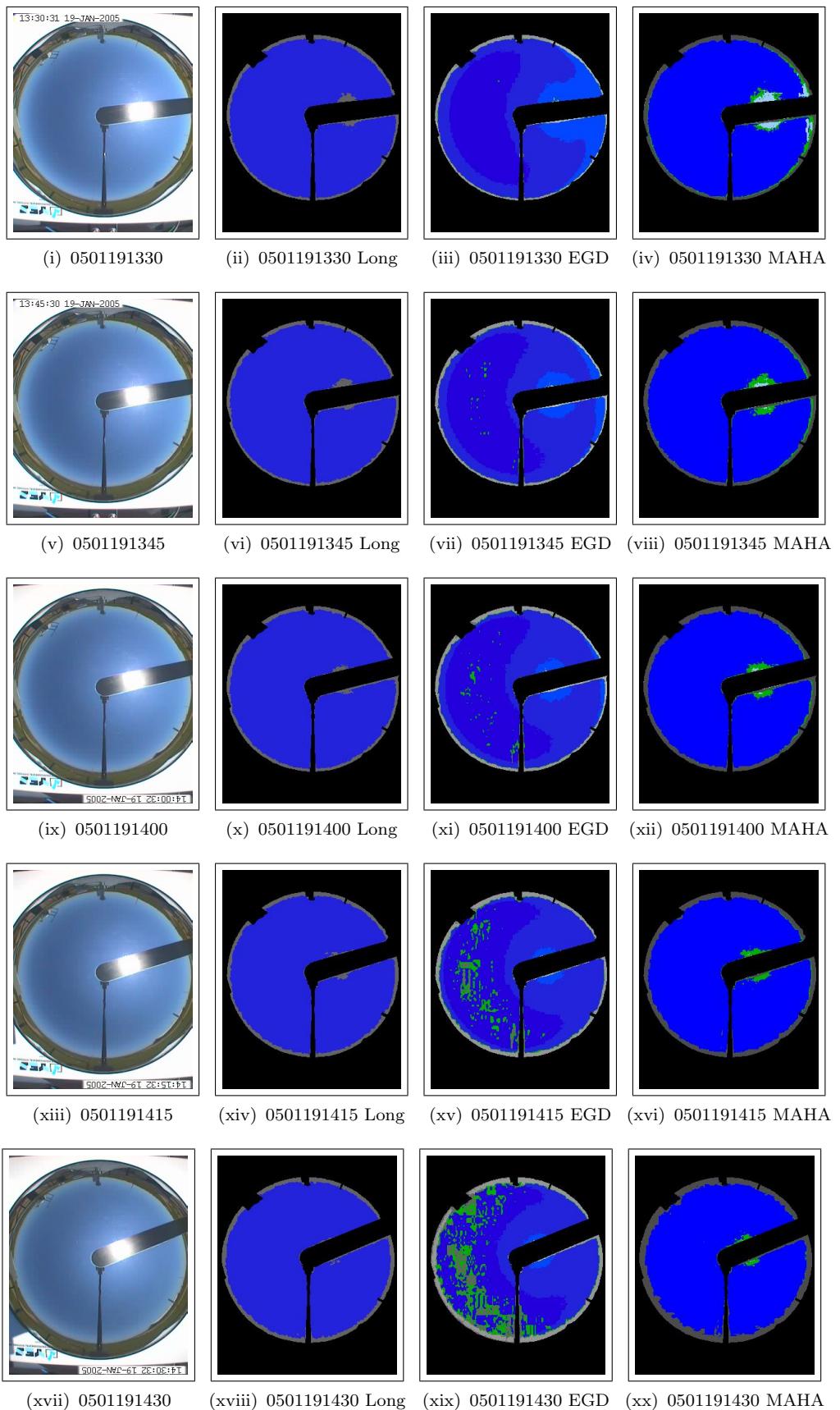


Figure A.207 - Sky images generated from 0501191330 to 0501191430.

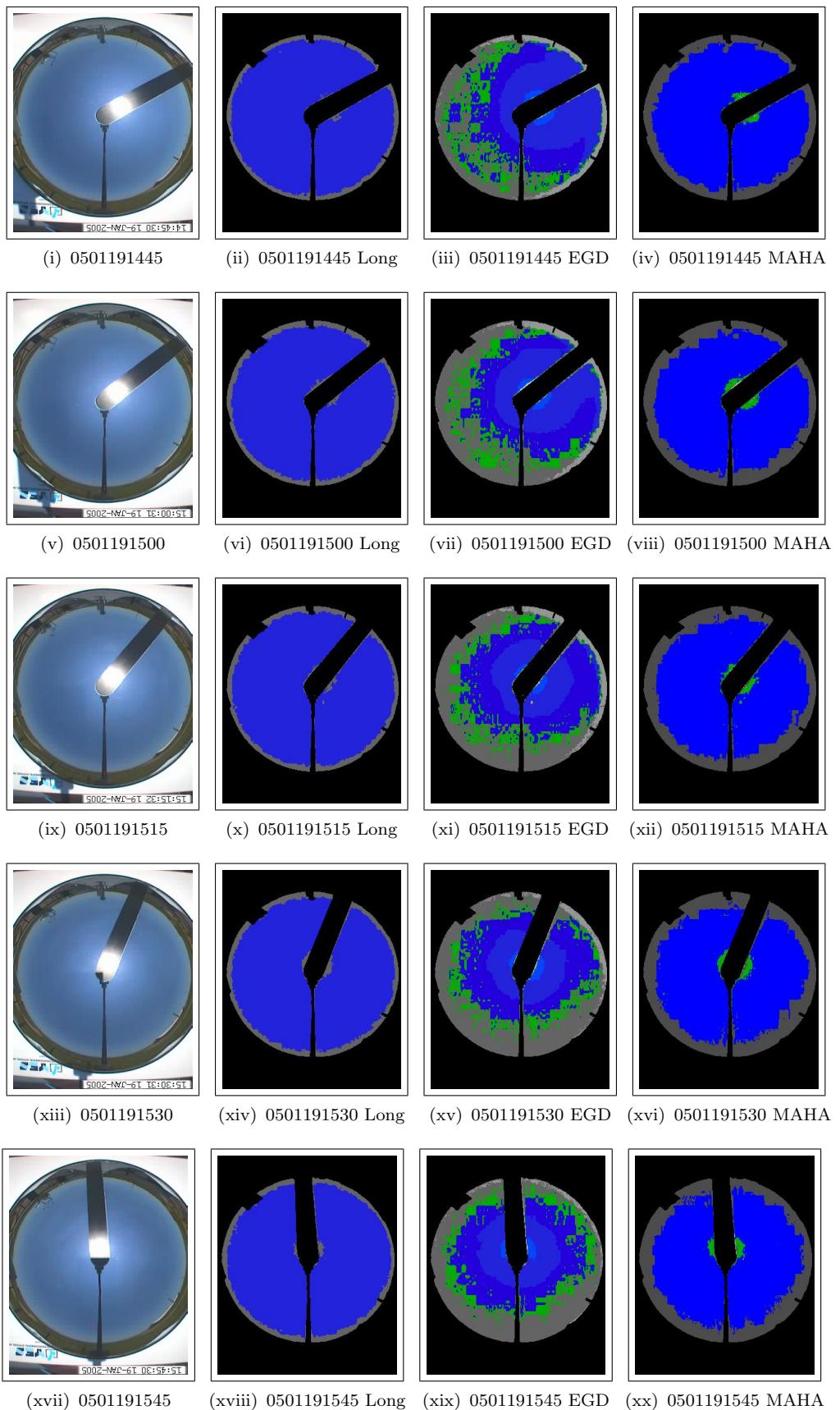


Figure A.208 - Sky images generated from 0501191445 to 0501191545.

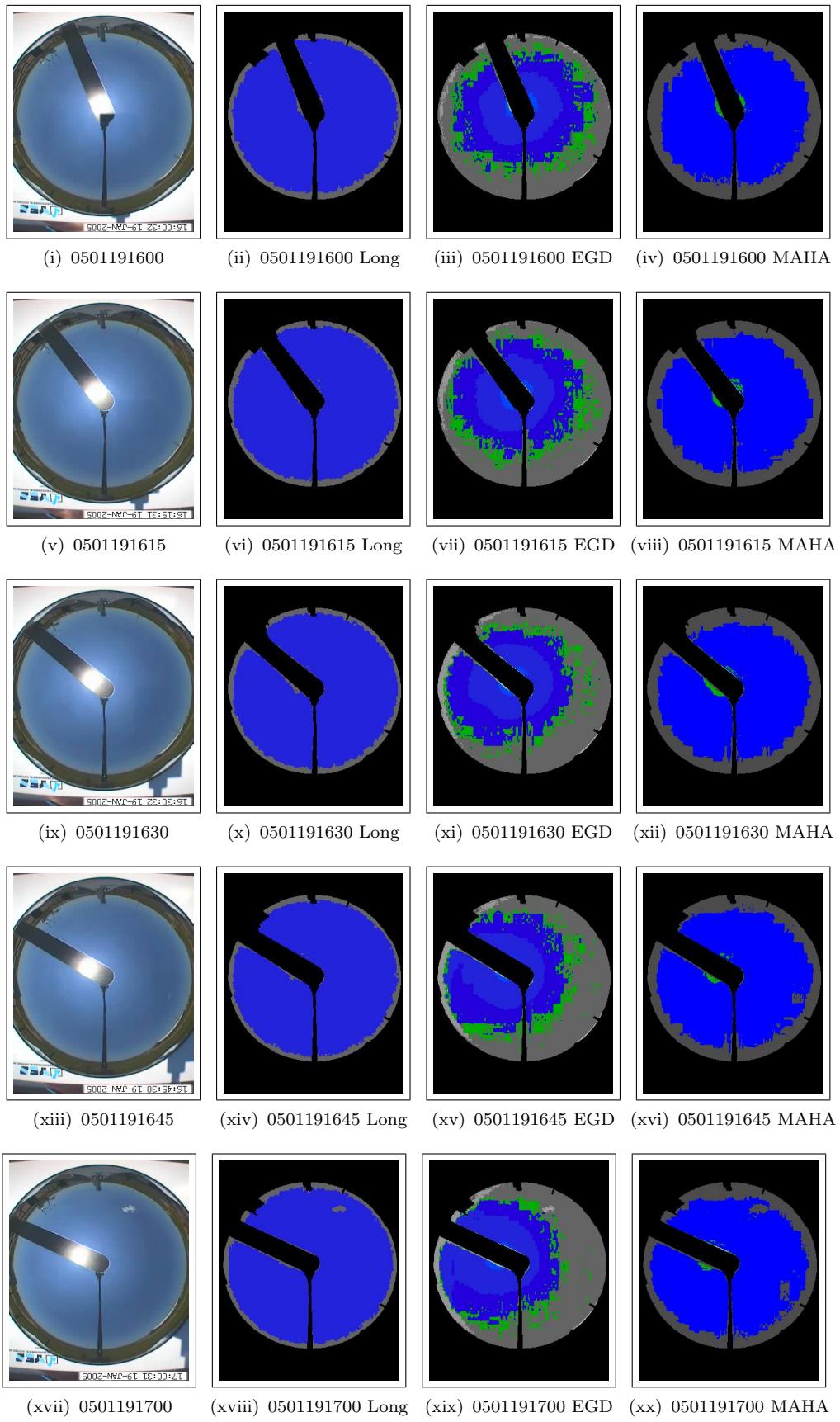


Figure A.209 - Sky images generated from 0501191600 to 0501191700.

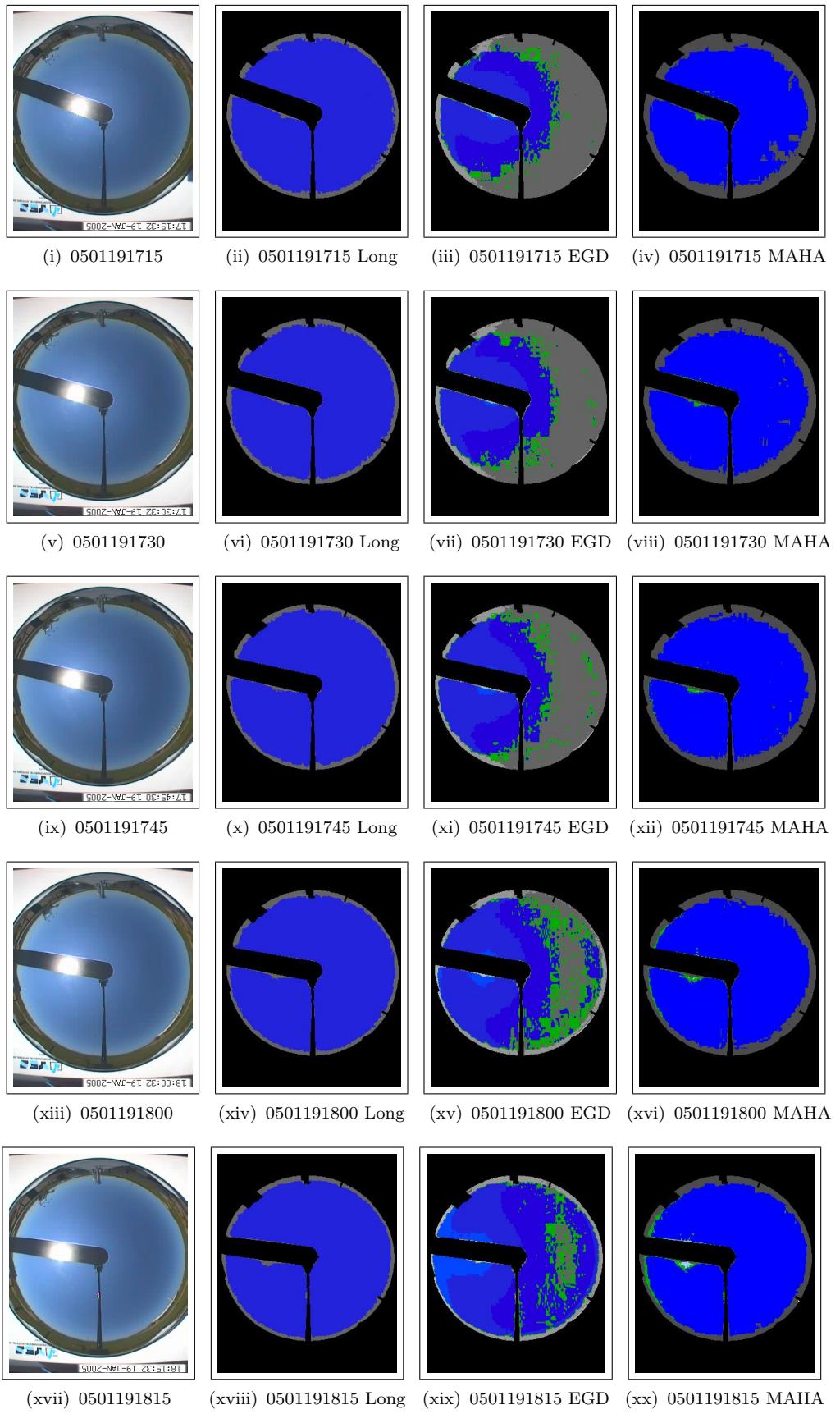


Figure A.210 - Sky images generated from 0501191715 to 0501191815.

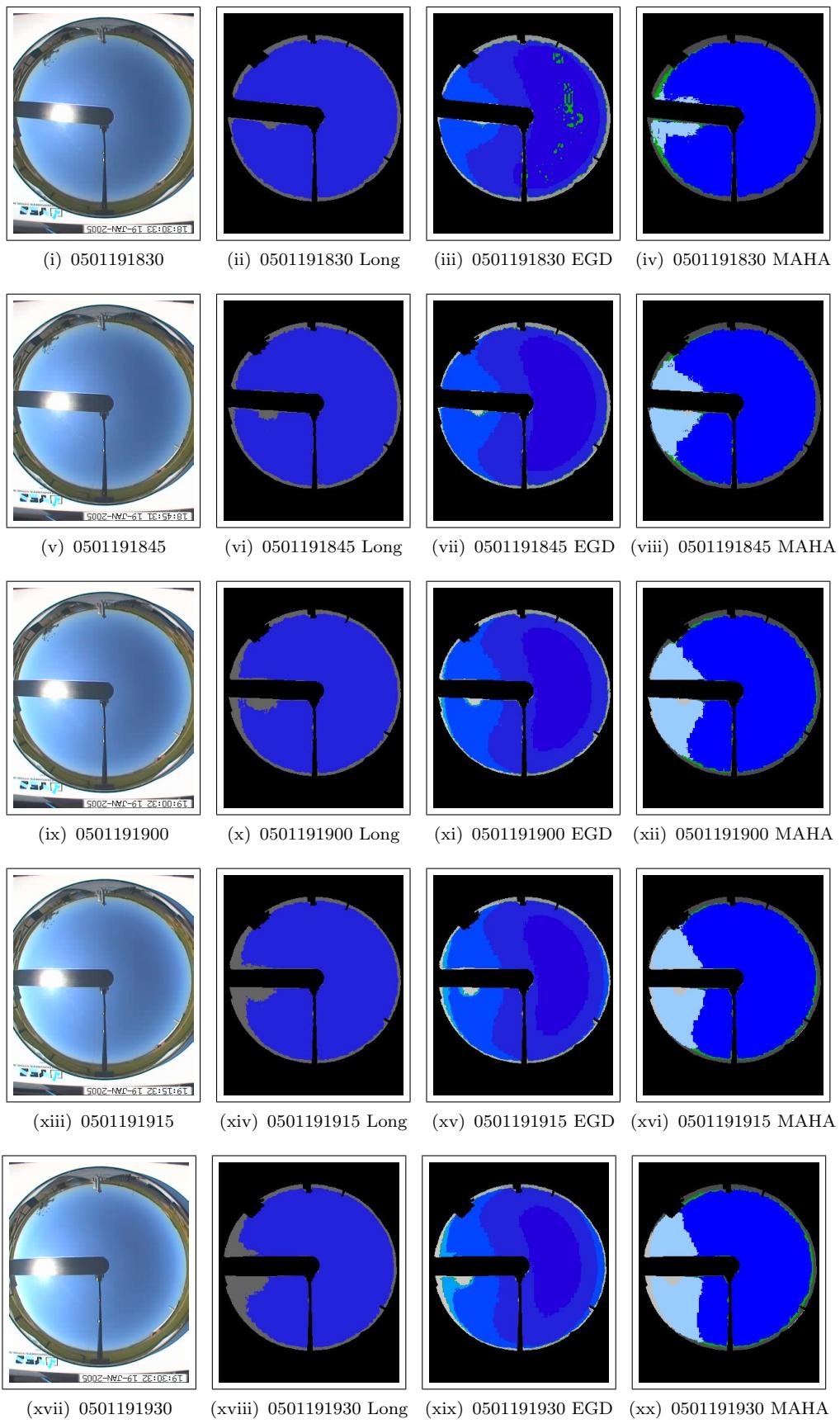


Figure A.211 - Sky images generated from 0501191830 to 0501191930.

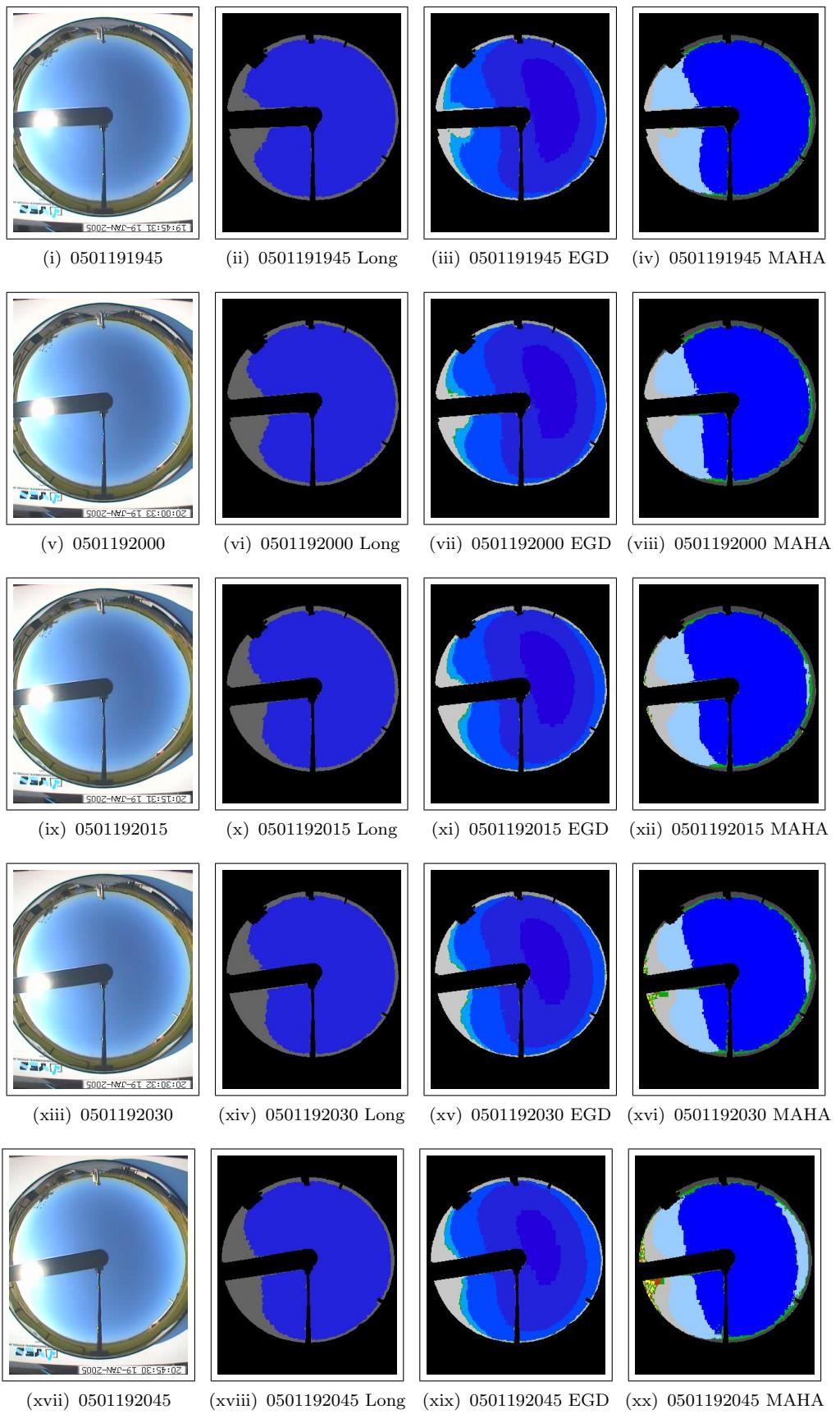


Figure A.212 - Sky images generated from 0501191945 to 0501192045.

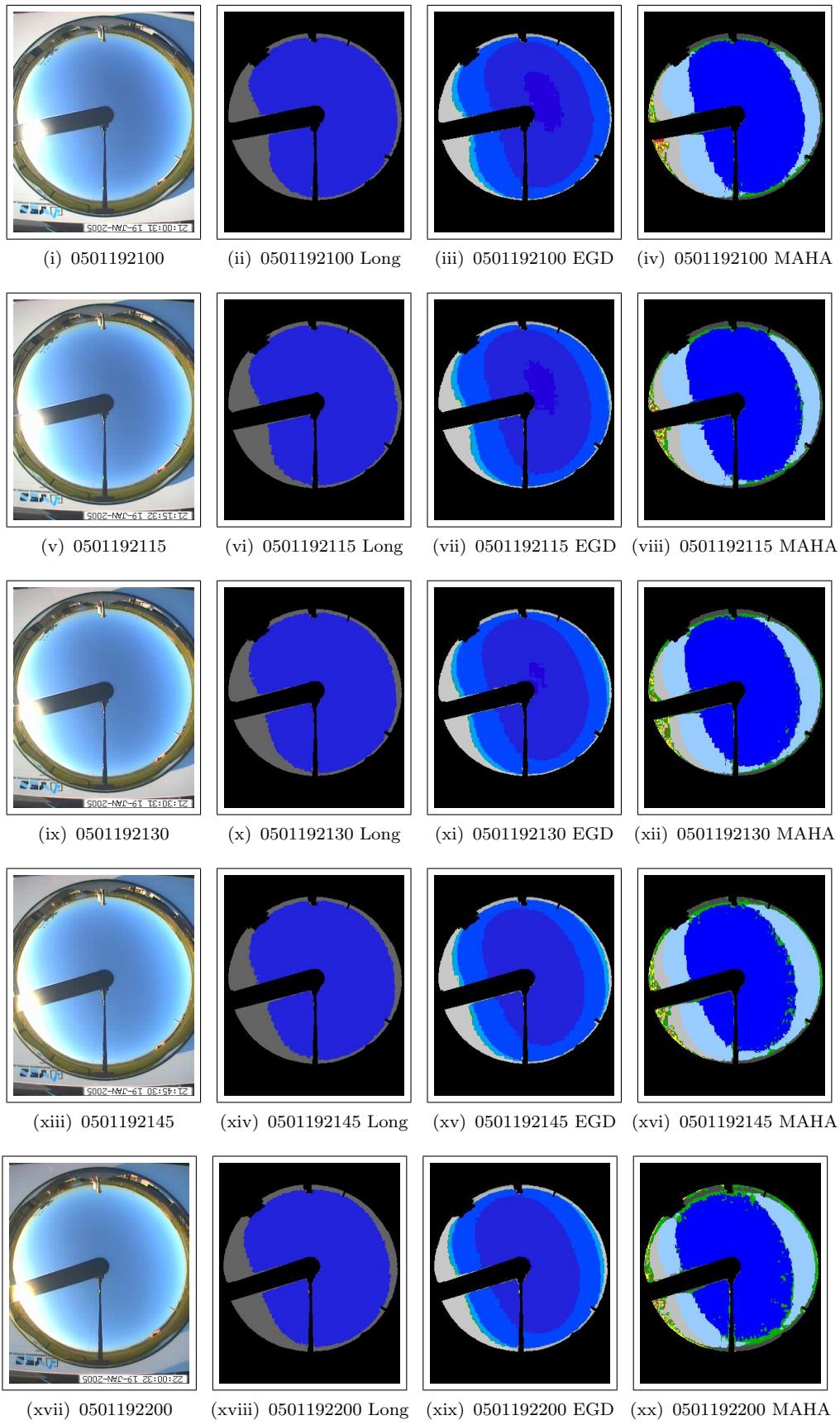


Figure A.213 - Sky images generated from 0501192100 to 0501192200.

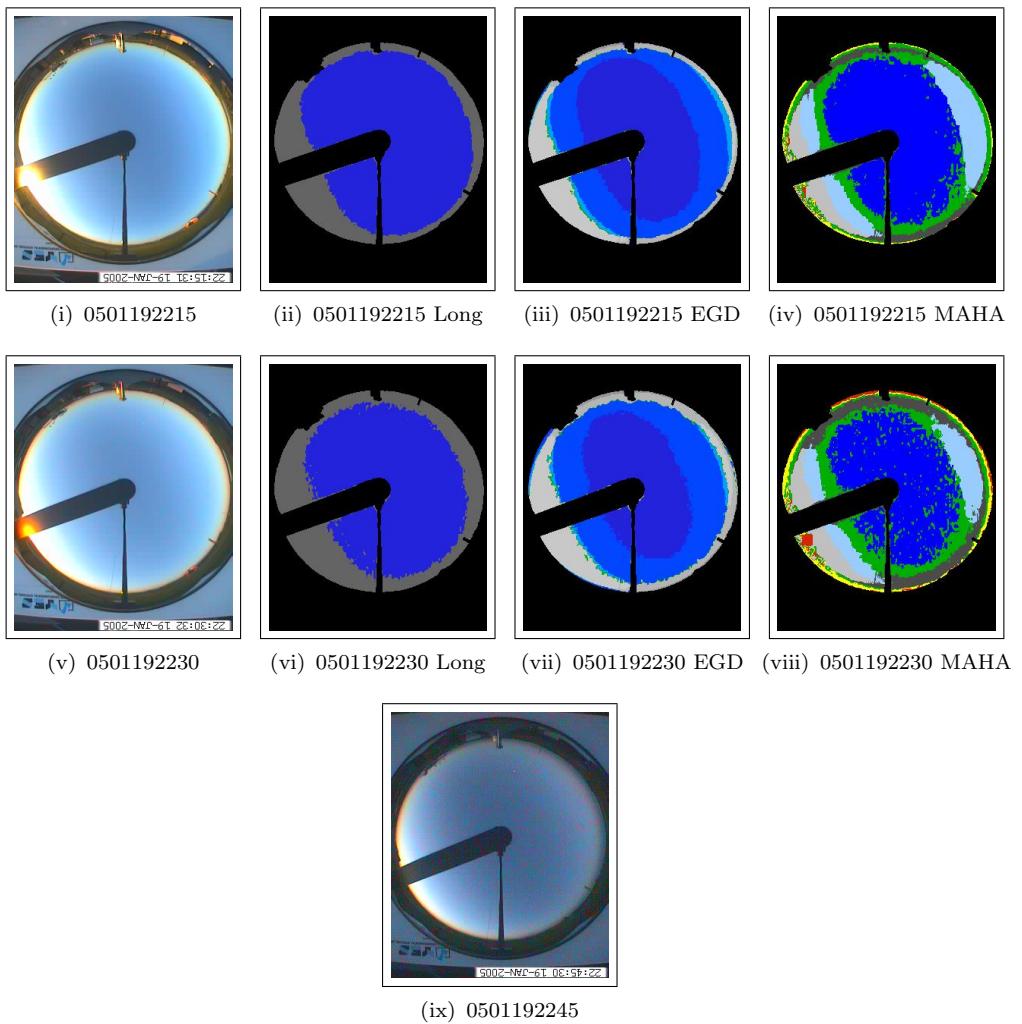


Figure A.214 - Sky images generated from 0501191600 to 0501192245.

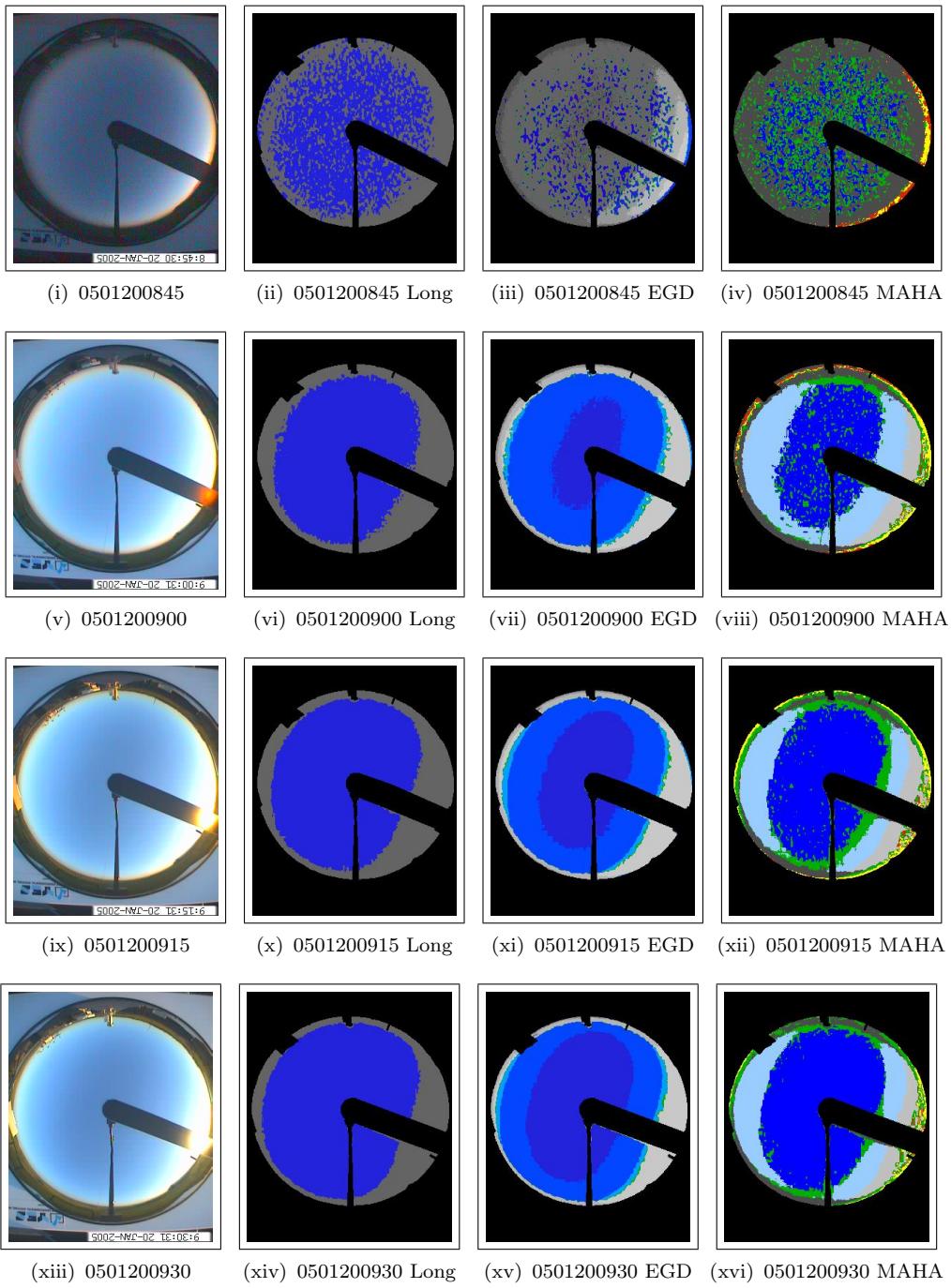


Figure A.215 - Sky images generated from 0501200845 to 0501200930.

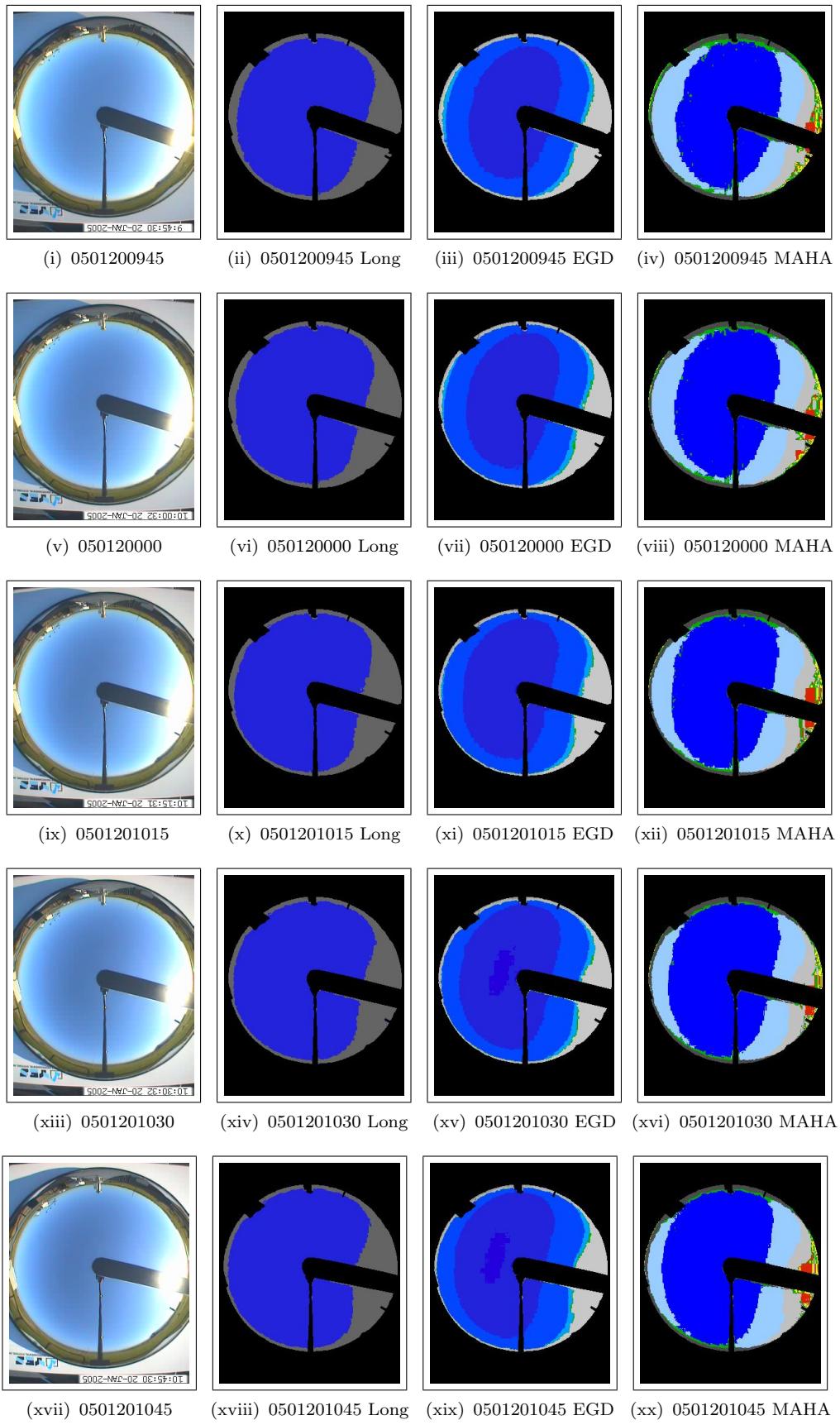


Figure A.216 - Sky images generated from 0501200945 to 0501201045.

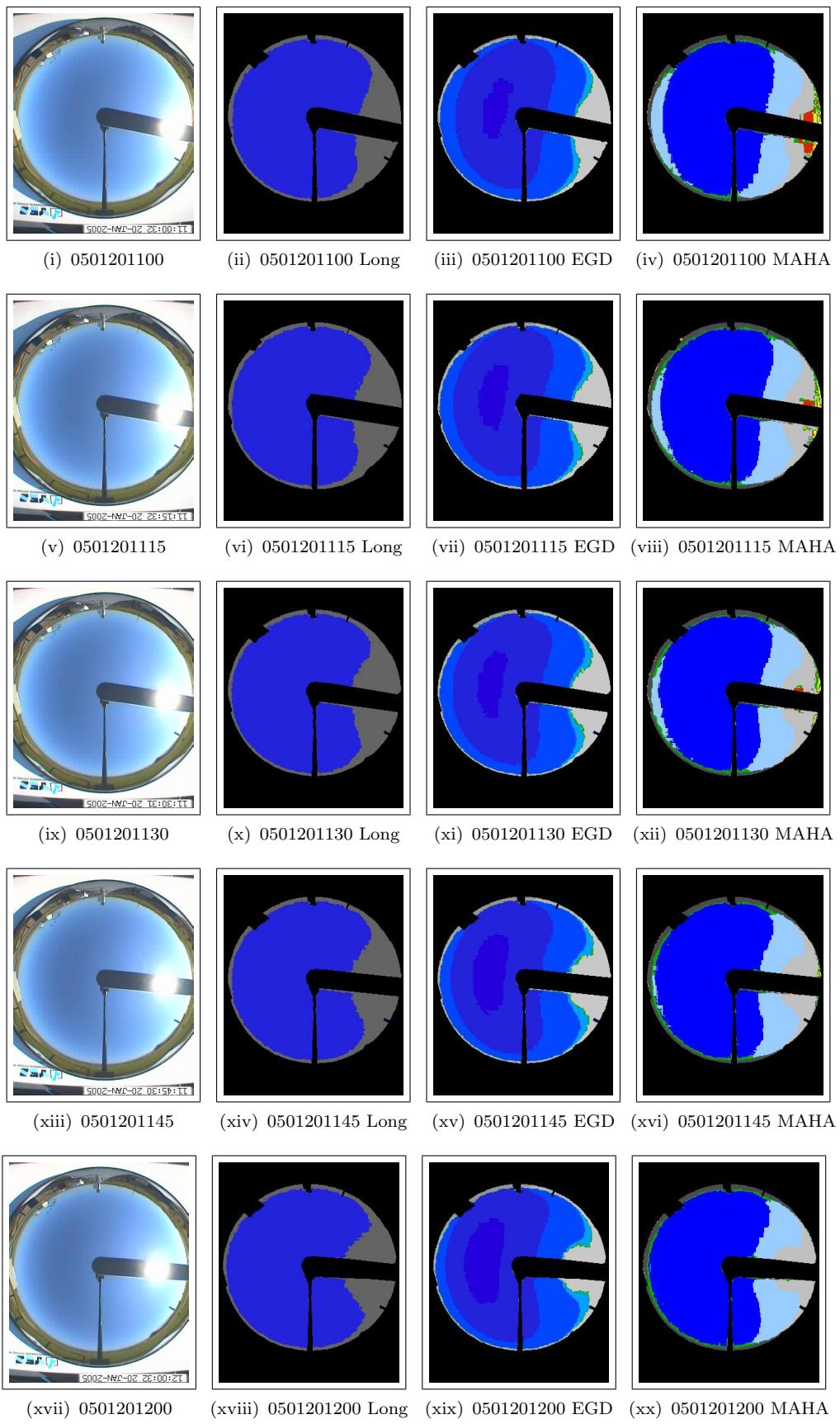


Figure A.217 - Sky images generated from 050120100 to 0501201200.

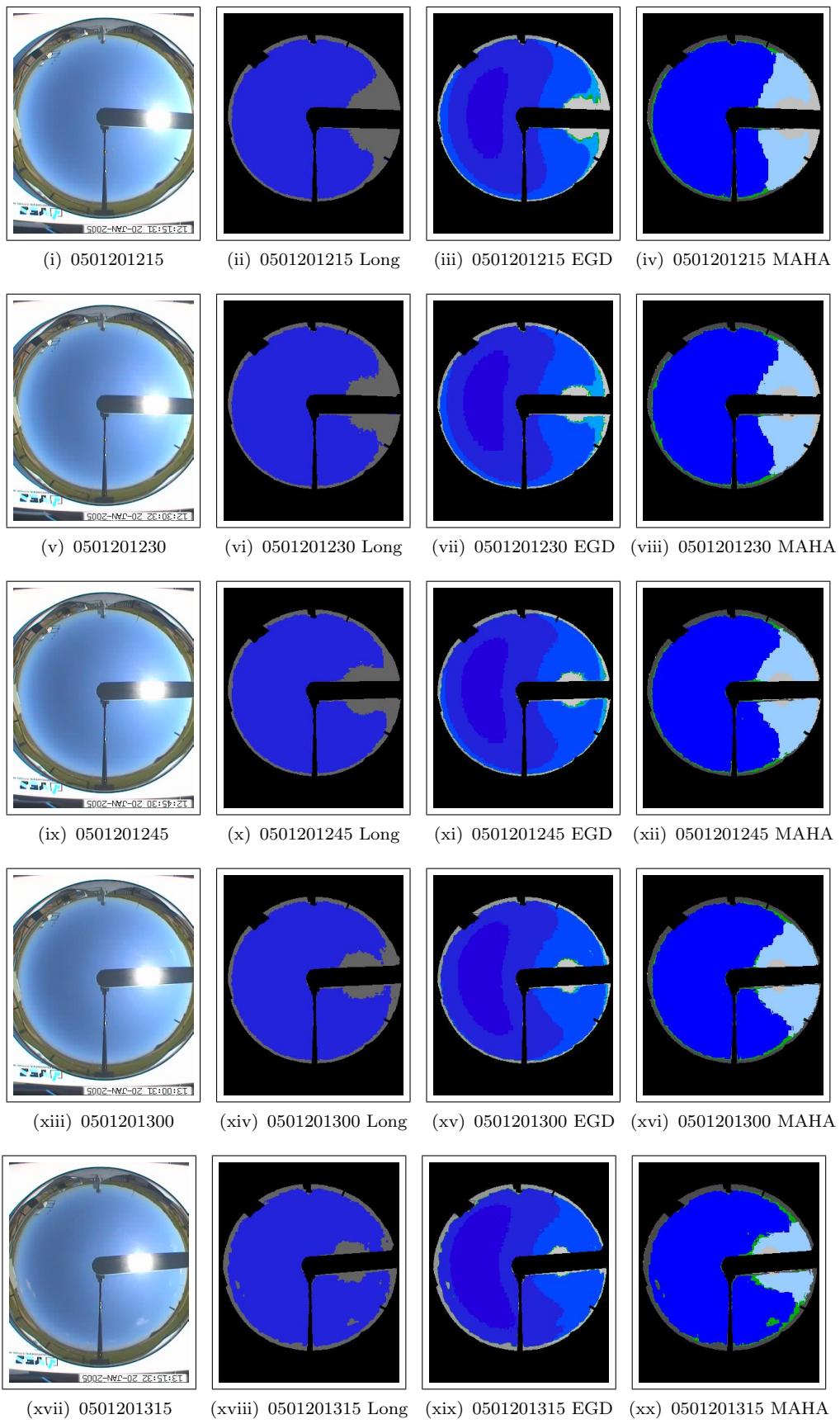


Figure A.218 - Sky images generated from 0501201215 to 0501201315.

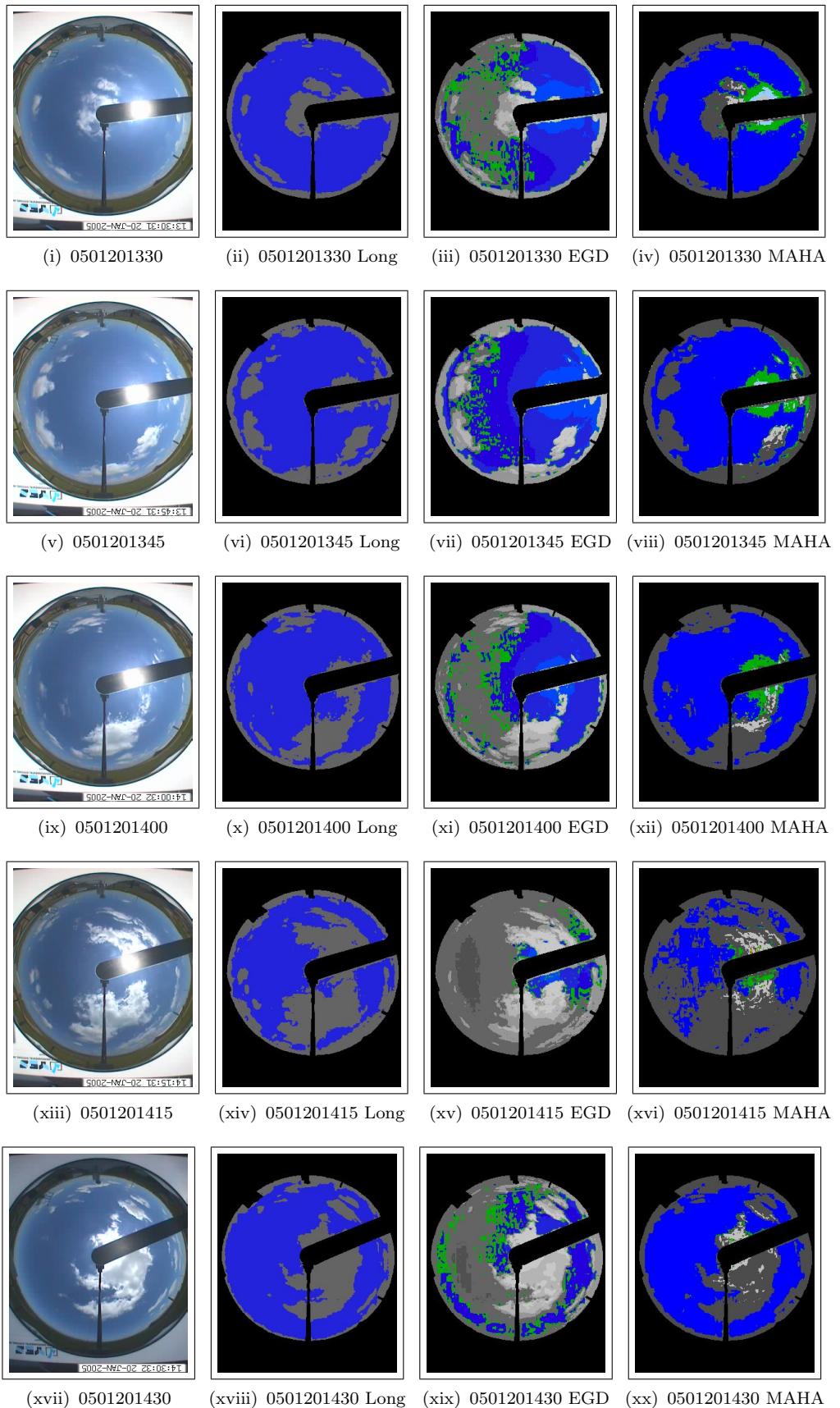


Figure A.219 - Sky images generated from 0501201330 to 0501201430.

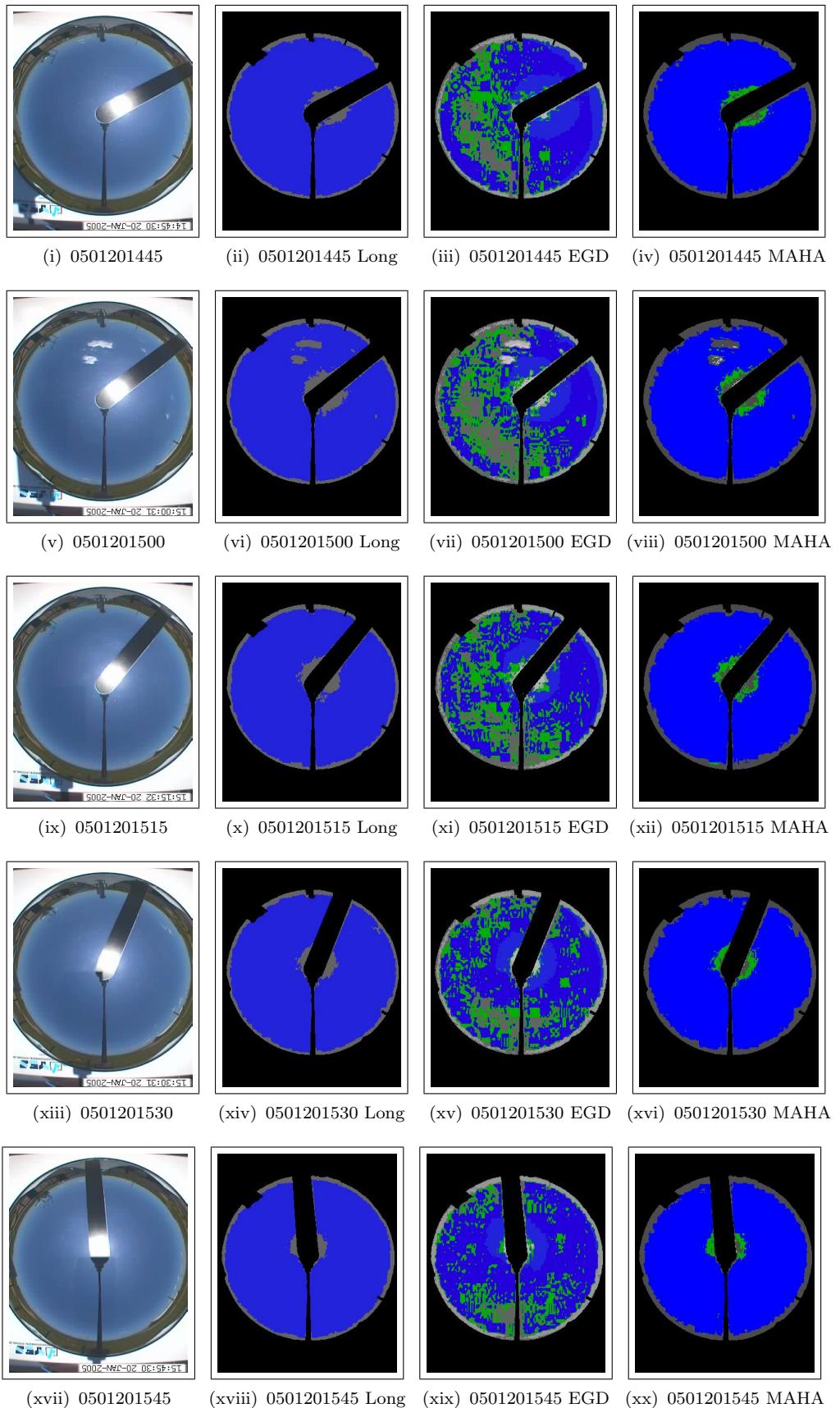


Figure A.220 - Sky images generated from 0501201445 to 0501201545.

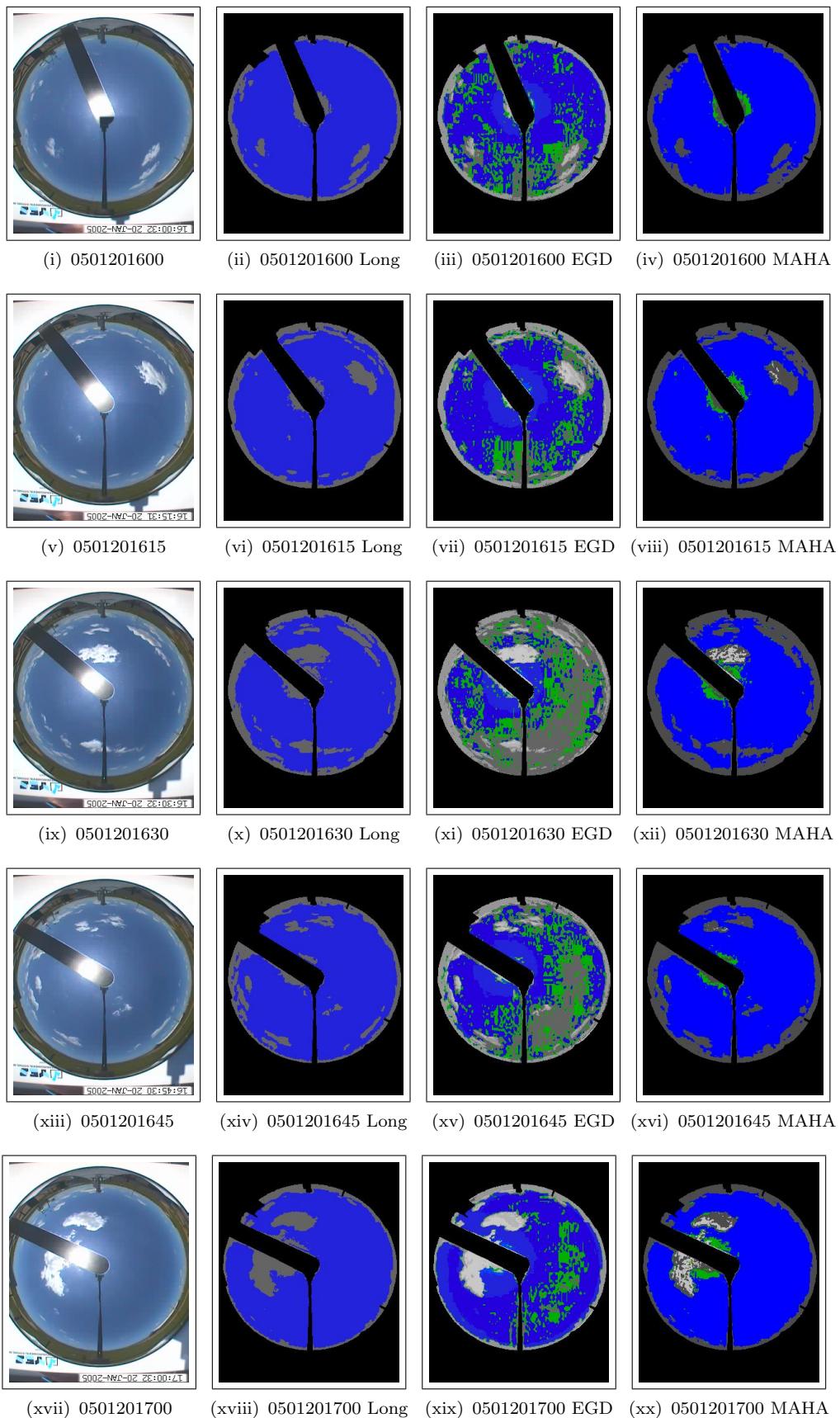


Figure A.221 - Sky images generated from 0501201600 to 0501201700.

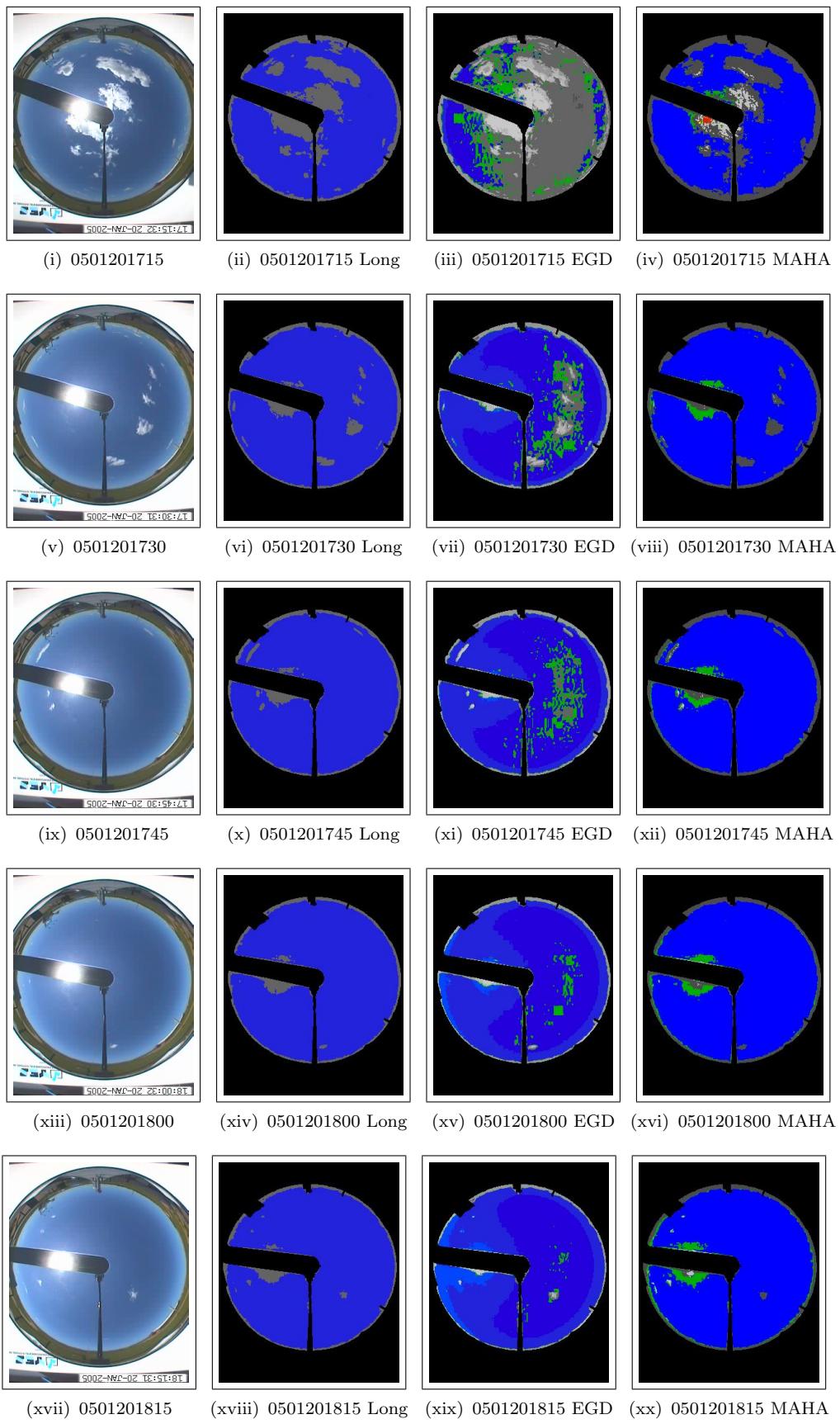


Figure A.222 - Sky images generated from 0501201715 to 0501201815.

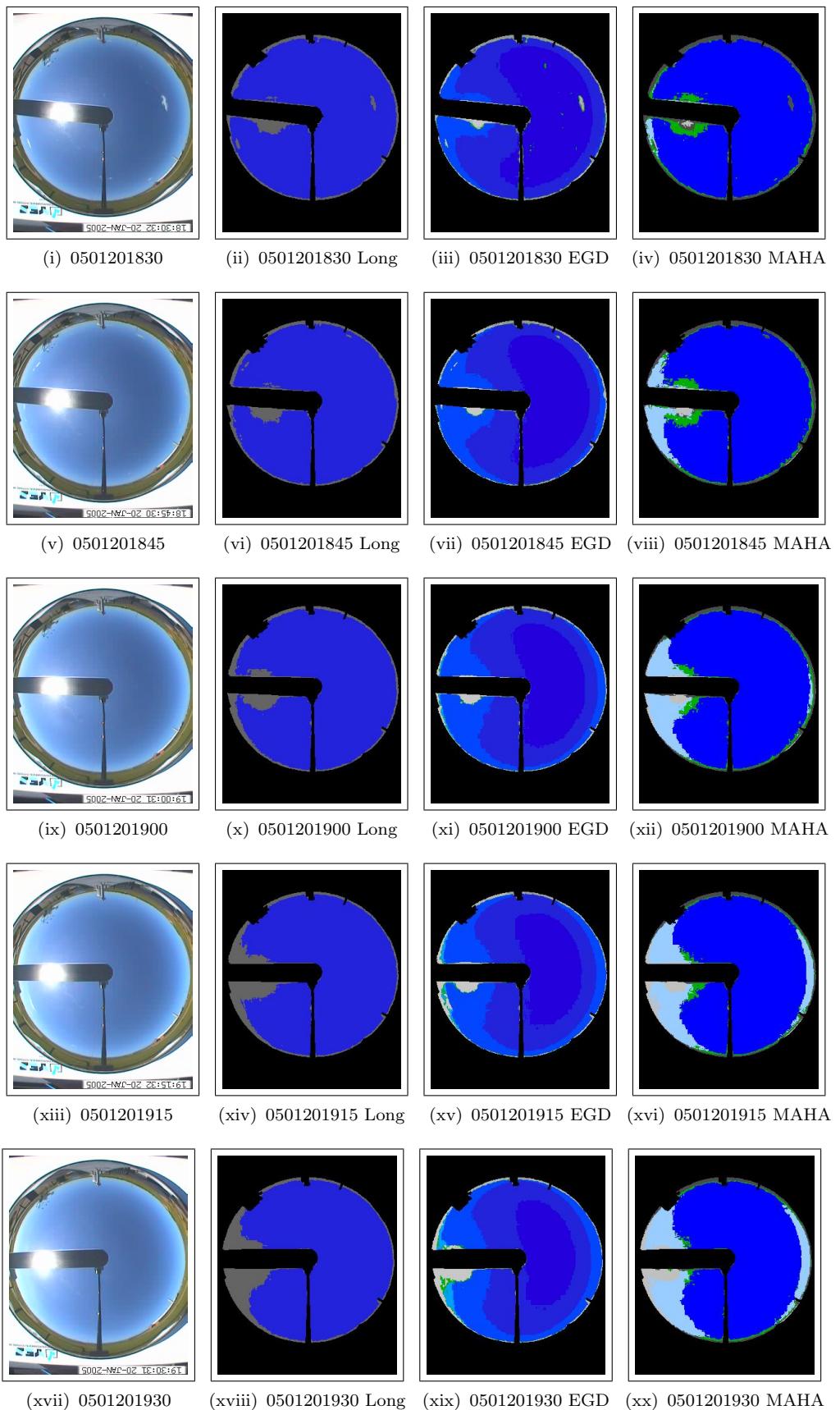


Figure A.223 - Sky images generated from 0501201830 to 0501201930.

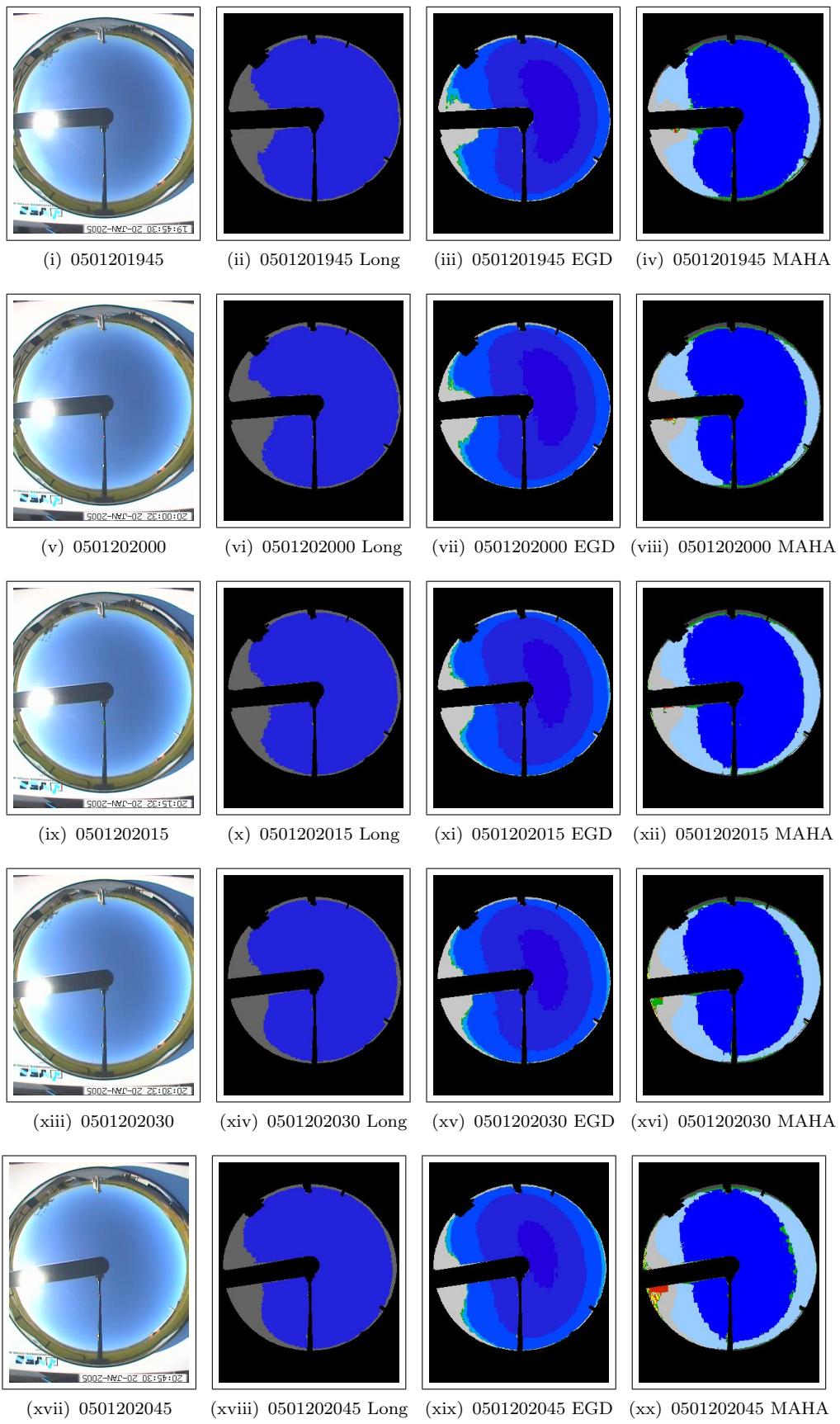


Figure A.224 - Sky images generated from 0501201945 to 0501202045.

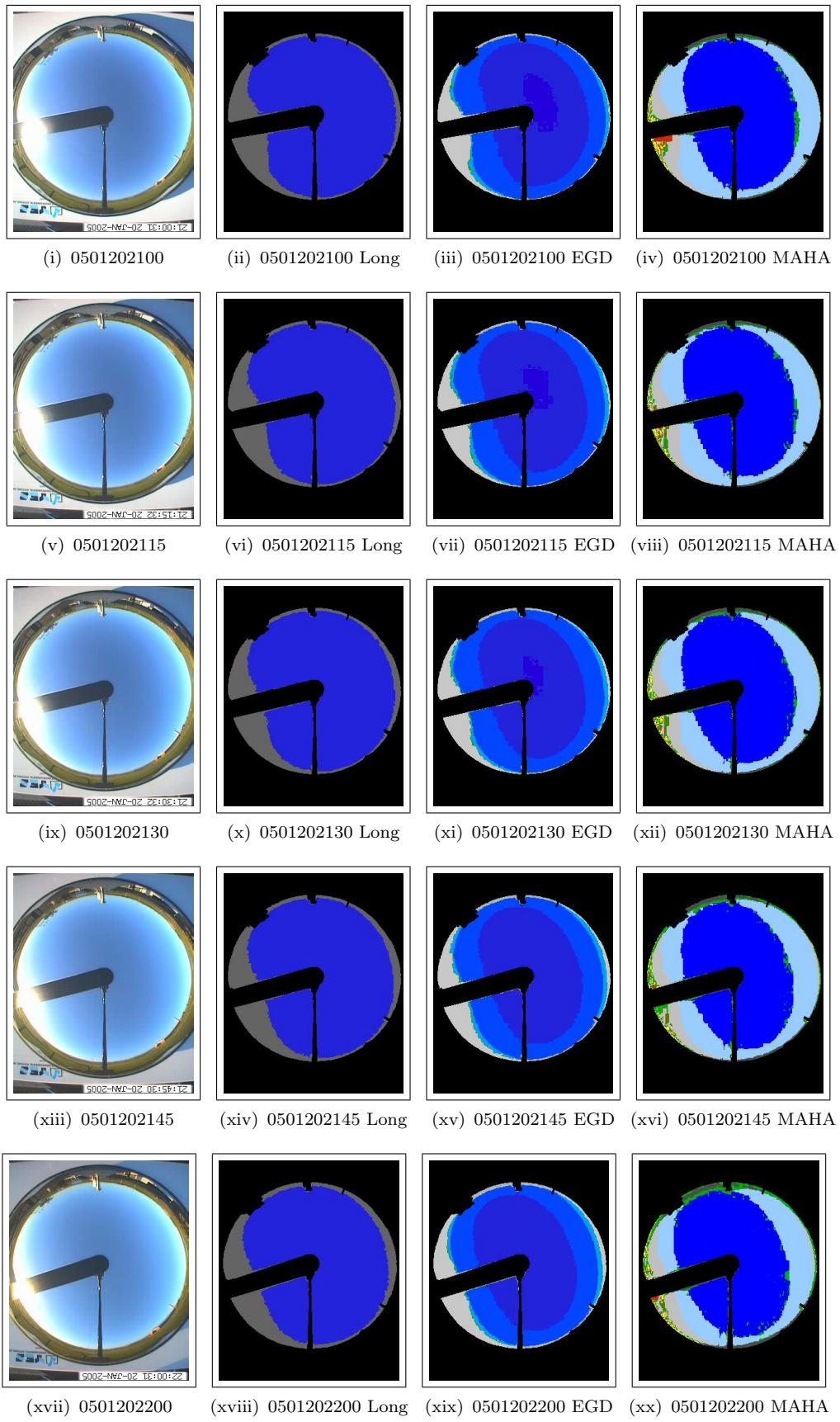


Figure A.225 - Sky images generated from 0501202100 to 0501202200.

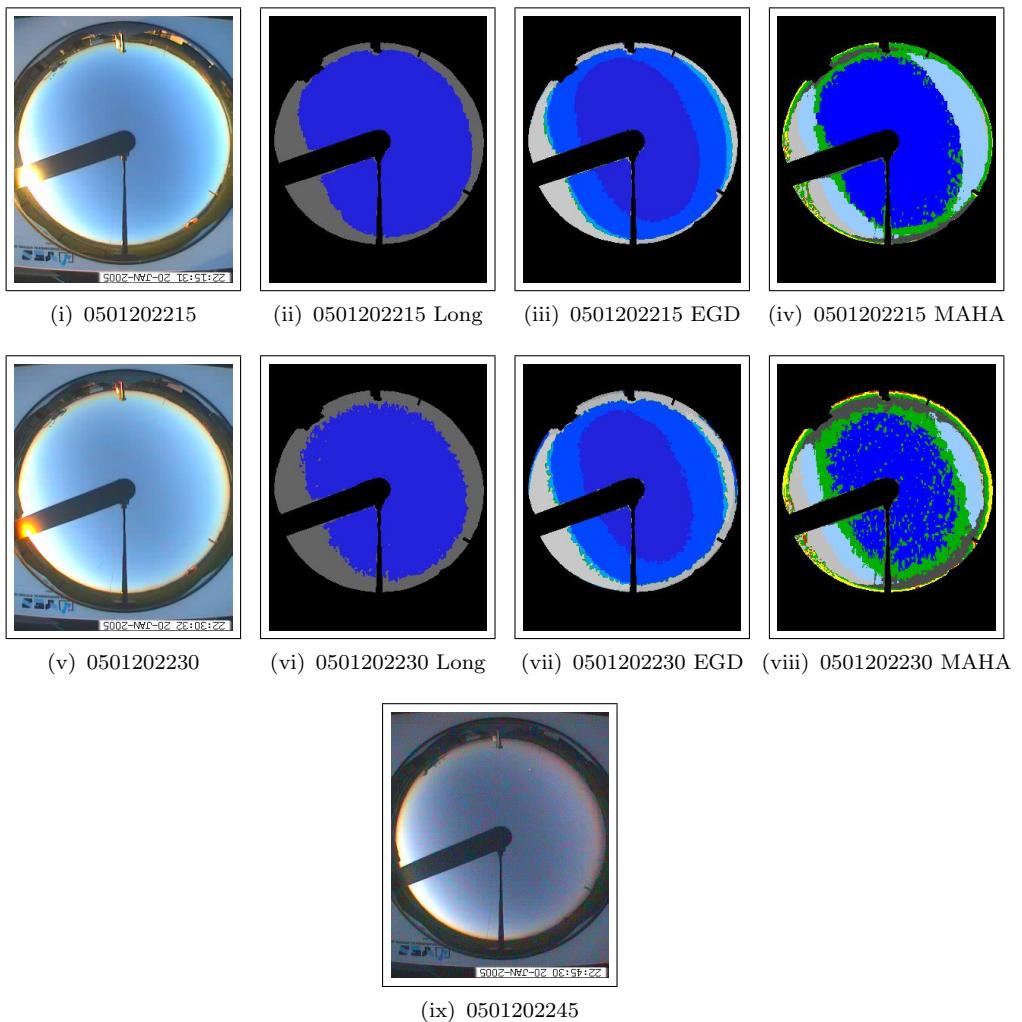


Figure A.226 - Sky images generated from 0501201600 to 0501202245.

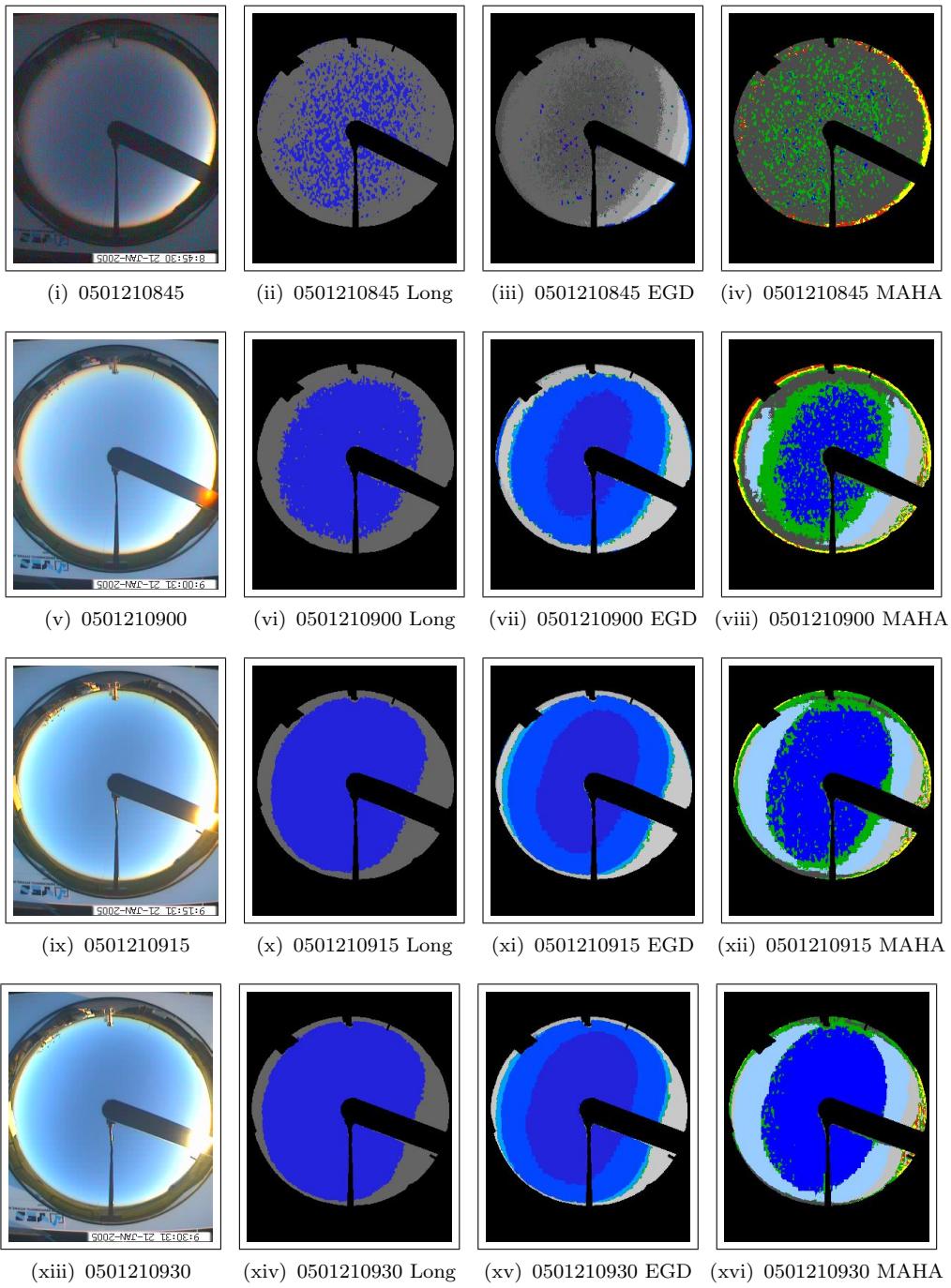


Figure A.227 - Sky images generated from 0501210845 to 0501210930.

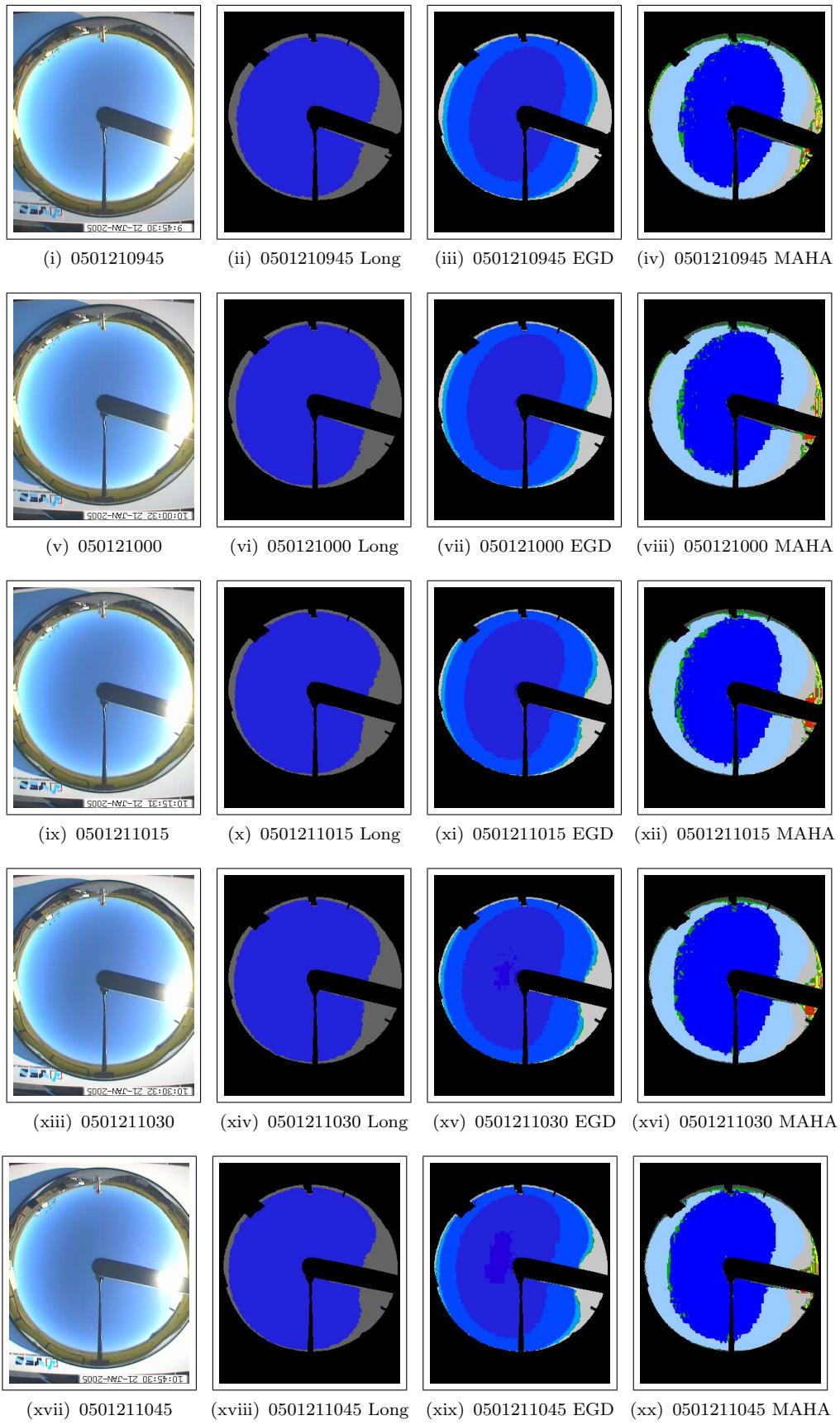


Figure A.228 - Sky images generated from 0501210945 to 0501211045.

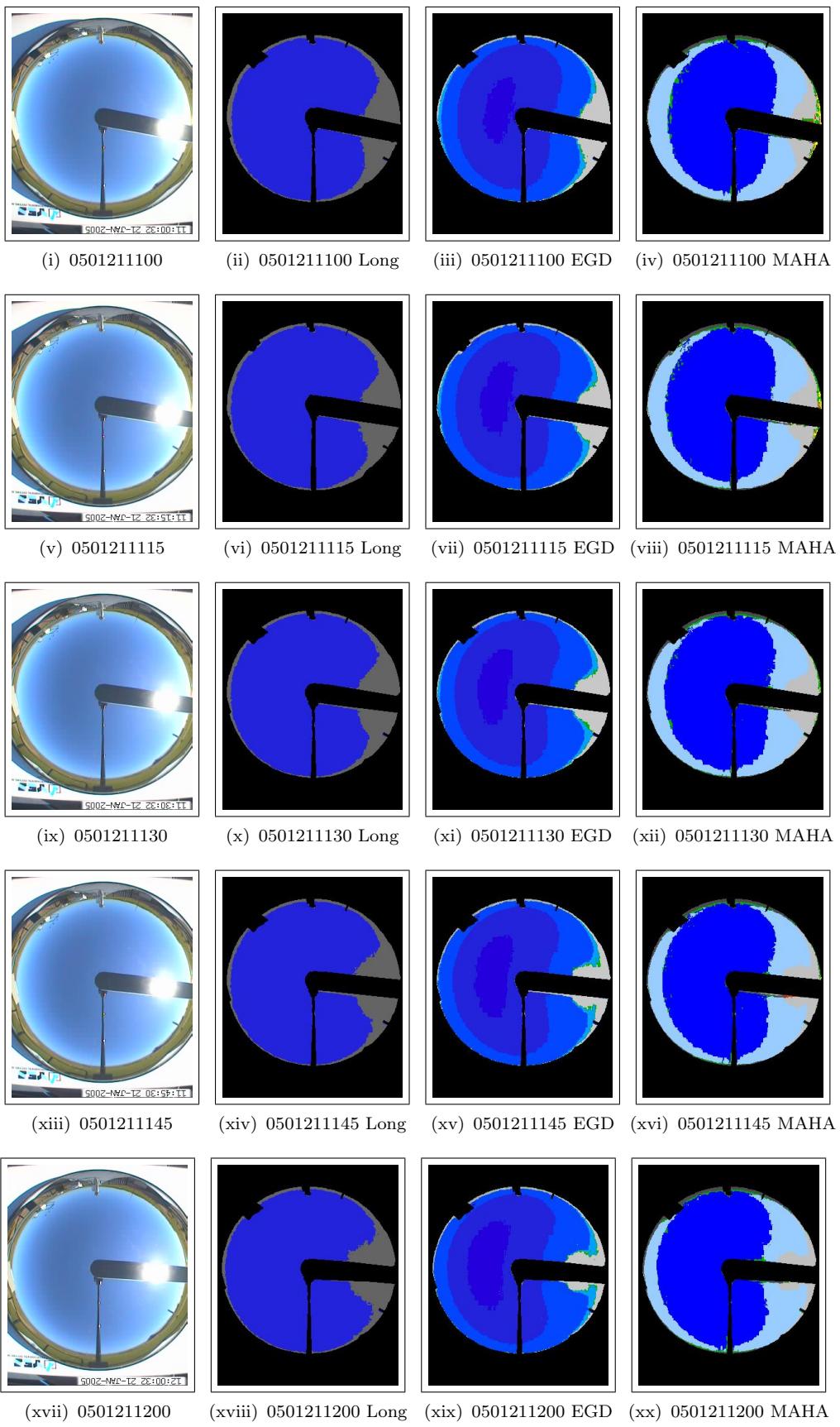


Figure A.229 - Sky images generated from 050121100 to 0501211200.

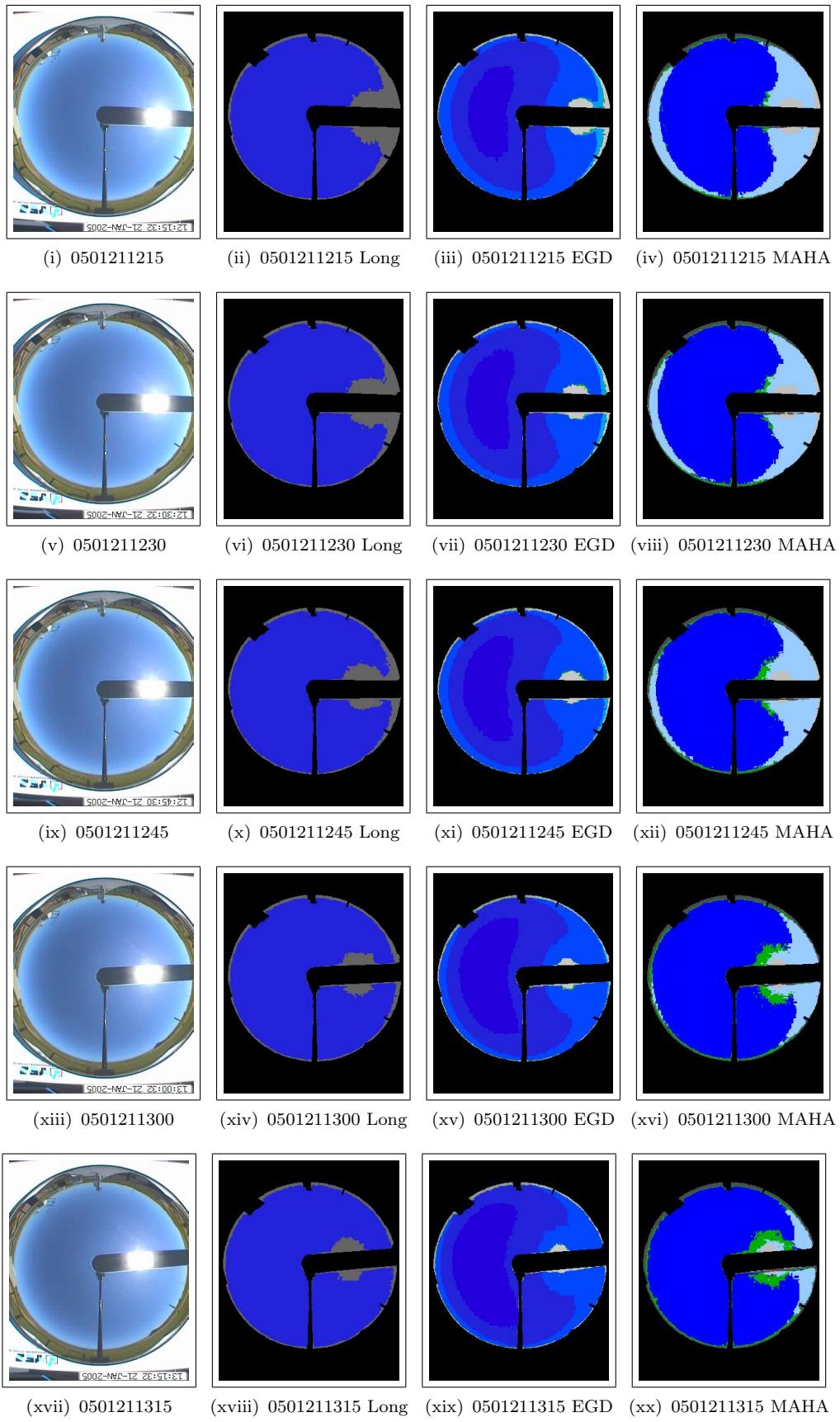


Figure A.230 - Sky images generated from 0501211215 to 0501211315.

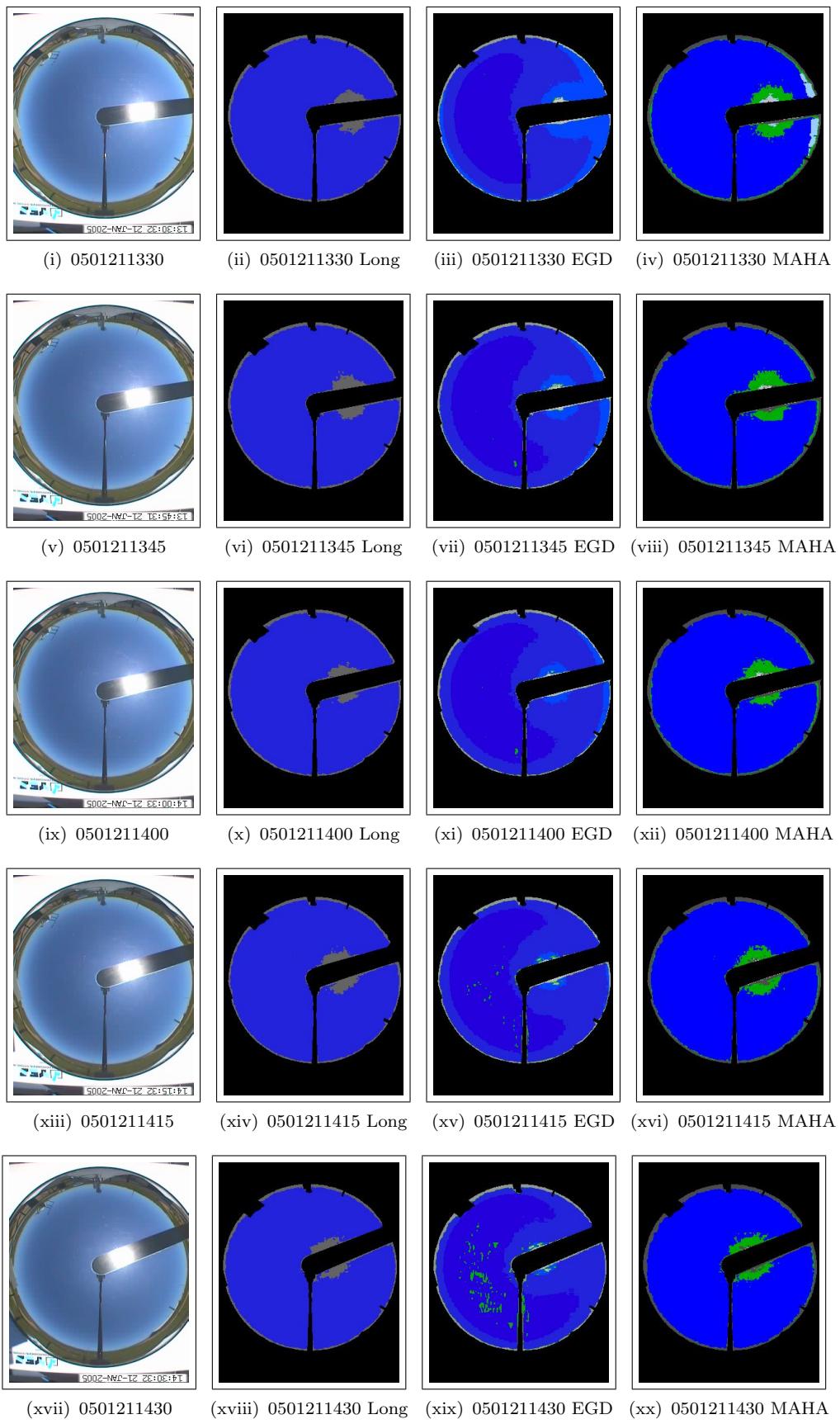


Figure A.231 - Sky images generated from 0501211330 to 0501211430.

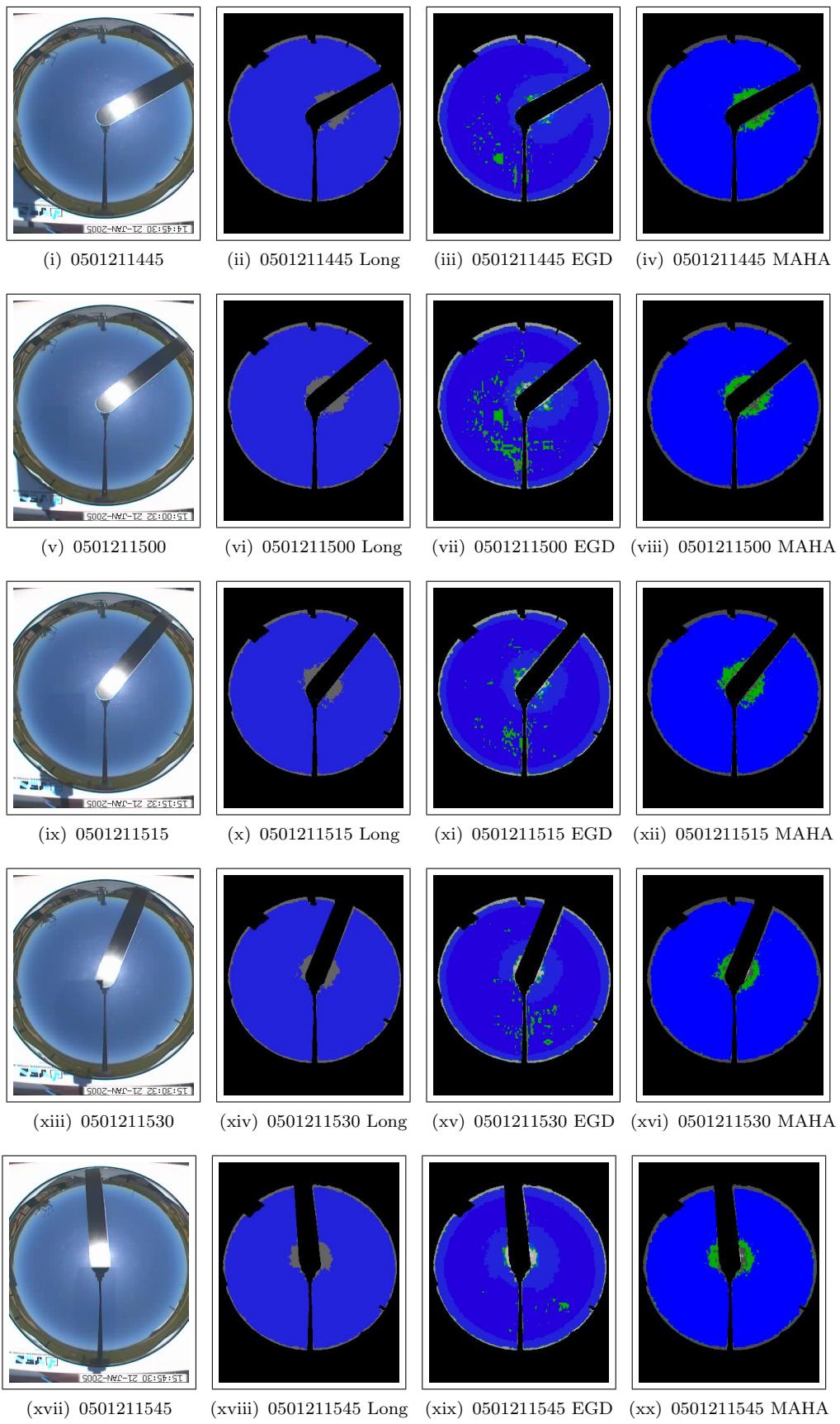


Figure A.232 - Sky images generated from 0501211445 to 0501211545.

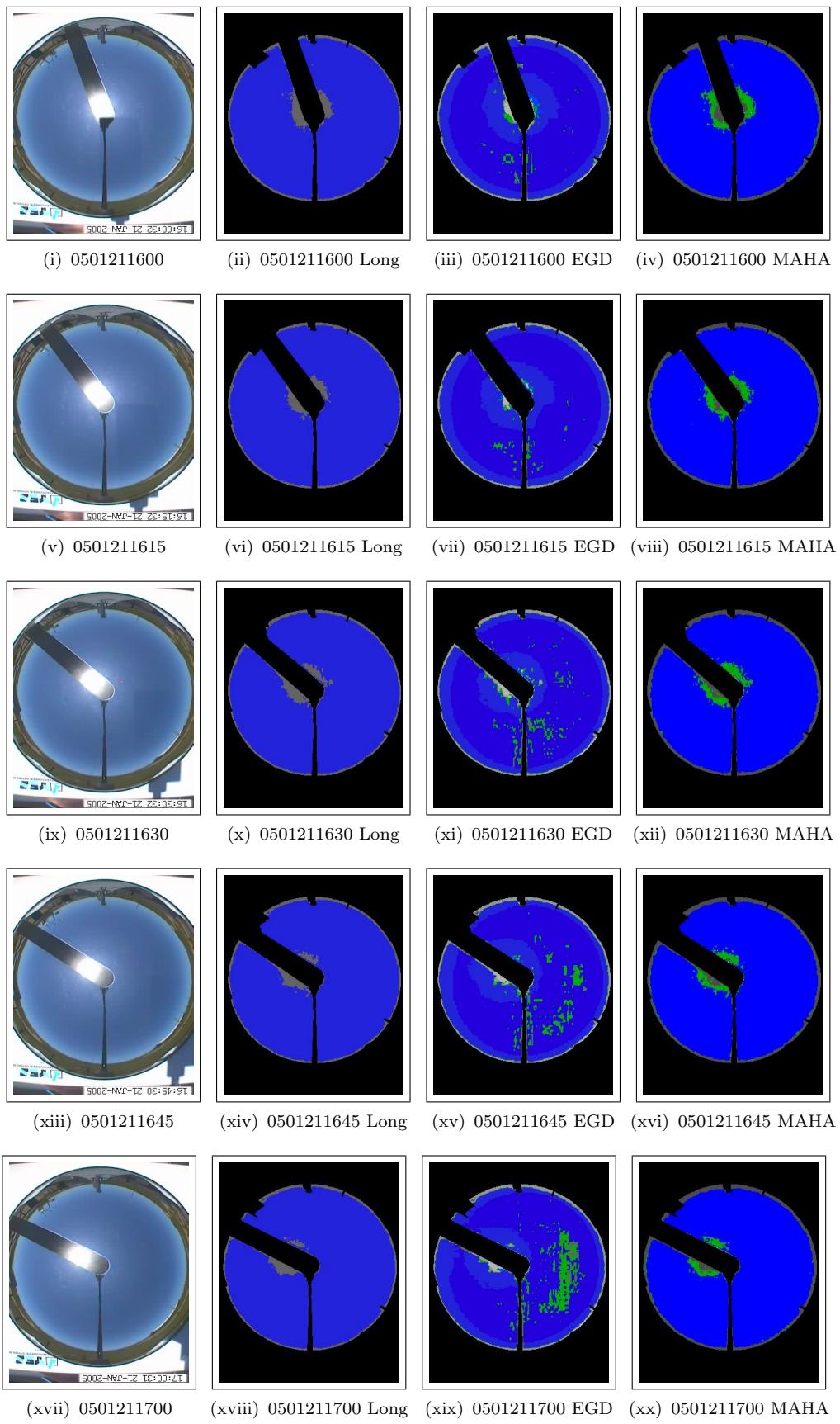


Figure A.233 - Sky images generated from 0501211600 to 0501211700.

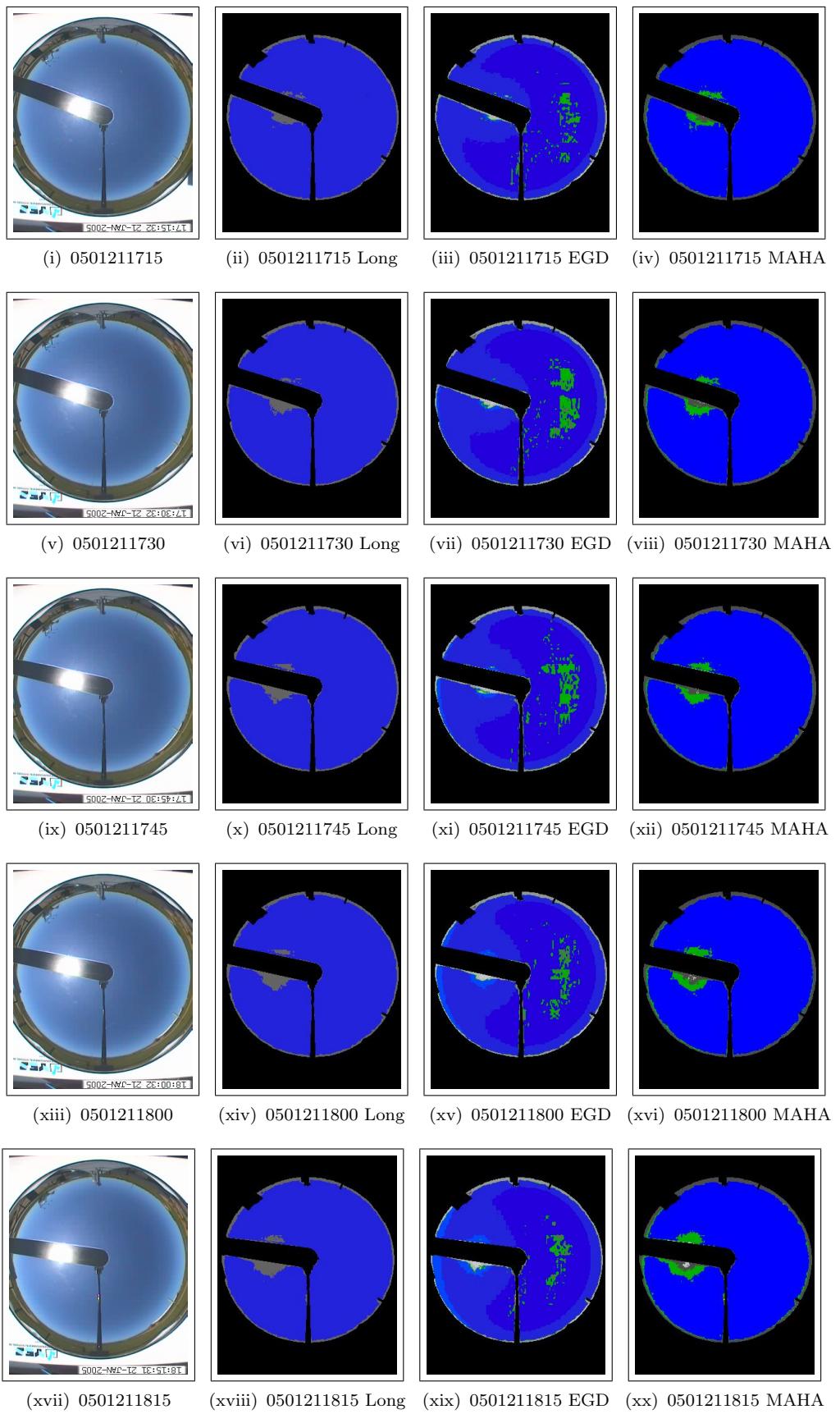


Figure A.234 - Sky images generated from 0501211715 to 0501211815.

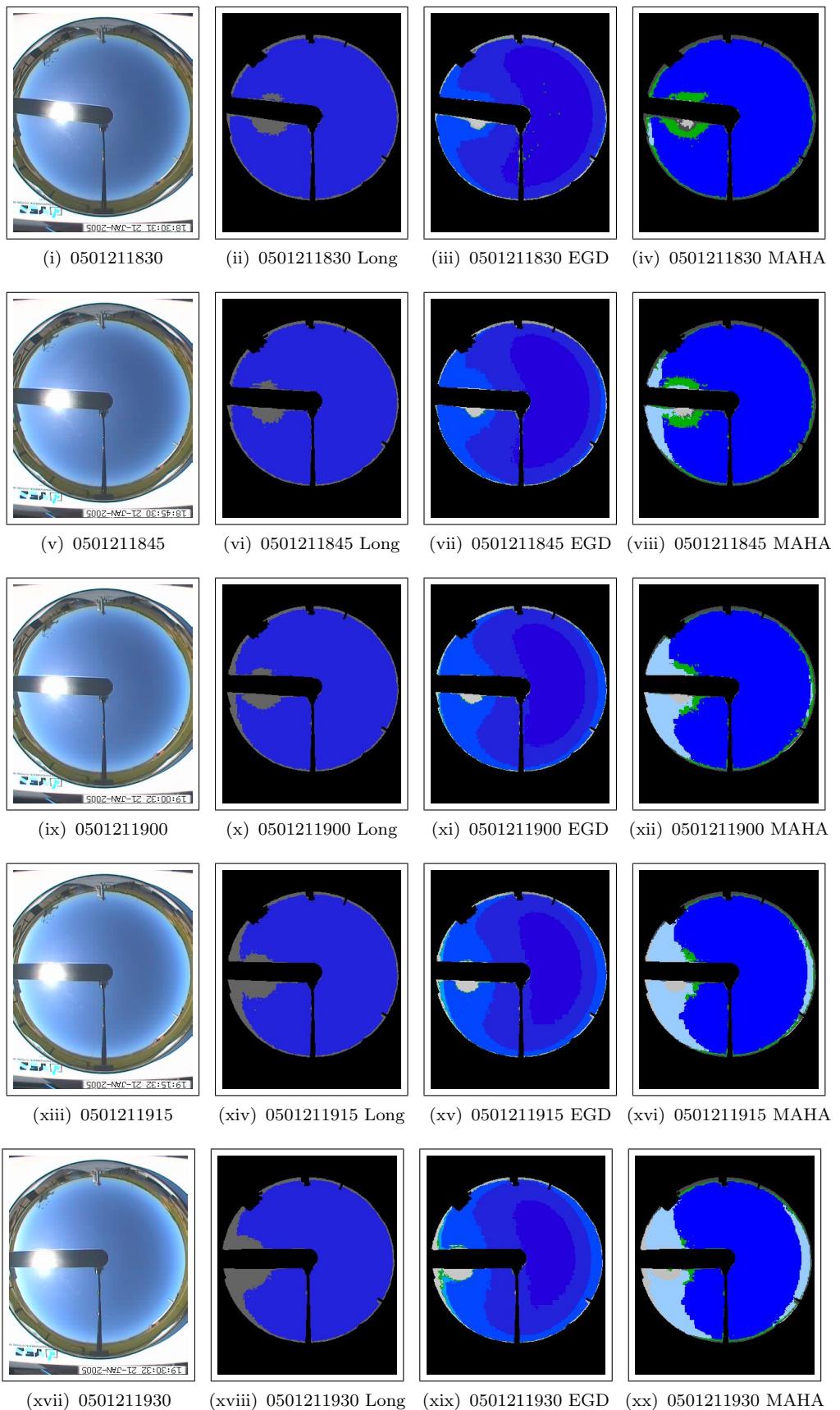


Figure A.235 - Sky images generated from 0501211830 to 0501211930.

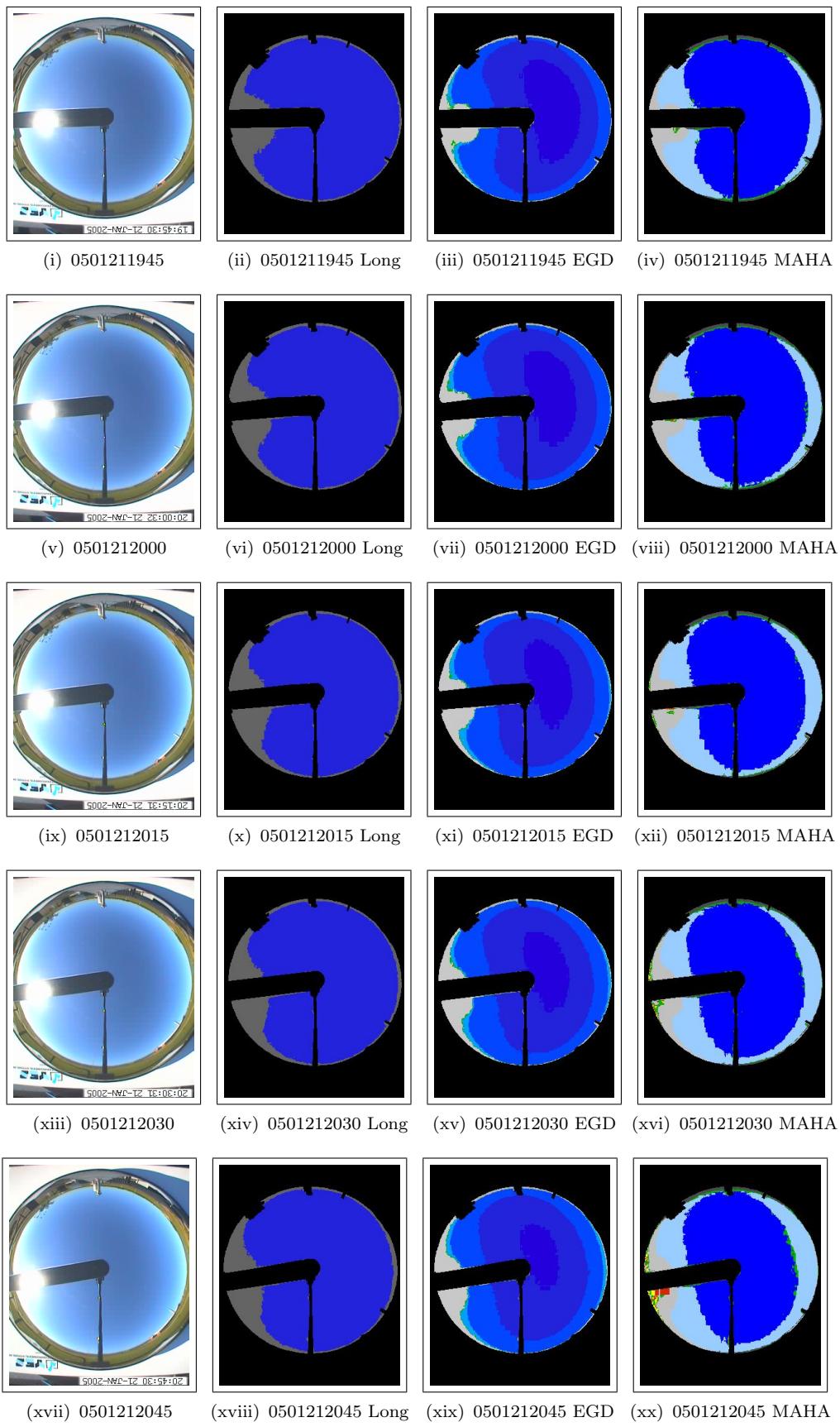


Figure A.236 - Sky images generated from 0501211945 to 0501212045.

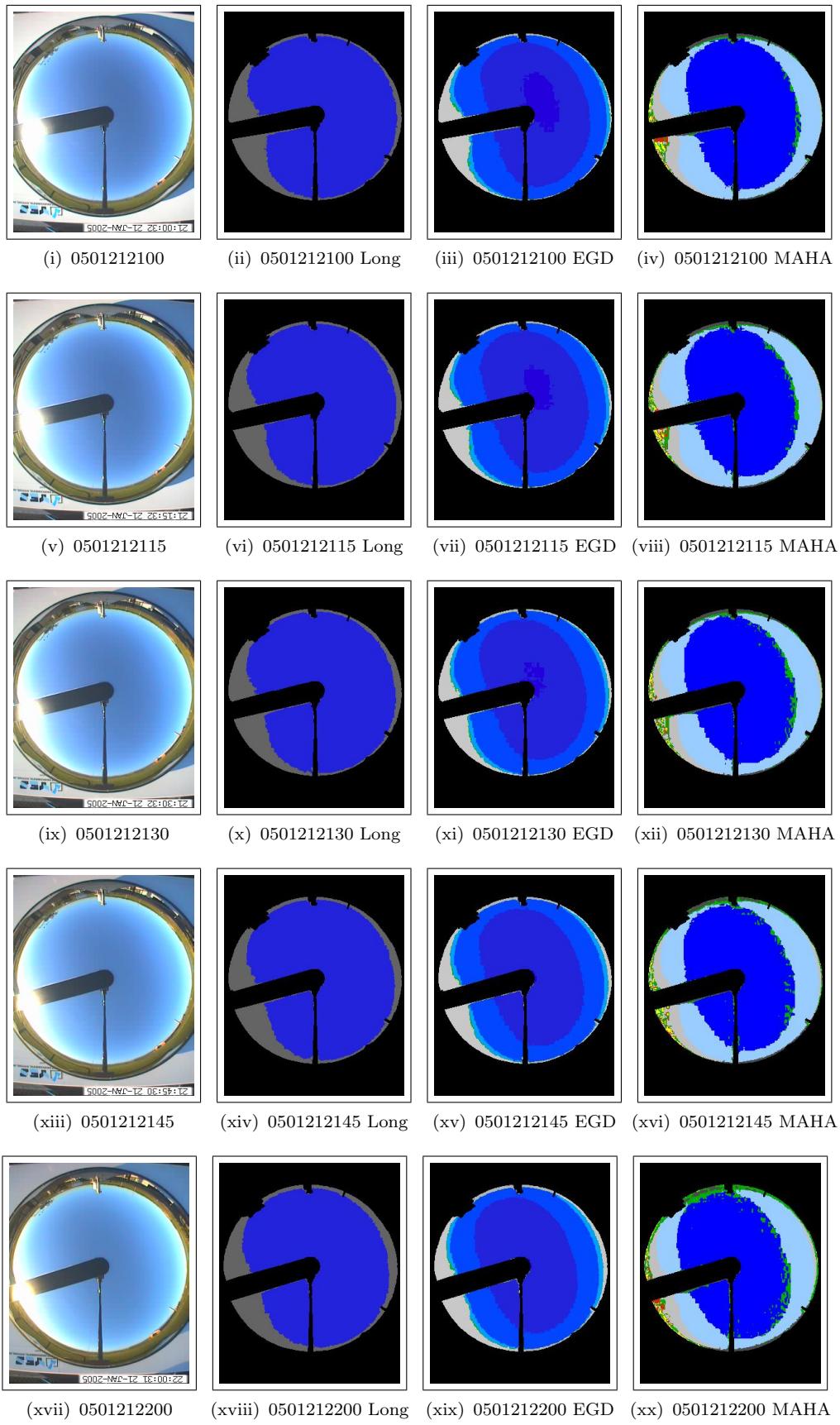


Figure A.237 - Sky images generated from 0501212100 to 0501212200.

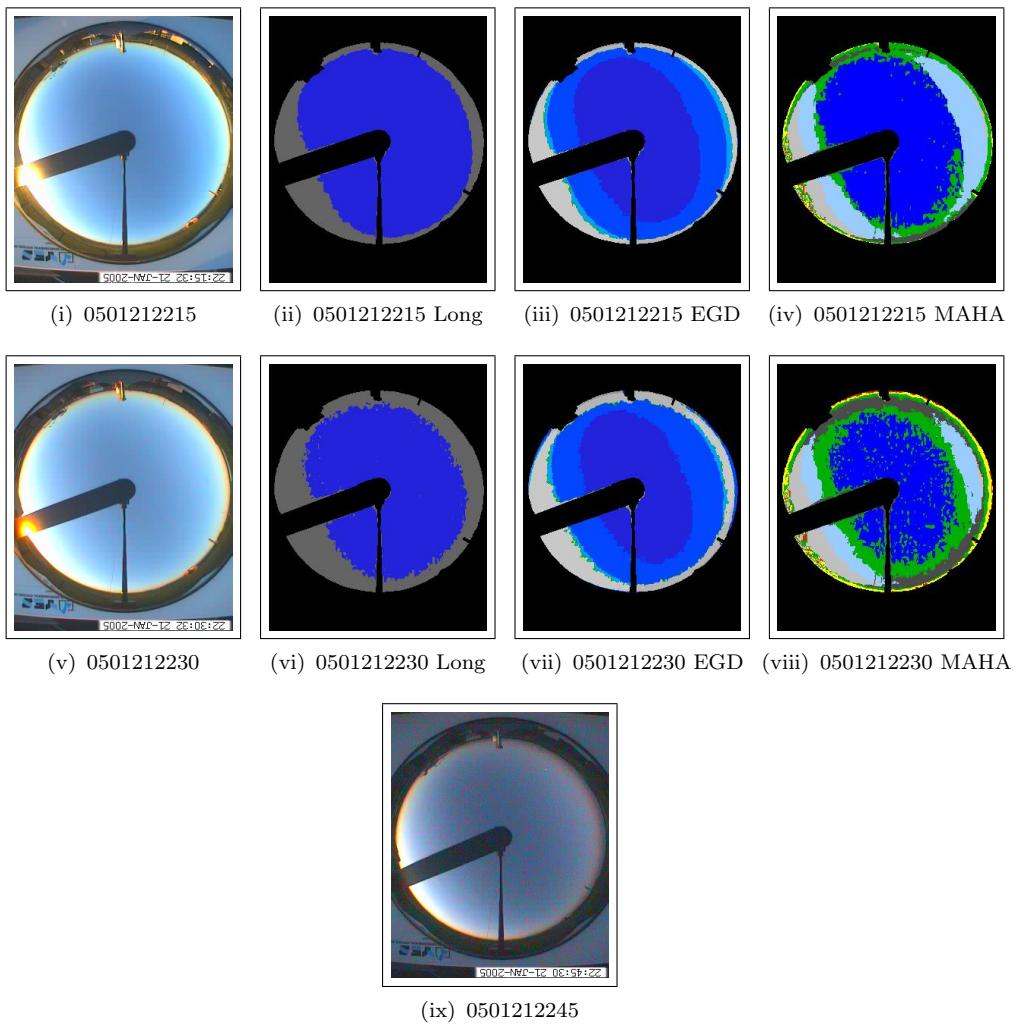


Figure A.238 - Sky images generated from 0501211600 to 0501212245.

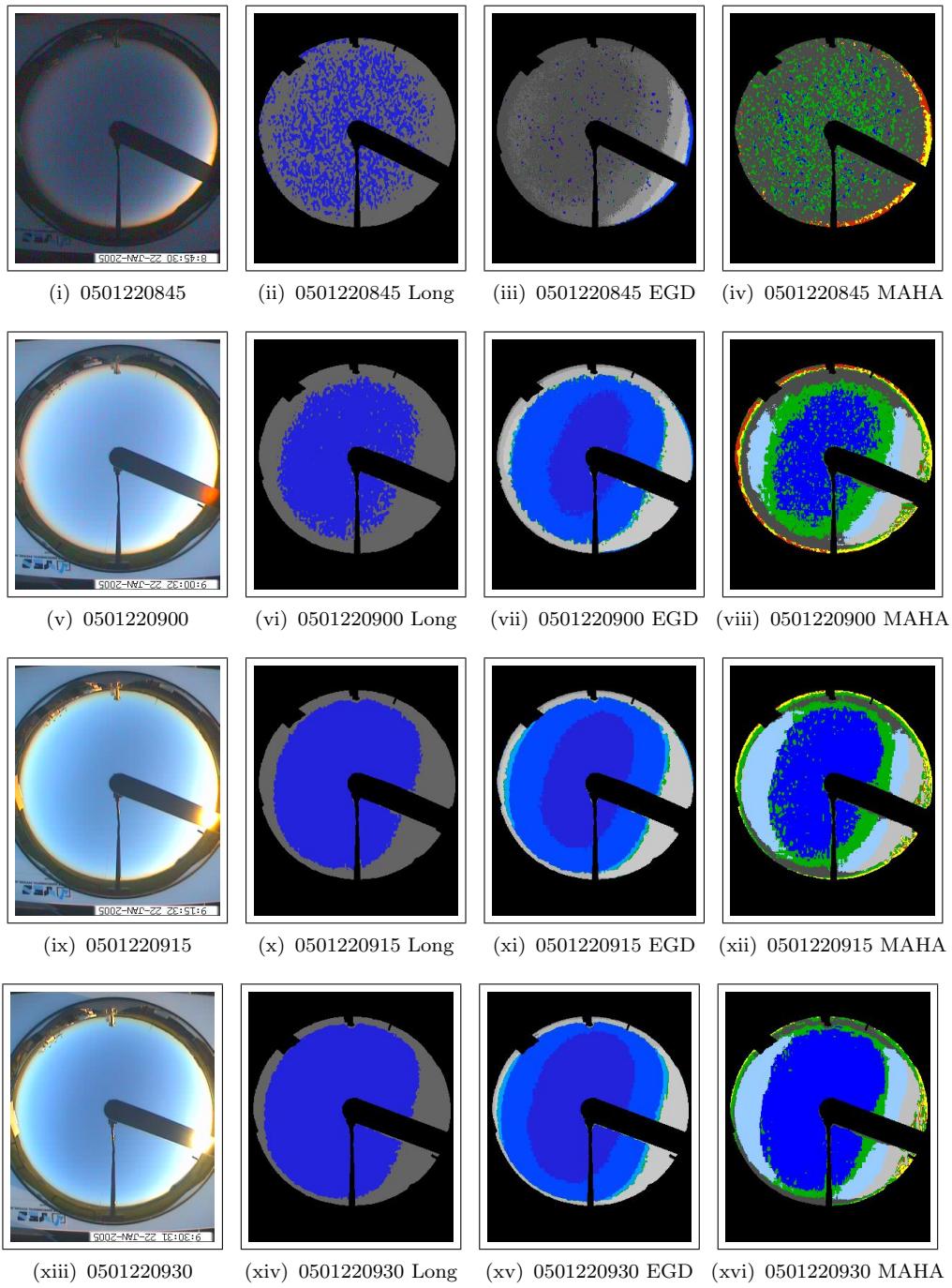


Figure A.239 - Sky images generated from 0501220830 to 0501220930.

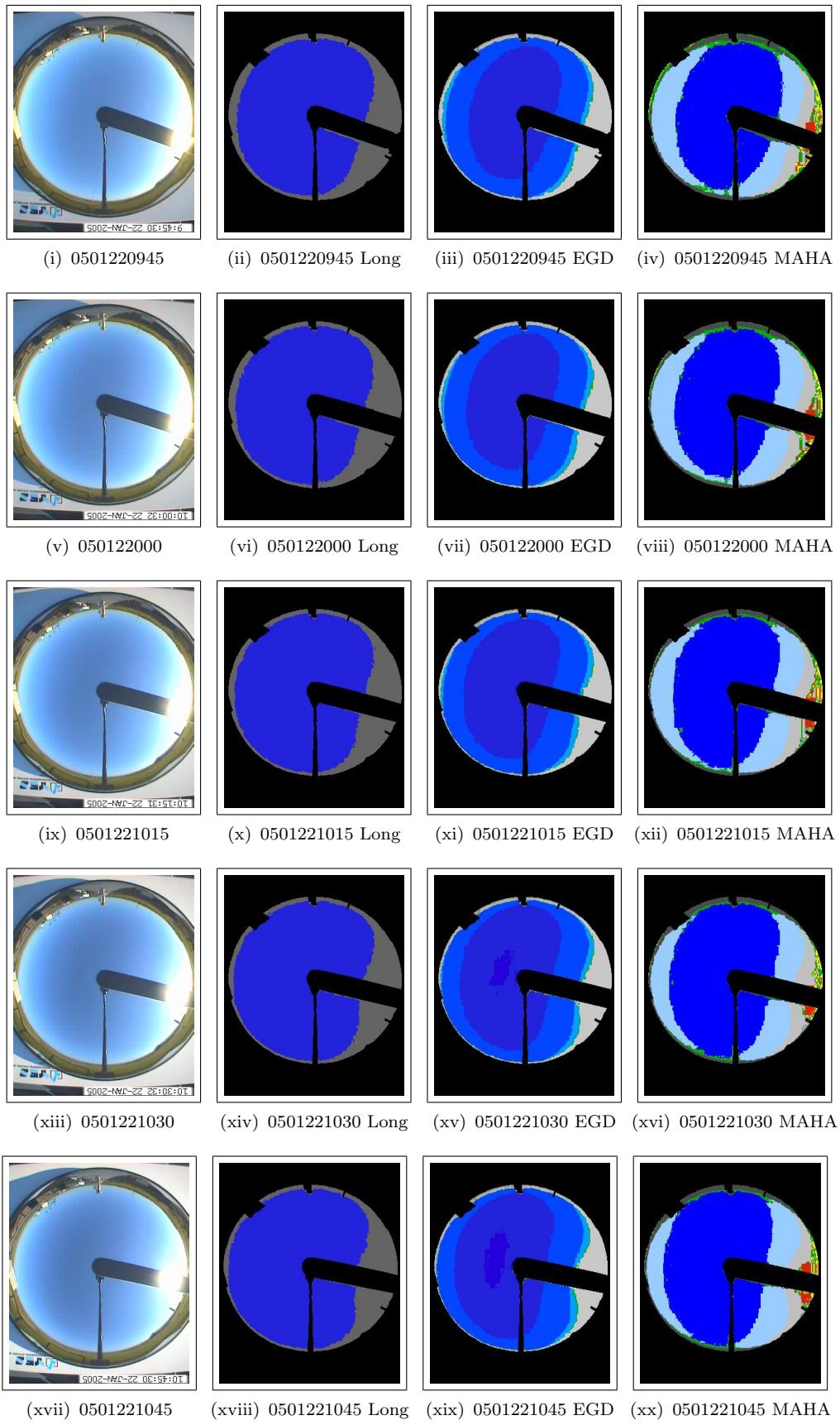


Figure A.240 - Sky images generated from 0501220945 to 0501221045.

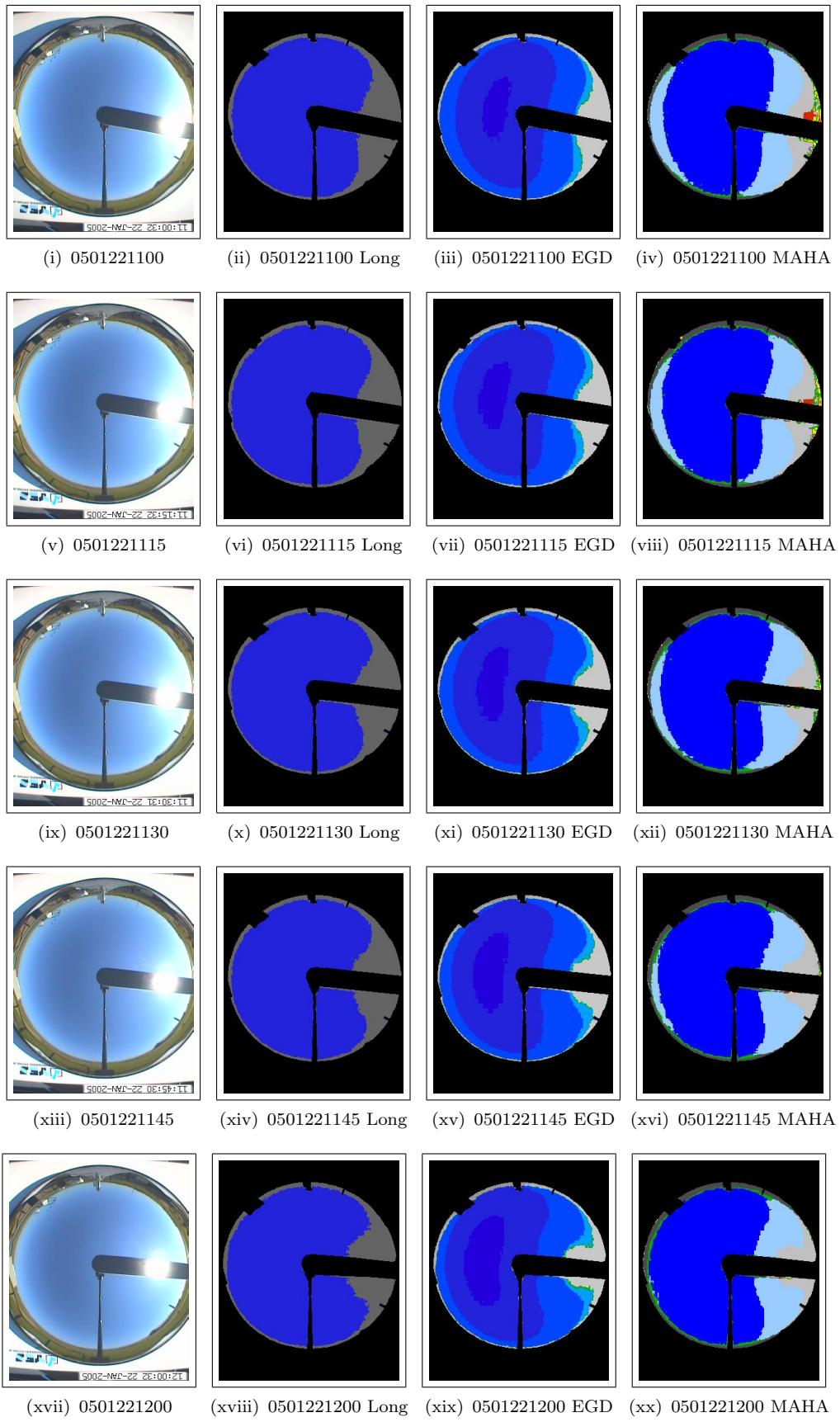


Figure A.241 - Sky images generated from 050122100 to 0501221200.

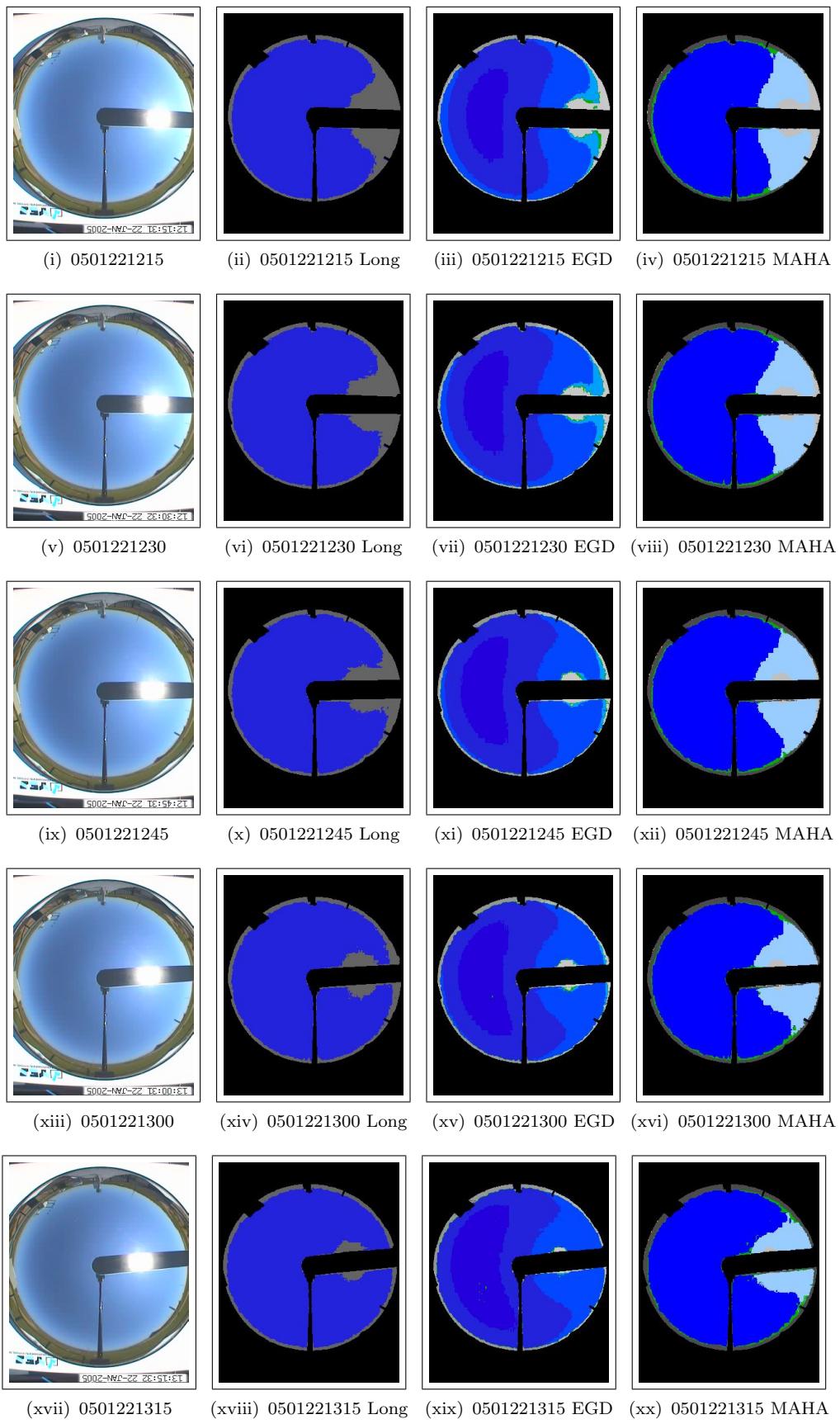


Figure A.242 - Sky images generated from 0501221215 to 0501221315.

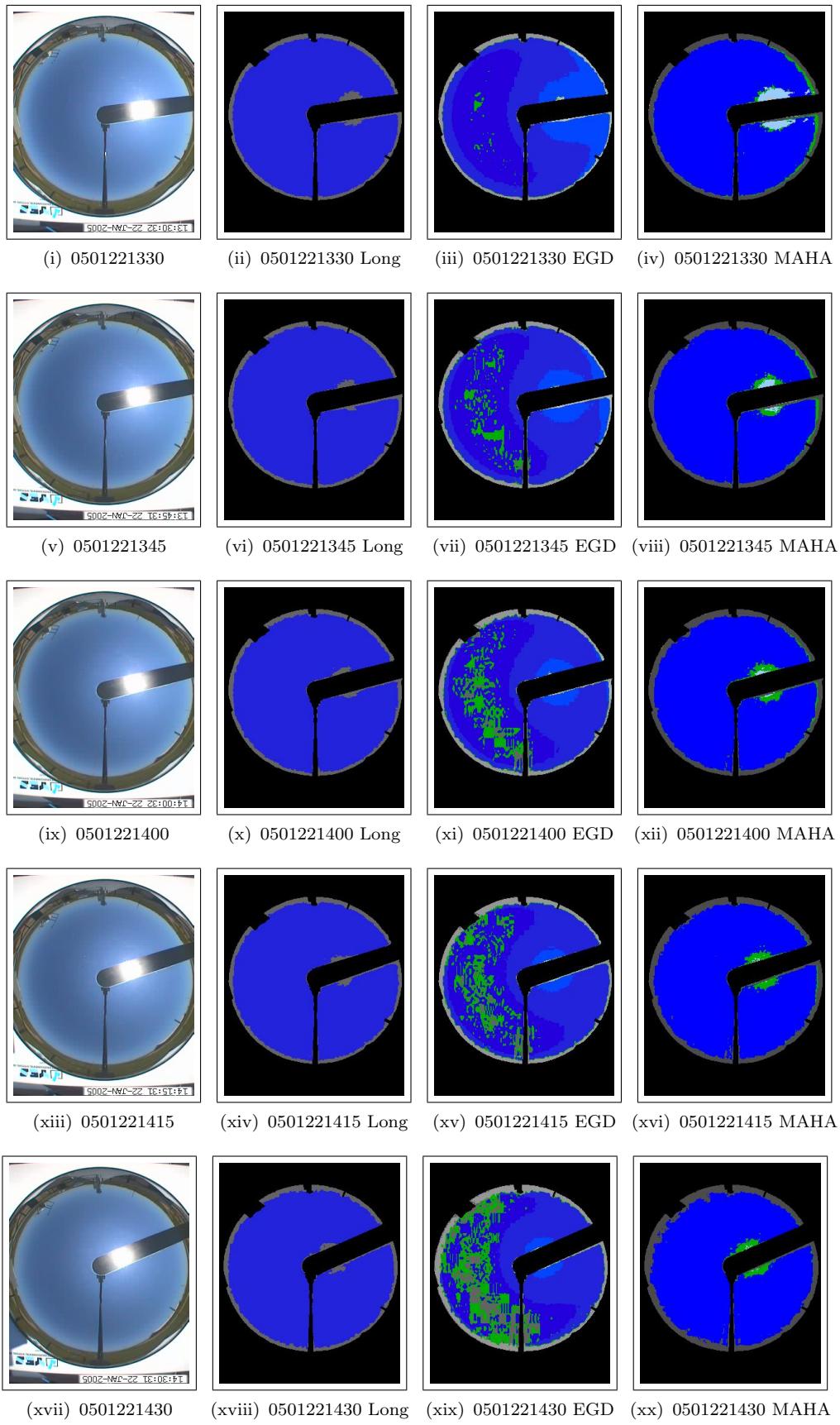


Figure A.243 - Sky images generated from 0501221330 to 0501221430.

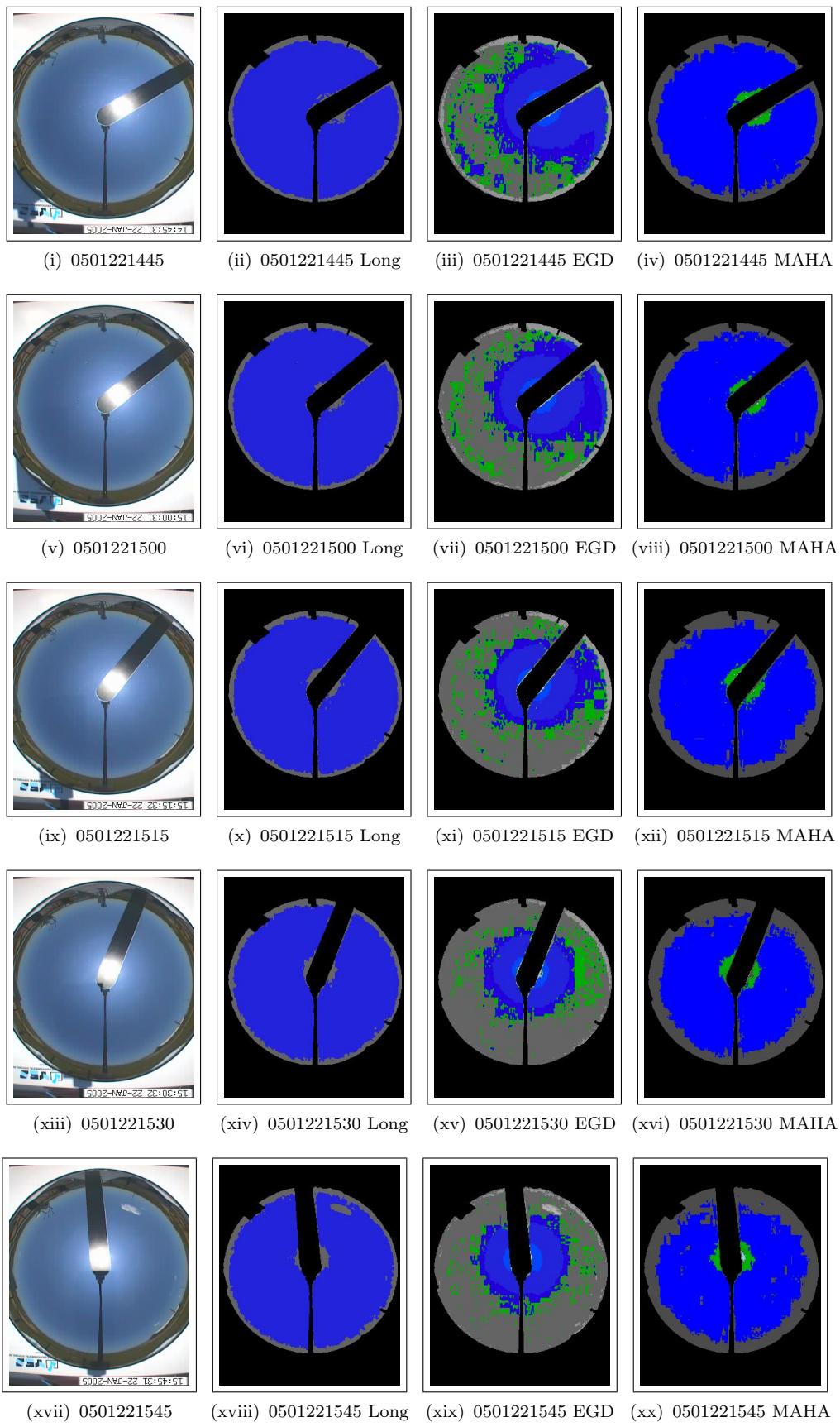


Figure A.244 - Sky images generated from 0501221445 to 0501221545.

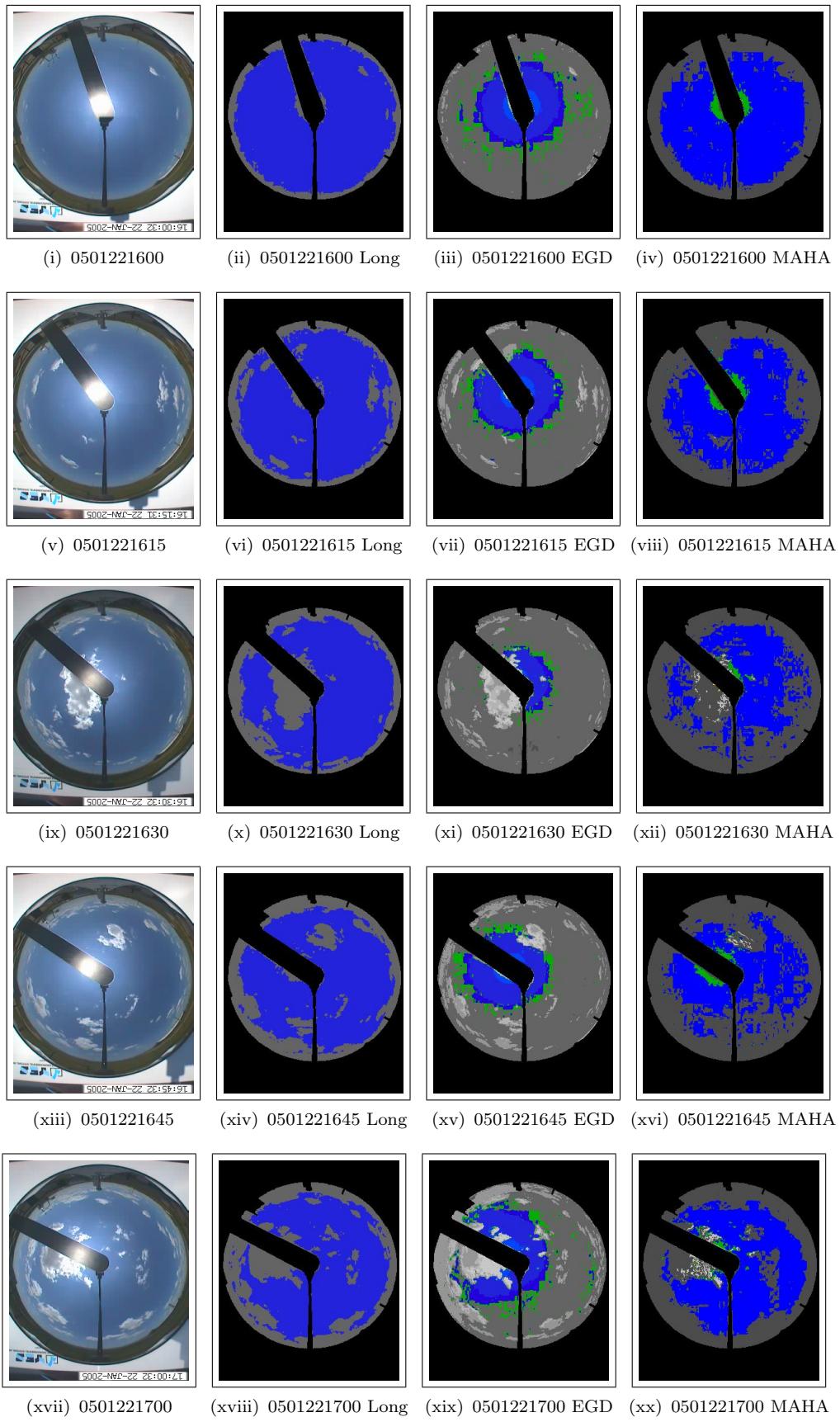


Figure A.245 - Sky images generated from 0501221600 to 0501221700.

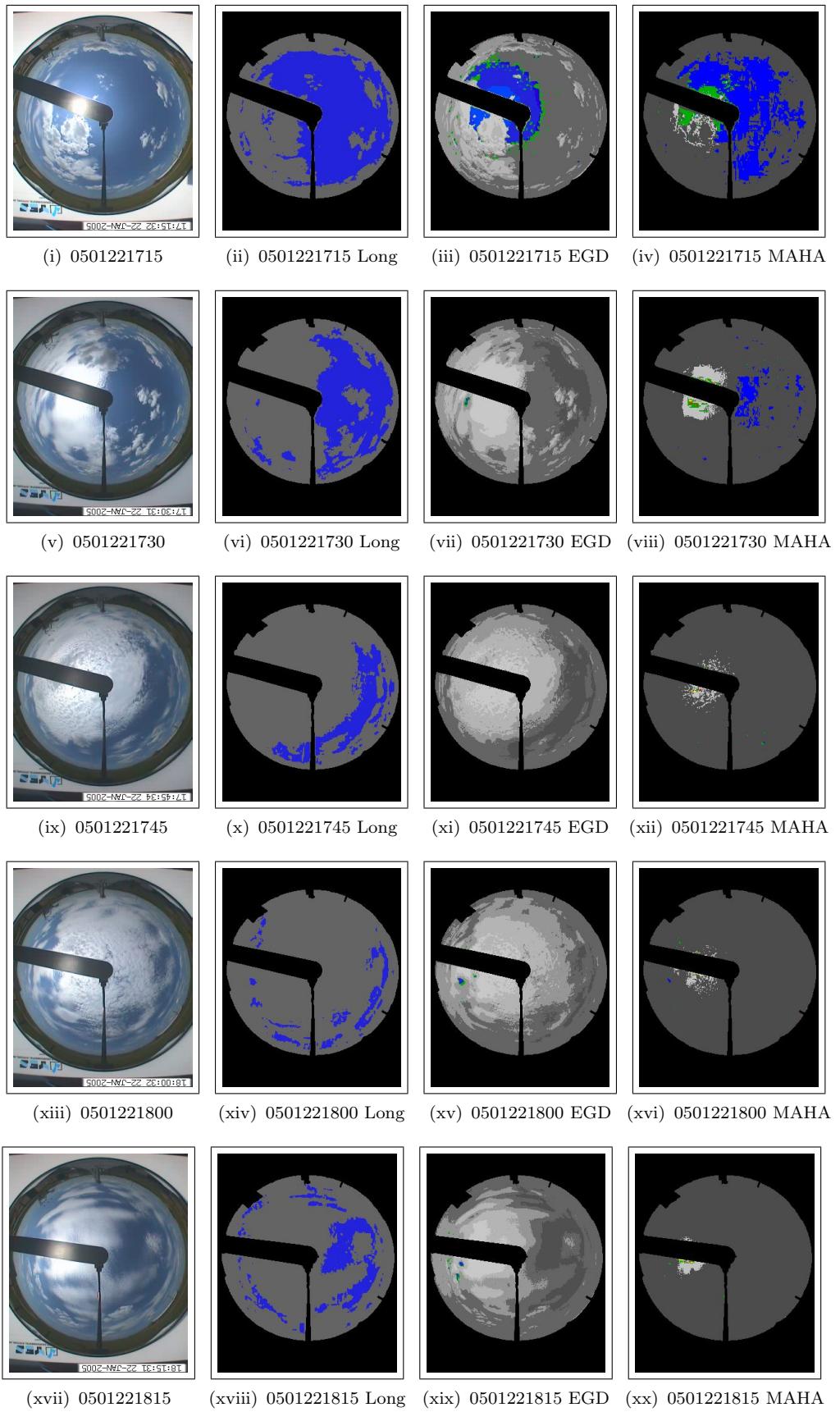


Figure A.246 - Sky images generated from 0501221715 to 0501221815.

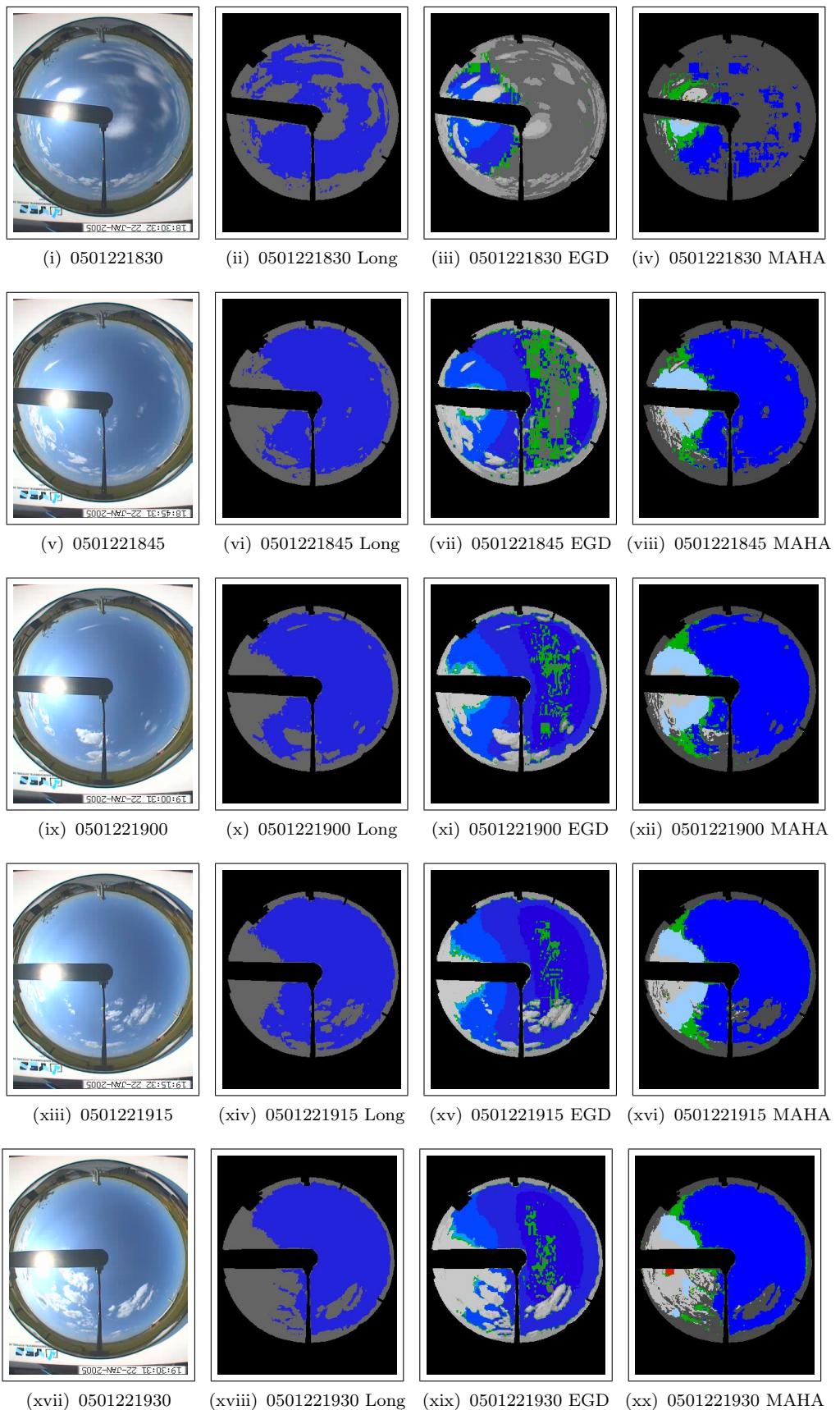


Figure A.247 - Sky images generated from 0501221830 to 0501221930.

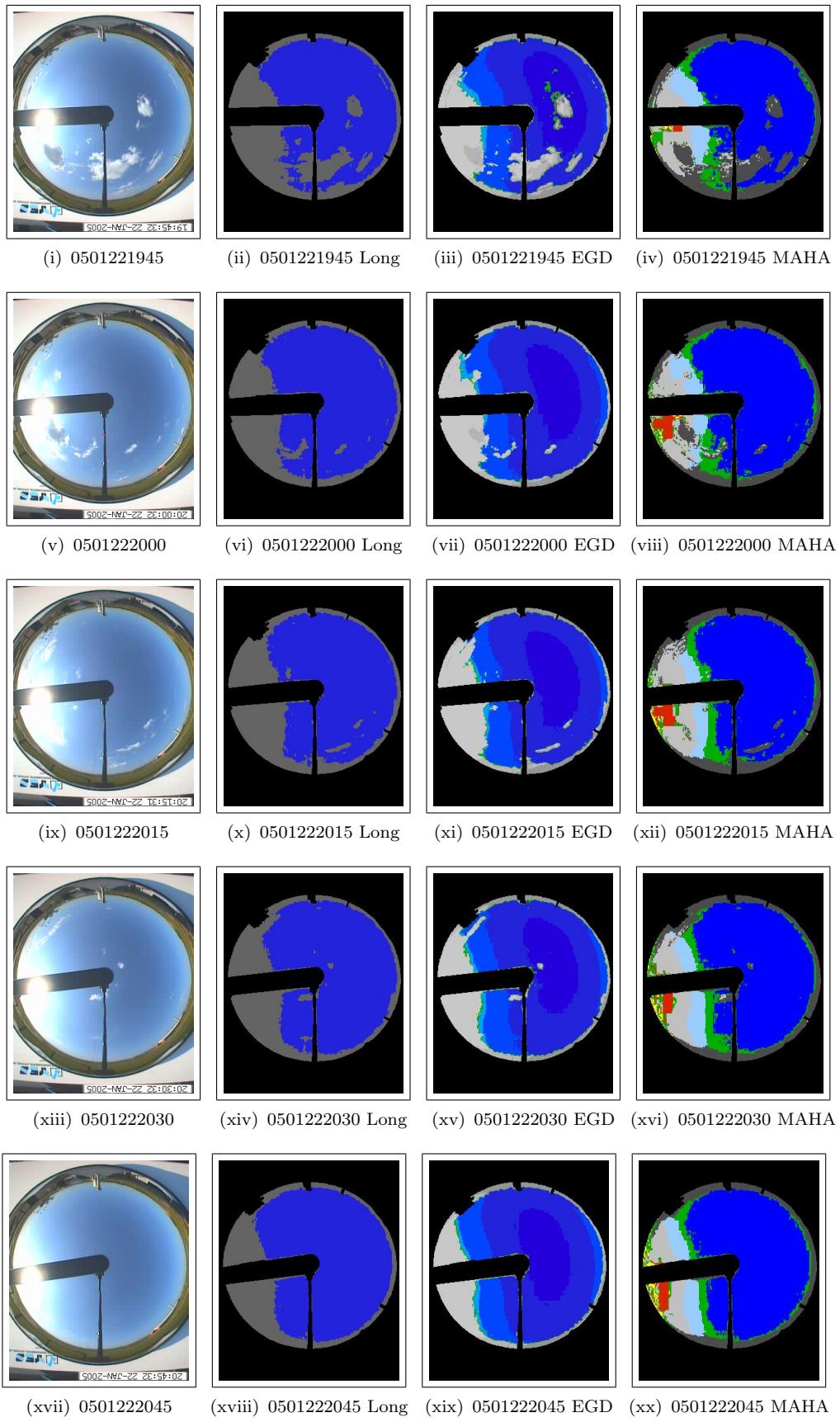


Figure A.248 - Sky images generated from 0501221945 to 0501222045.

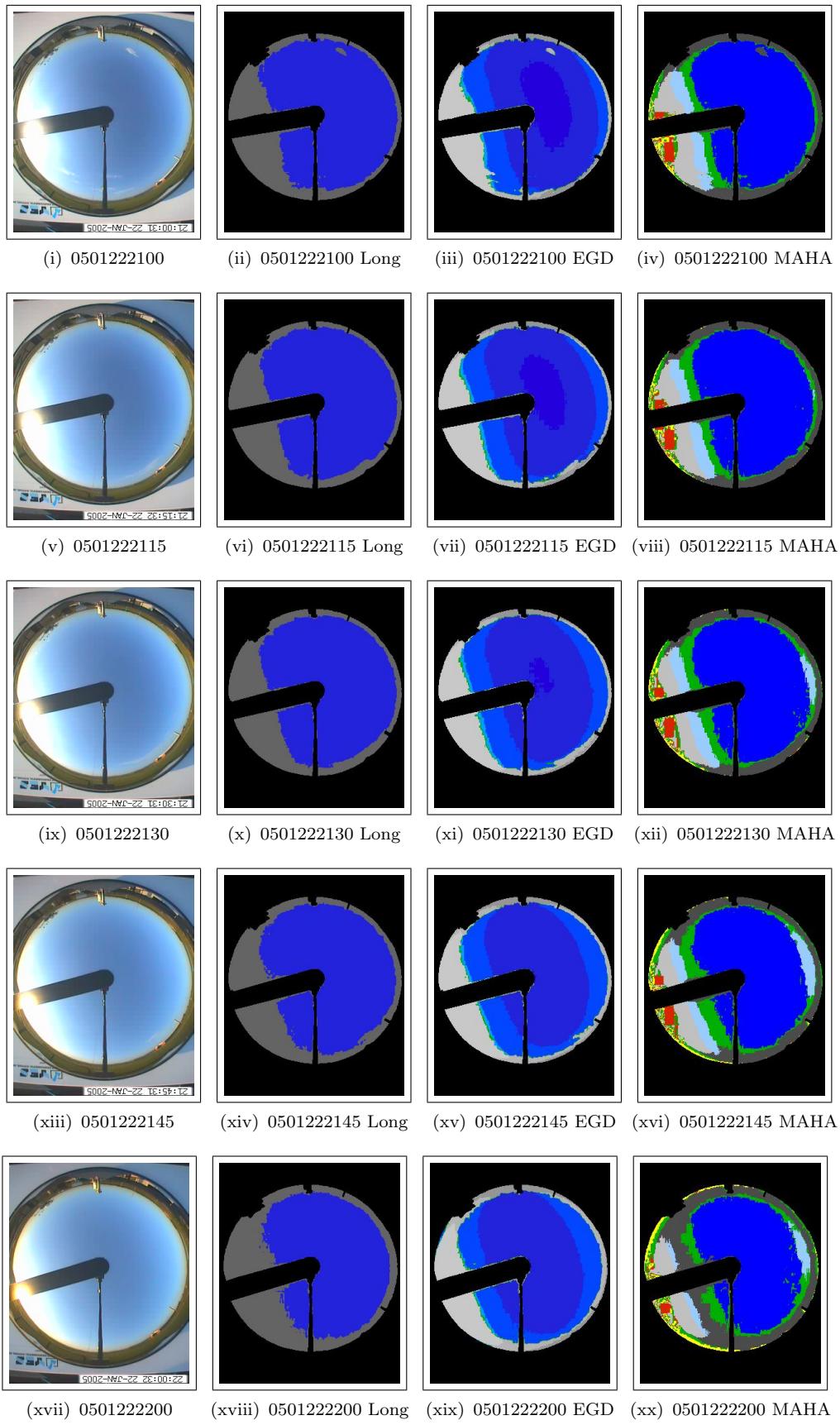


Figure A.249 - Sky images generated from 0501222100 to 0501222200.

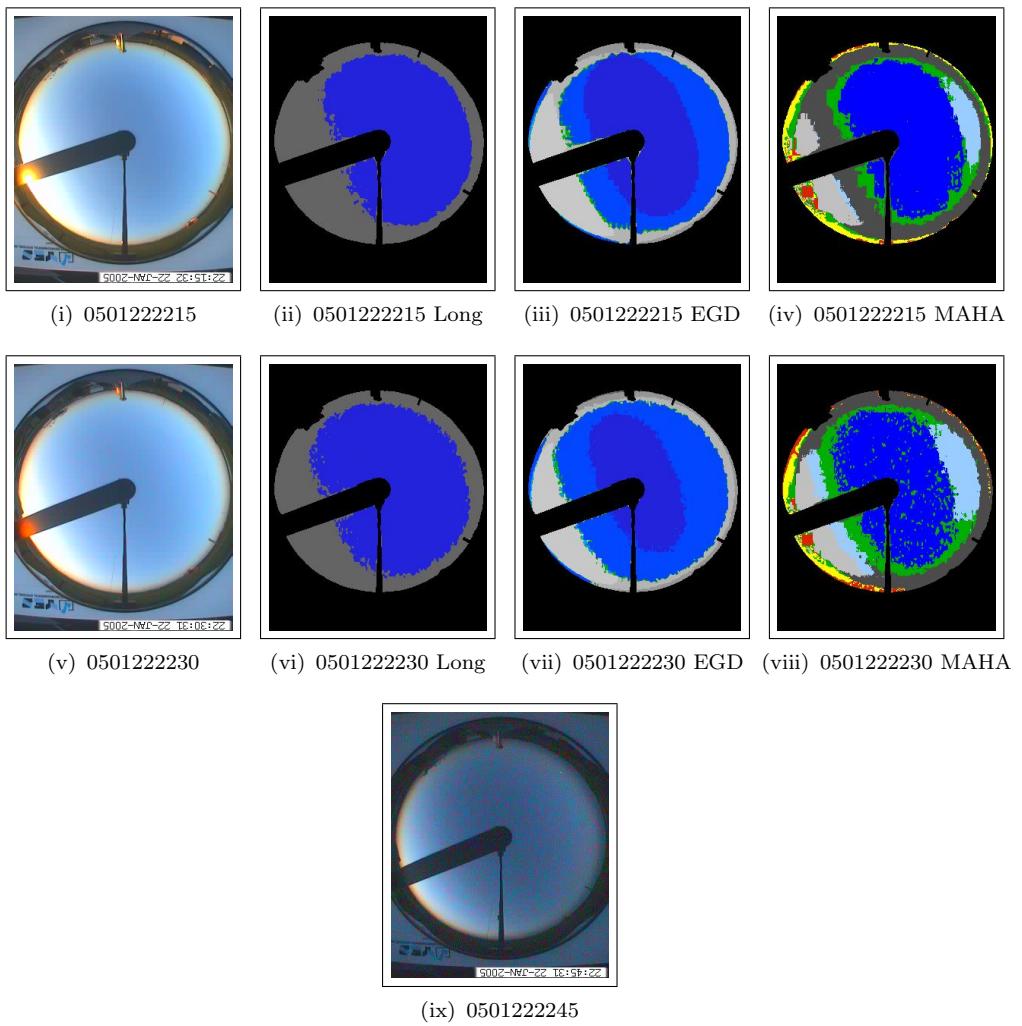


Figure A.250 - Sky images generated from 0501221600 to 0501222245.

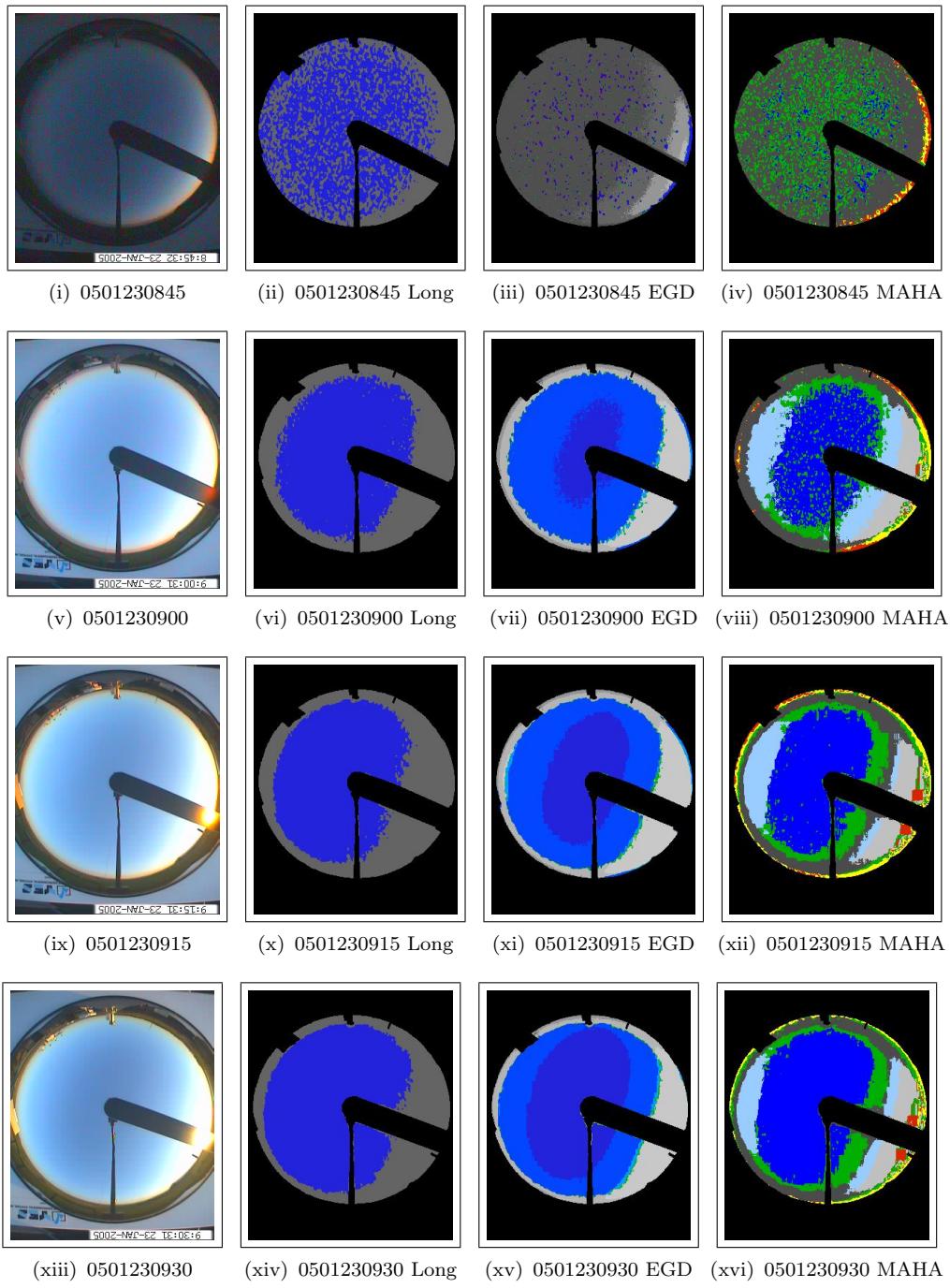


Figure A.251 - Sky images generated from 0501230845 to 0501230930.

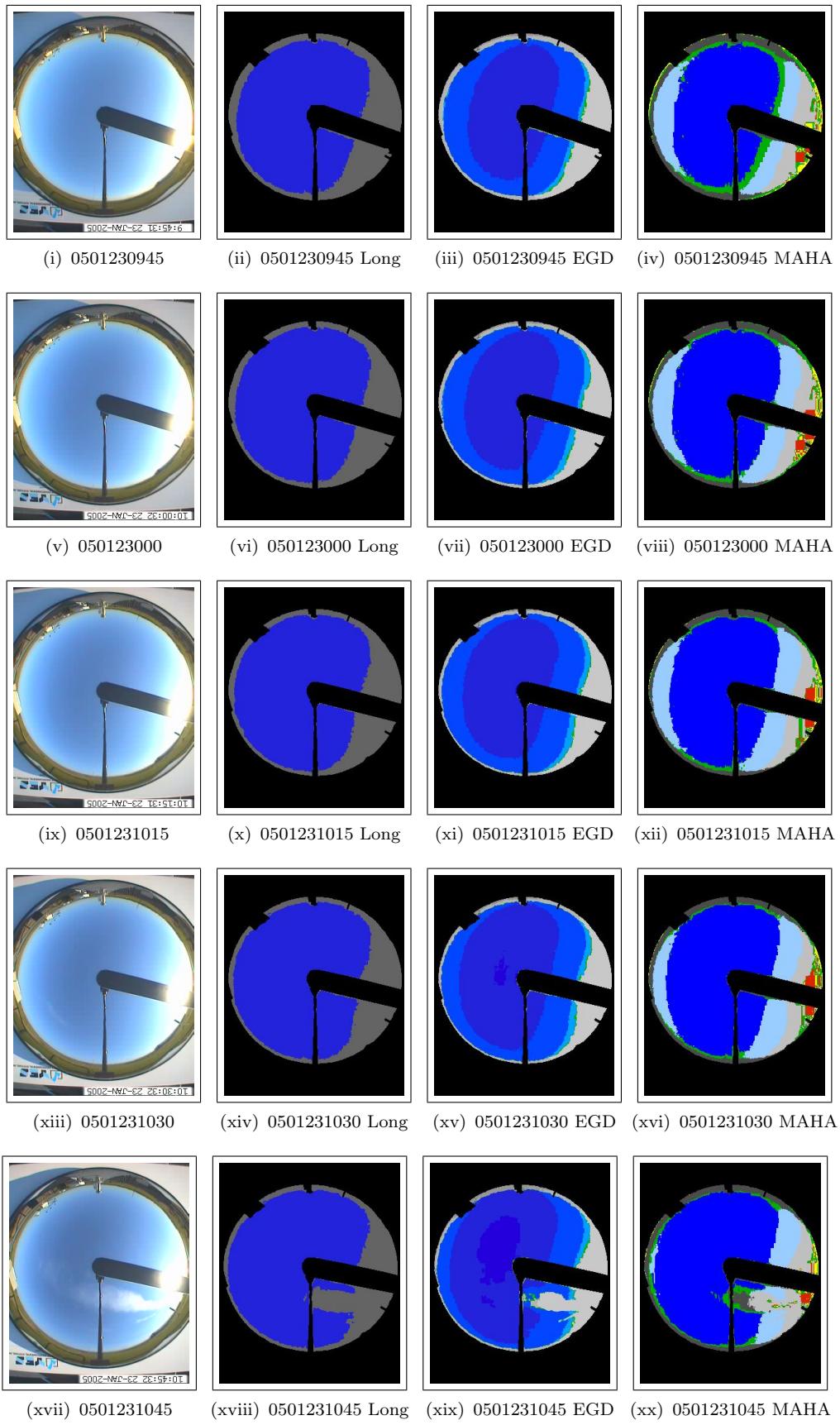


Figure A.252 - Sky images generated from 0501230945 to 0501231045.

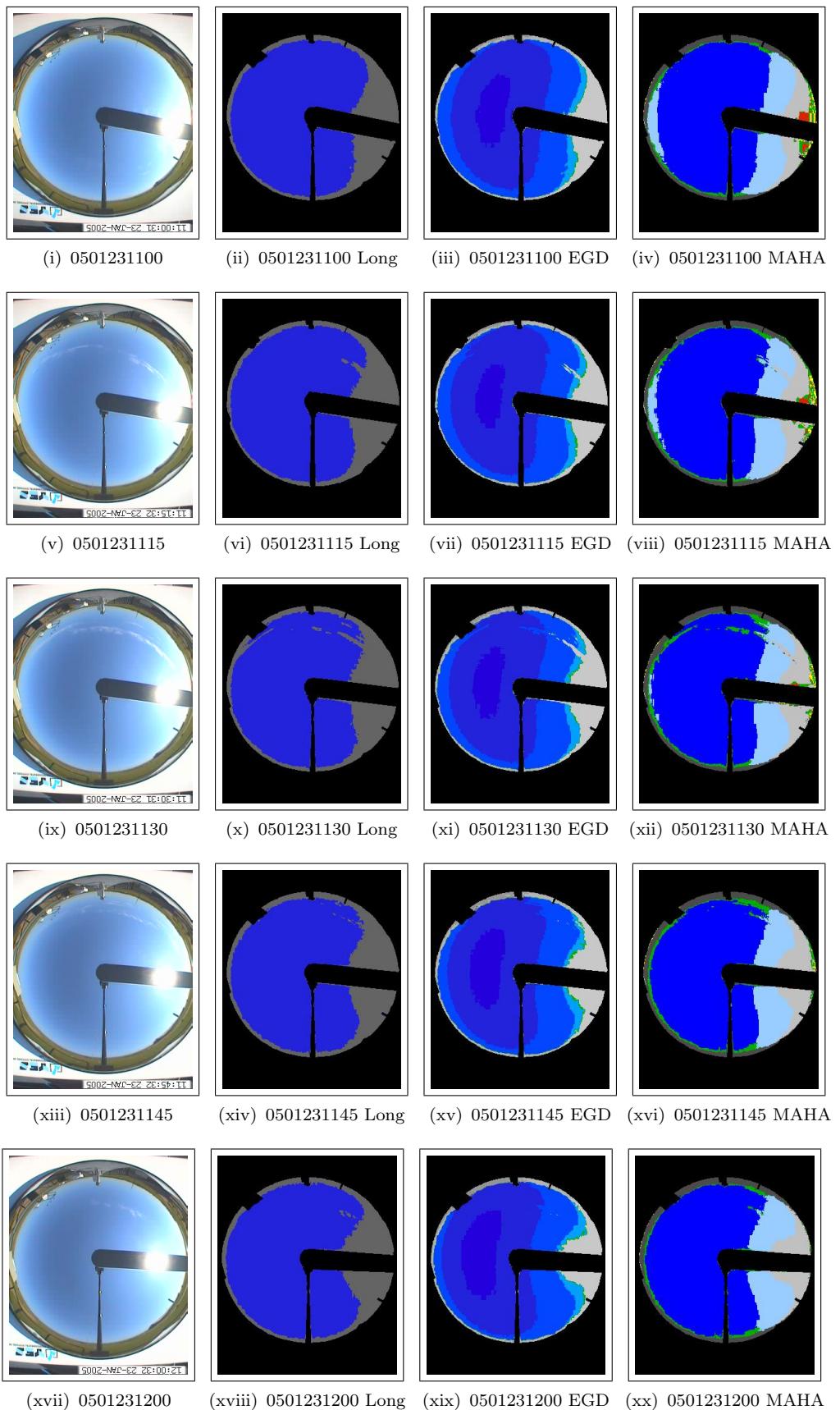


Figure A.253 - Sky images generated from 050123100 to 0501231200.

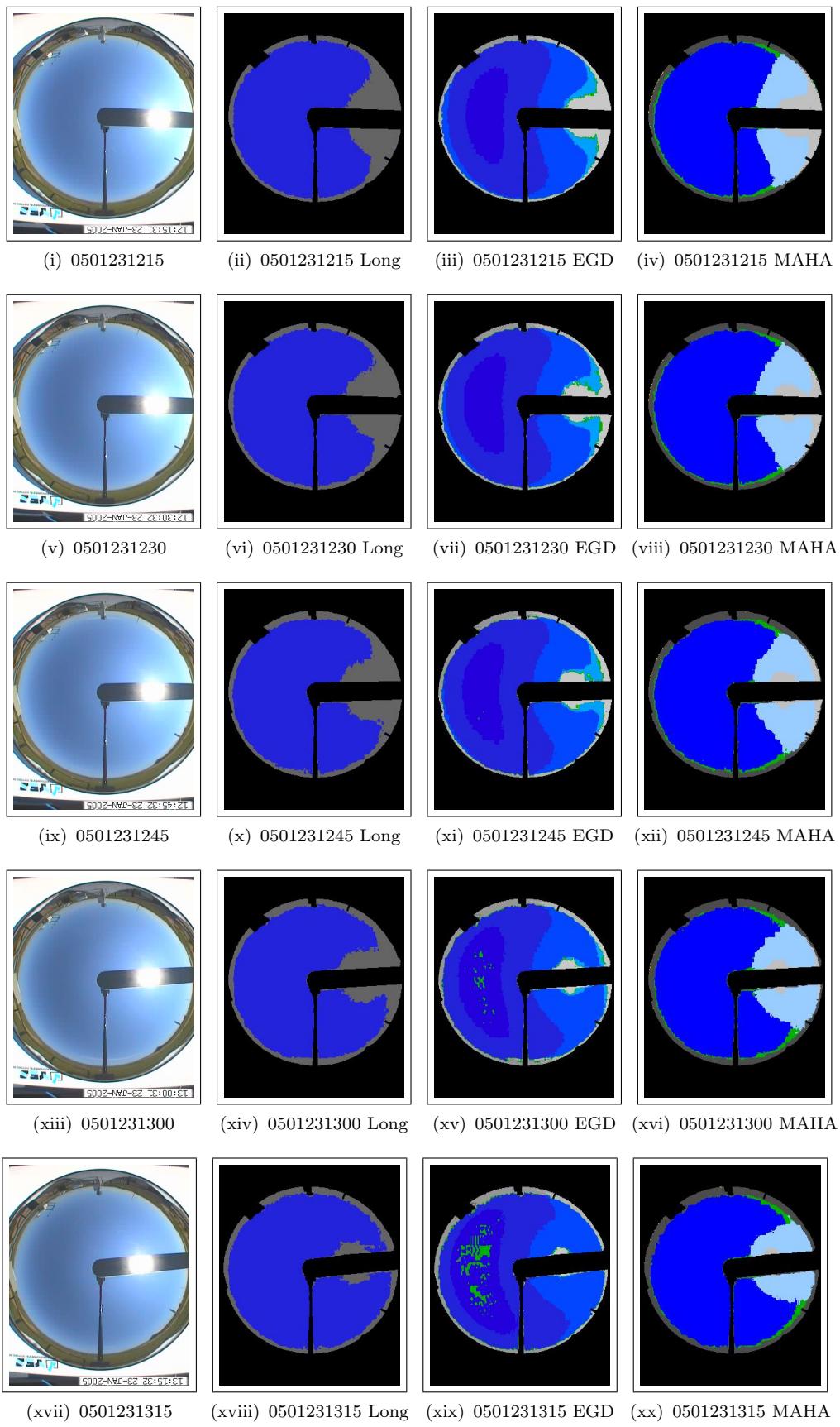


Figure A.254 - Sky images generated from 0501231215 to 0501231315.

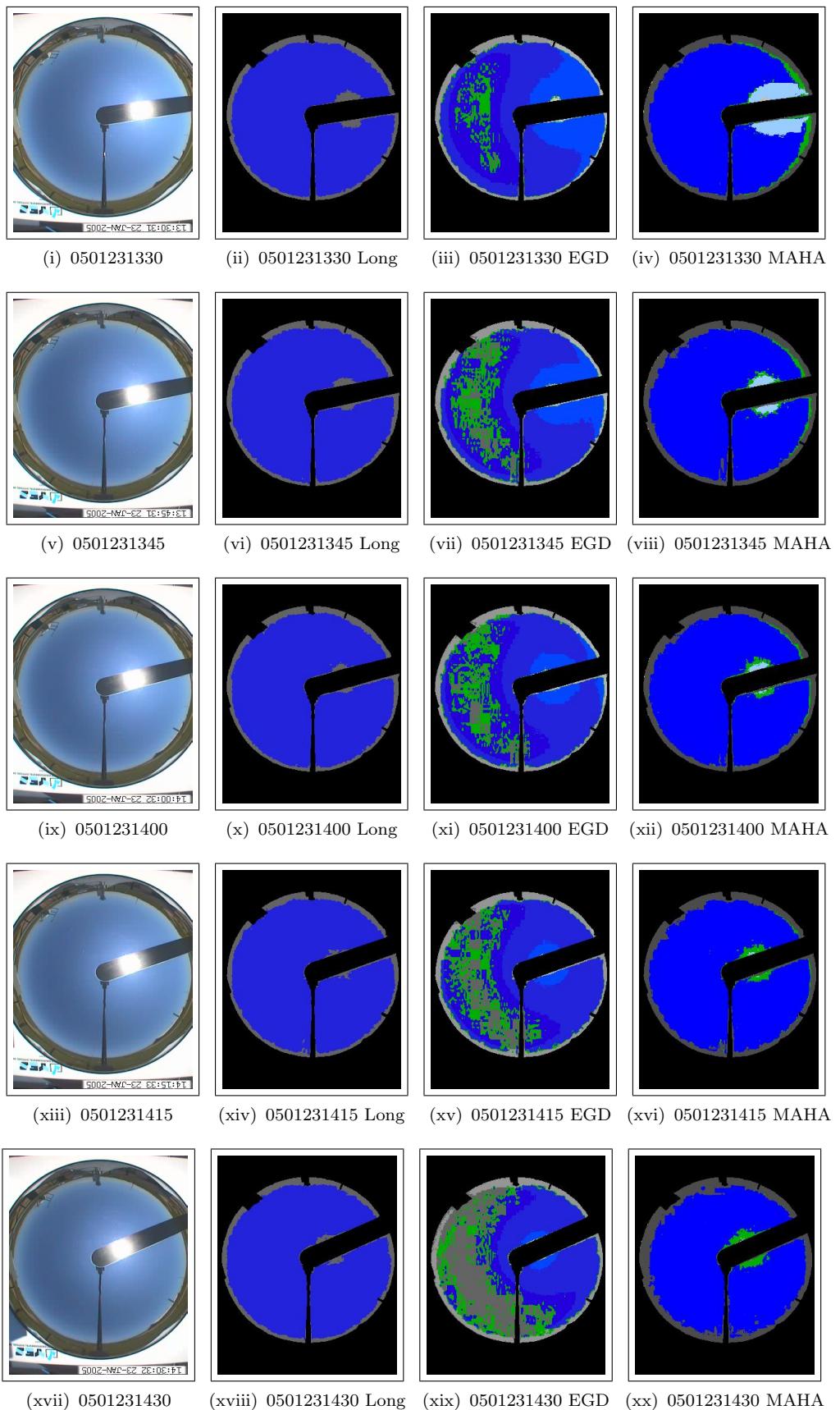


Figure A.255 - Sky images generated from 0501231330 to 0501231430.

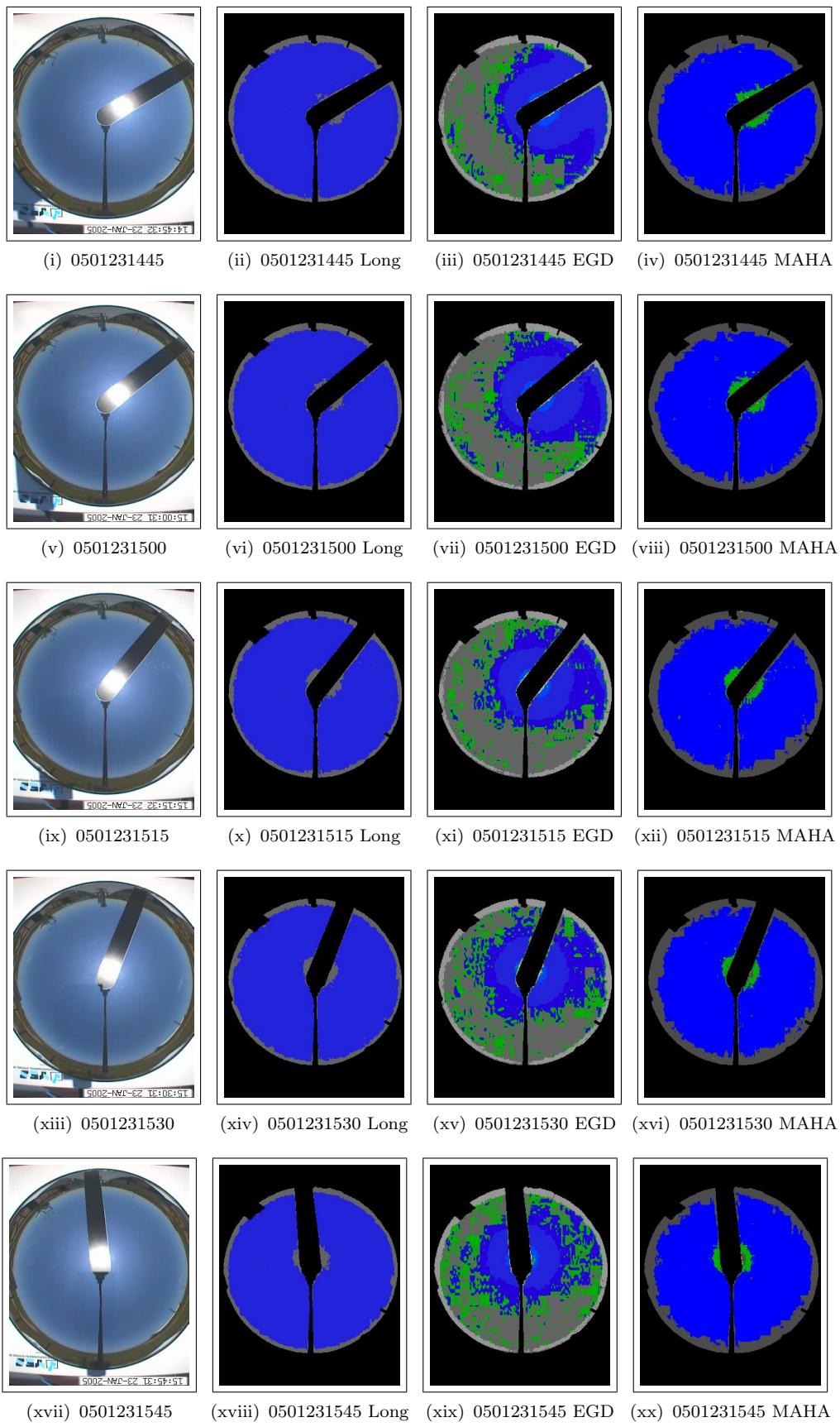


Figure A.256 - Sky images generated from 0501231445 to 0501231545.

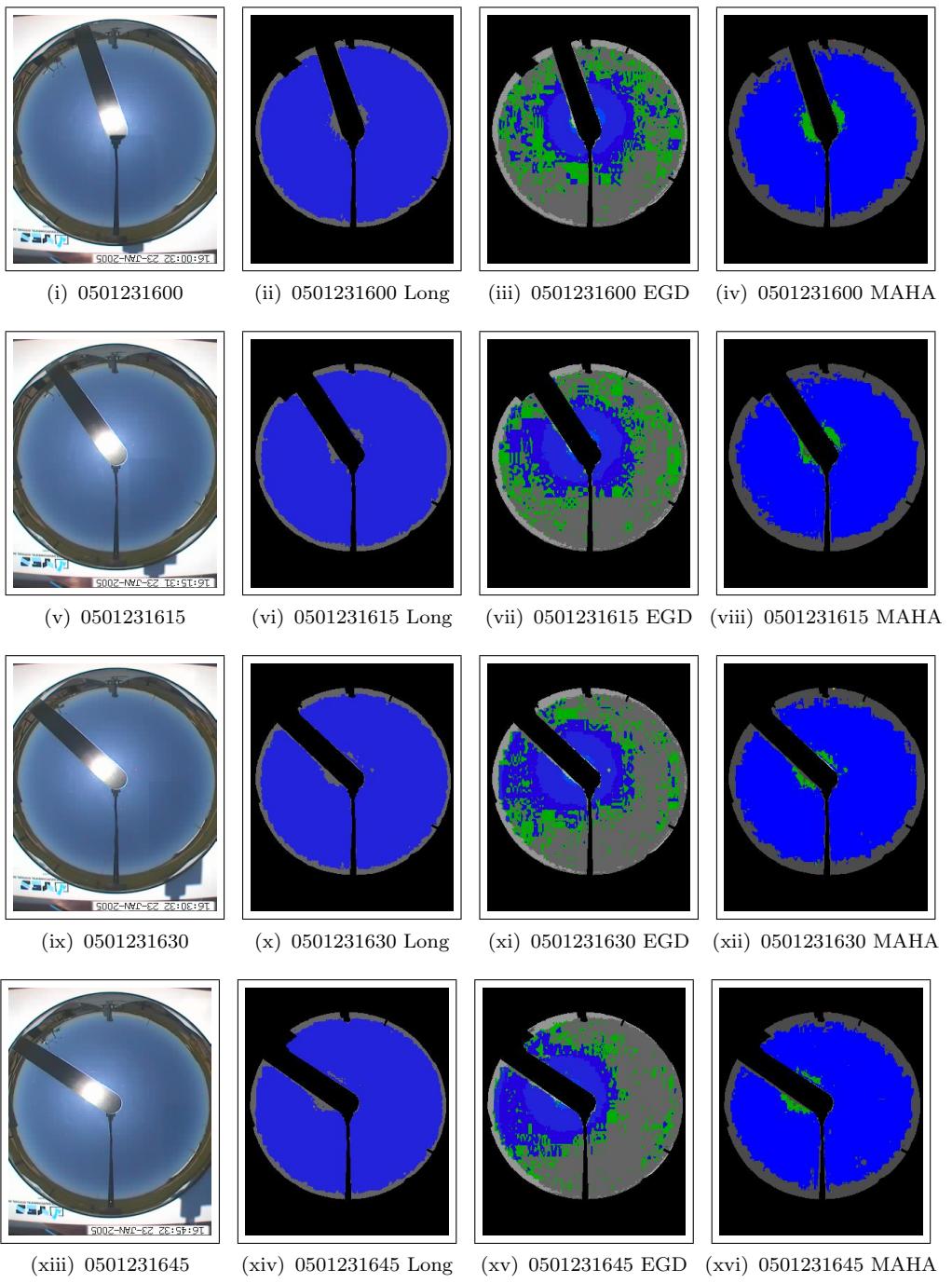


Figure A.257 - Sky images generated from 0501231600 to 0501231645.

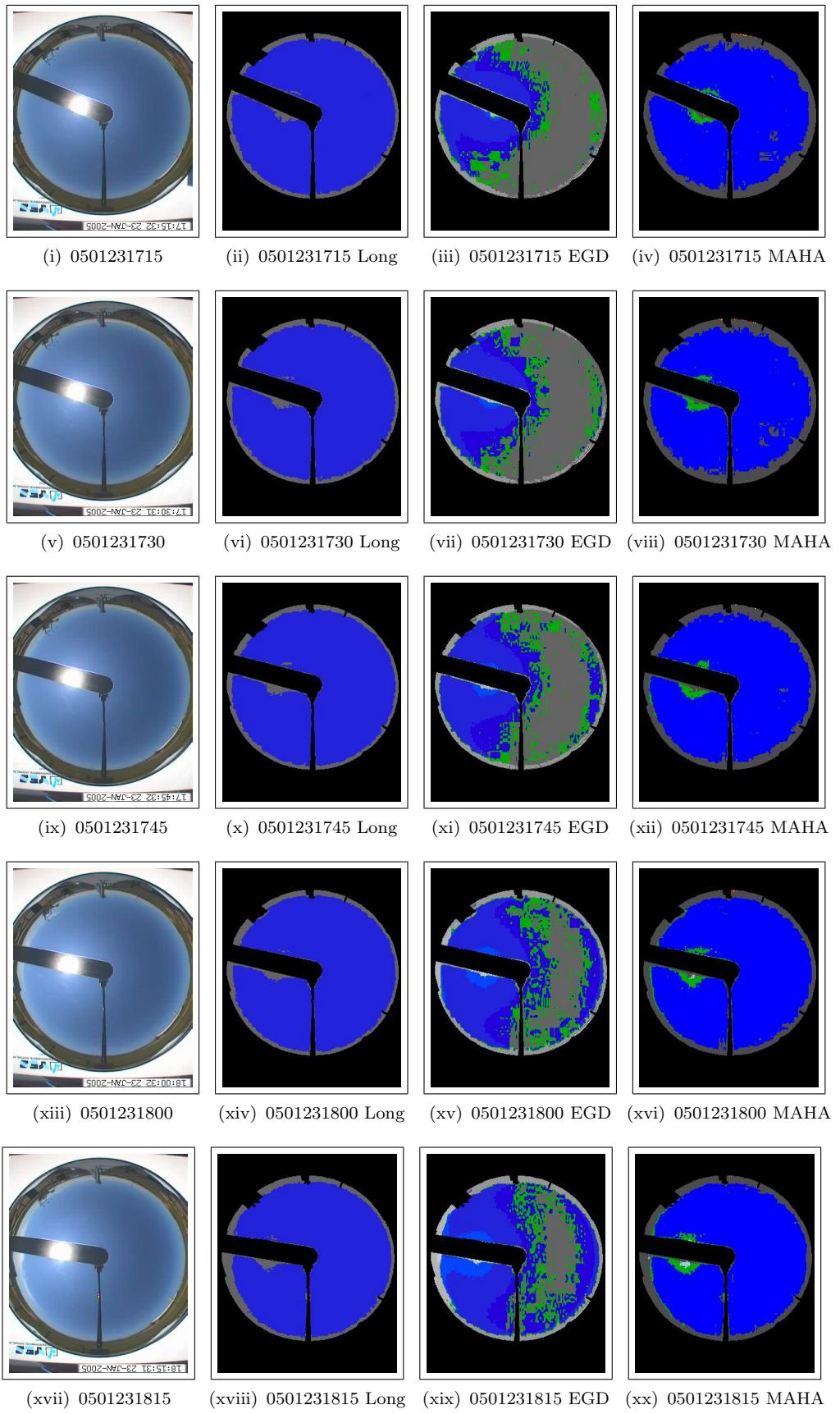


Figure A.258 - Sky images generated from 0501231715 to 0501231815.

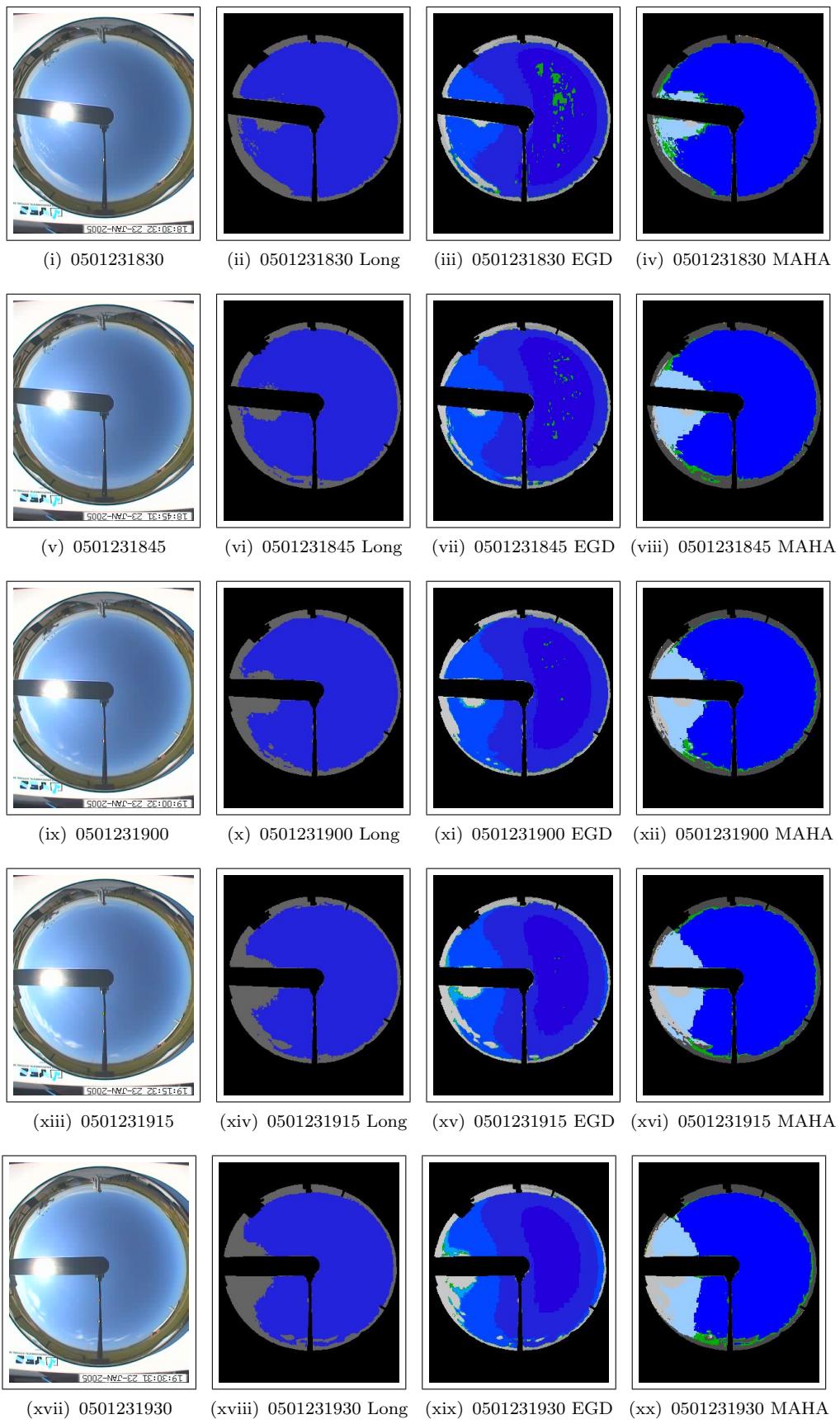


Figure A.259 - Sky images generated from 0501231830 to 0501231930.

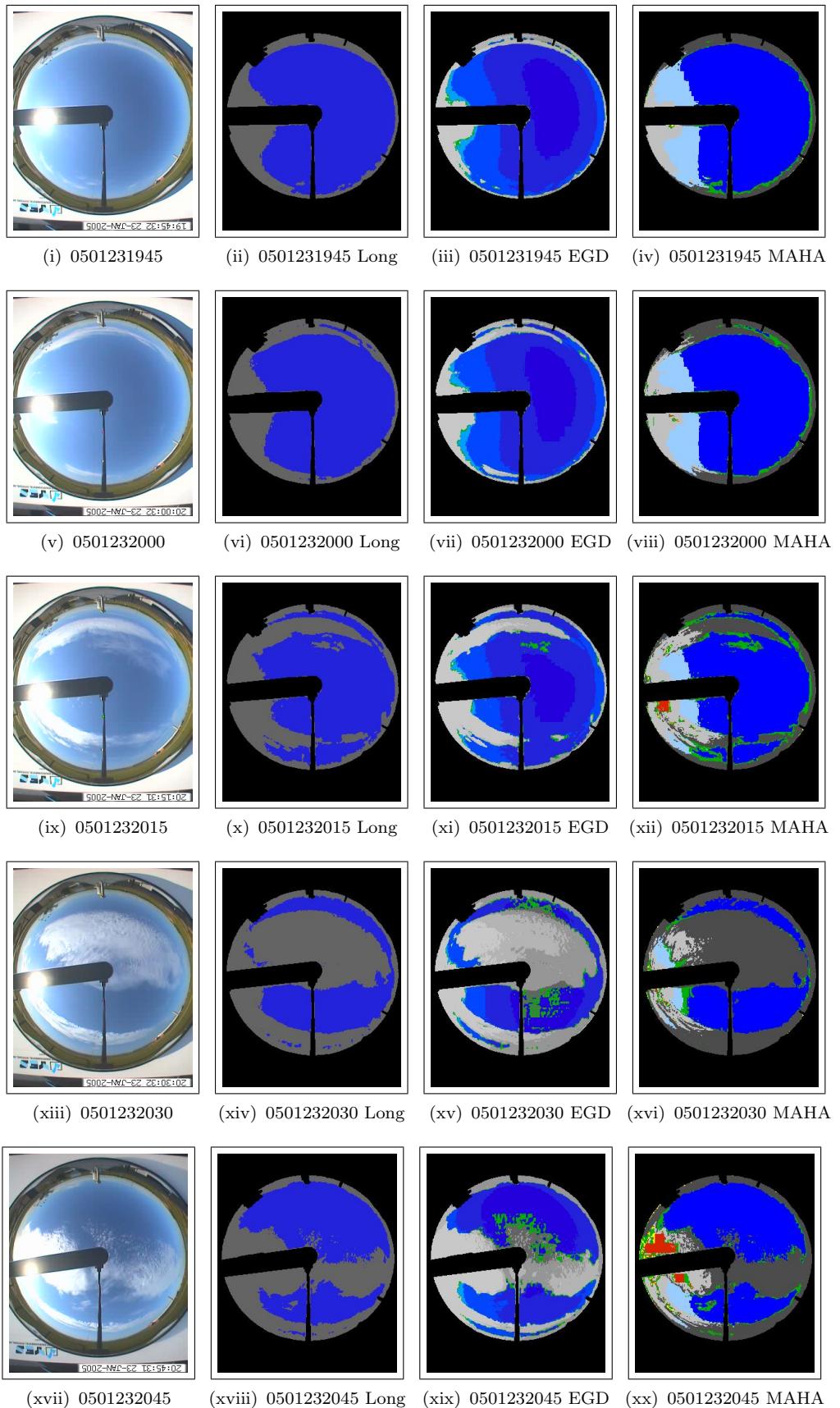


Figure A.260 - Sky images generated from 0501231945 to 0501232045.

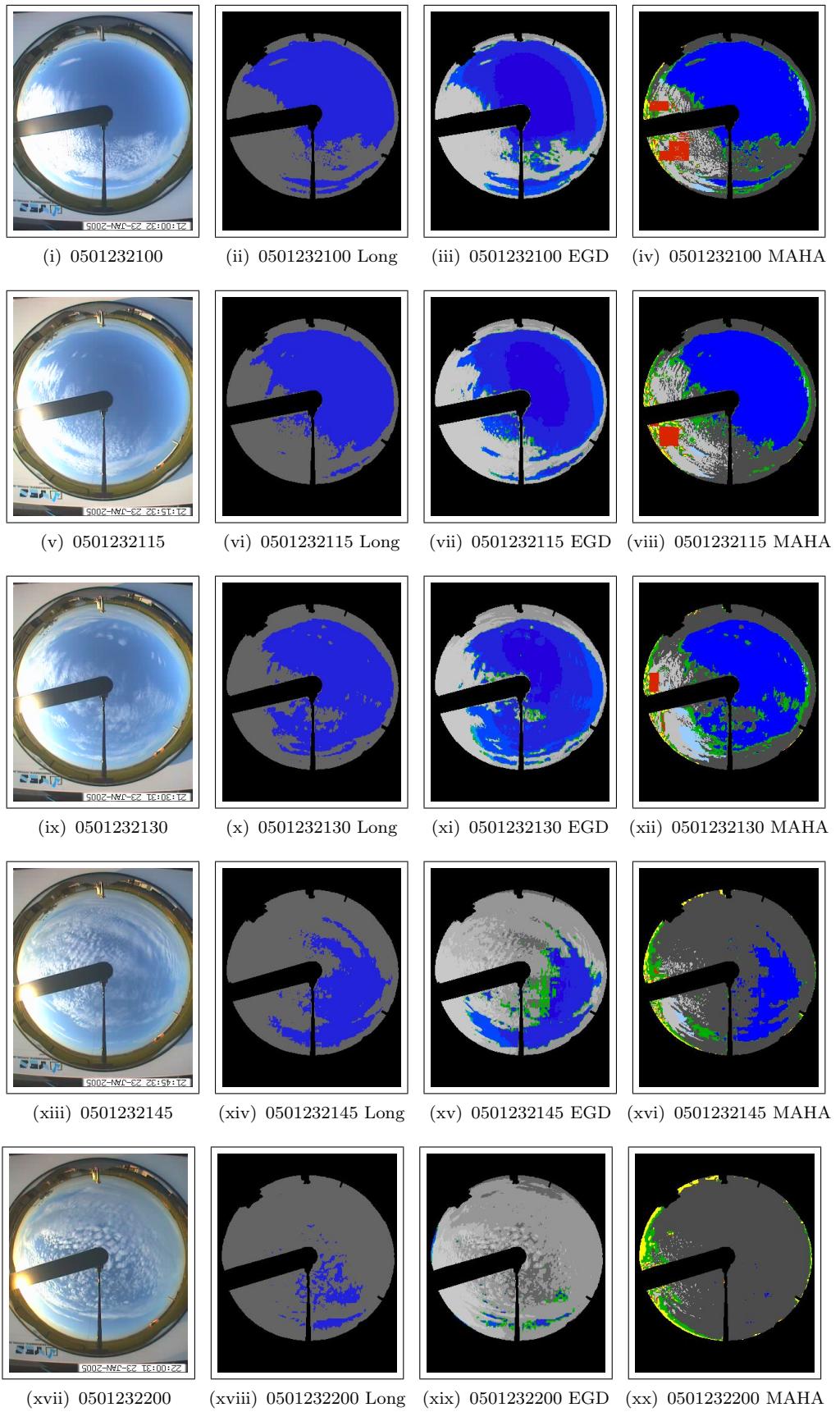


Figure A.261 - Sky images generated from 0501232100 to 0501232200.

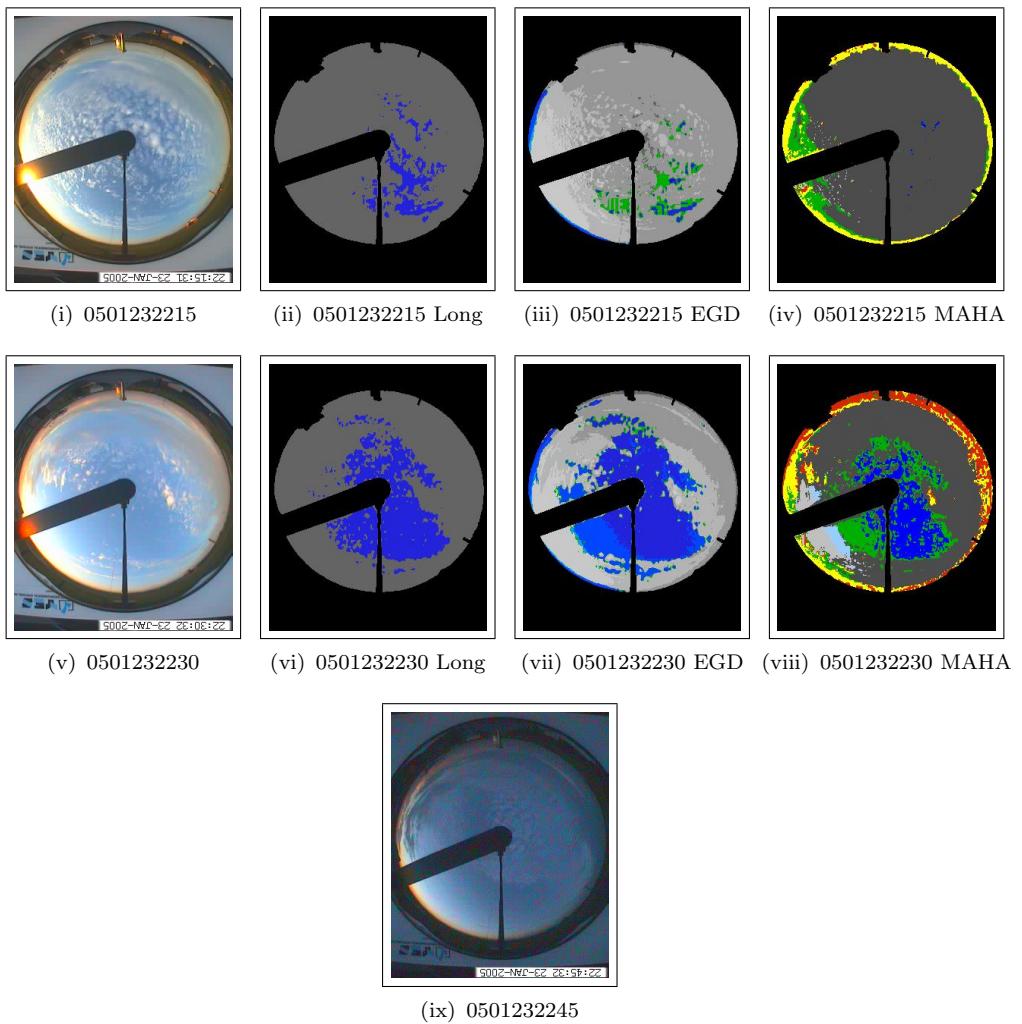


Figure A.262 - Sky images generated from 0501231600 to 0501232245.

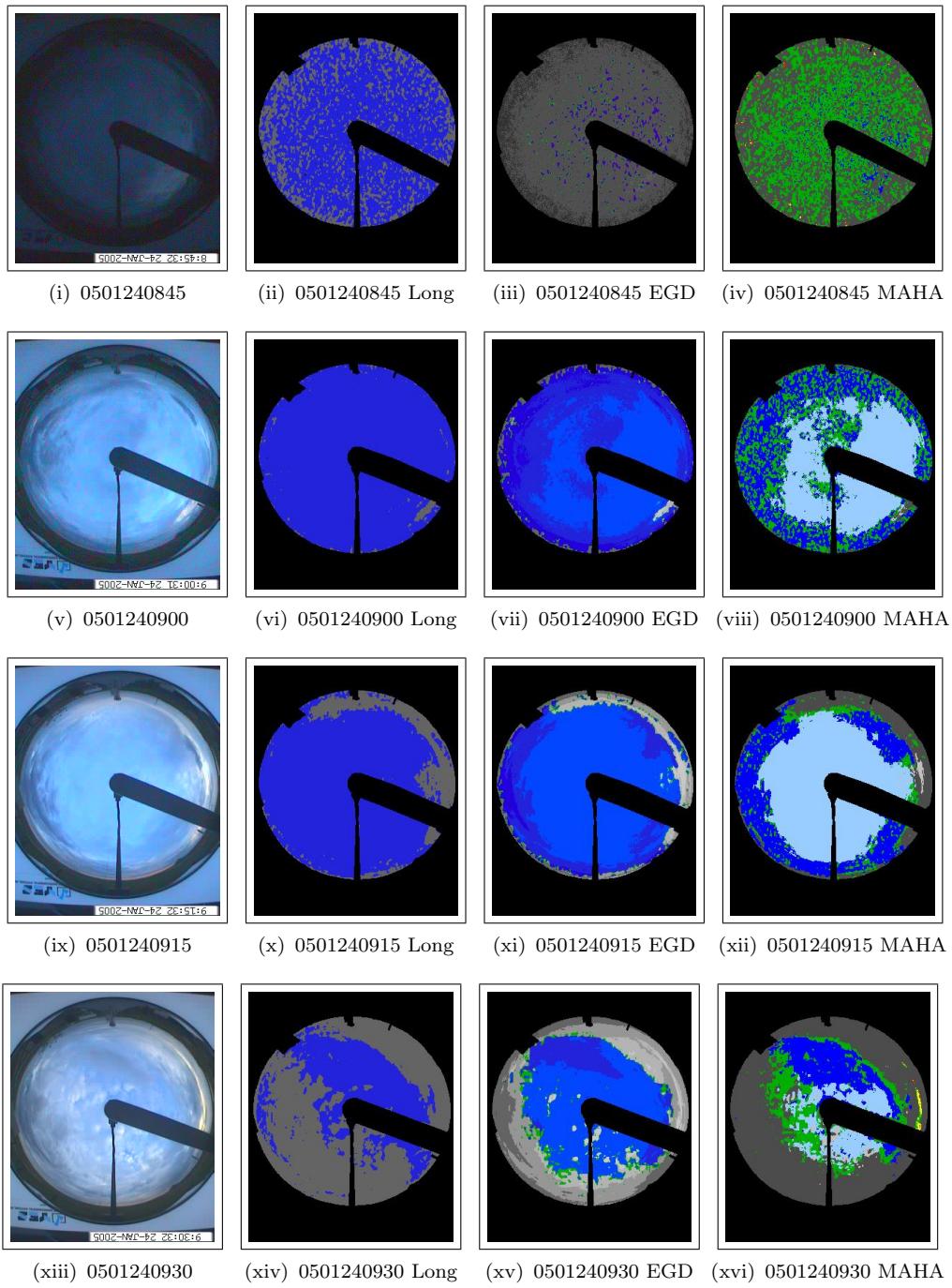


Figure A.263 - Sky images generated from 0501240845 to 0501240930.

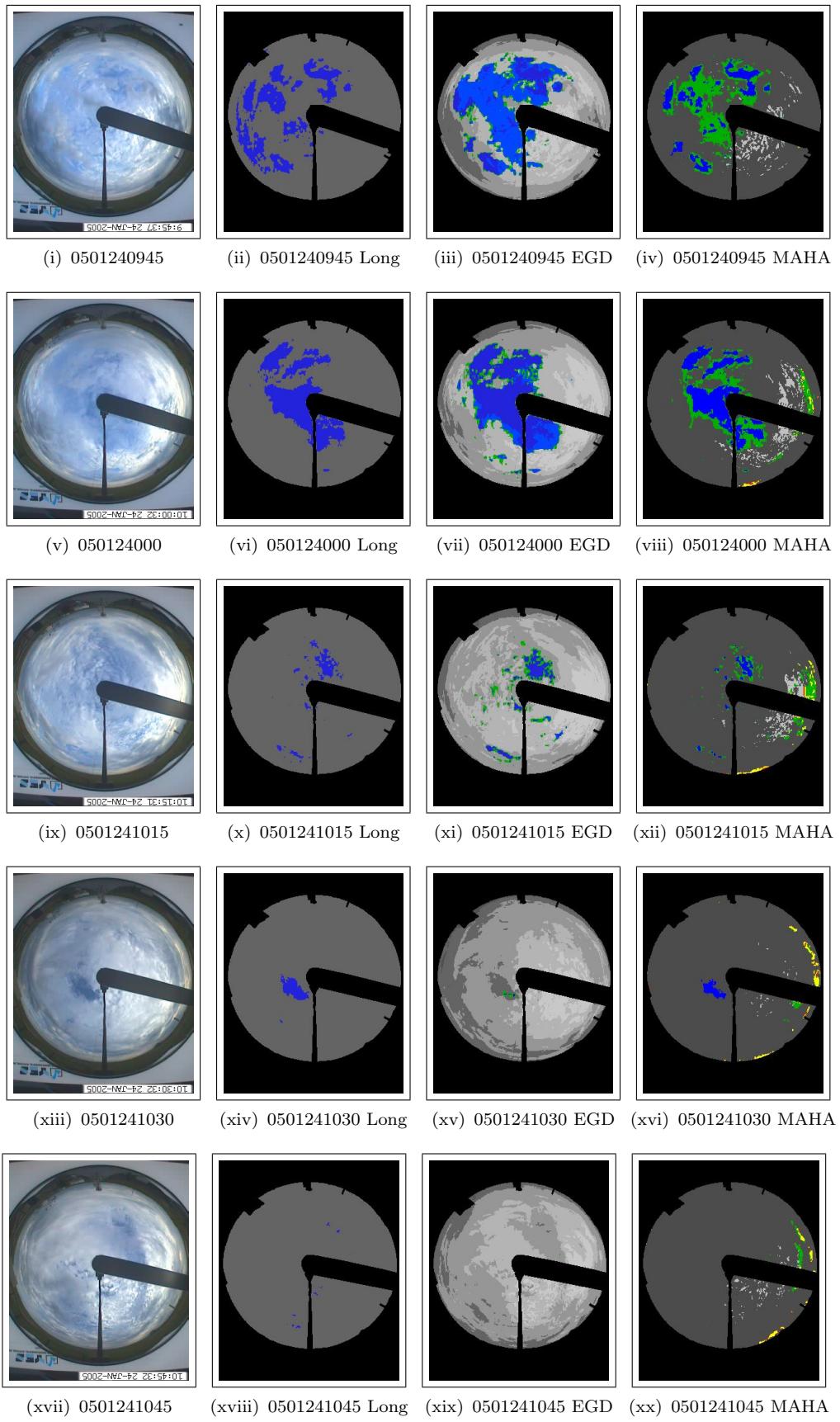


Figure A.264 - Sky images generated from 0501240945 to 0501241045.

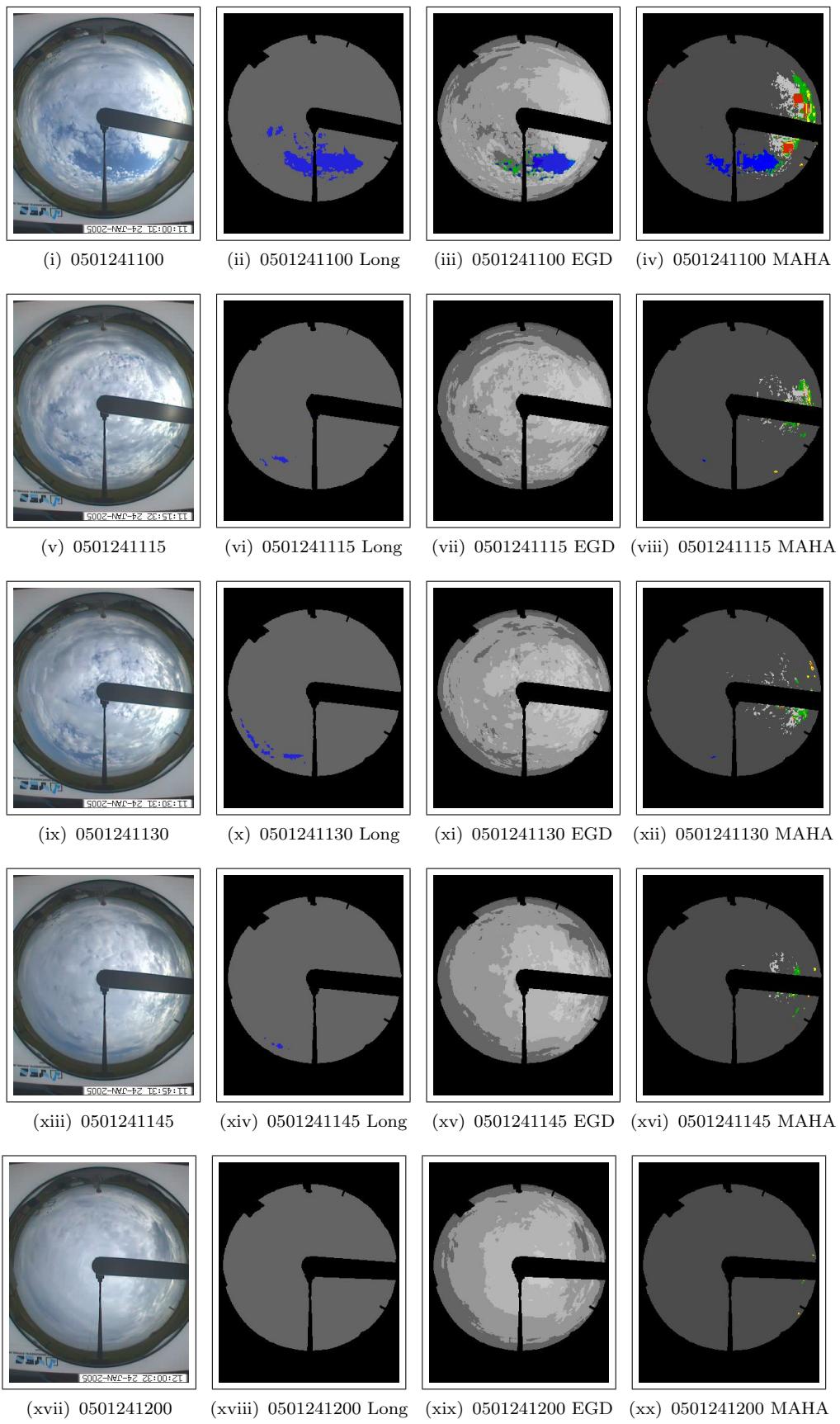


Figure A.265 - Sky images generated from 050124100 to 0501241200.

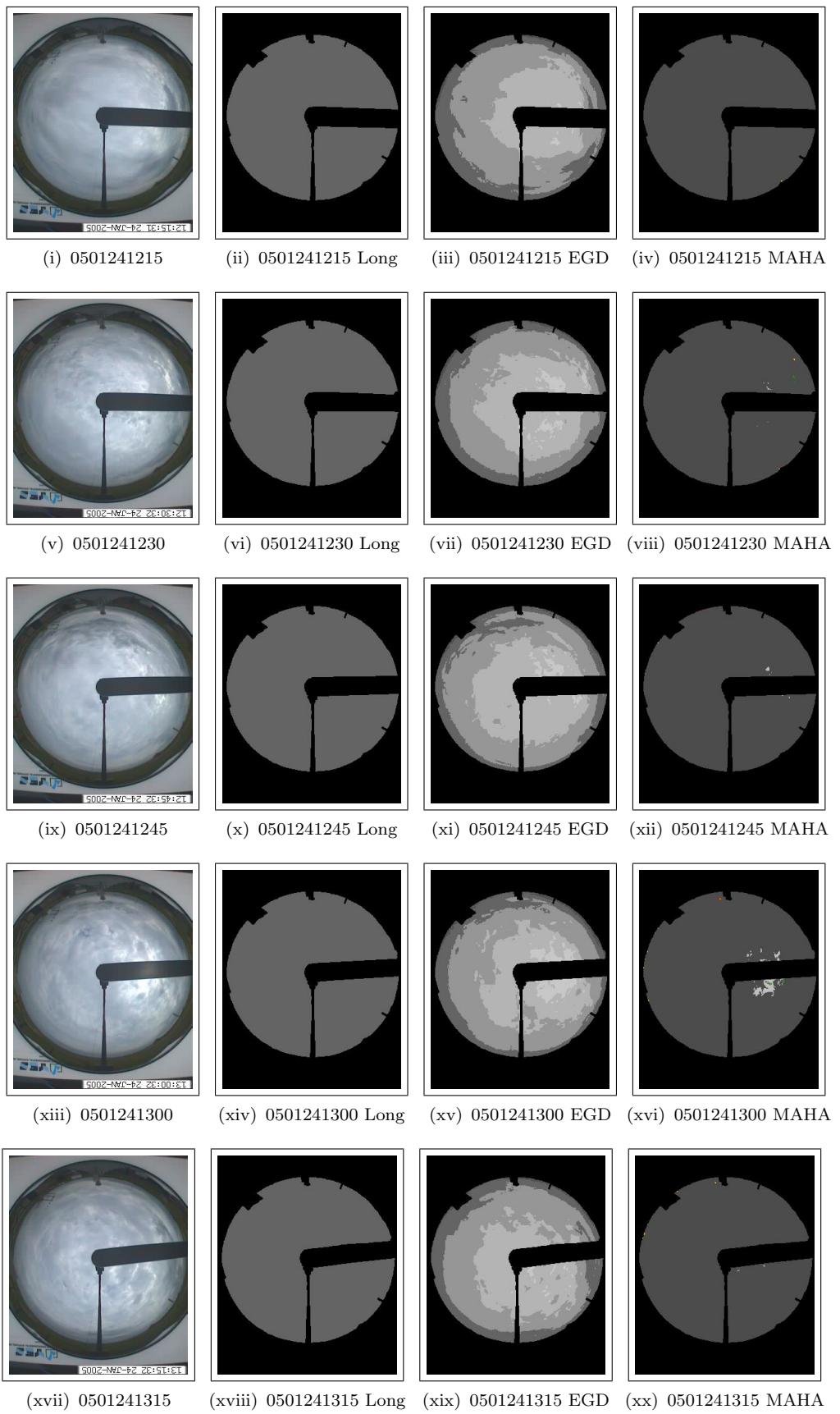


Figure A.266 - Sky images generated from 0501241215 to 0501241315.

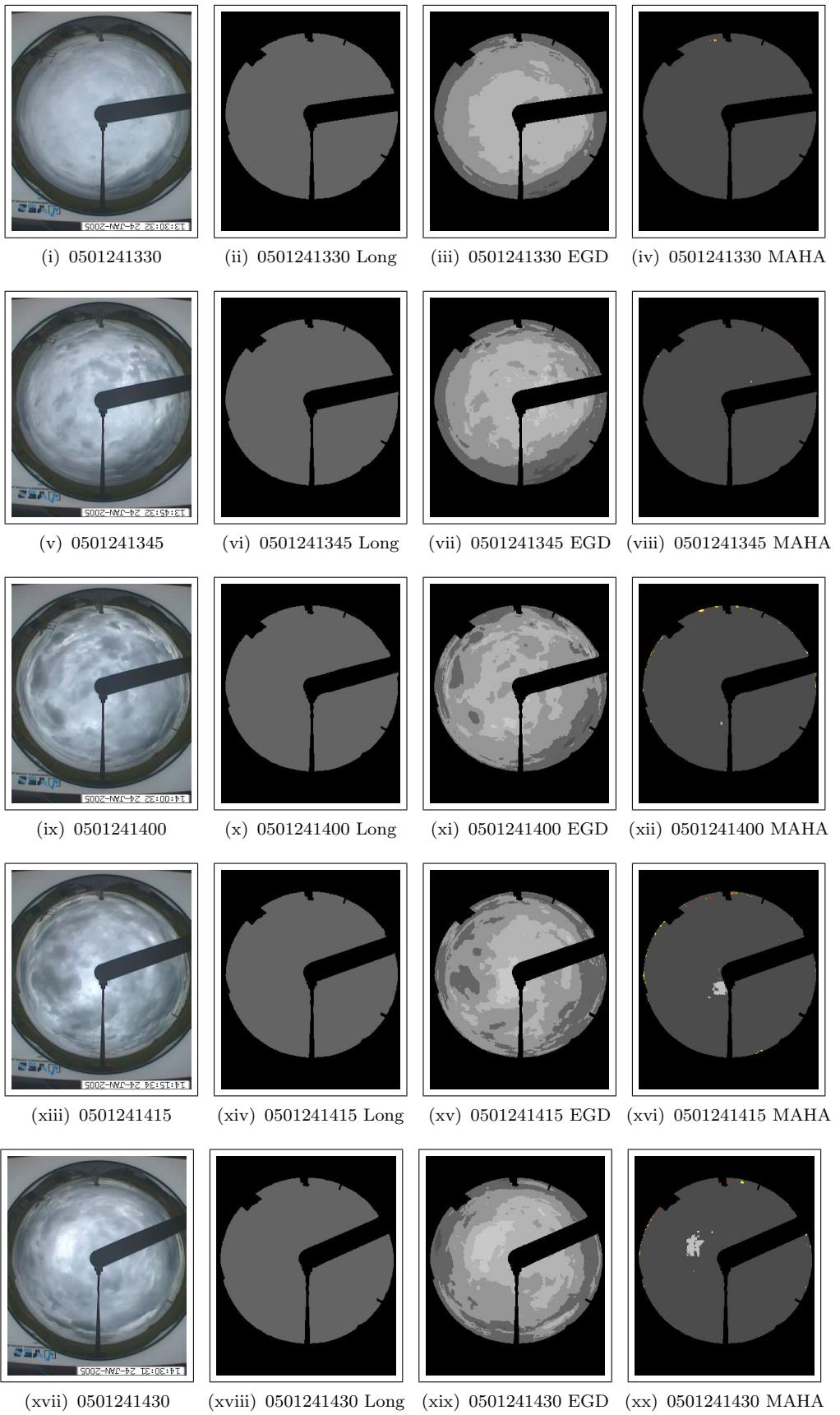


Figure A.267 - Sky images generated from 0501241330 to 0501241430.

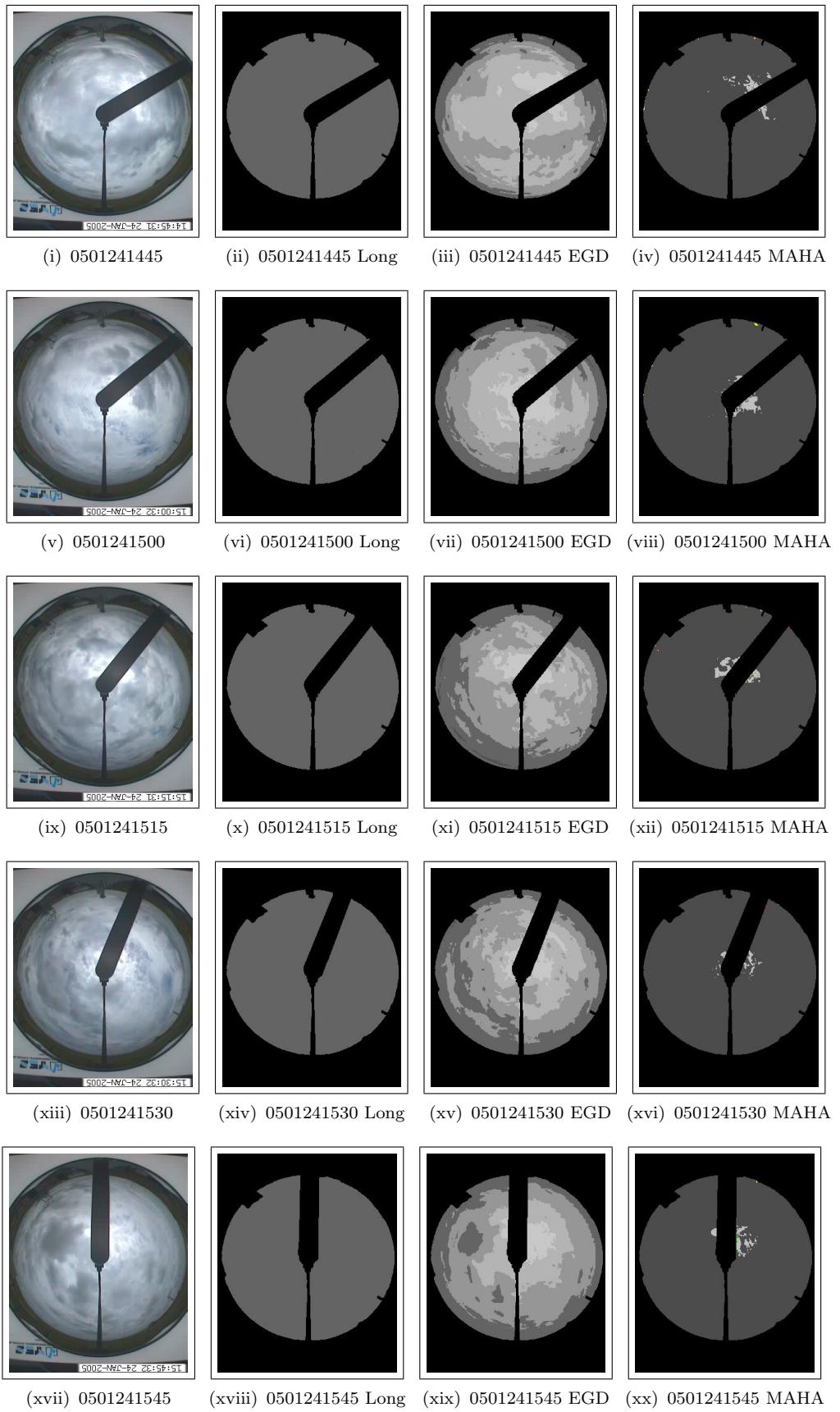


Figure A.268 - Sky images generated from 0501241445 to 0501241545.

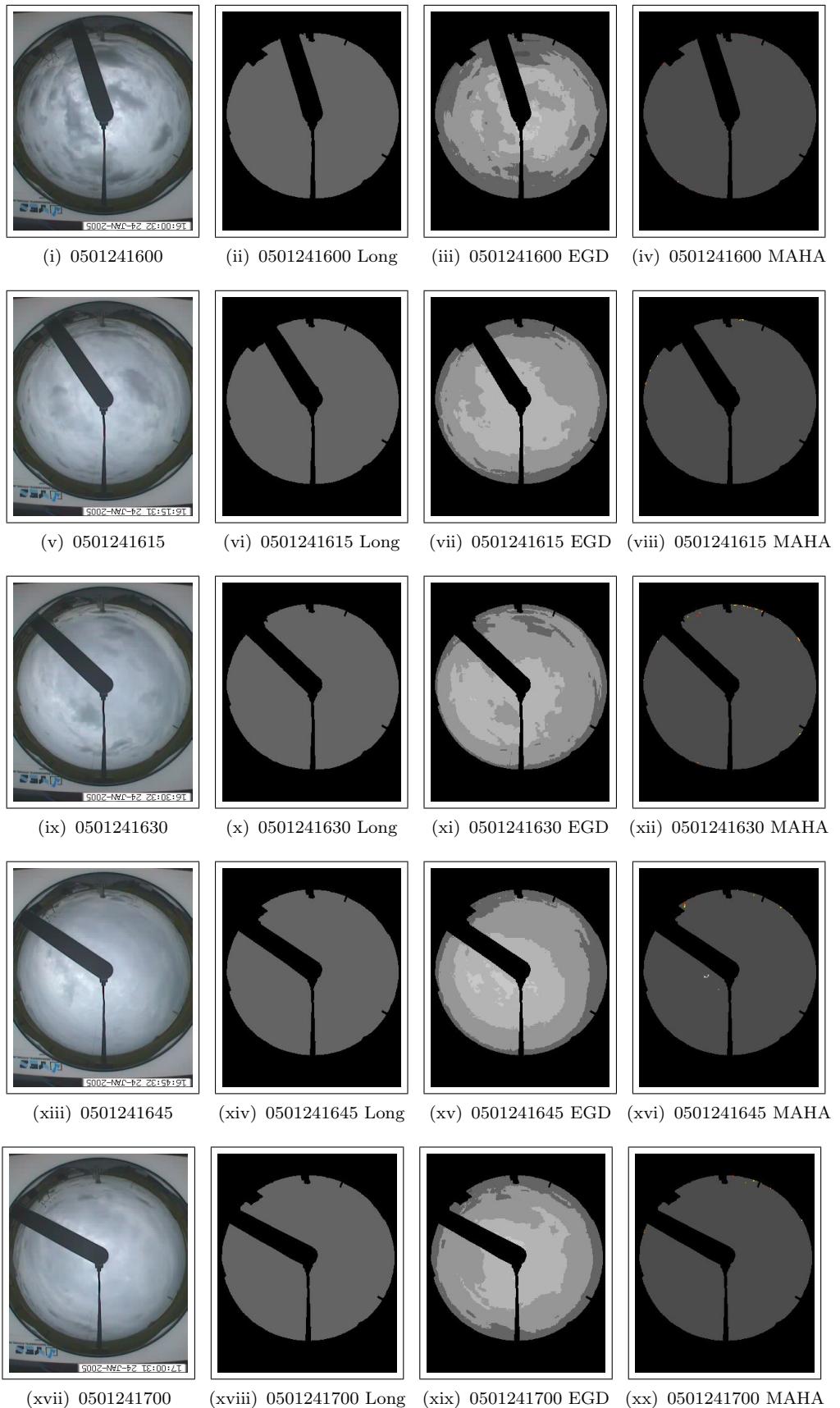


Figure A.269 - Sky images generated from 0501241600 to 0501241700.

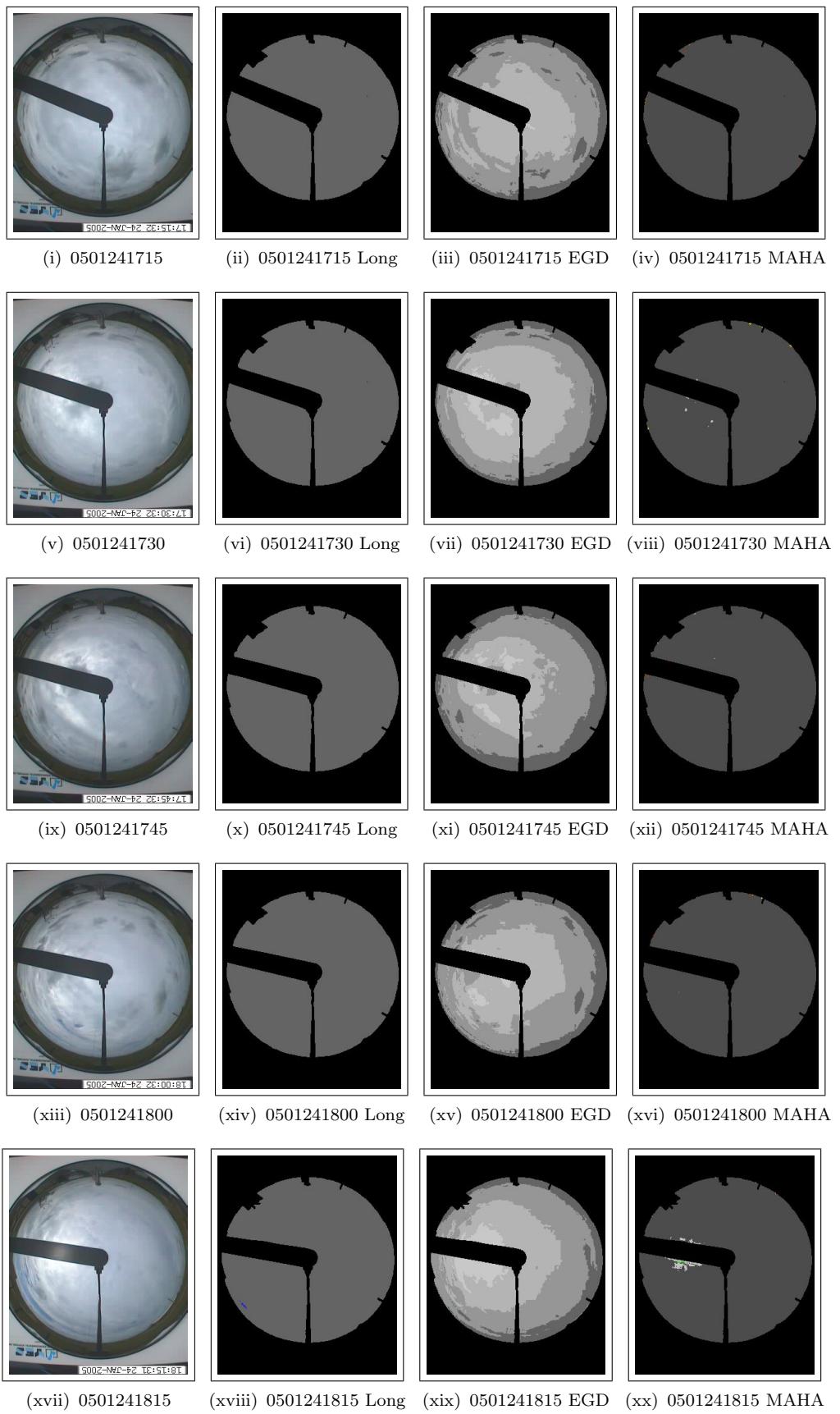


Figure A.270 - Sky images generated from 0501241715 to 0501241815.

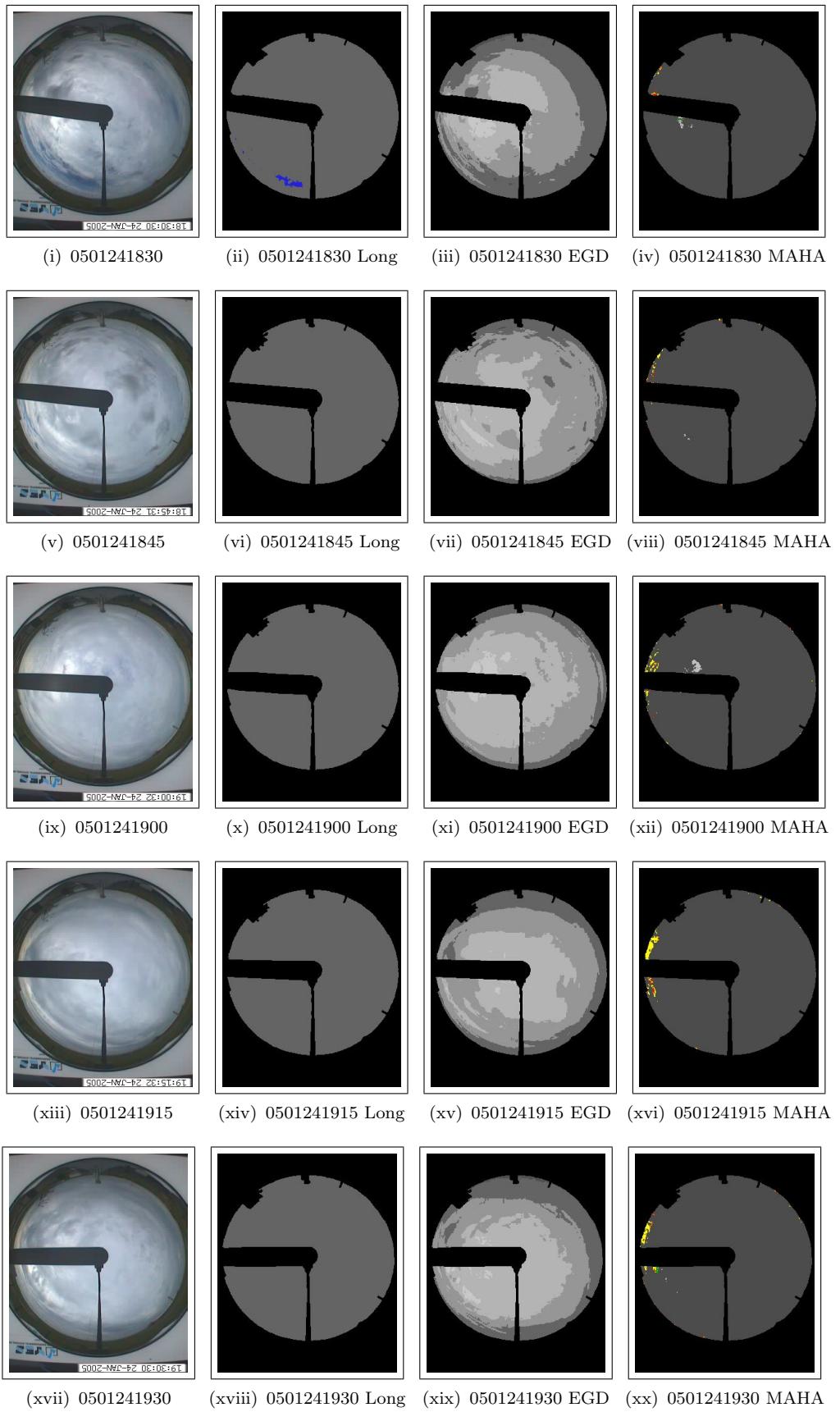


Figure A.271 - Sky images generated from 0501241830 to 0501241930.

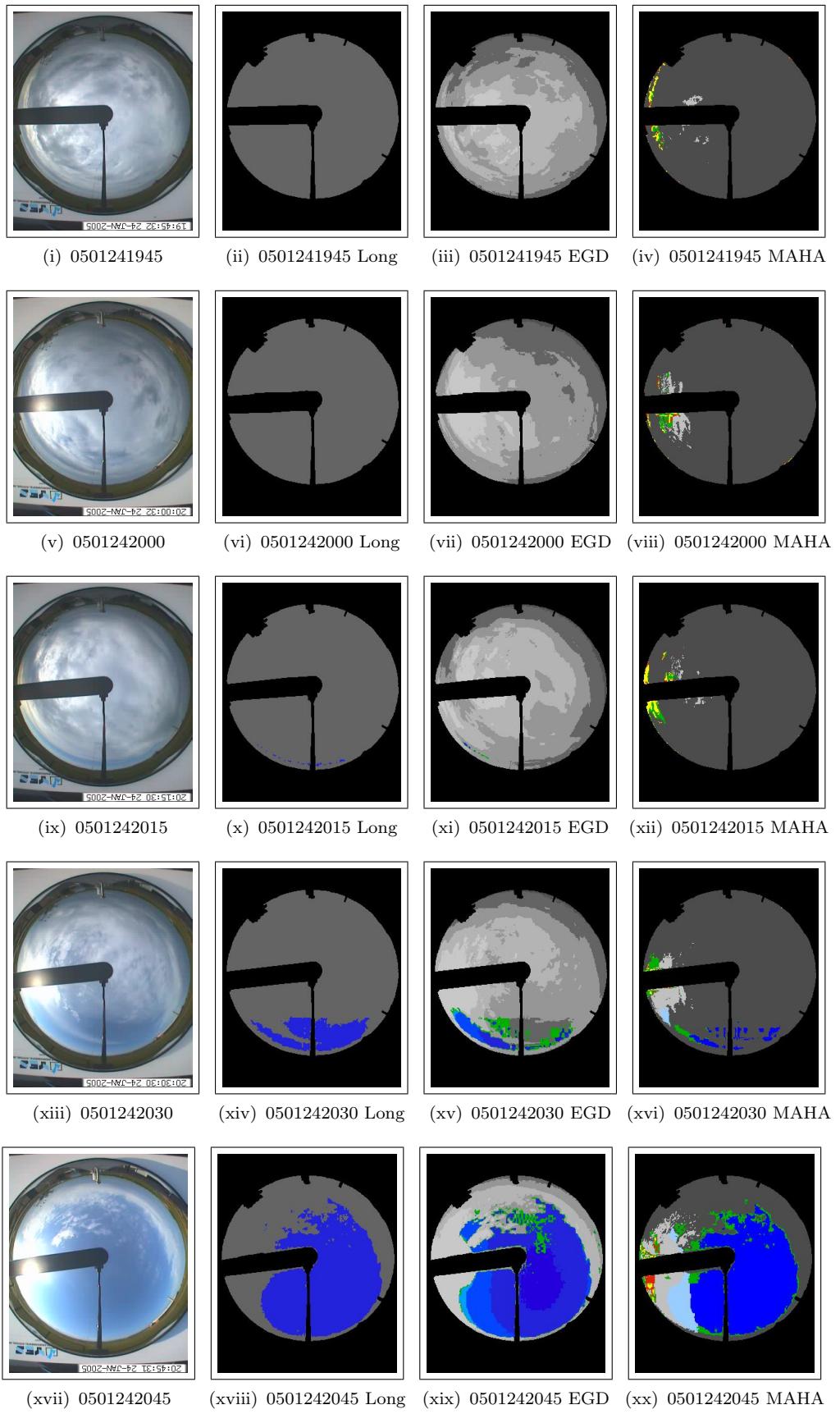


Figure A.272 - Sky images generated from 0501241945 to 0501242045.

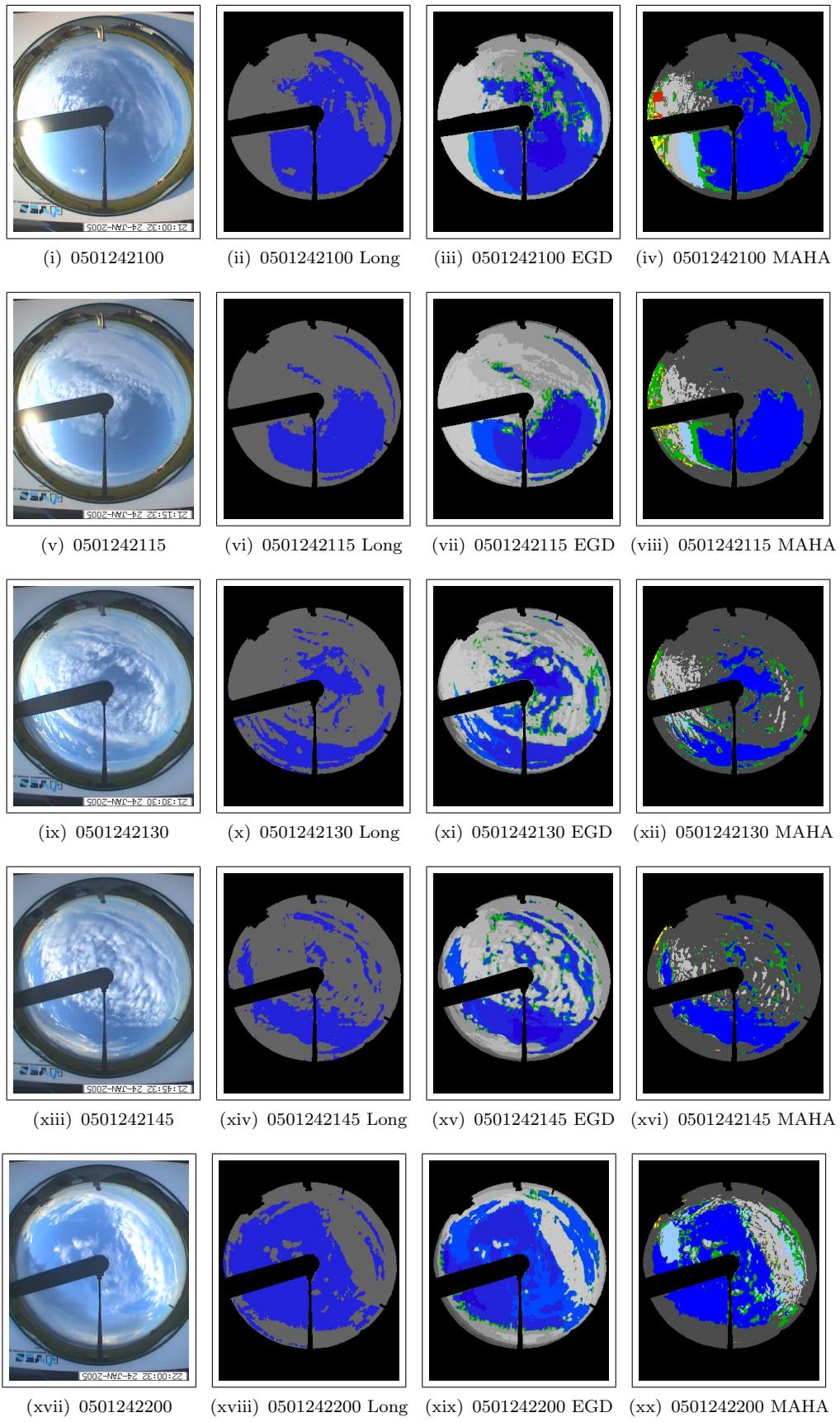


Figure A.273 - Sky images generated from 0501242100 to 0501242200.

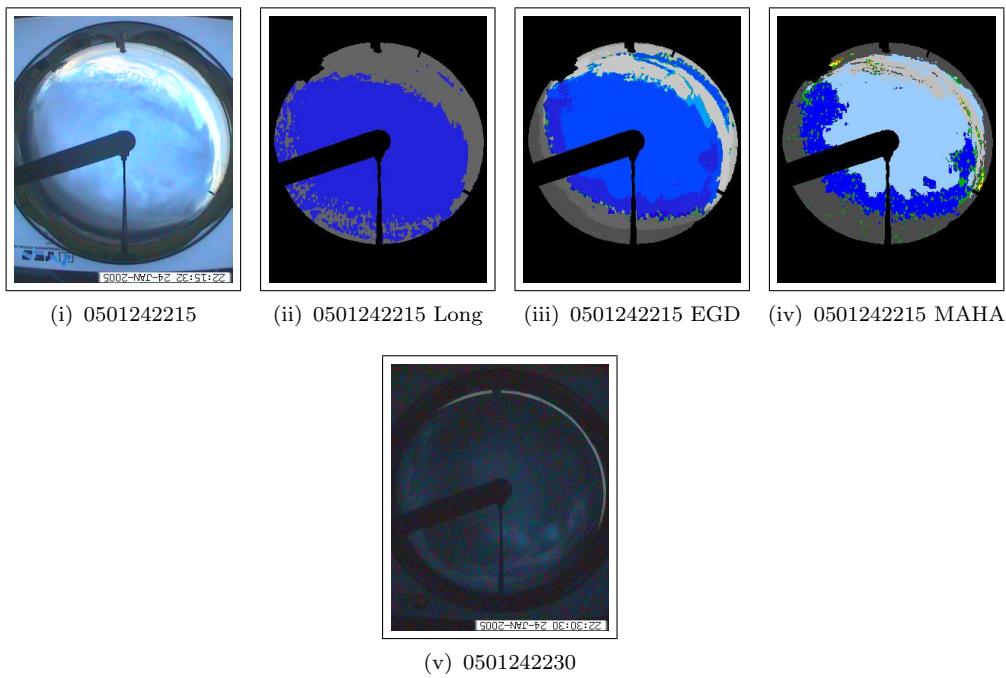


Figure A.274 - Sky images generated from 0501241600 to 0501242245.

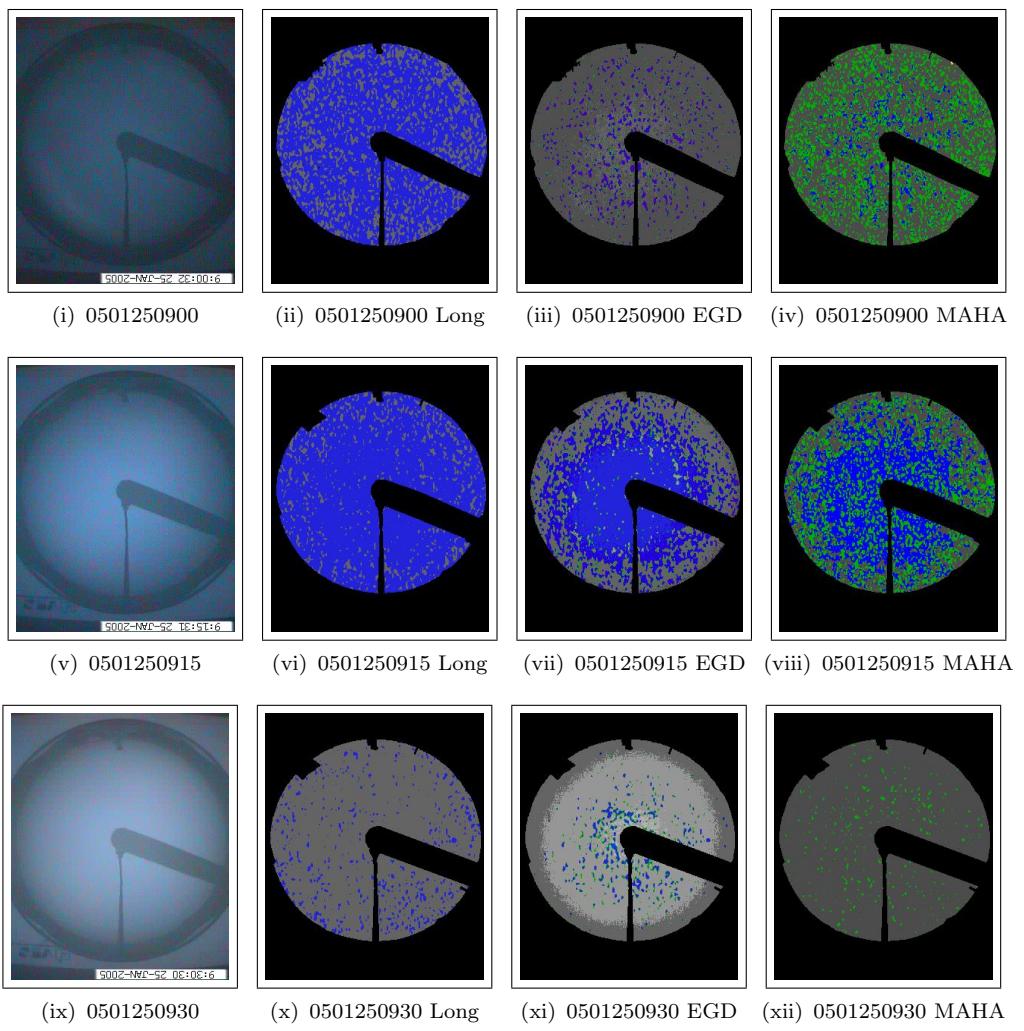


Figure A.275 - Sky images generated from 0501250900 to 0501250930.

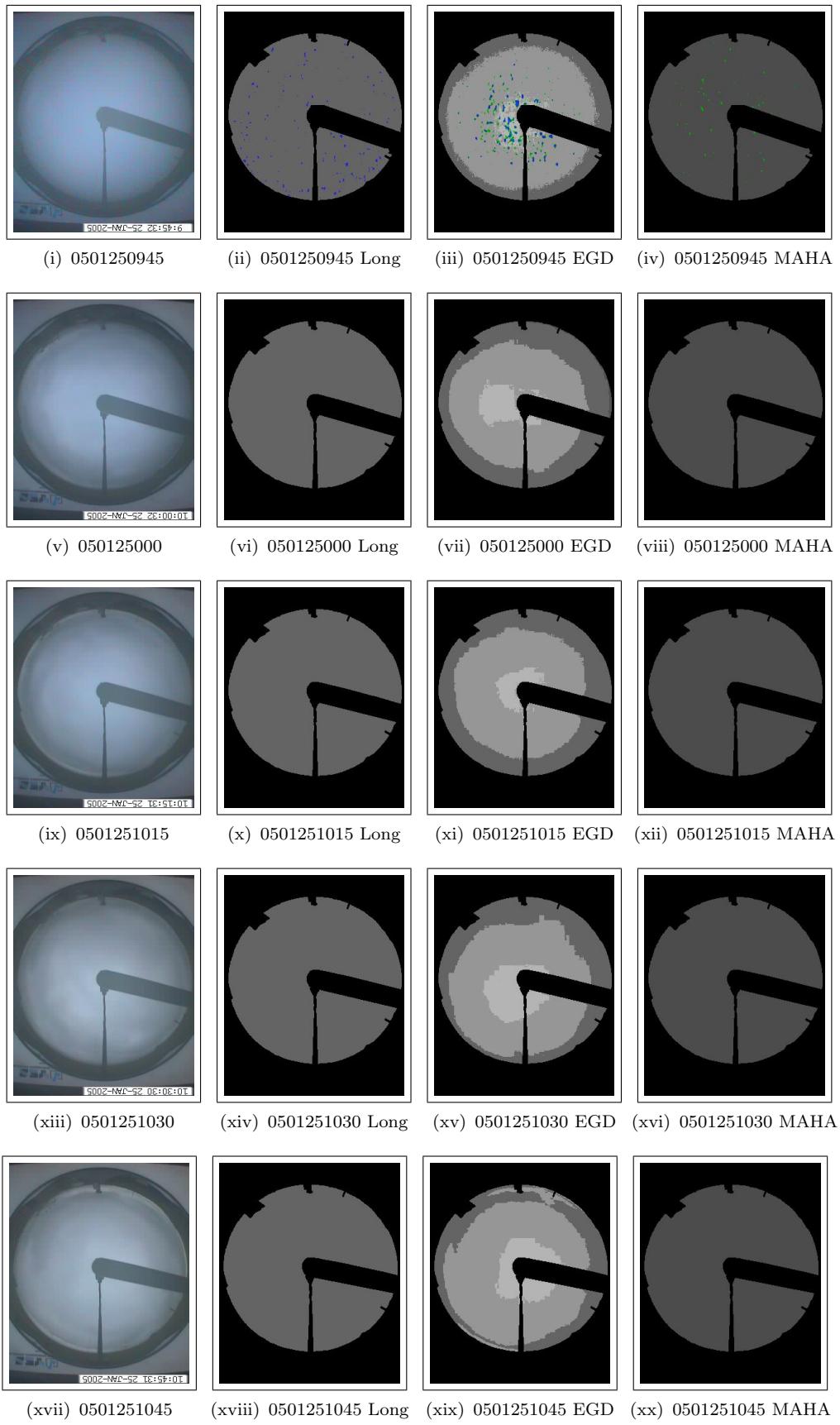


Figure A.276 - Sky images generated from 0501250945 to 0501251045.

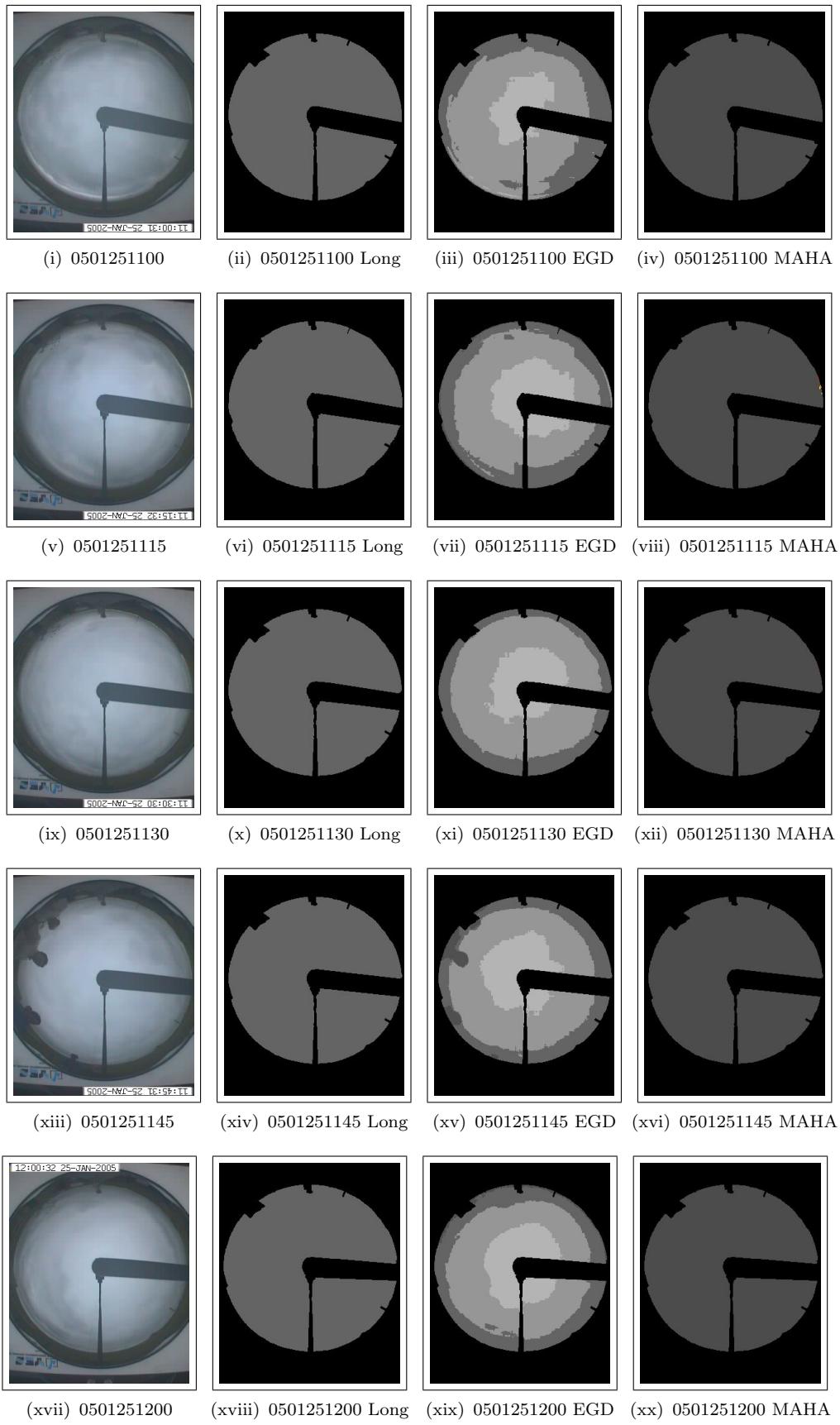


Figure A.277 - Sky images generated from 050125100 to 0501251200.

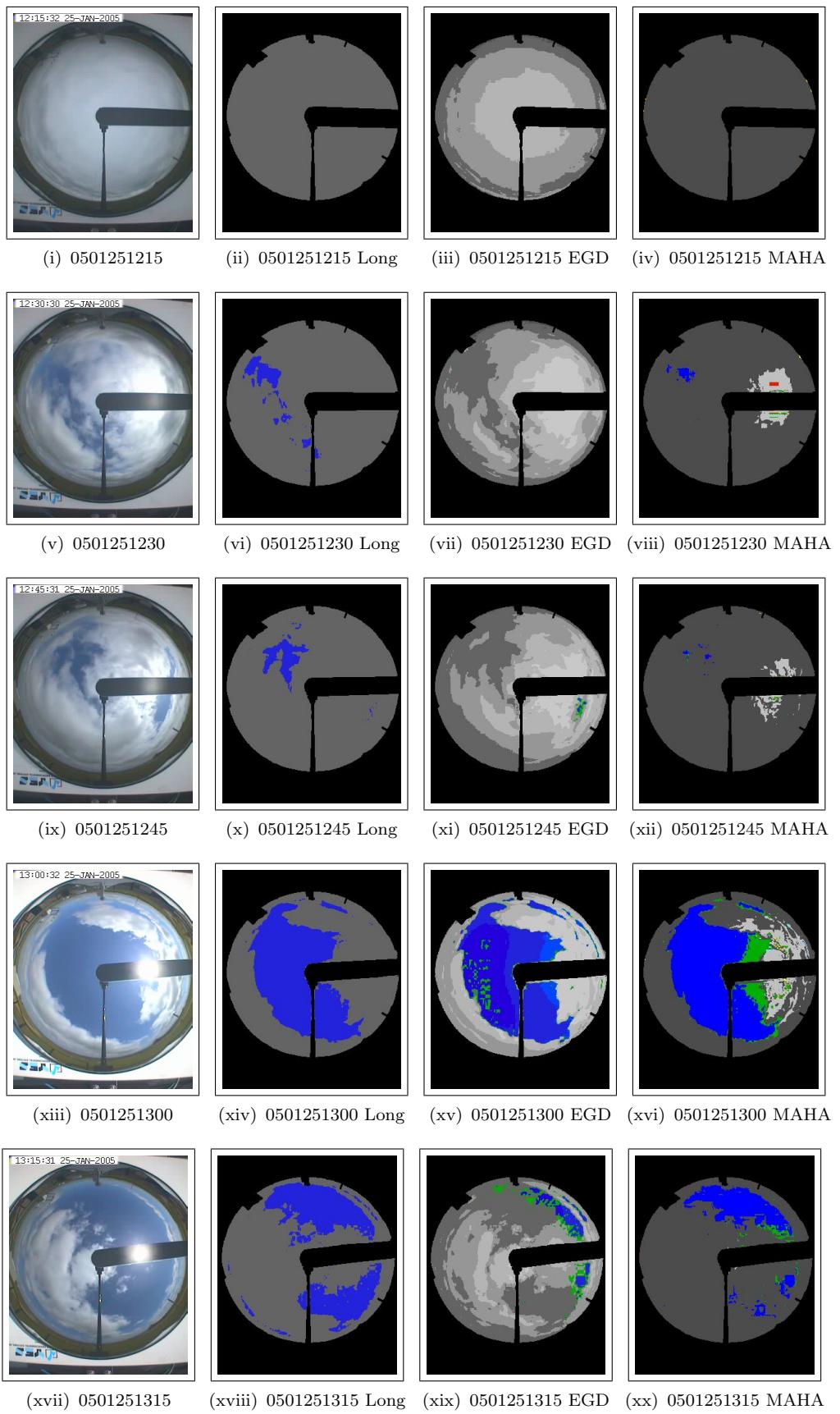


Figure A.278 - Sky images generated from 0501251215 to 0501251315.

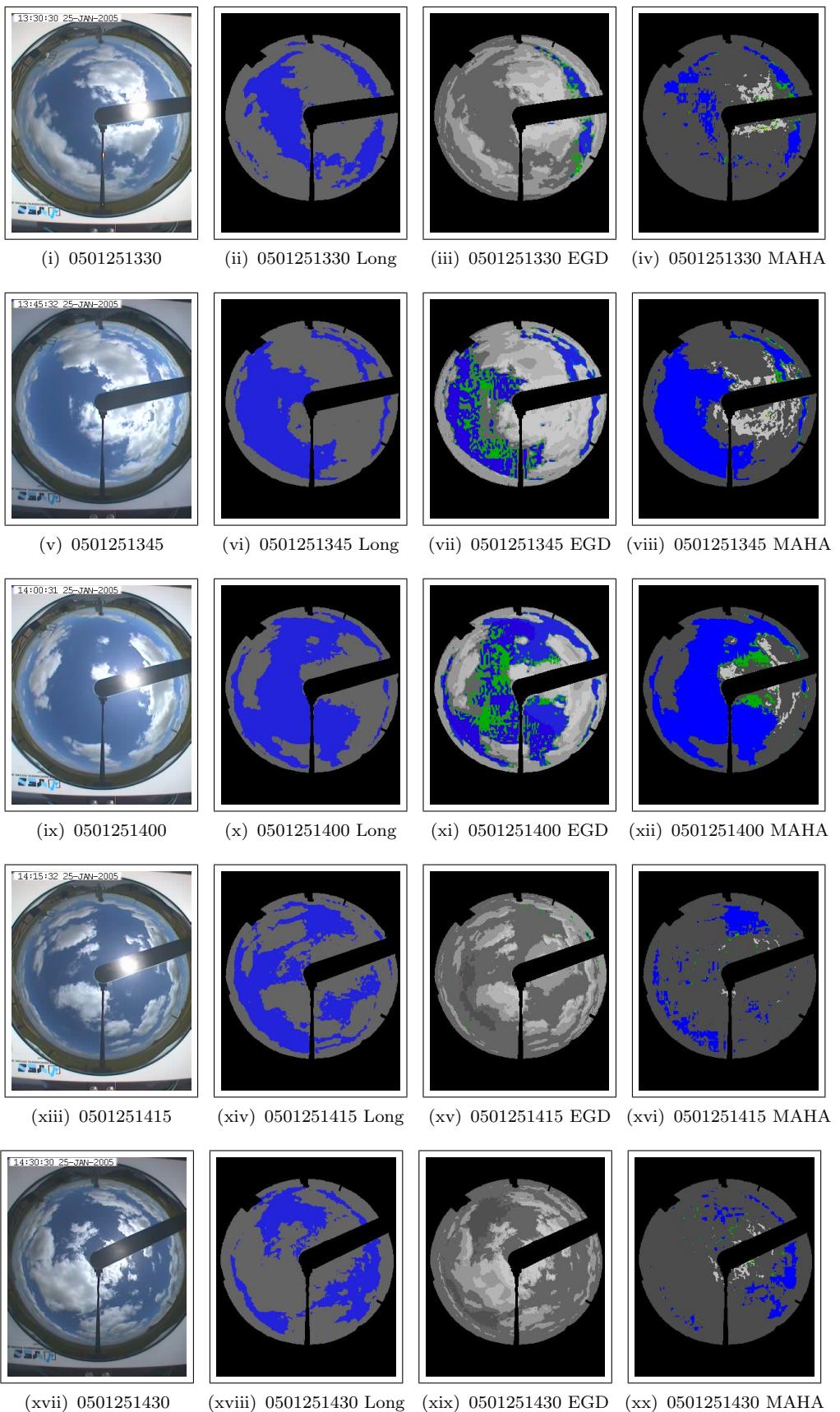


Figure A.279 - Sky images generated from 0501251330 to 0501251430.

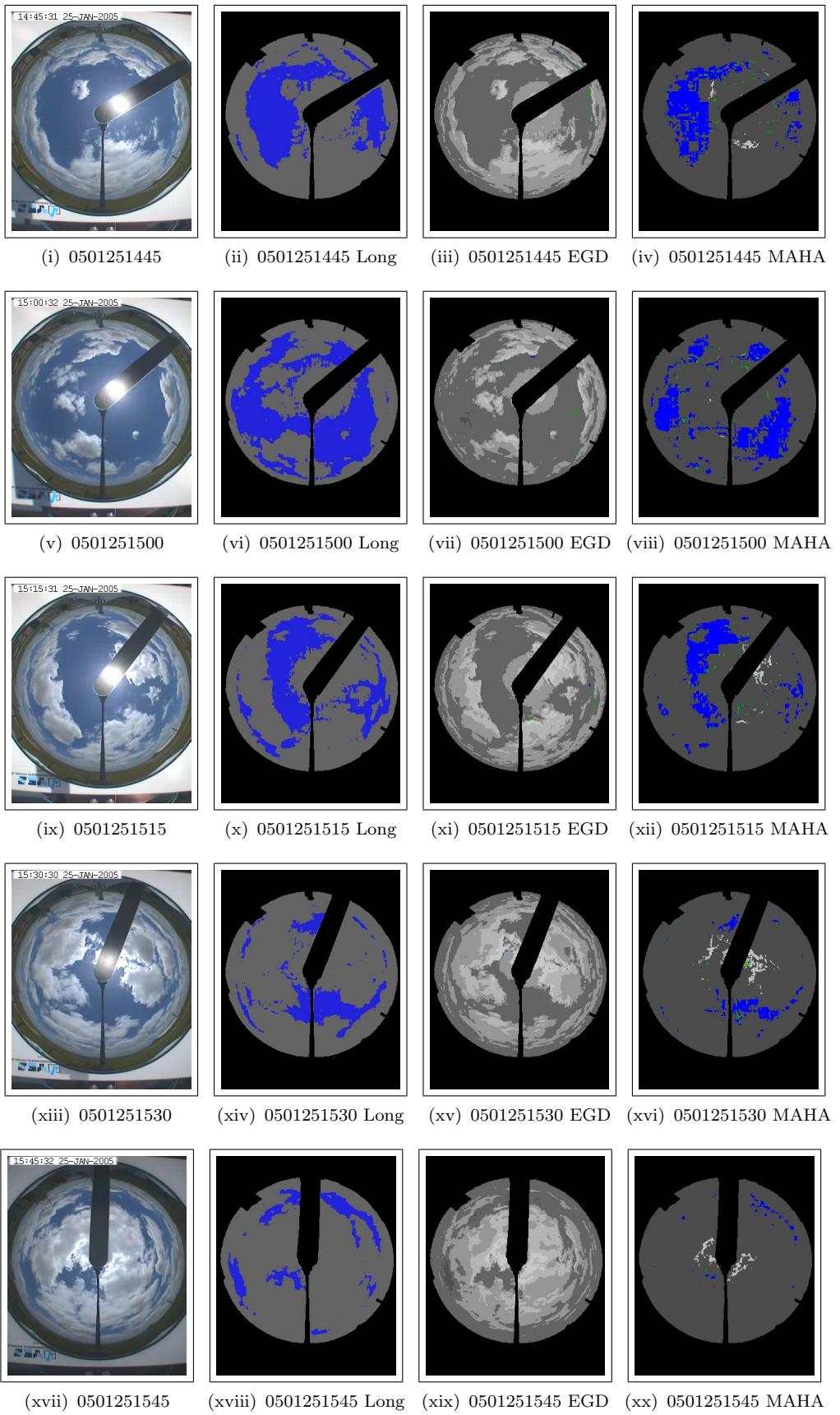


Figure A.280 - Sky images generated from 0501251445 to 0501251545.

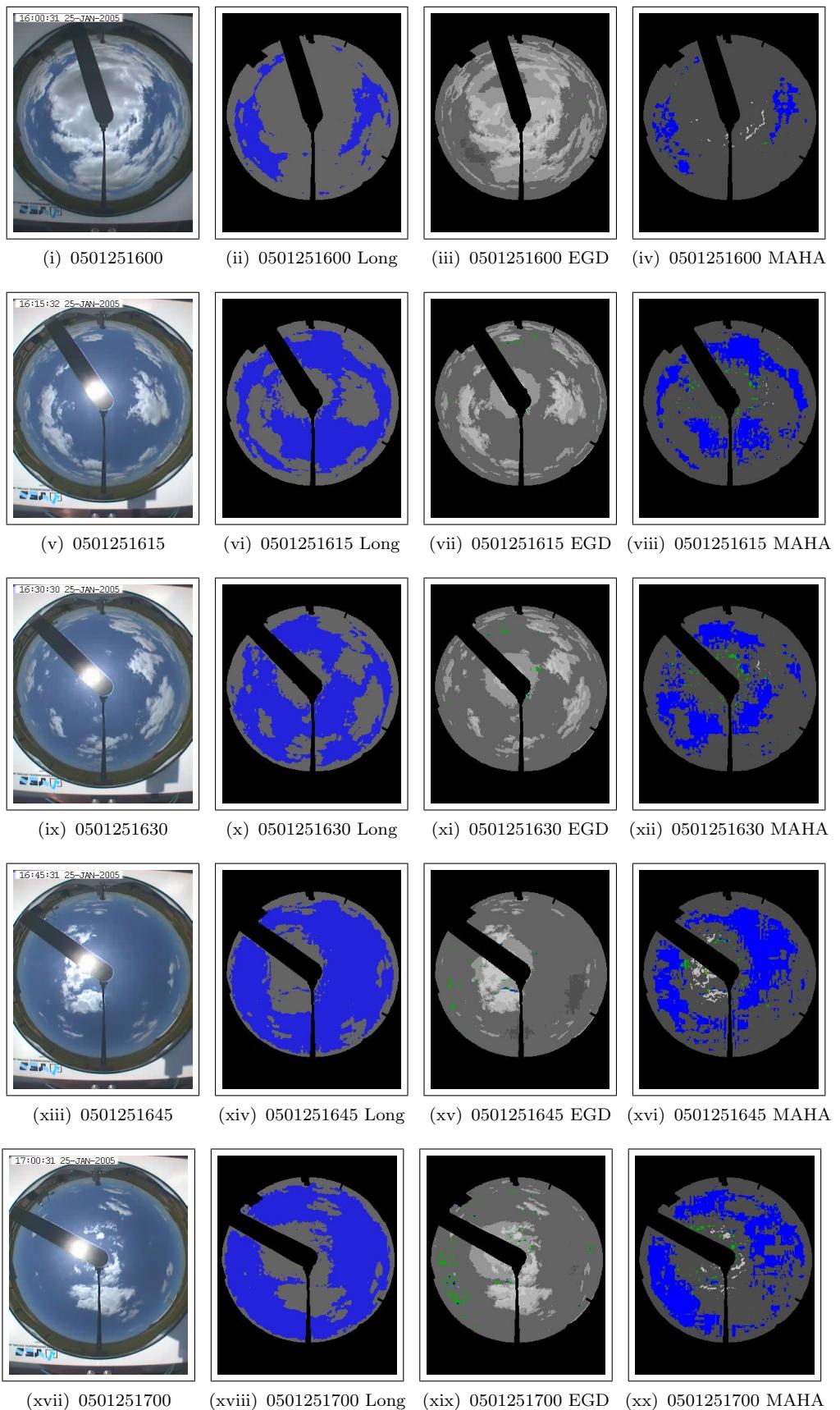


Figure A.281 - Sky images generated from 0501251600 to 0501251700.

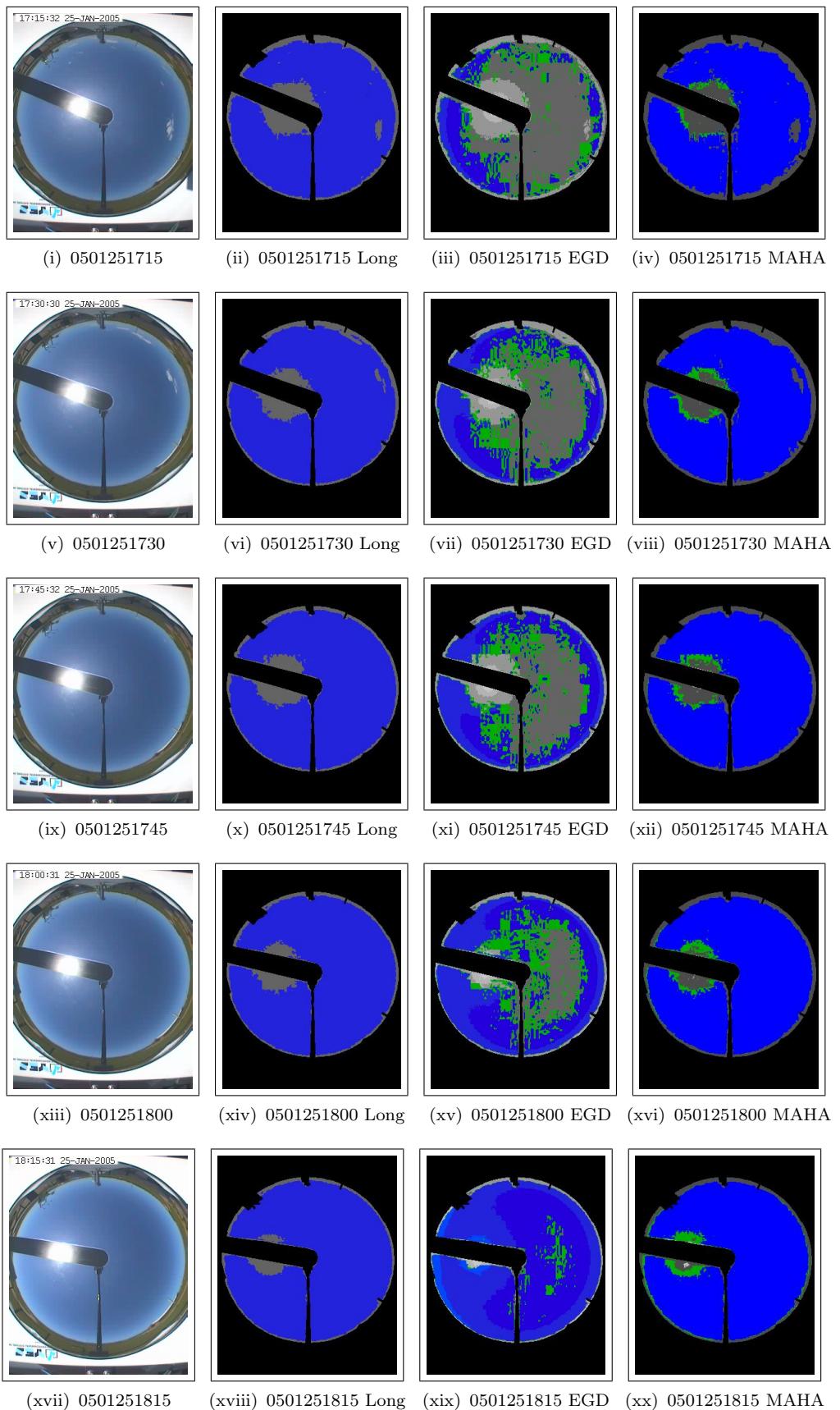


Figure A.282 - Sky images generated from 0501251715 to 0501251815.

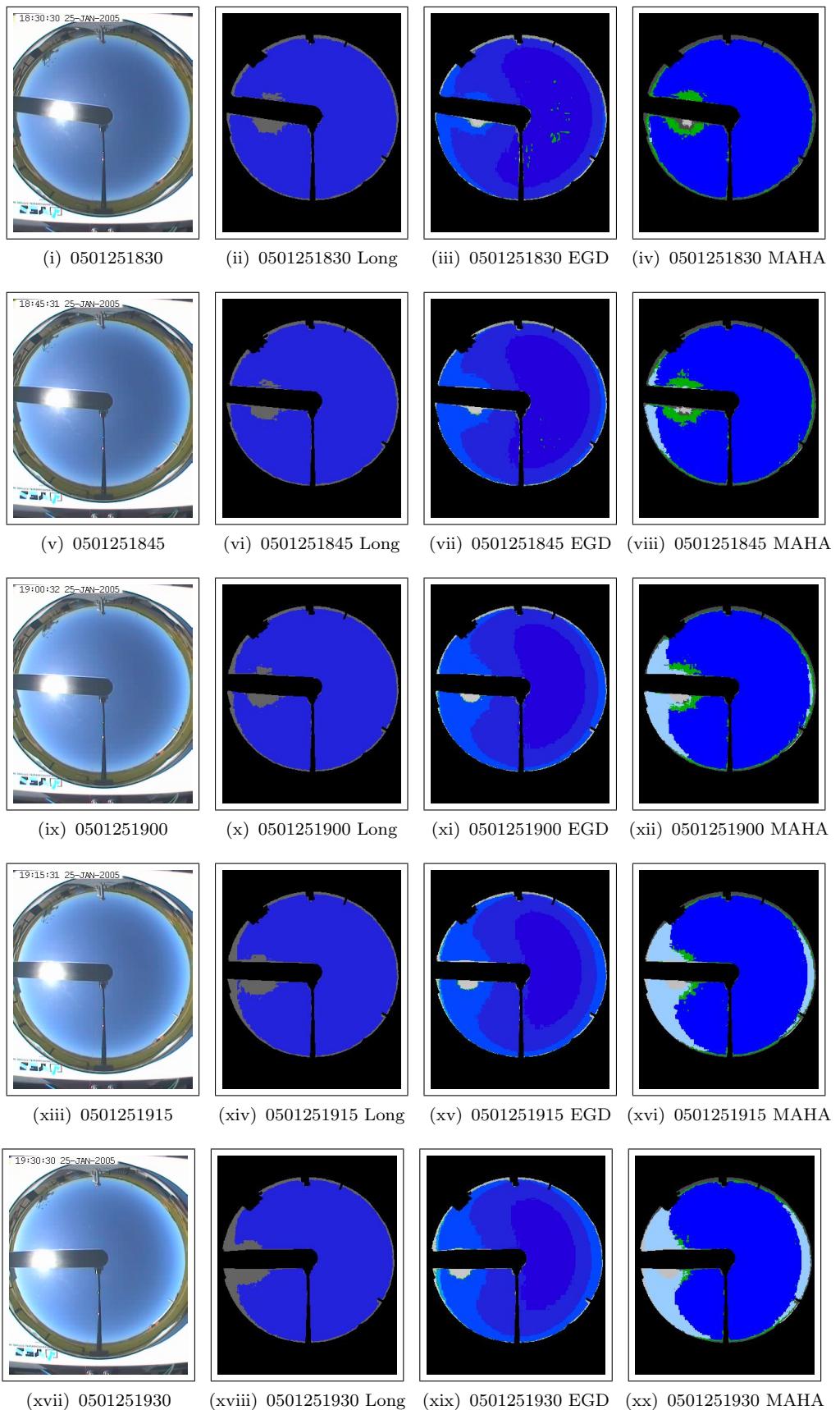


Figure A.283 - Sky images generated from 0501251830 to 0501251930.

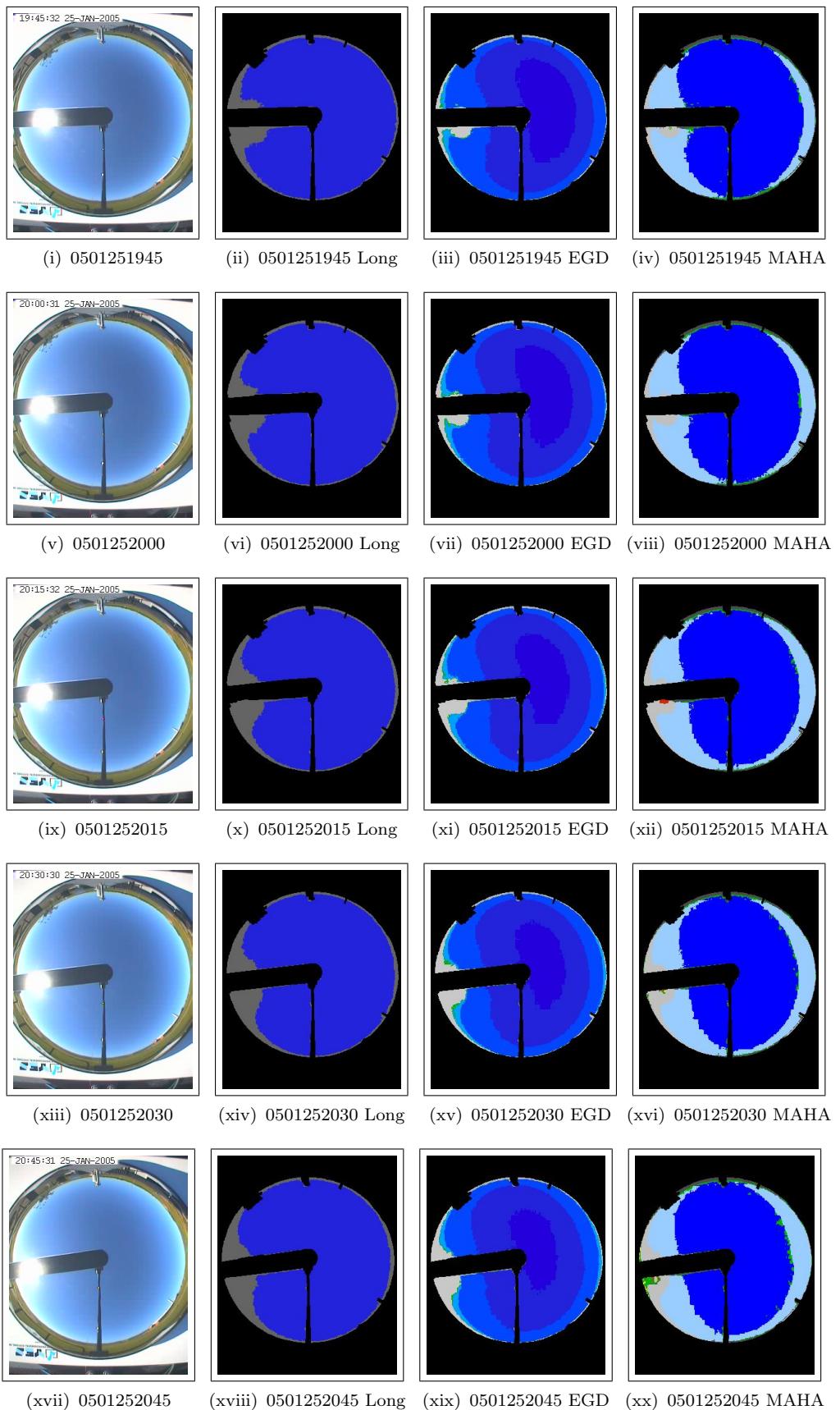


Figure A.284 - Sky images generated from 0501251945 to 0501252045.

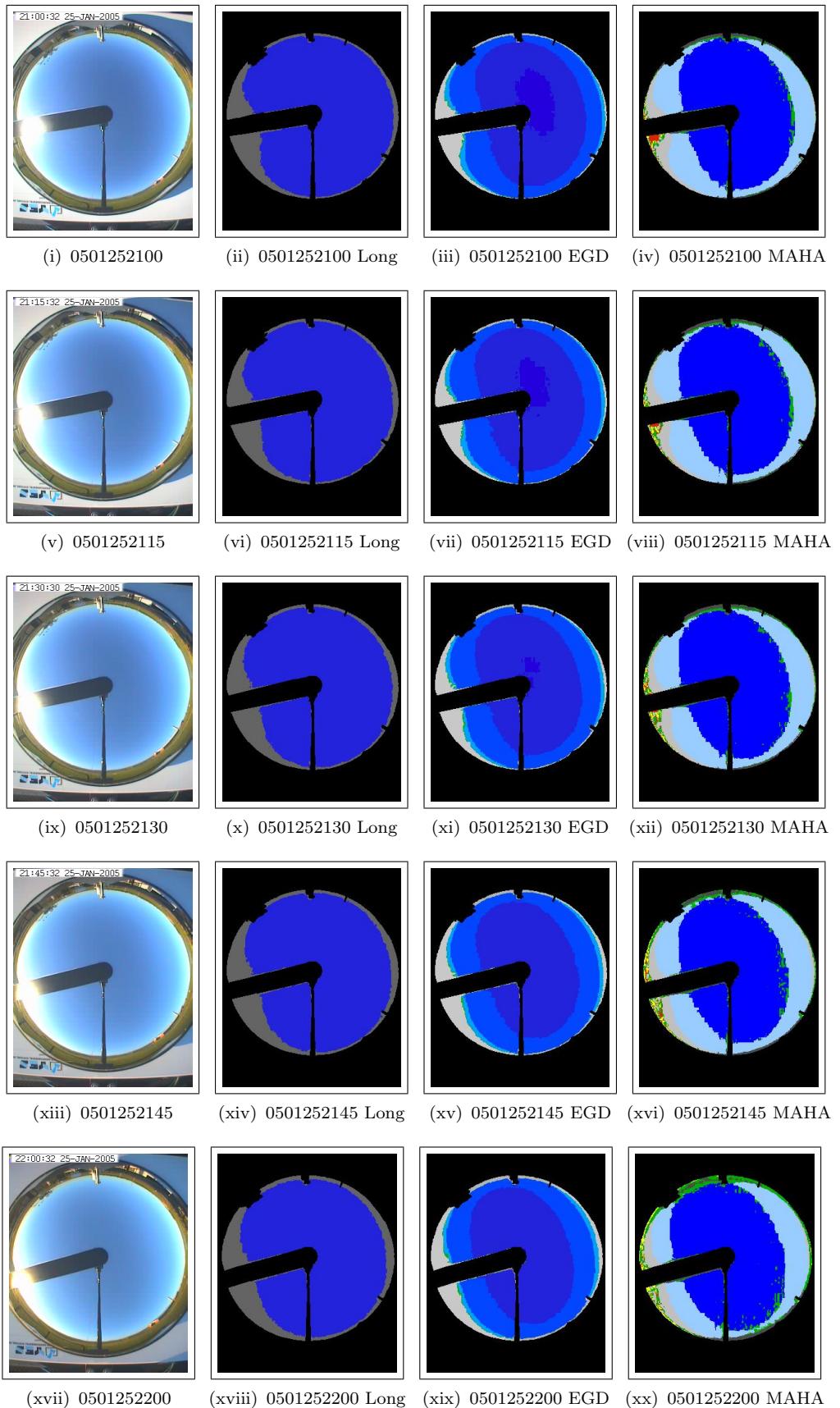


Figure A.285 - Sky images generated from 0501252100 to 0501252200.

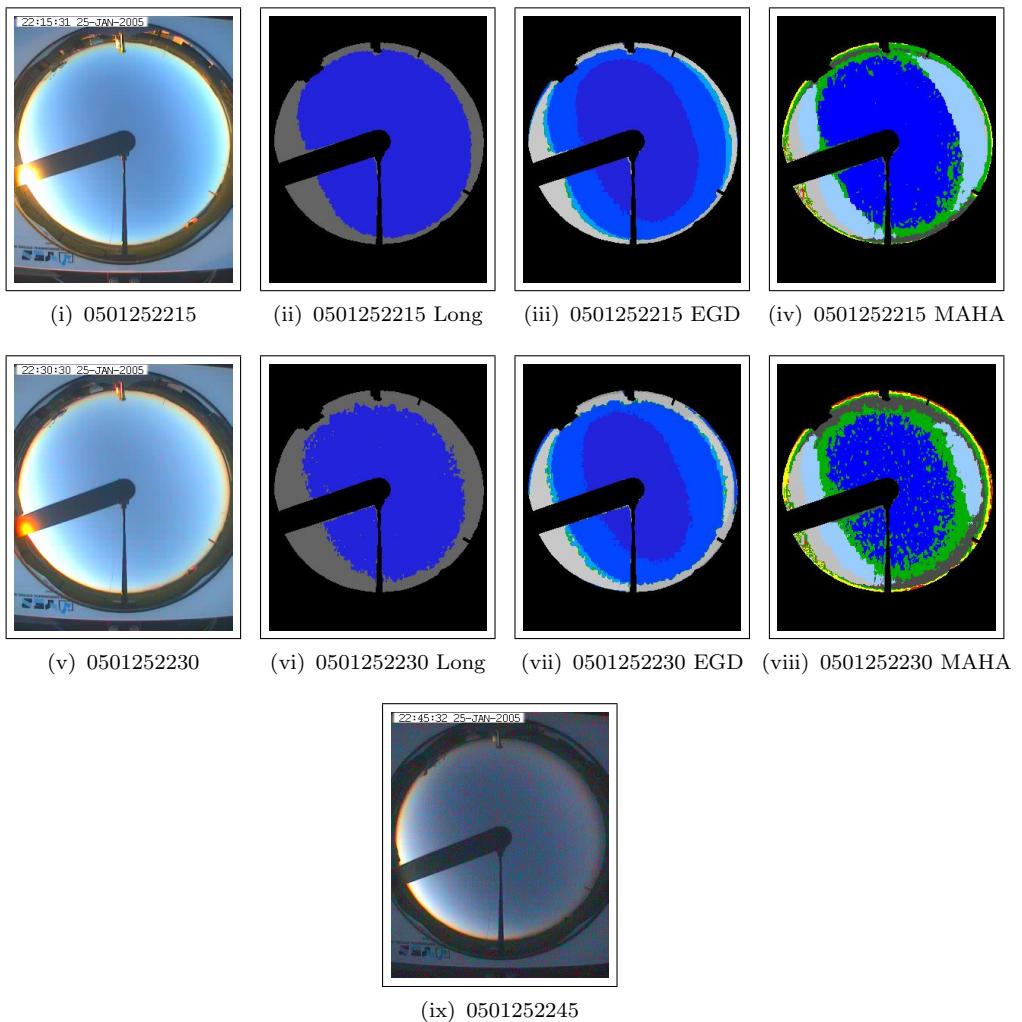


Figure A.286 - Sky images generated from 0501251600 to 0501252245.

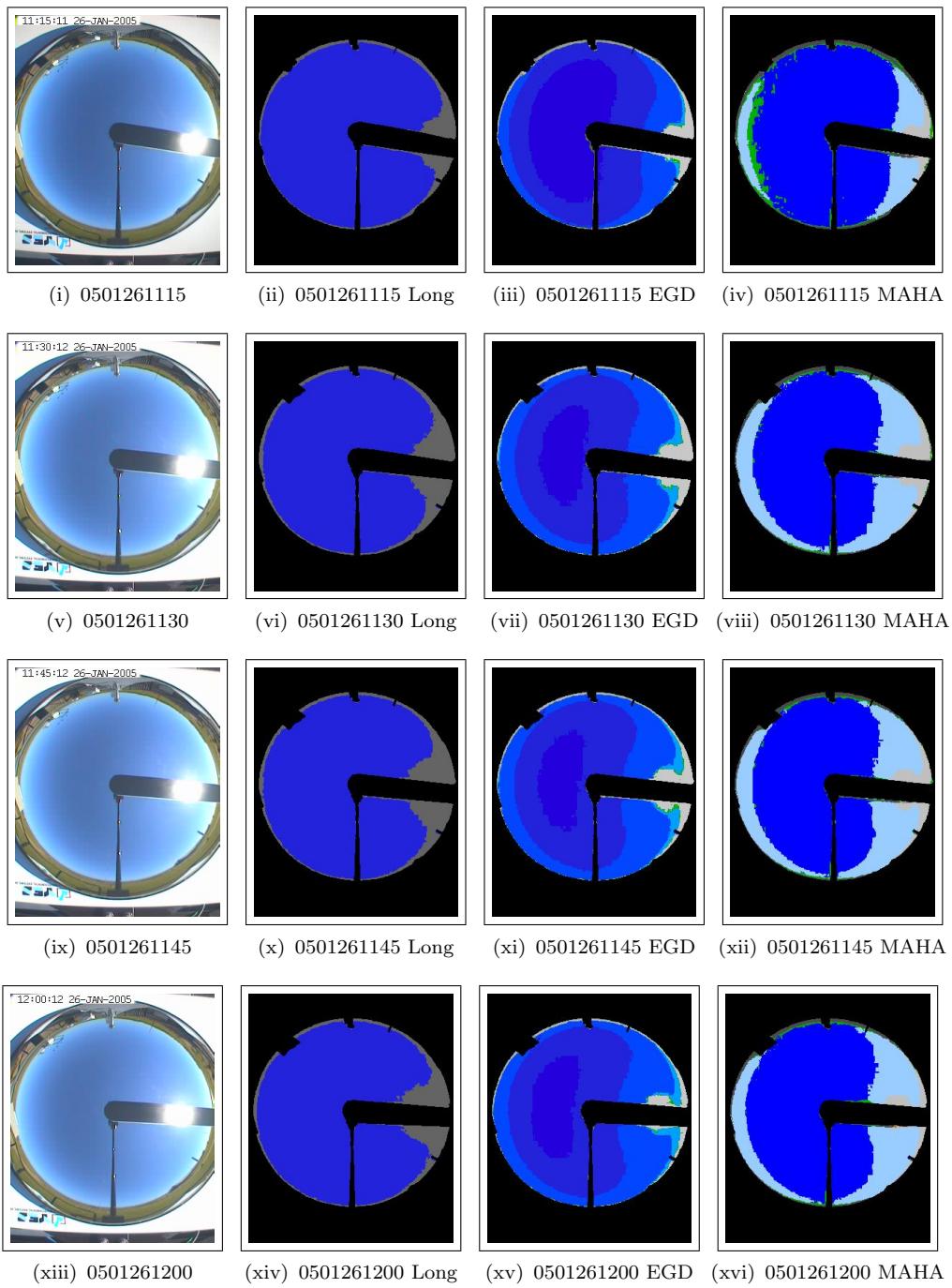


Figure A.287 - Sky images generated from 0501261115 to 0501261200.

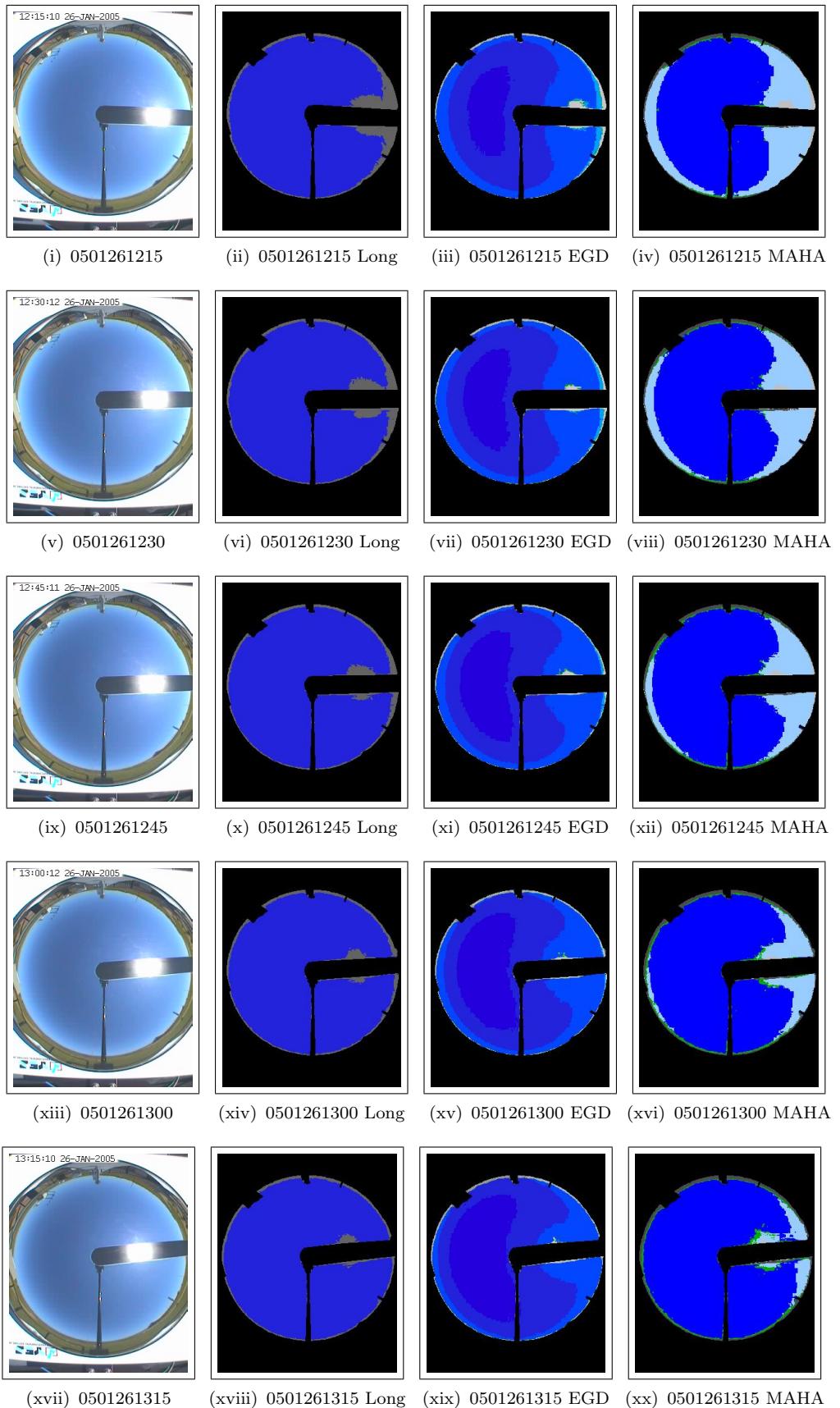


Figure A.288 - Sky images generated from 0501261215 to 0501261315.

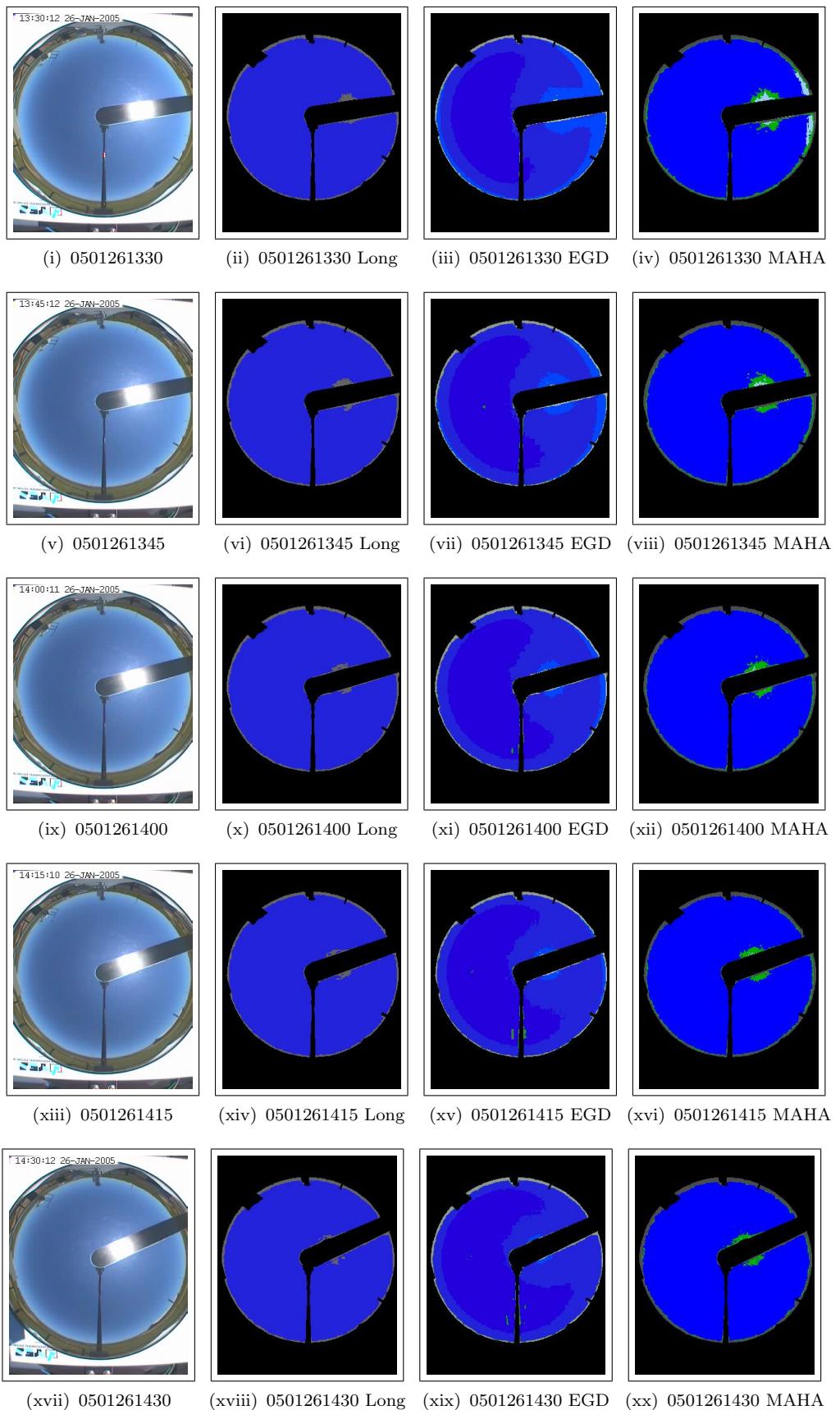


Figure A.289 - Sky images generated from 0501261330 to 0501261430.

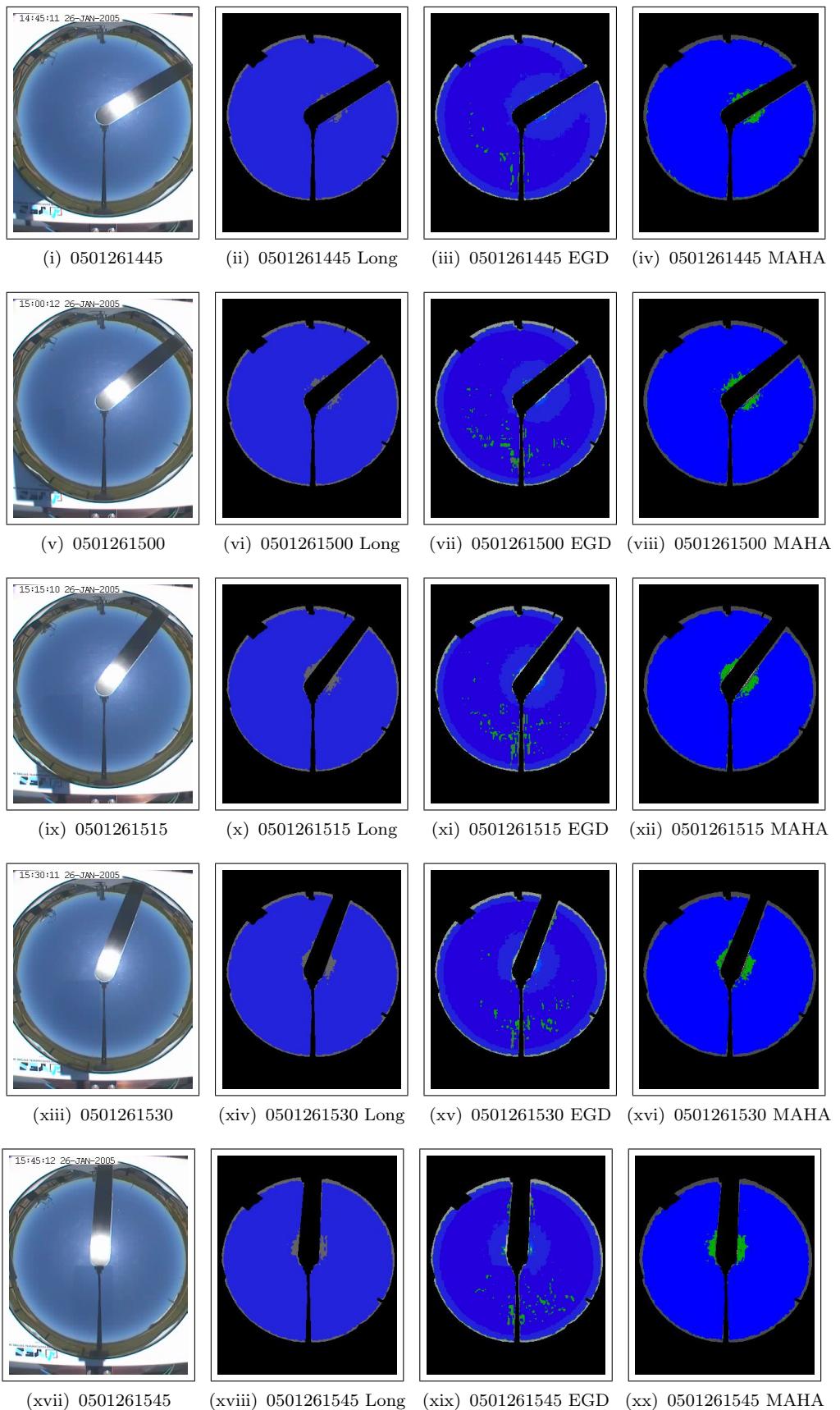


Figure A.290 - Sky images generated from 0501261445 to 0501261545.

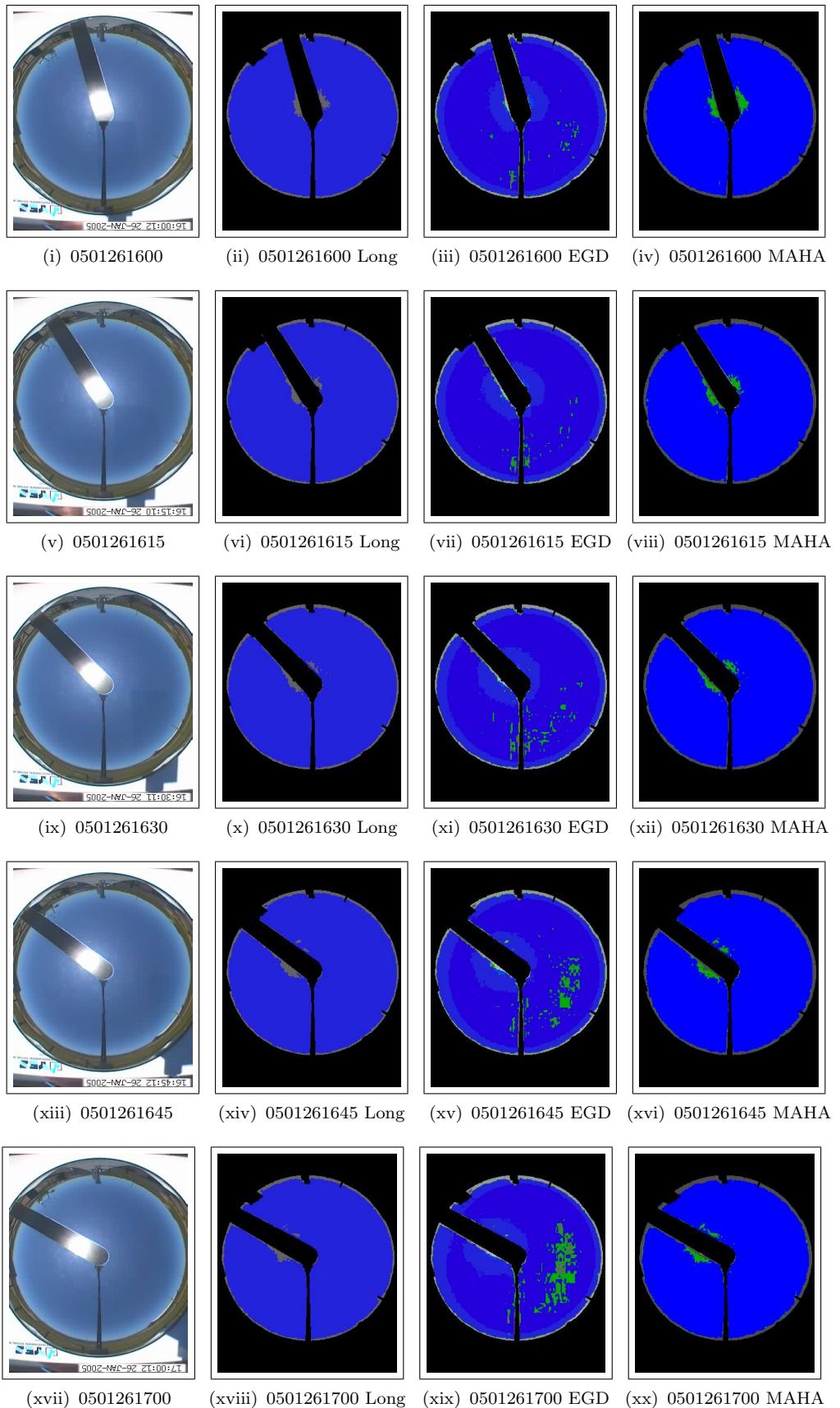


Figure A.291 - Sky images generated from 0501261600 to 0501261700.

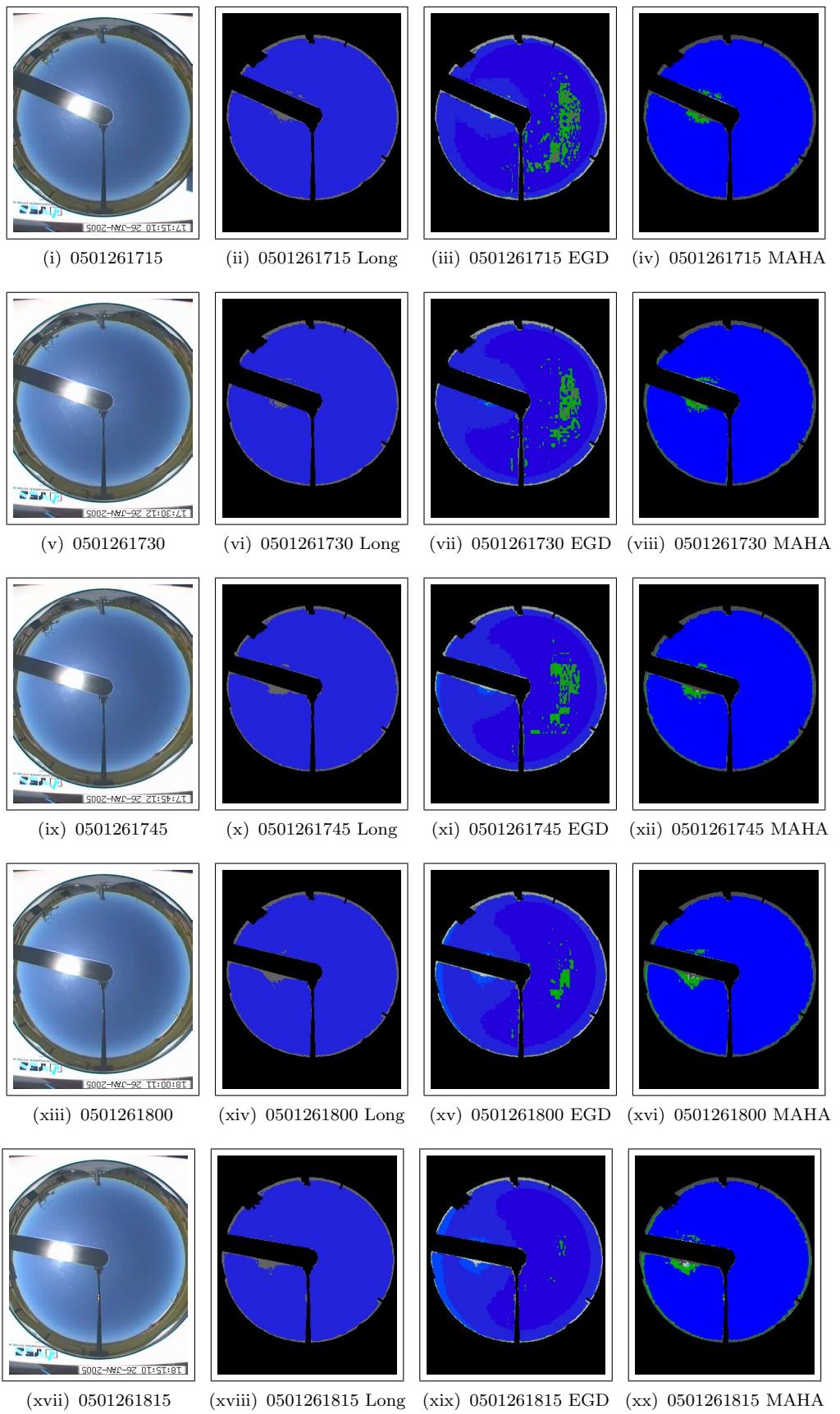


Figure A.292 - Sky images generated from 0501261715 to 0501261815.

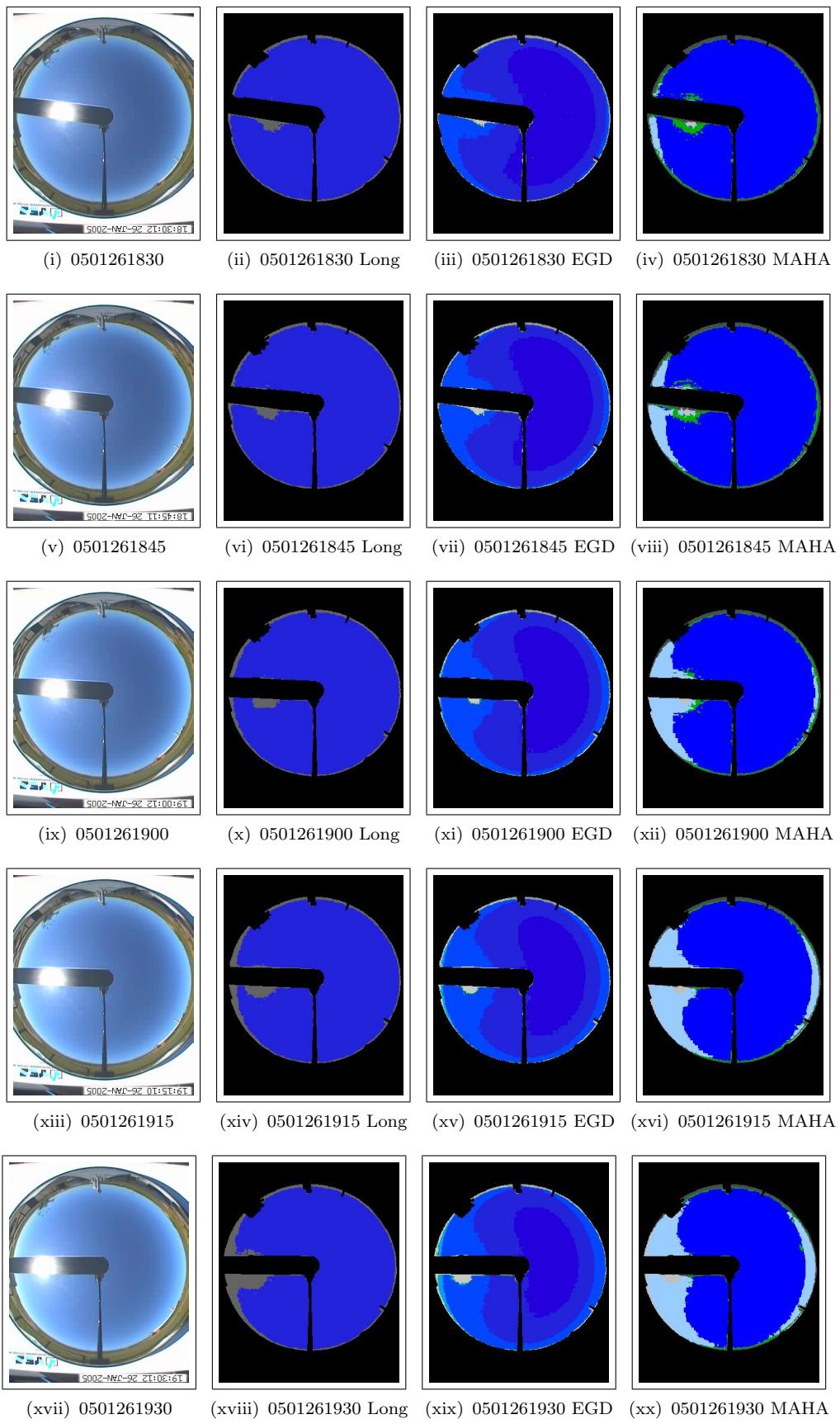


Figure A.293 - Sky images generated from 0501261830 to 0501261930.

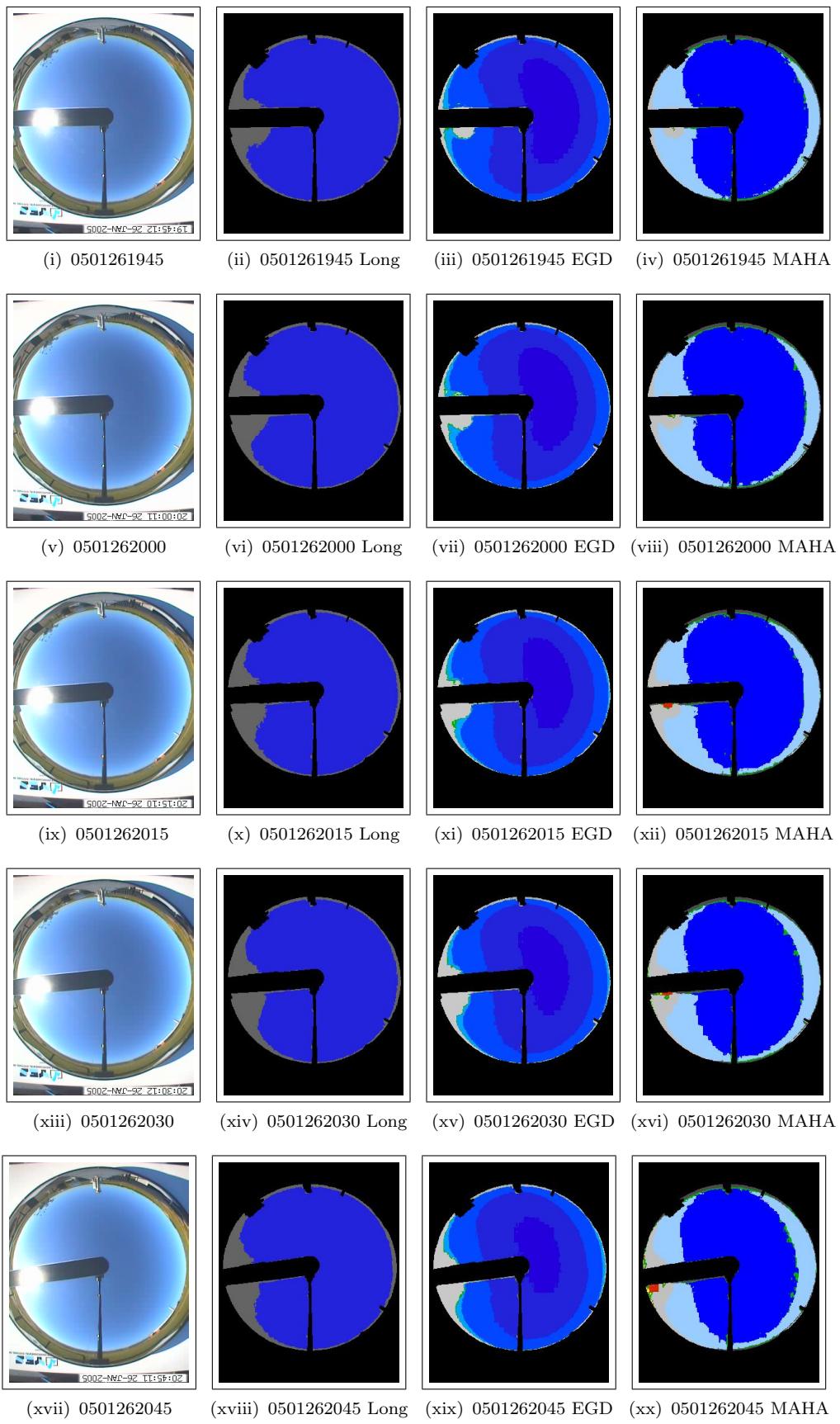


Figure A.294 - Sky images generated from 0501261945 to 0501262045.

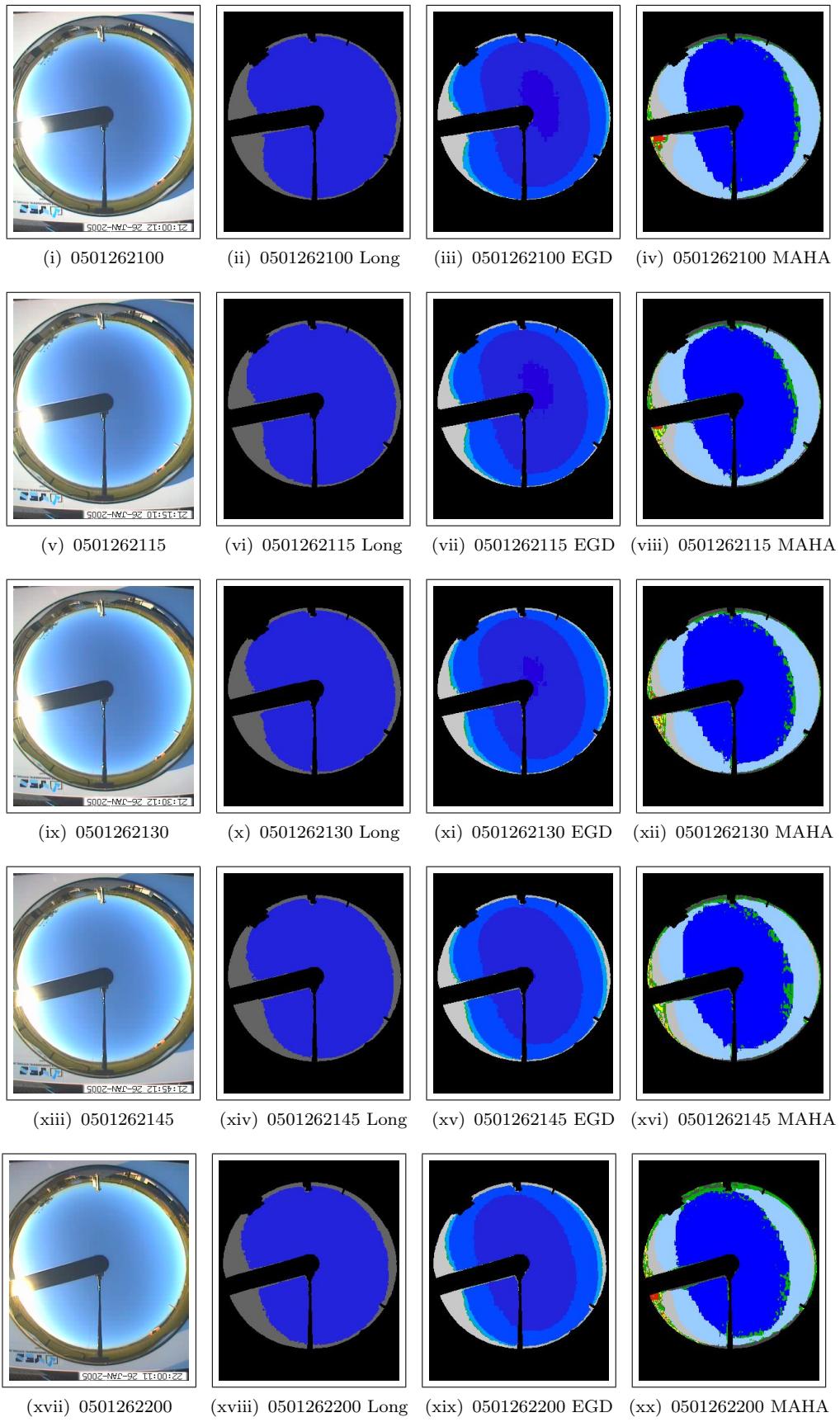
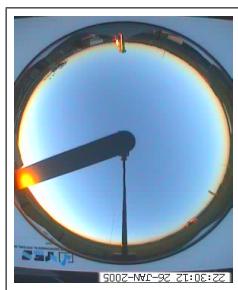
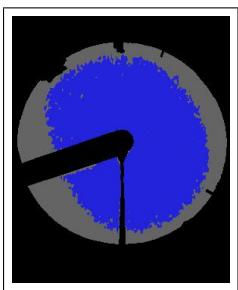


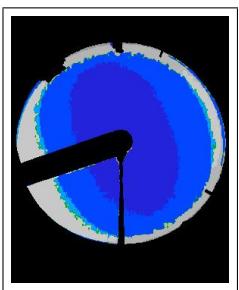
Figure A.295 - Sky images generated from 0501262100 to 0501262200.



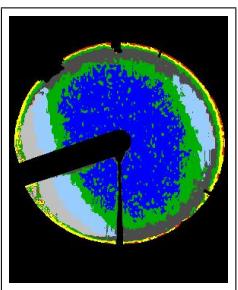
(i) 0501262230



(ii) 0501262230 Long



(iii) 0501262230 EGD



(iv) 0501262230 MAHA



(v) 0501262245

Figure A.296 - Sky images generated for 0501262230.

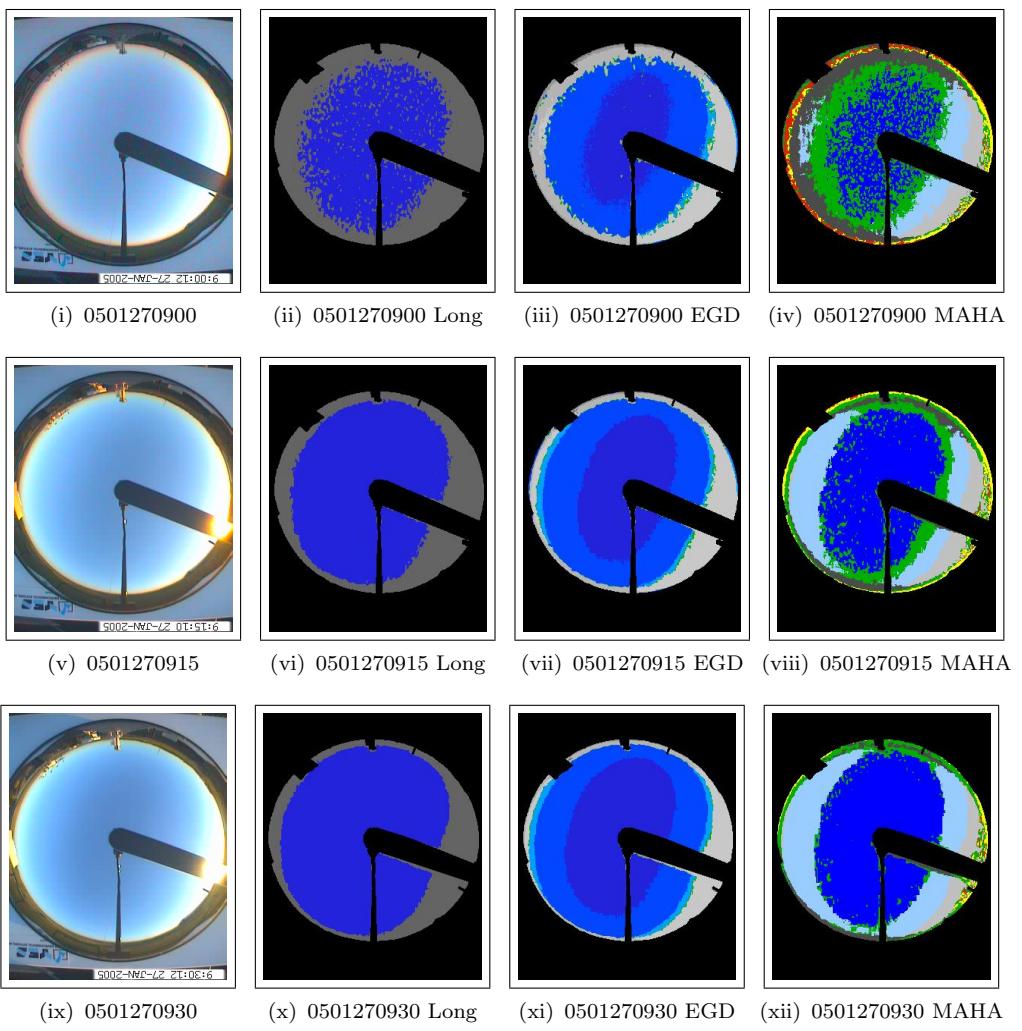


Figure A.297 - Sky images generated from 0501270900 to 0501270930.

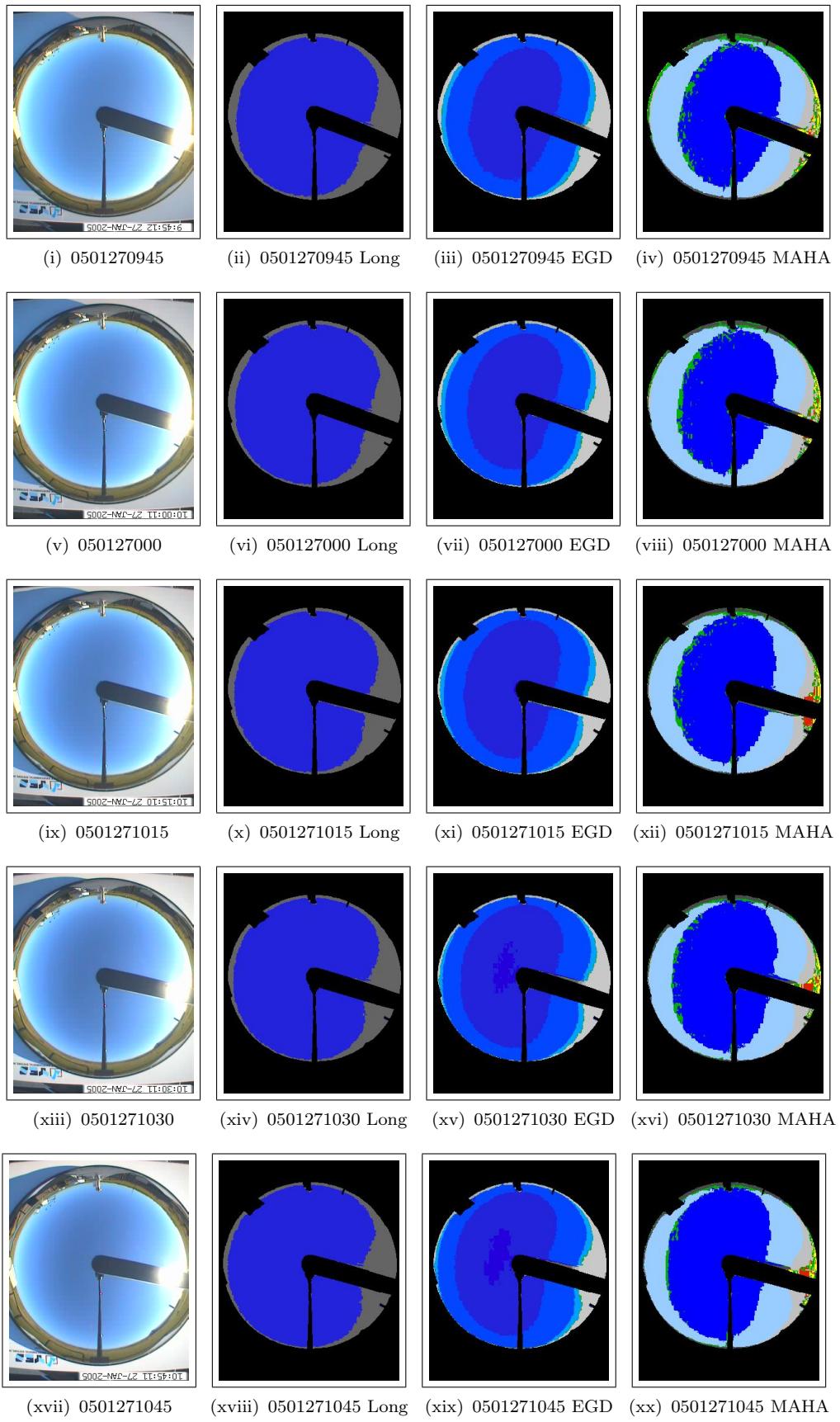


Figure A.298 - Sky images generated from 0501270945 to 0501271045.

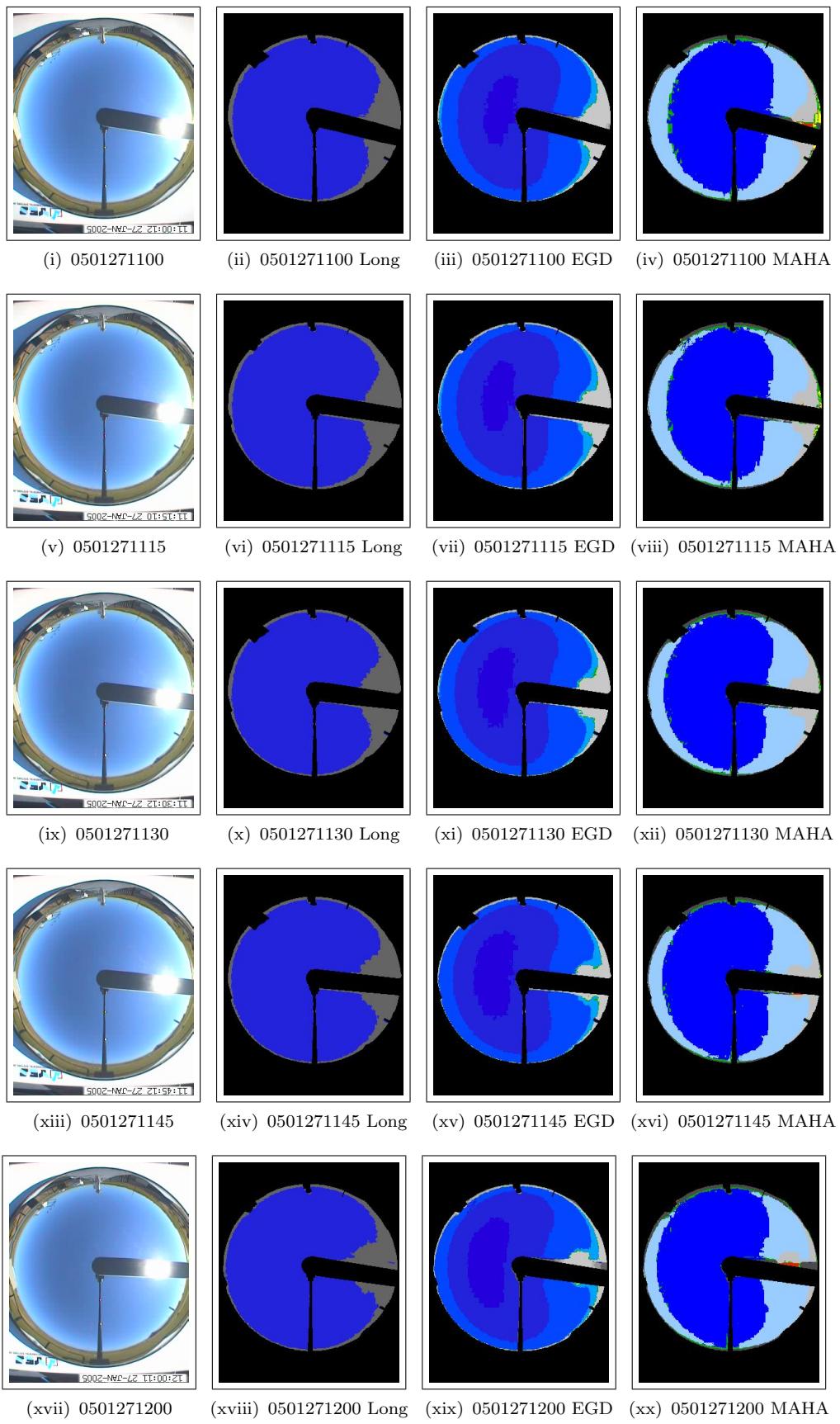


Figure A.299 - Sky images generated from 050127100 to 0501271200.

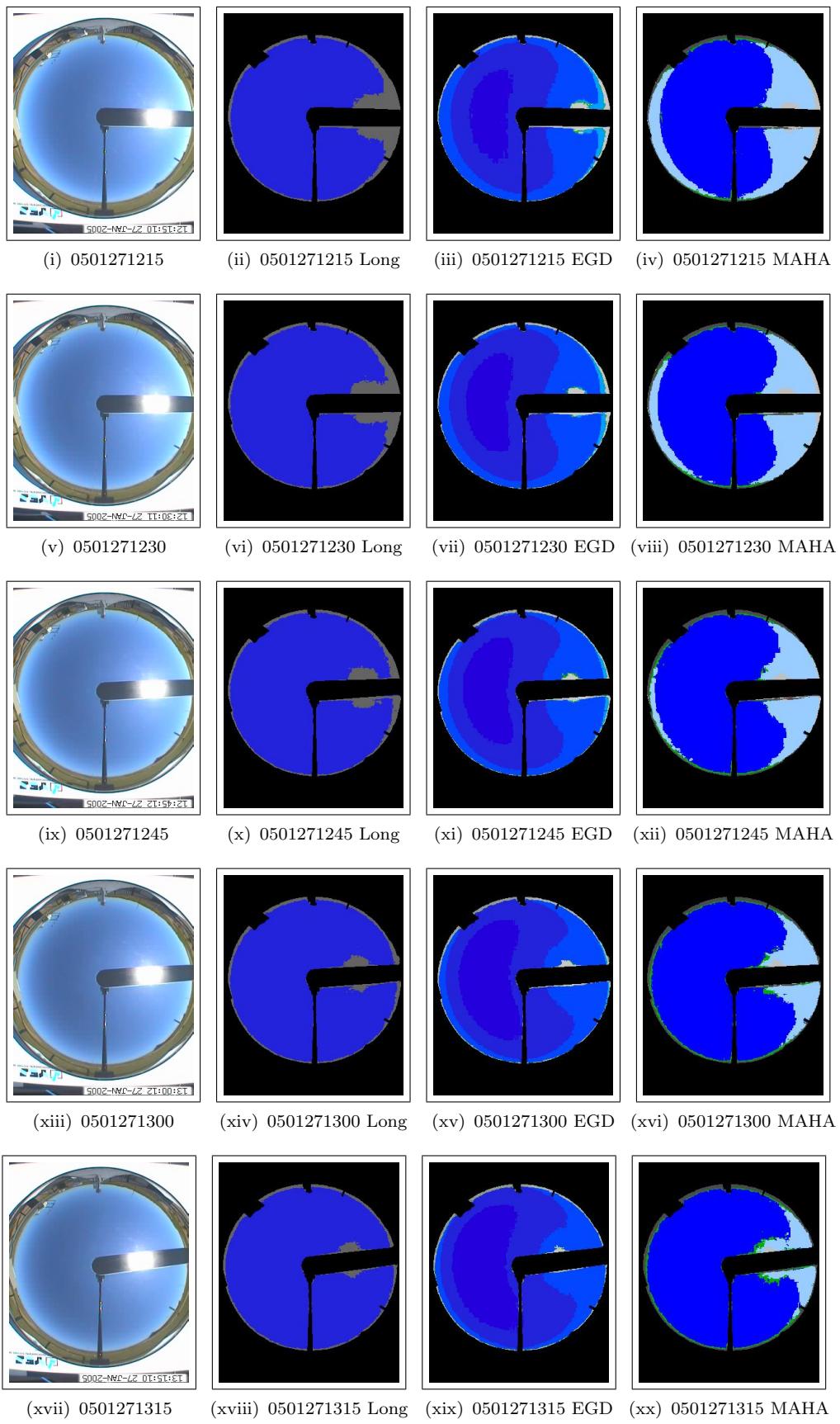


Figure A.300 - Sky images generated from 0501271215 to 0501271315.

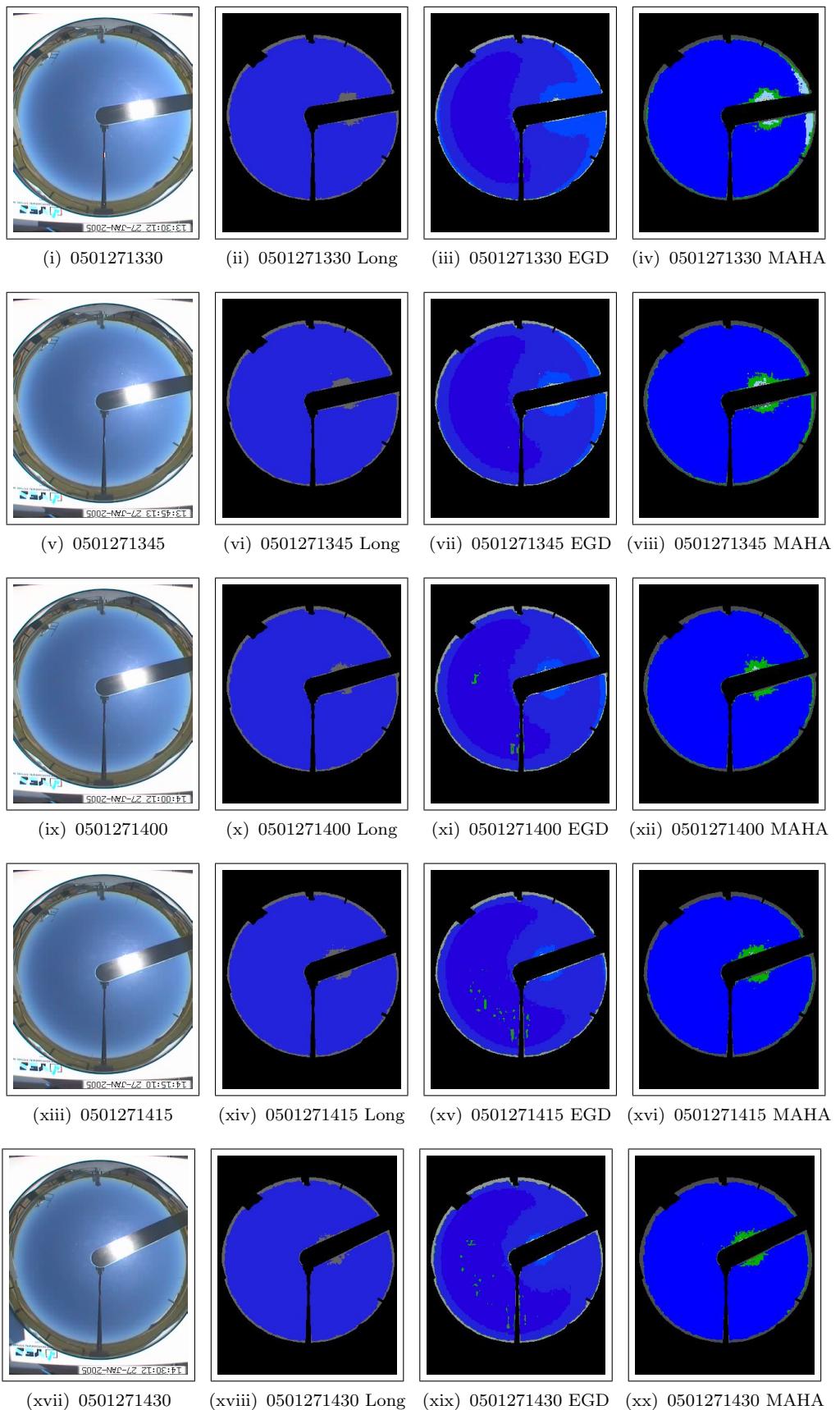


Figure A.301 - Sky images generated from 0501271330 to 0501271430.

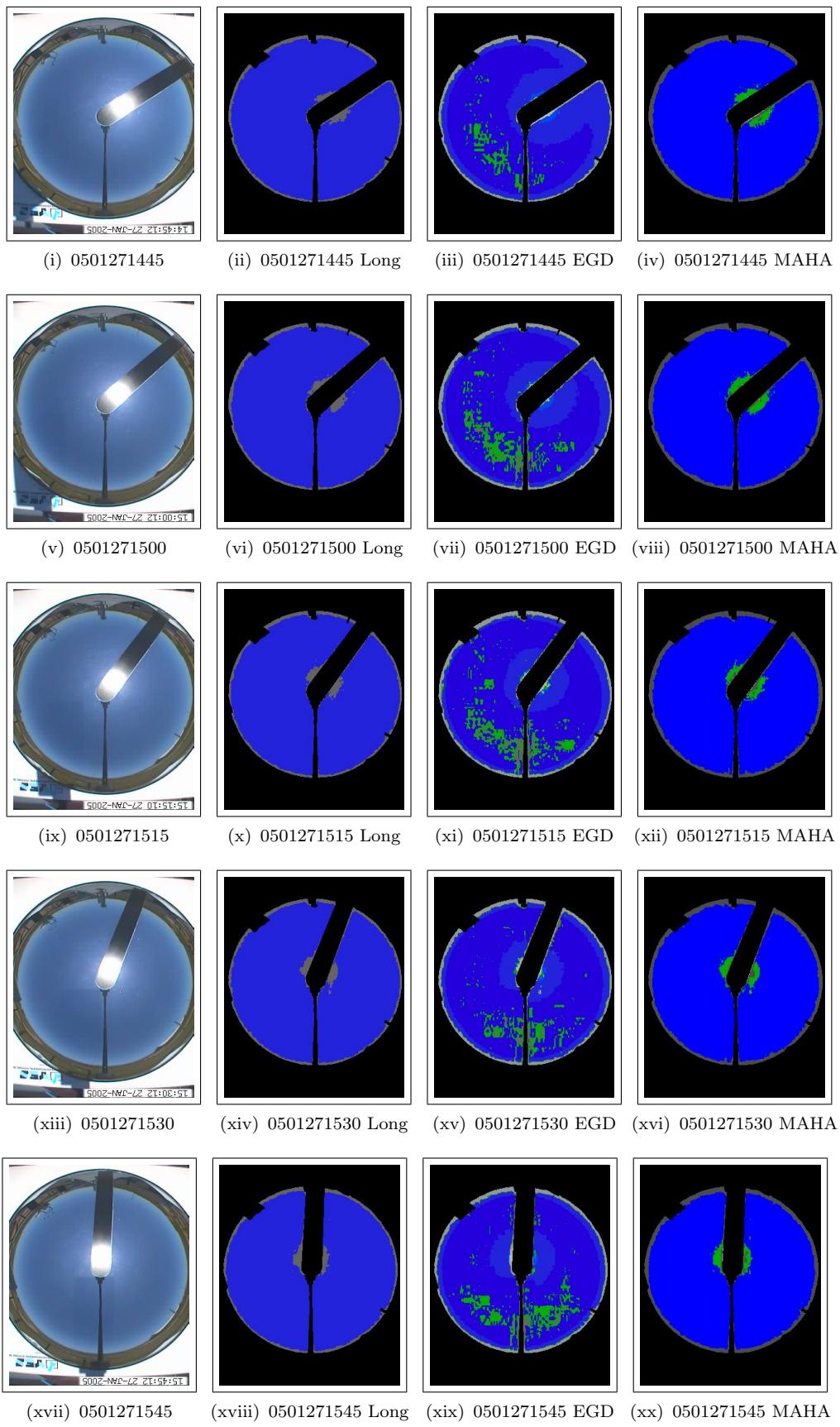


Figure A.302 - Sky images generated from 0501271445 to 0501271545.

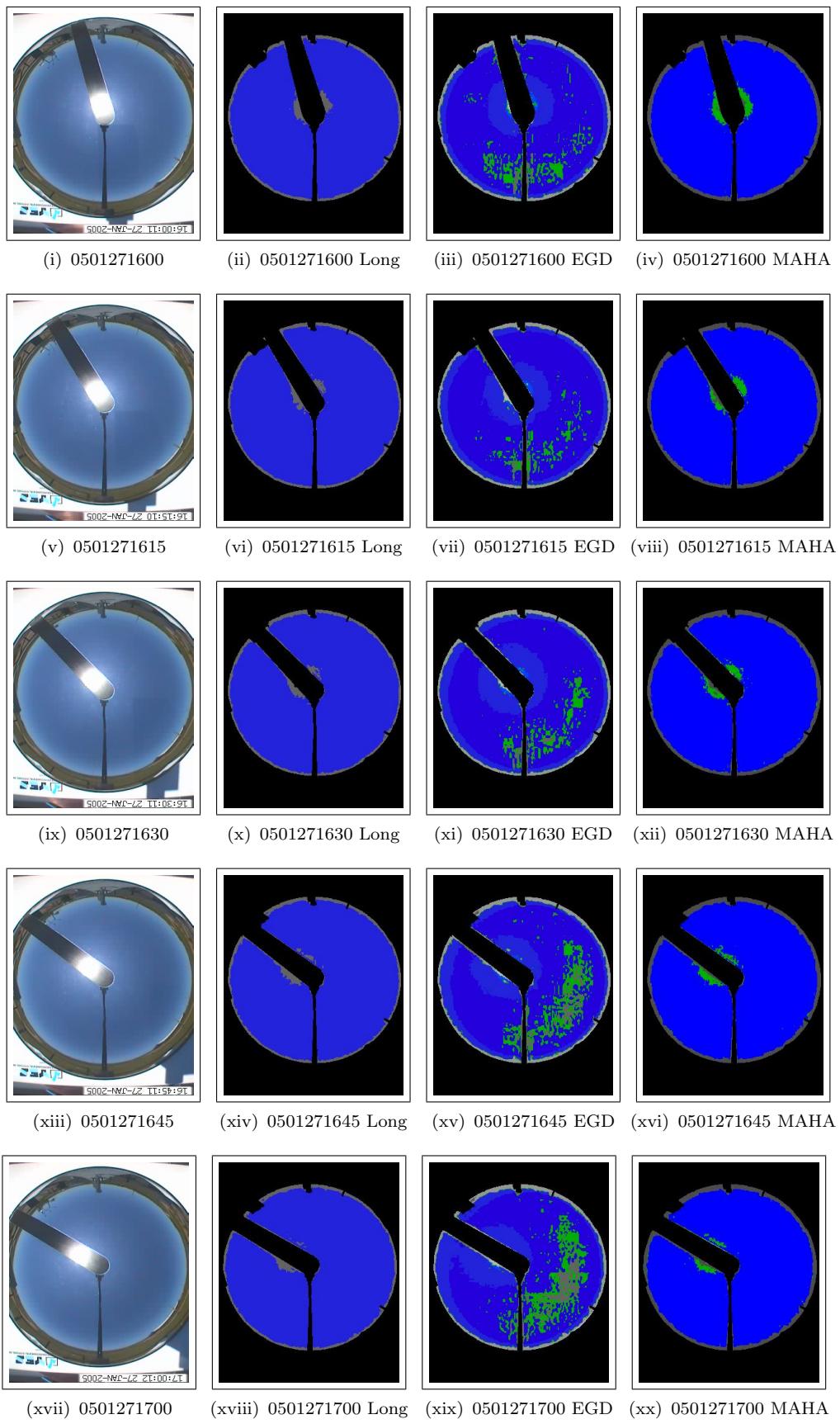


Figure A.303 - Sky images generated from 0501271600 to 0501271700.

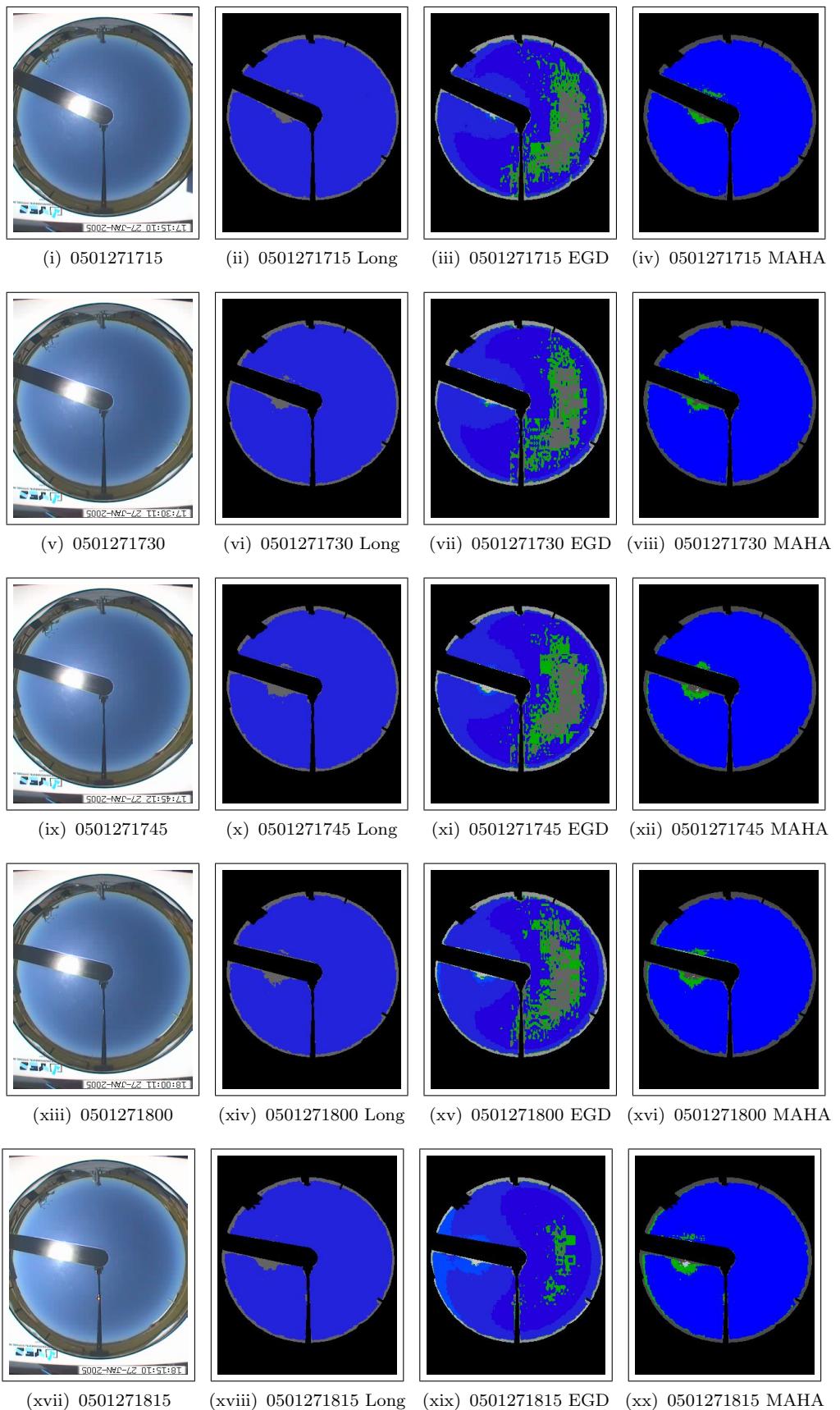


Figure A.304 - Sky images generated from 0501271715 to 0501271815.

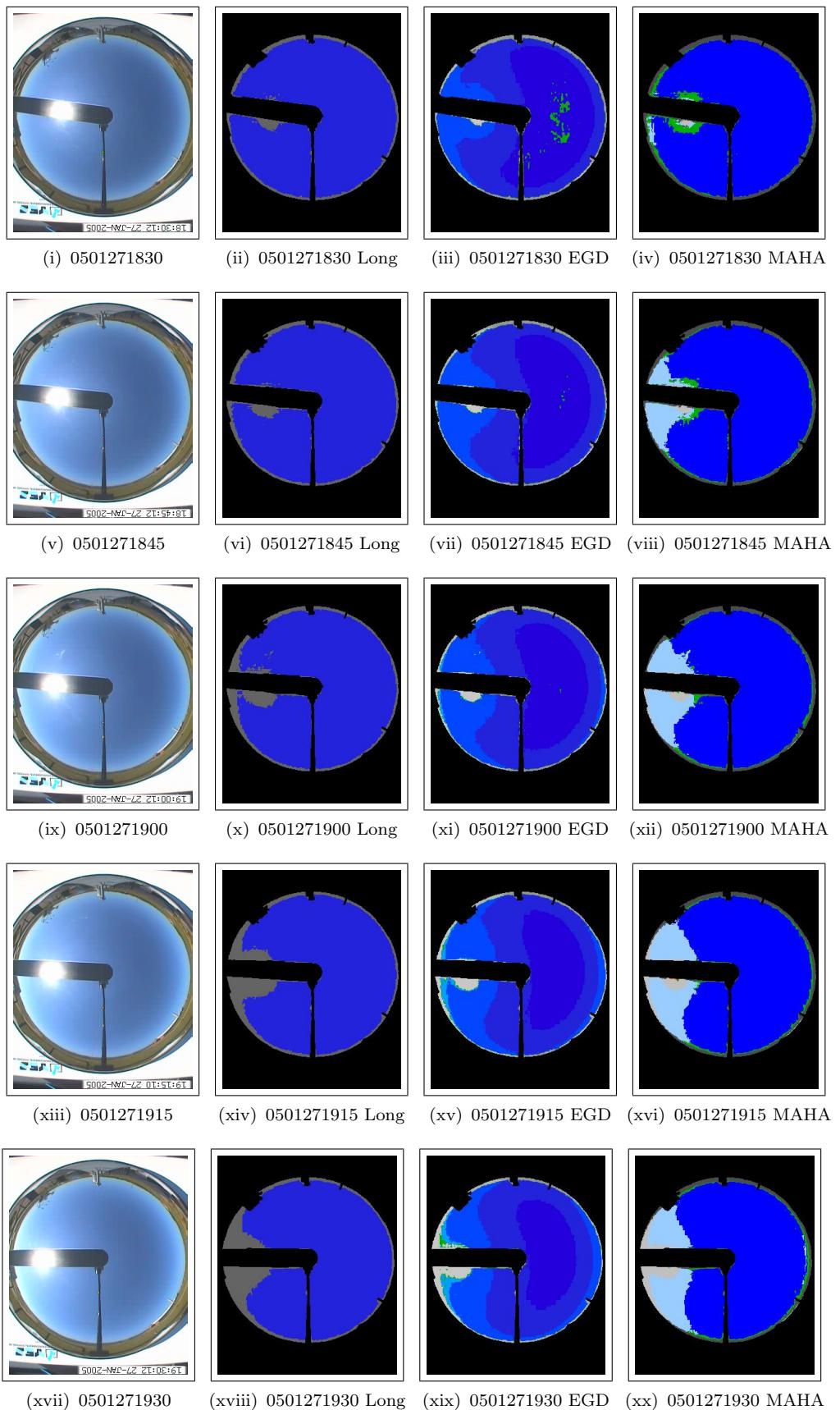


Figure A.305 - Sky images generated from 0501271830 to 0501271930.

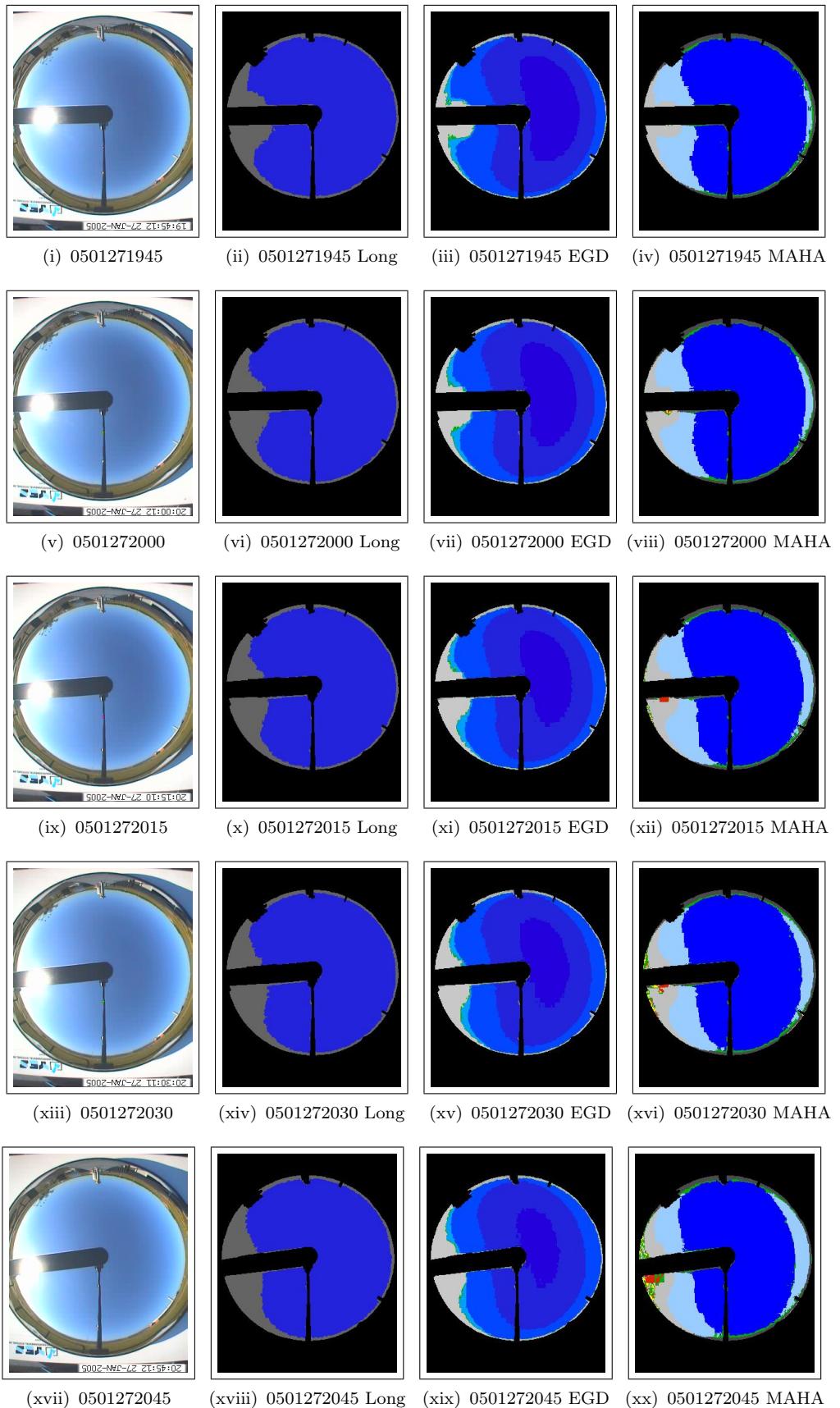


Figure A.306 - Sky images generated from 0501271945 to 0501272045.

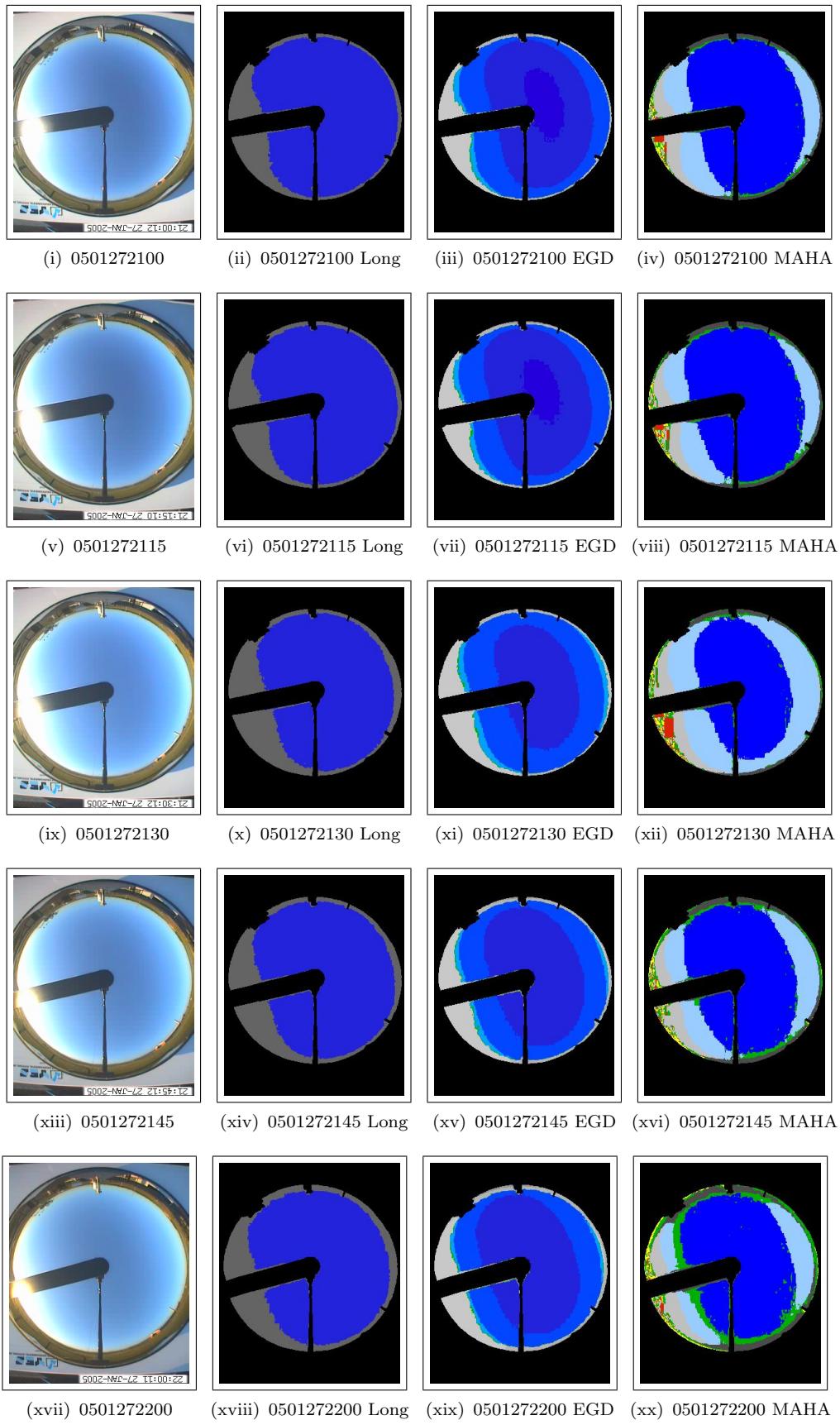


Figure A.307 - Sky images generated from 0501272100 to 0501272200.

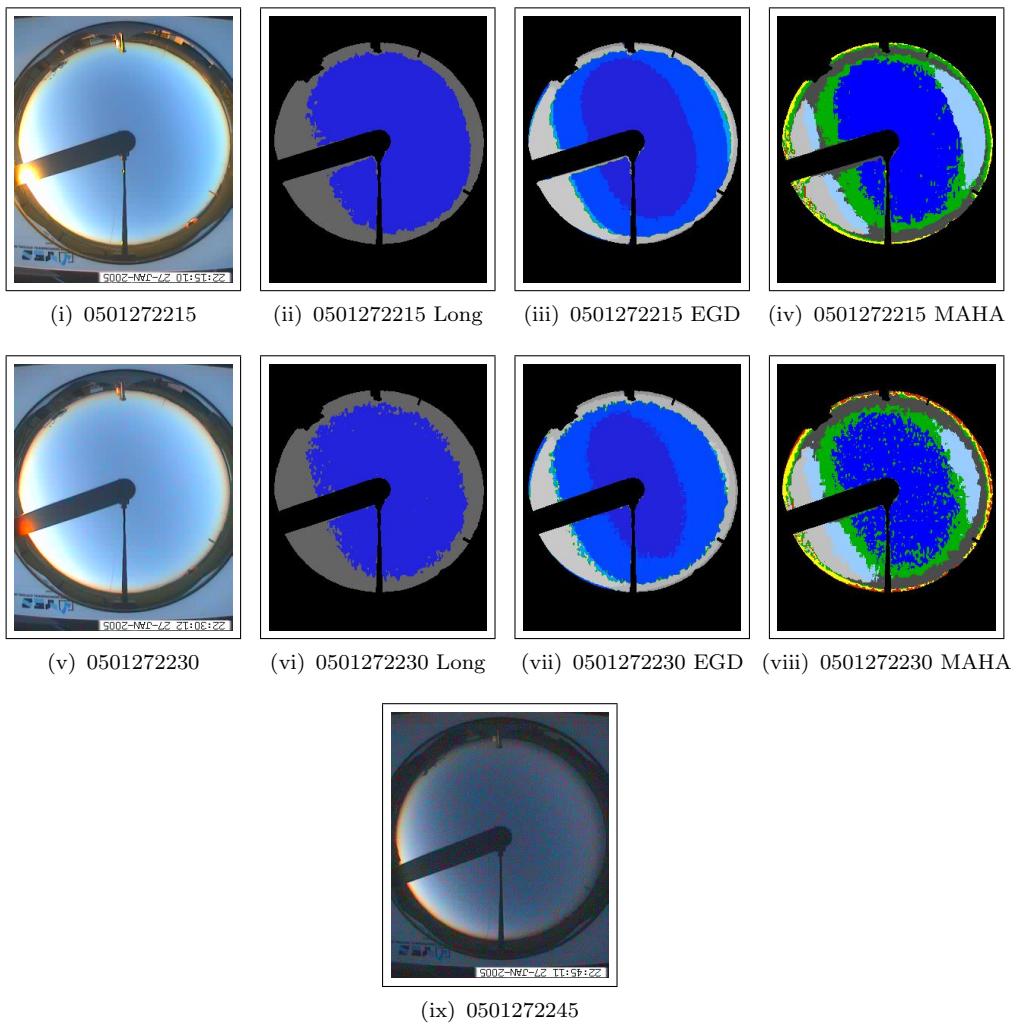


Figure A.308 - Sky images generated from 0501271600 to 0501272245.

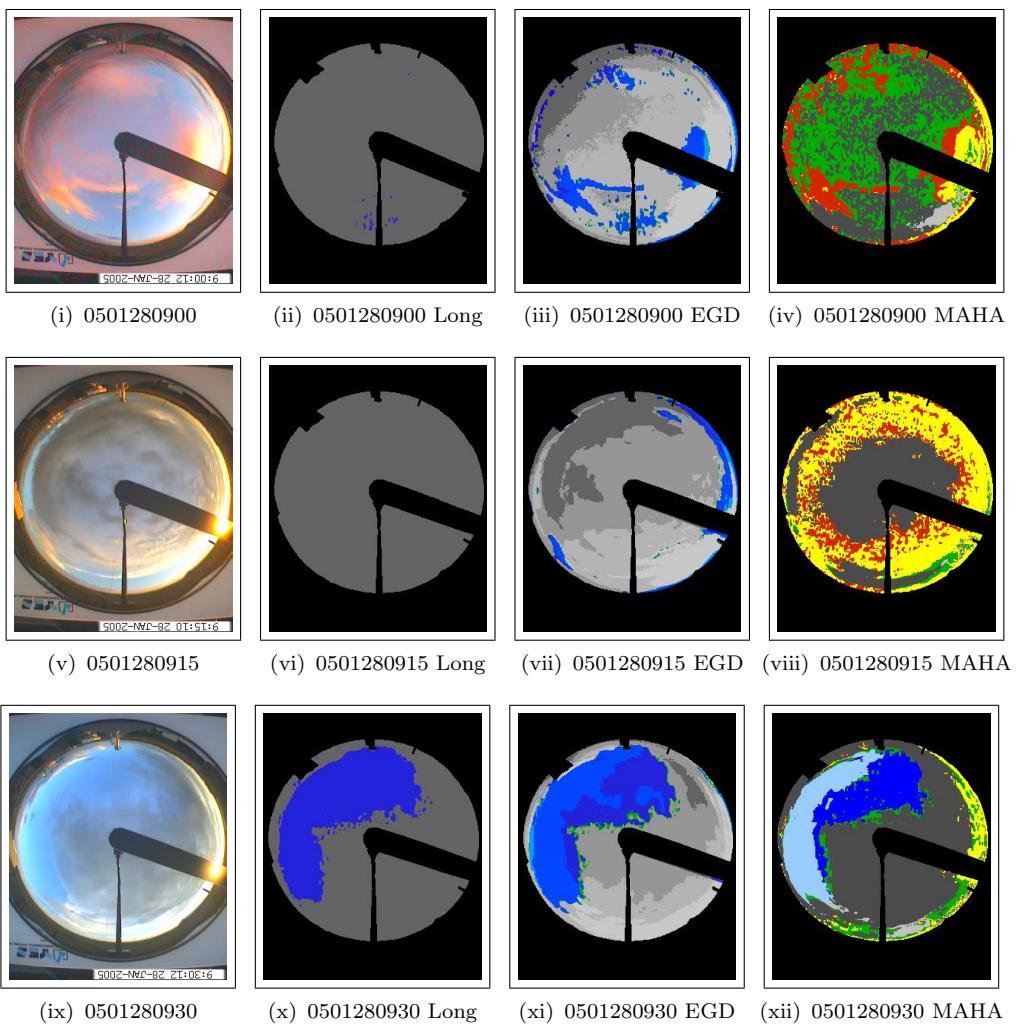


Figure A.309 - Sky images generated from 0501280900 to 0501280930.

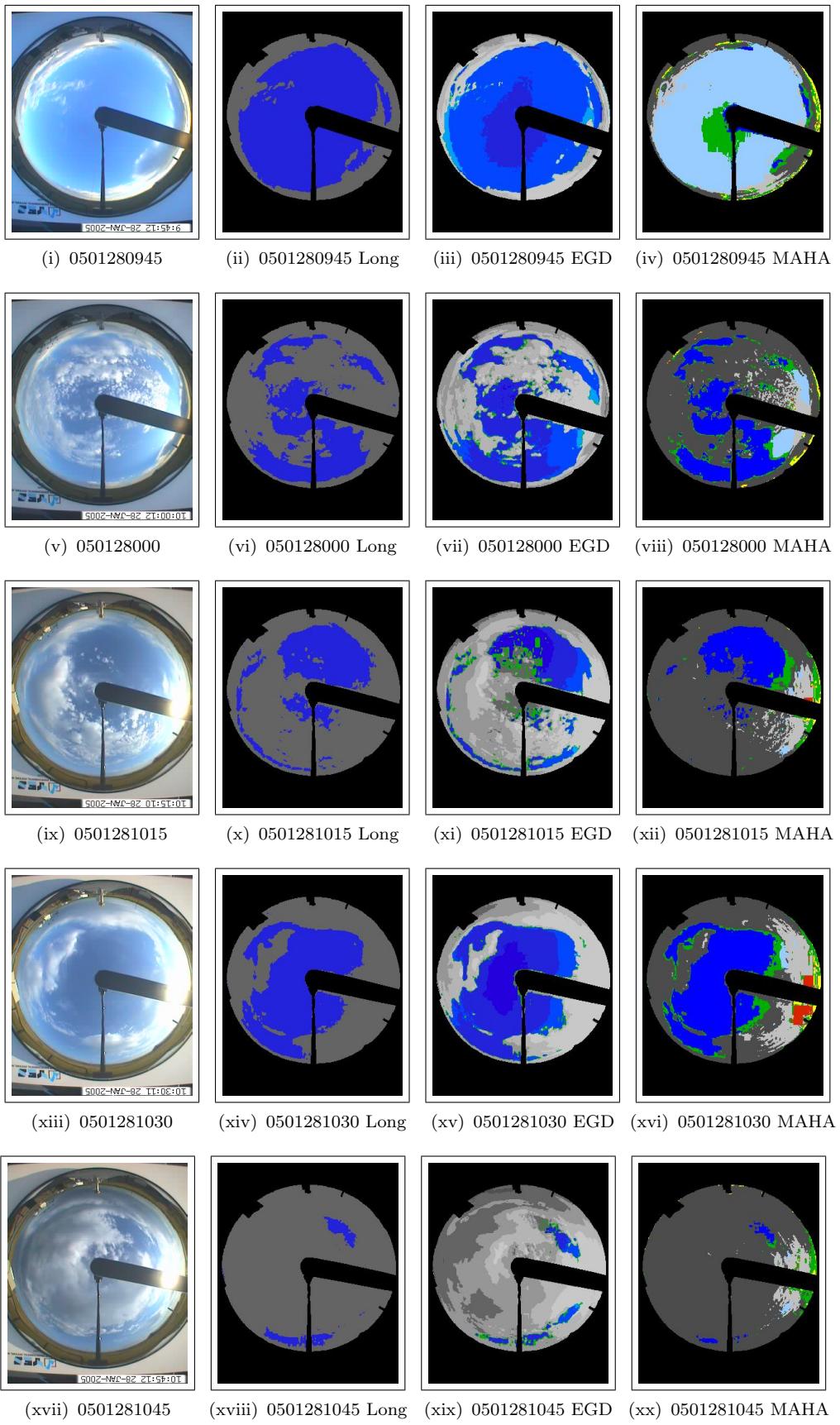


Figure A.310 - Sky images generated from 0501280945 to 0501281045.

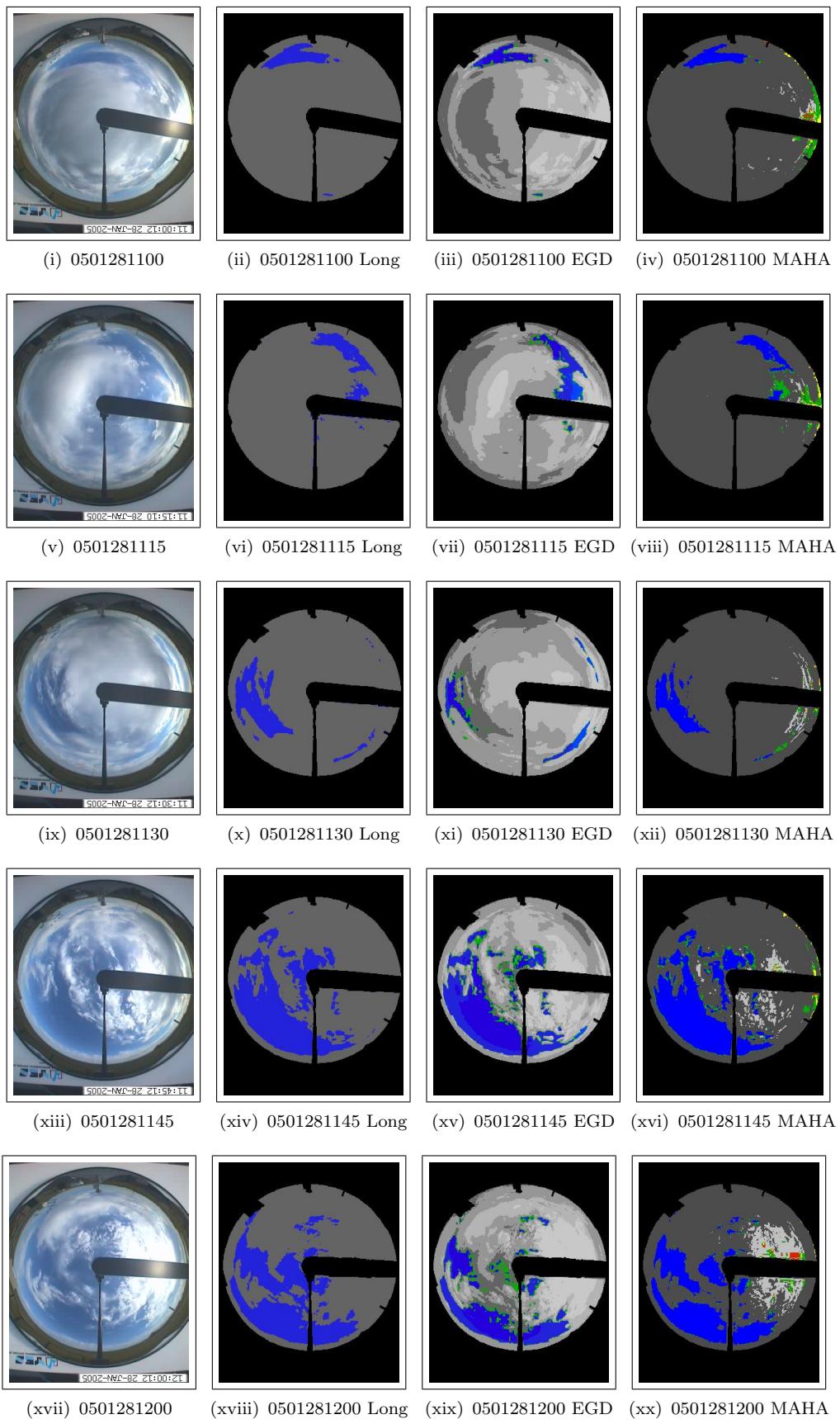


Figure A.311 - Sky images generated from 050128100 to 0501281200.

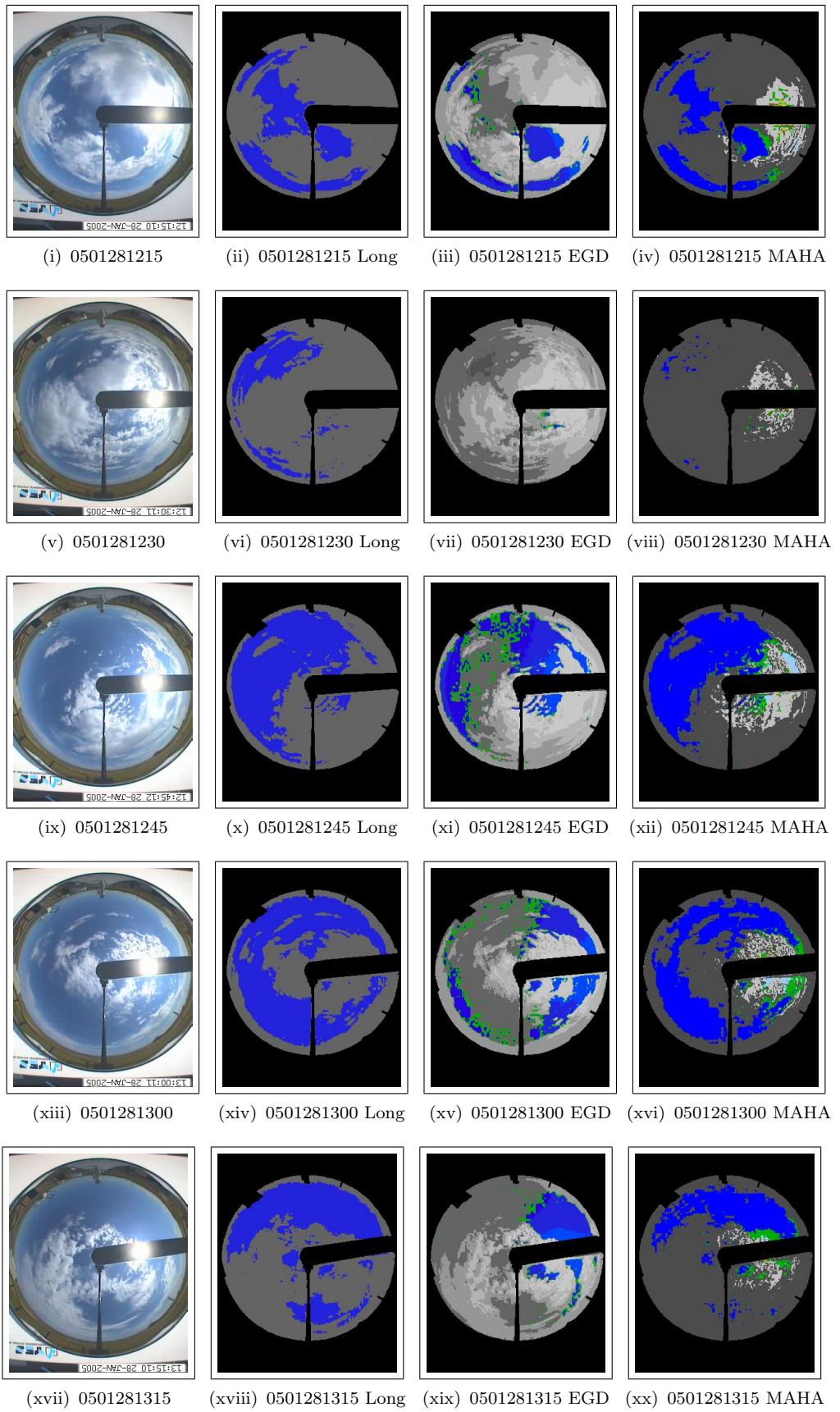


Figure A.312 - Sky images generated from 0501281215 to 0501281315.

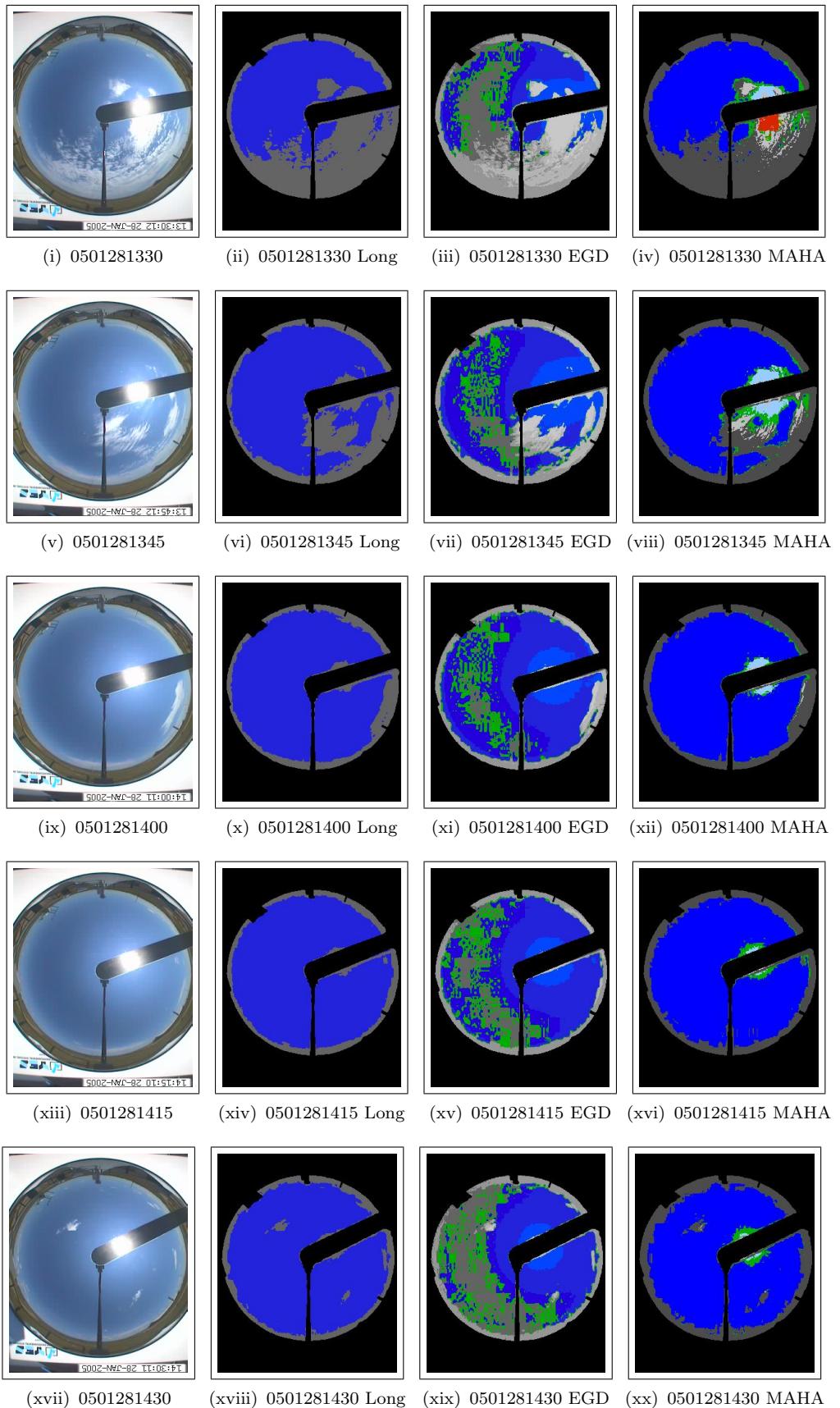


Figure A.313 - Sky images generated from 0501281330 to 0501281430.

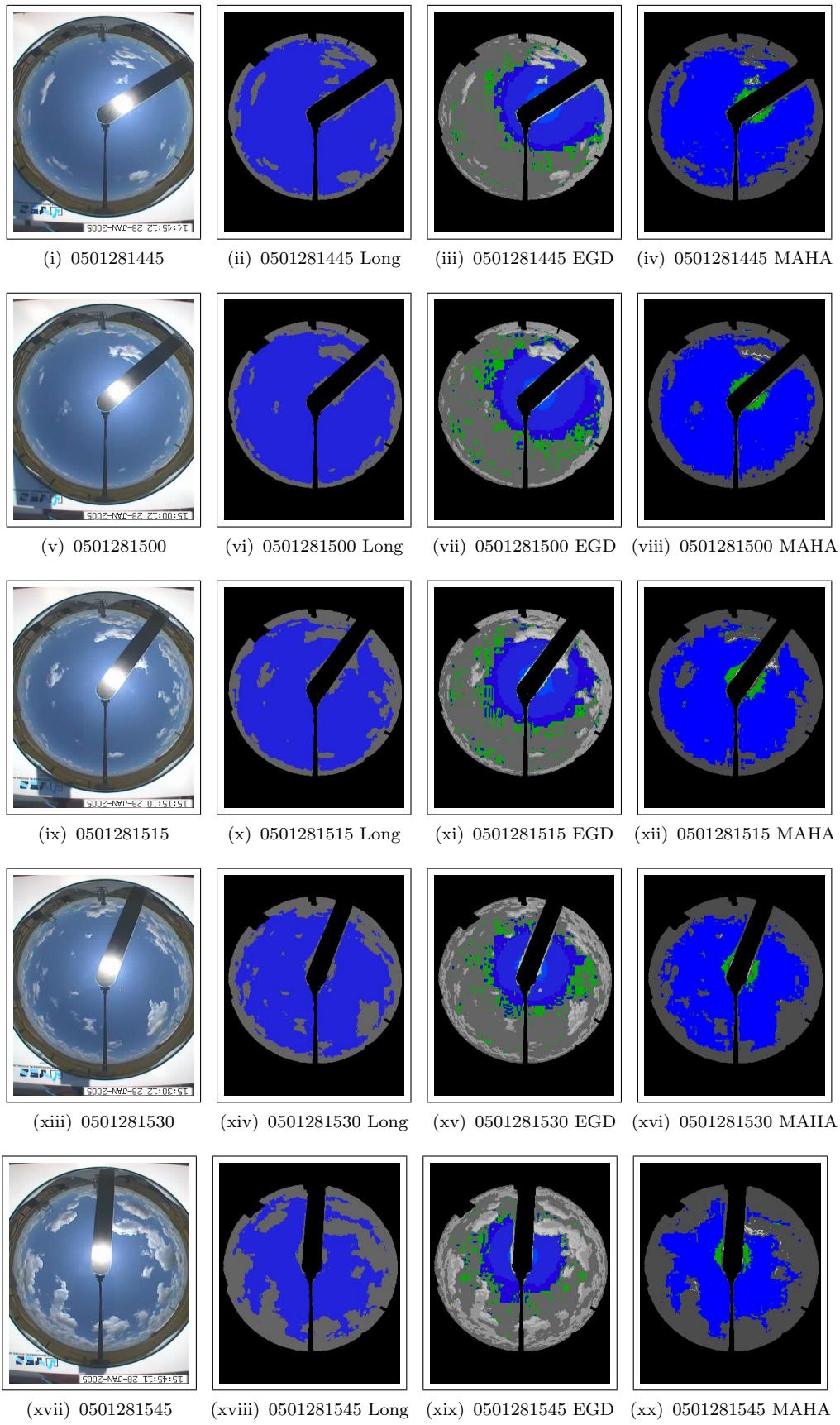


Figure A.314 - Sky images generated from 0501281445 to 0501281545.

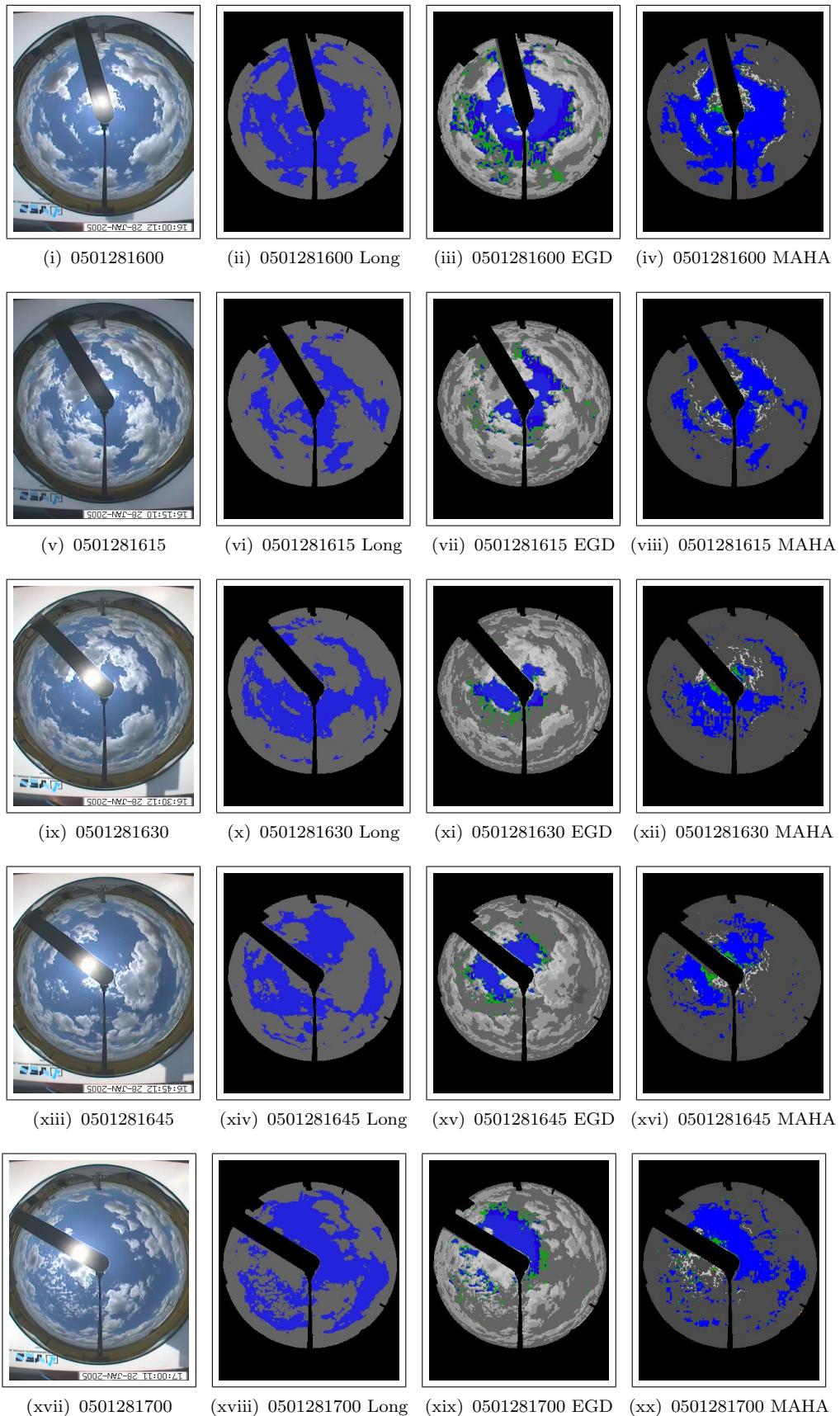


Figure A.315 - Sky images generated from 0501281600 to 0501281700.

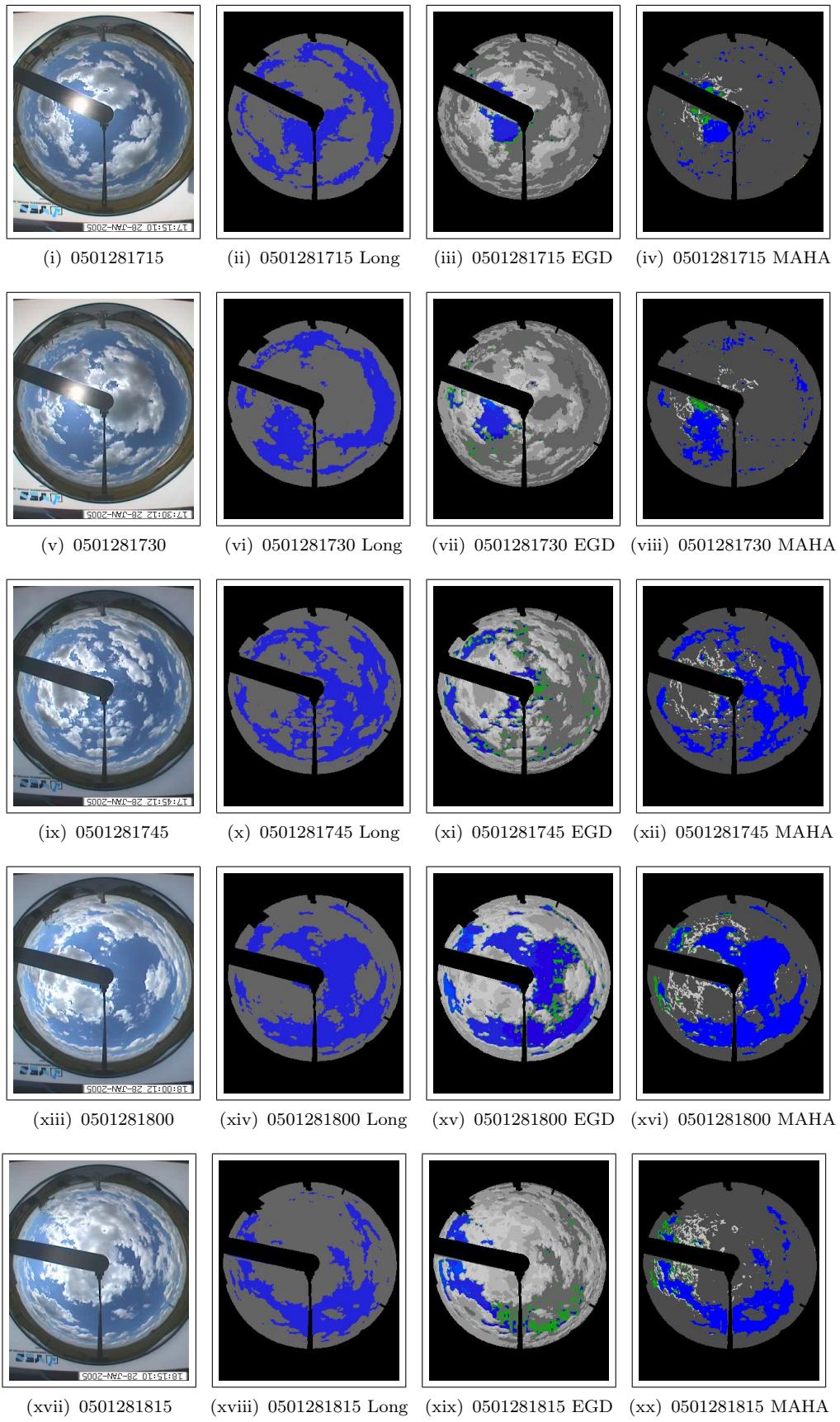


Figure A.316 - Sky images generated from 0501281715 to 0501281815.

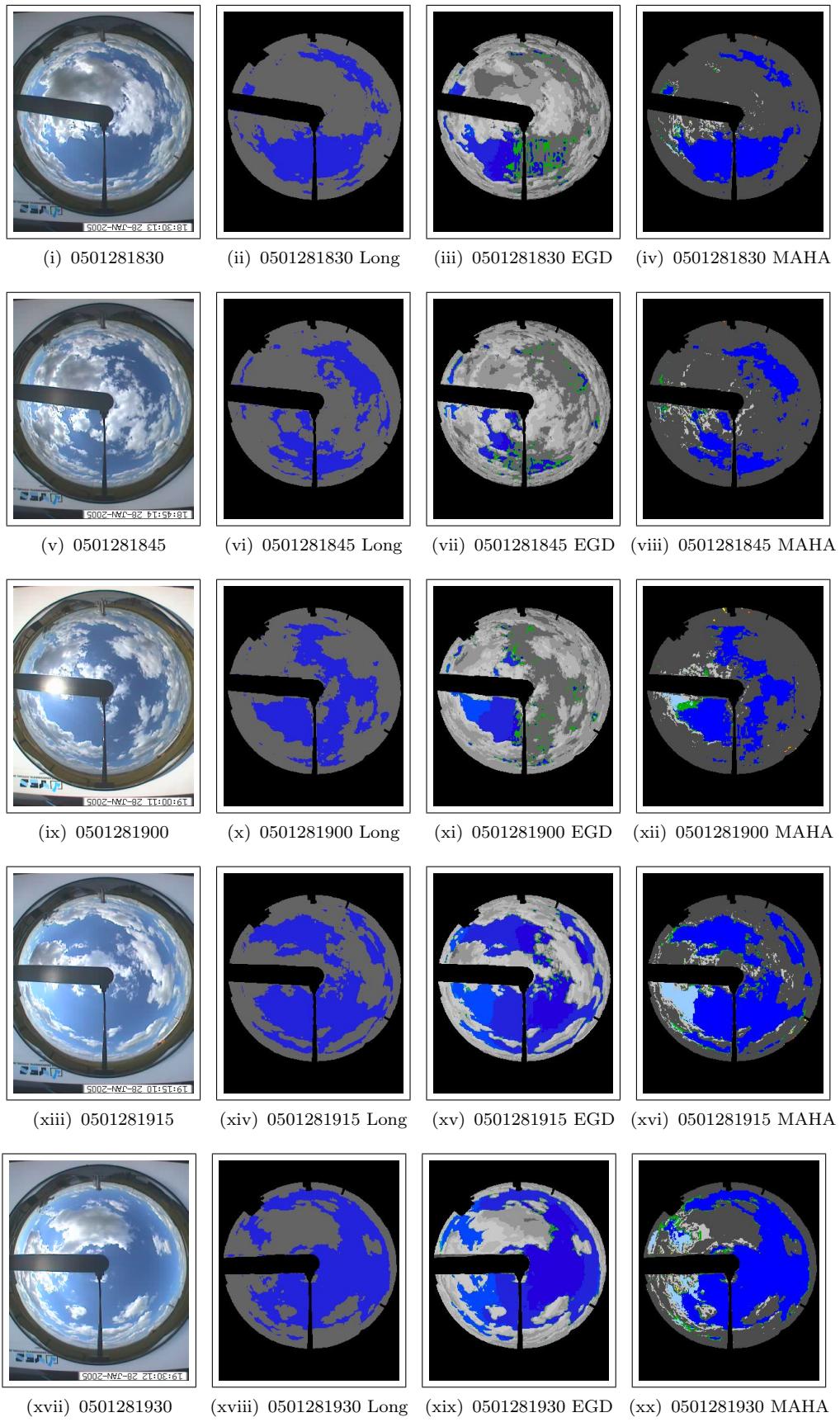


Figure A.317 - Sky images generated from 0501281830 to 0501281930.

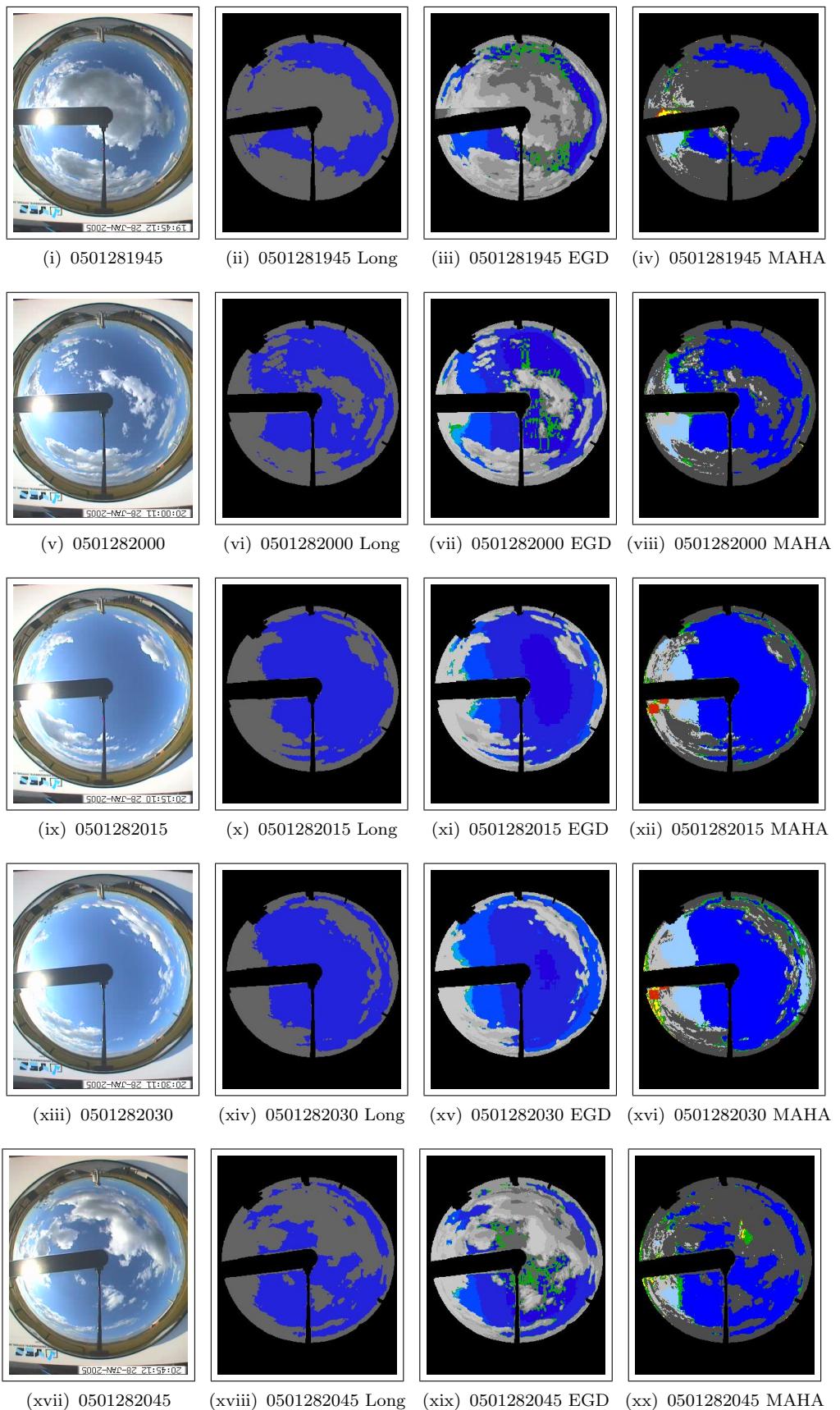


Figure A.318 - Sky images generated from 0501281945 to 0501282045.

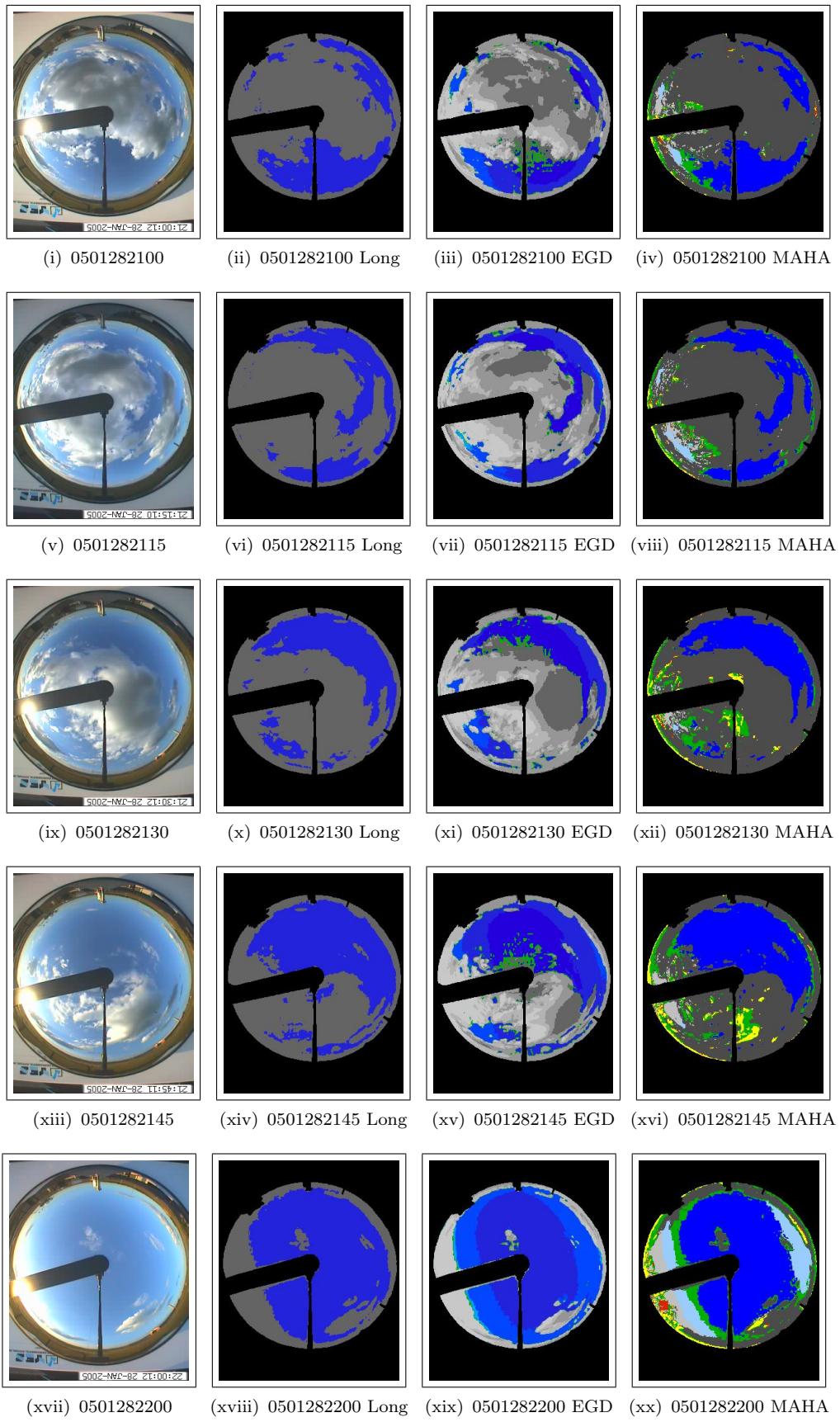


Figure A.319 - Sky images generated from 0501282100 to 0501282200.

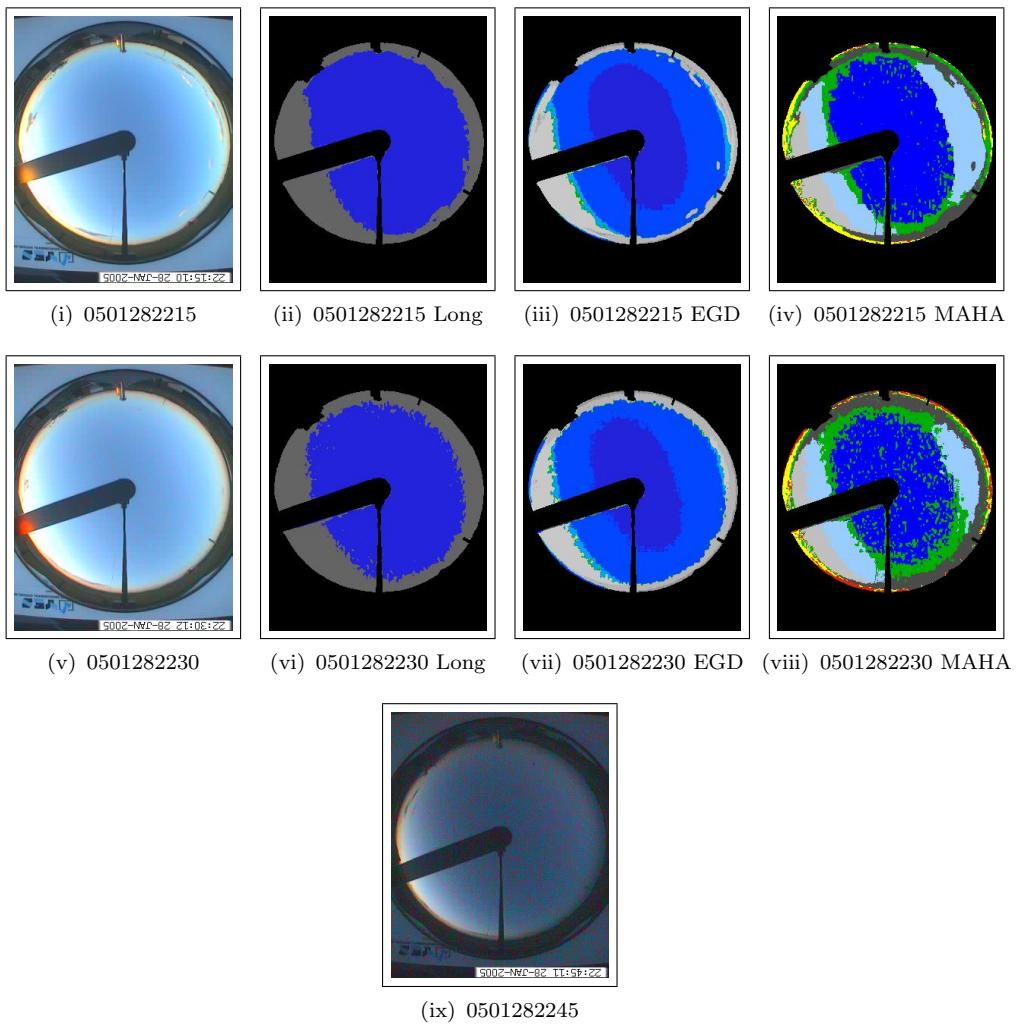


Figure A.320 - Sky images generated from 0501281600 to 0501282245.

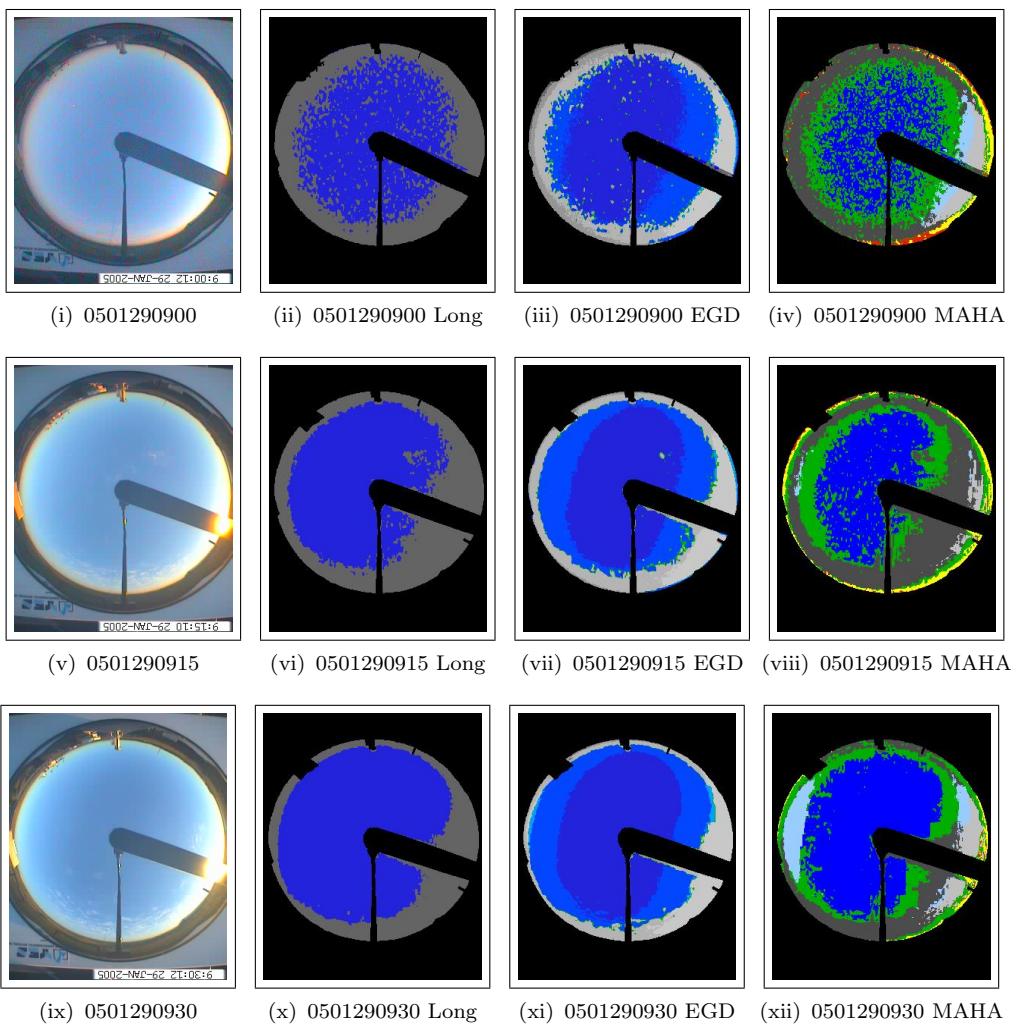


Figure A.321 - Sky images generated from 0501290845 to 0501290930.

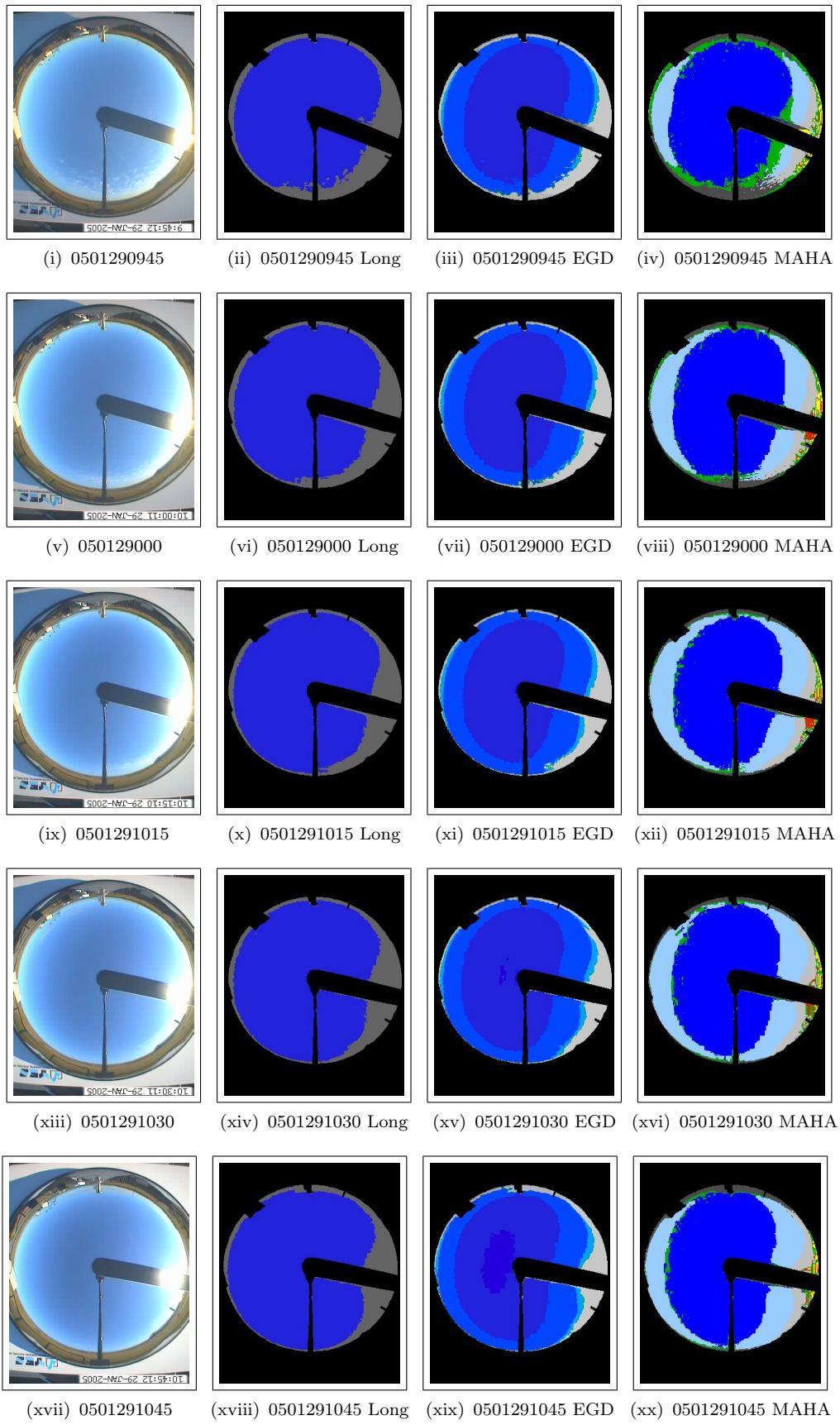


Figure A.322 - Sky images generated from 0501290945 to 0501291045.

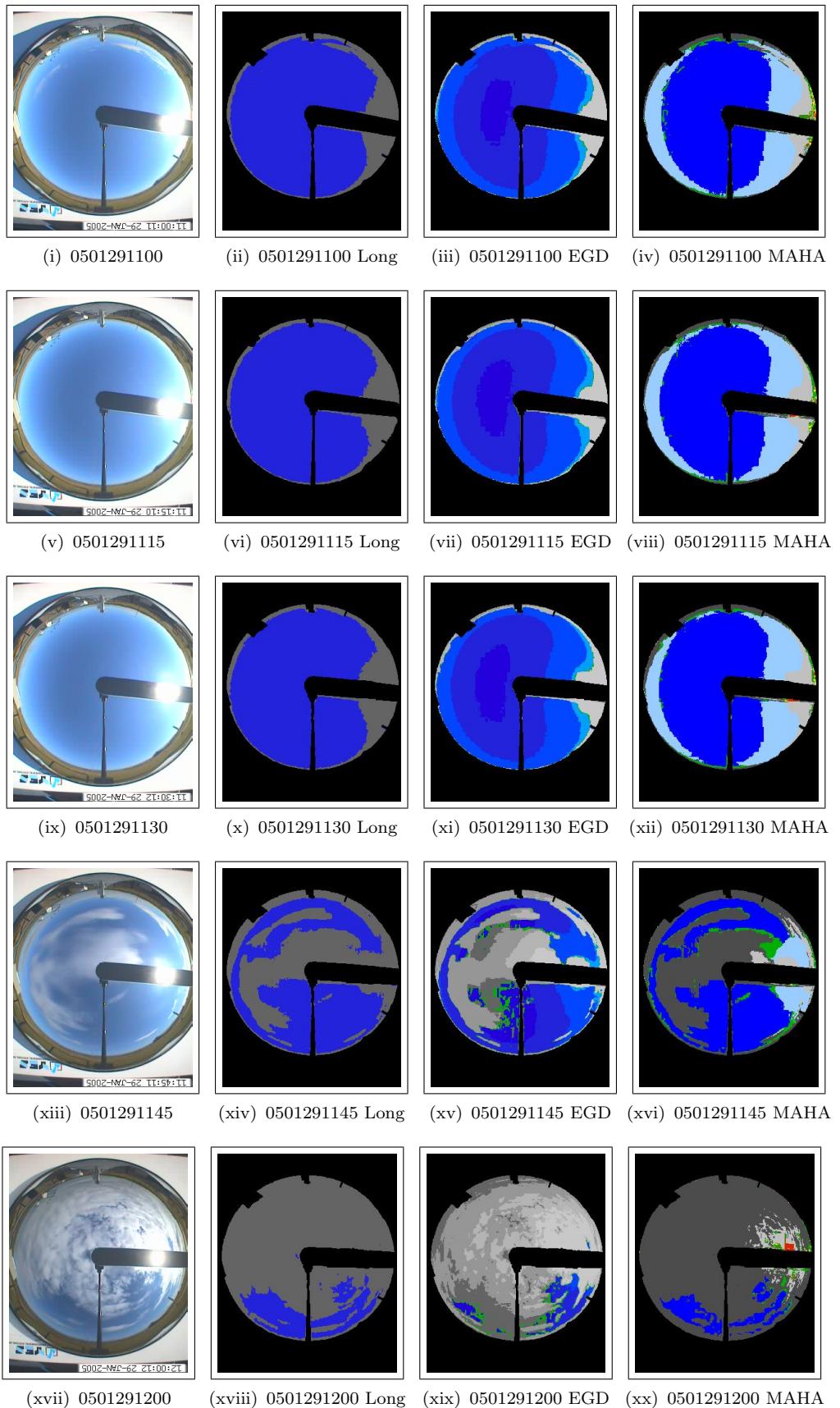


Figure A.323 - Sky images generated from 050129100 to 0501291200.

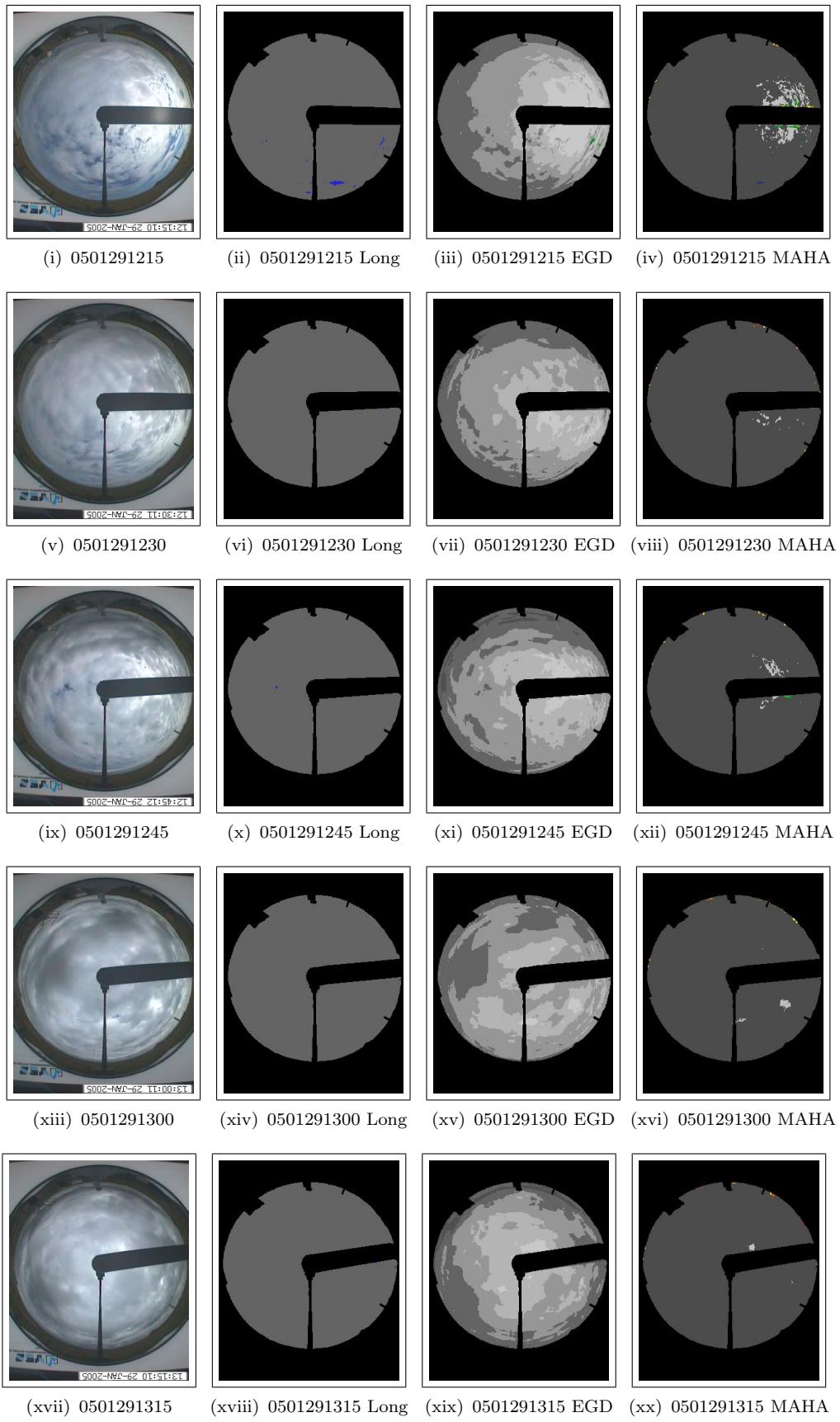


Figure A.324 - Sky images generated from 0501291215 to 0501291315.

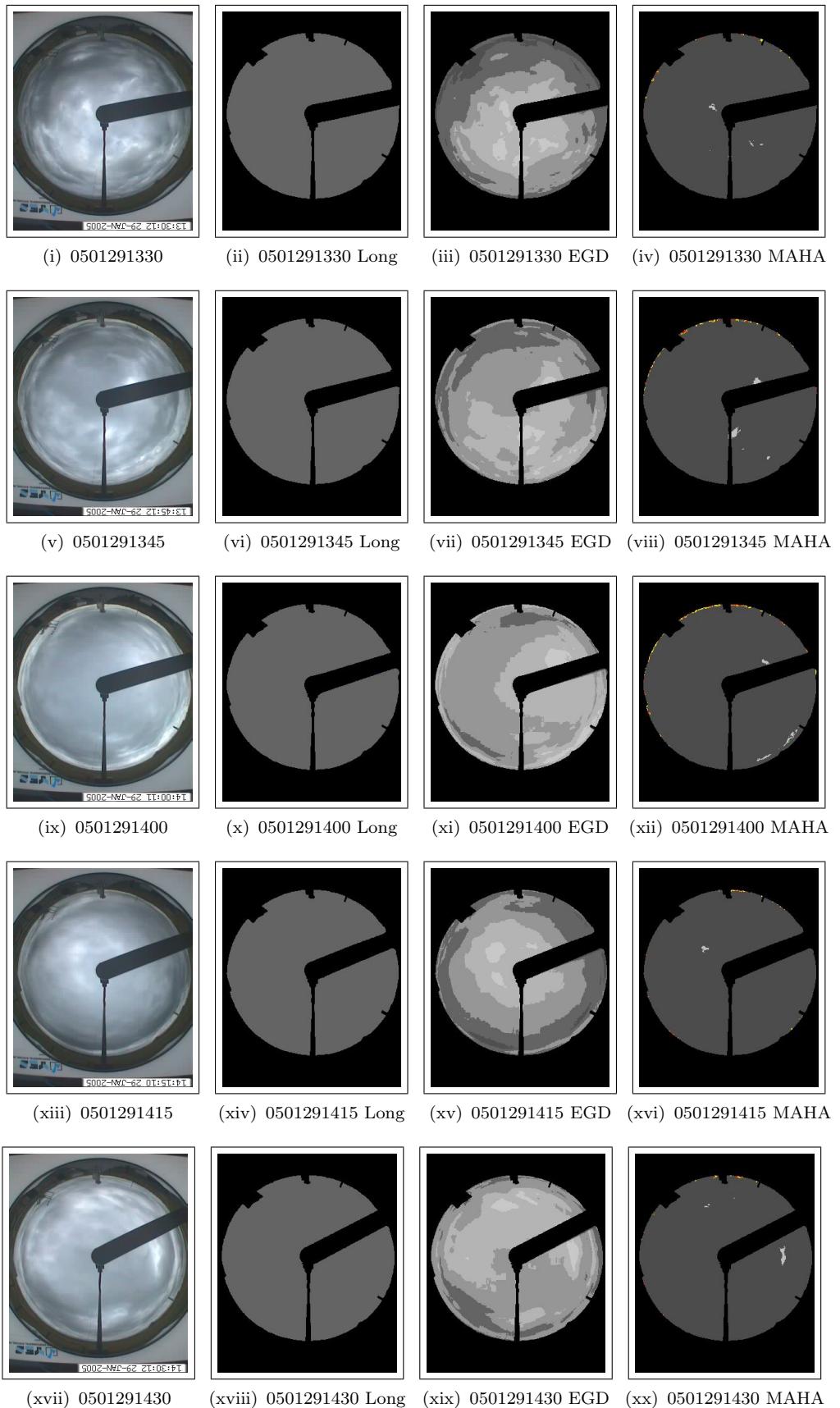


Figure A.325 - Sky images generated from 0501291330 to 0501291430.

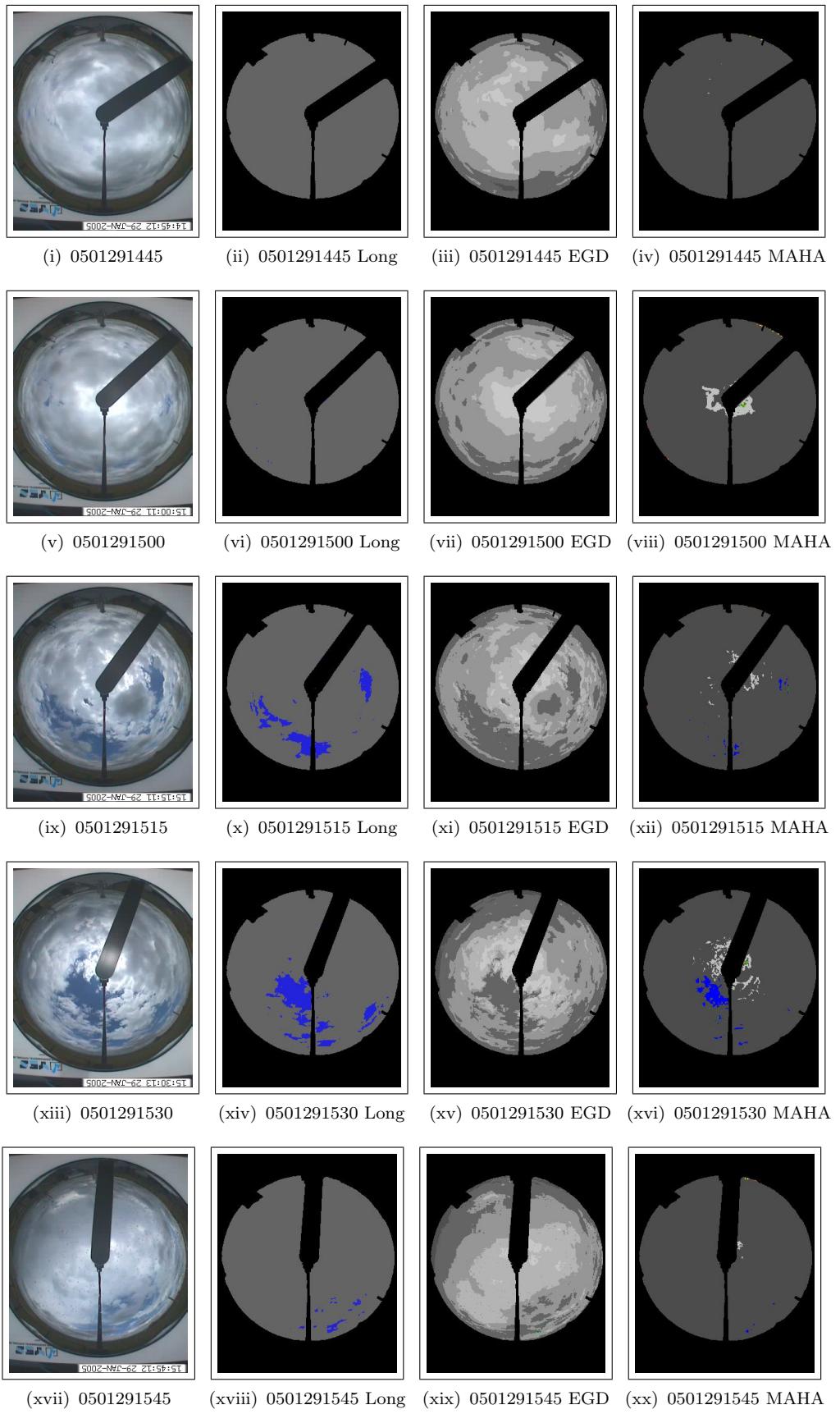


Figure A.326 - Sky images generated from 0501291445 to 0501291545.

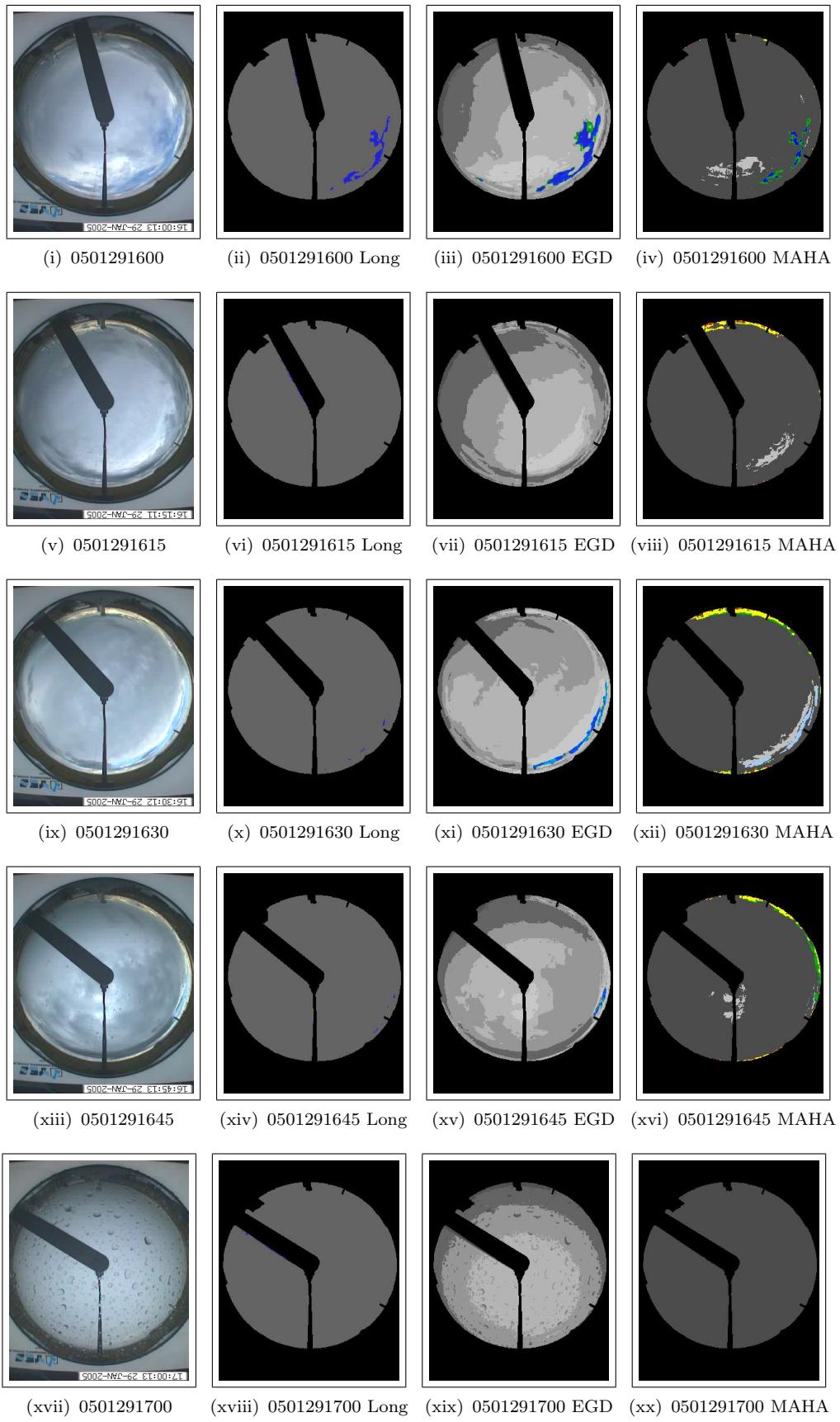


Figure A.327 - Sky images generated from 0501291600 to 0501291700.

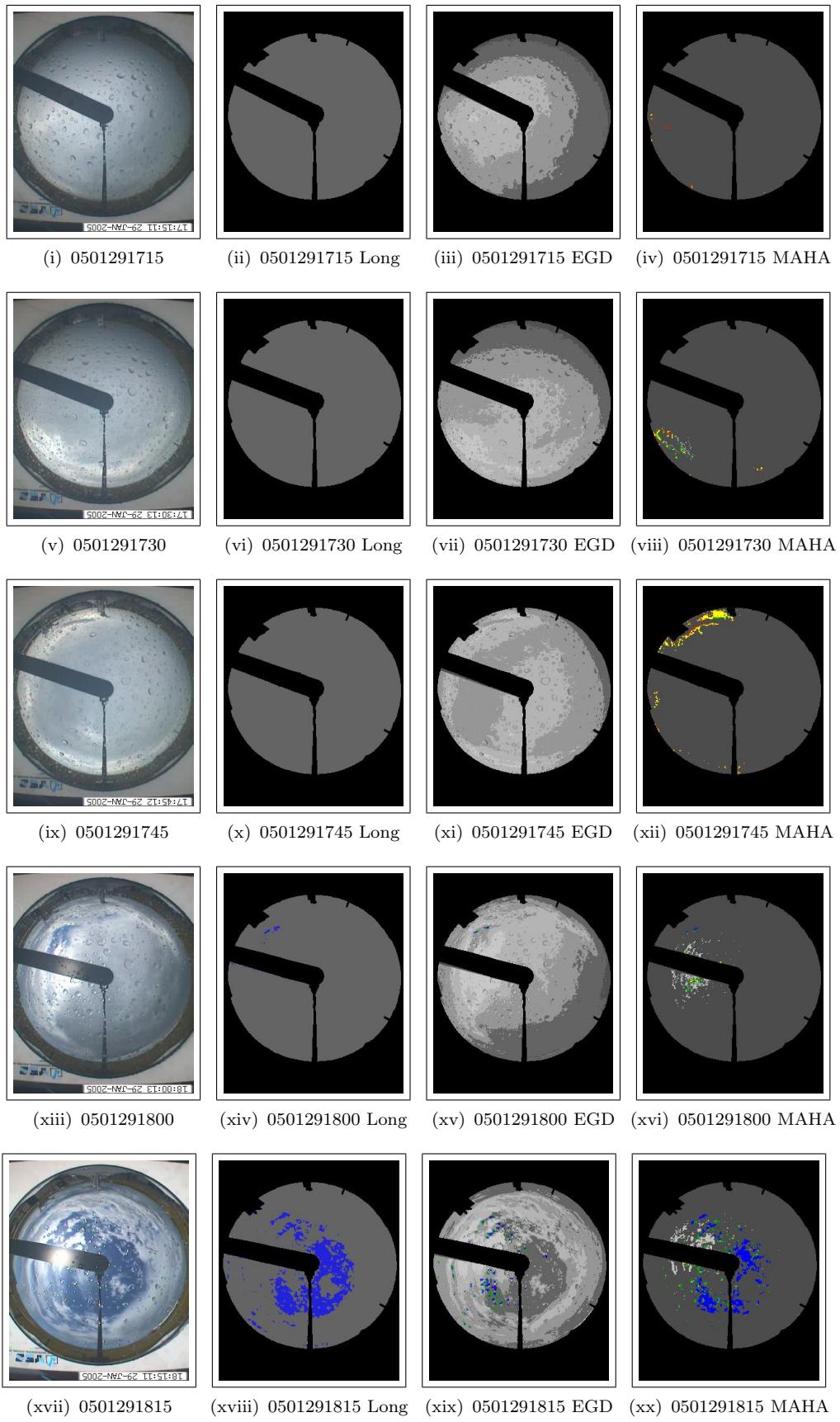


Figure A.328 - Sky images generated from 0501291715 to 0501291815.

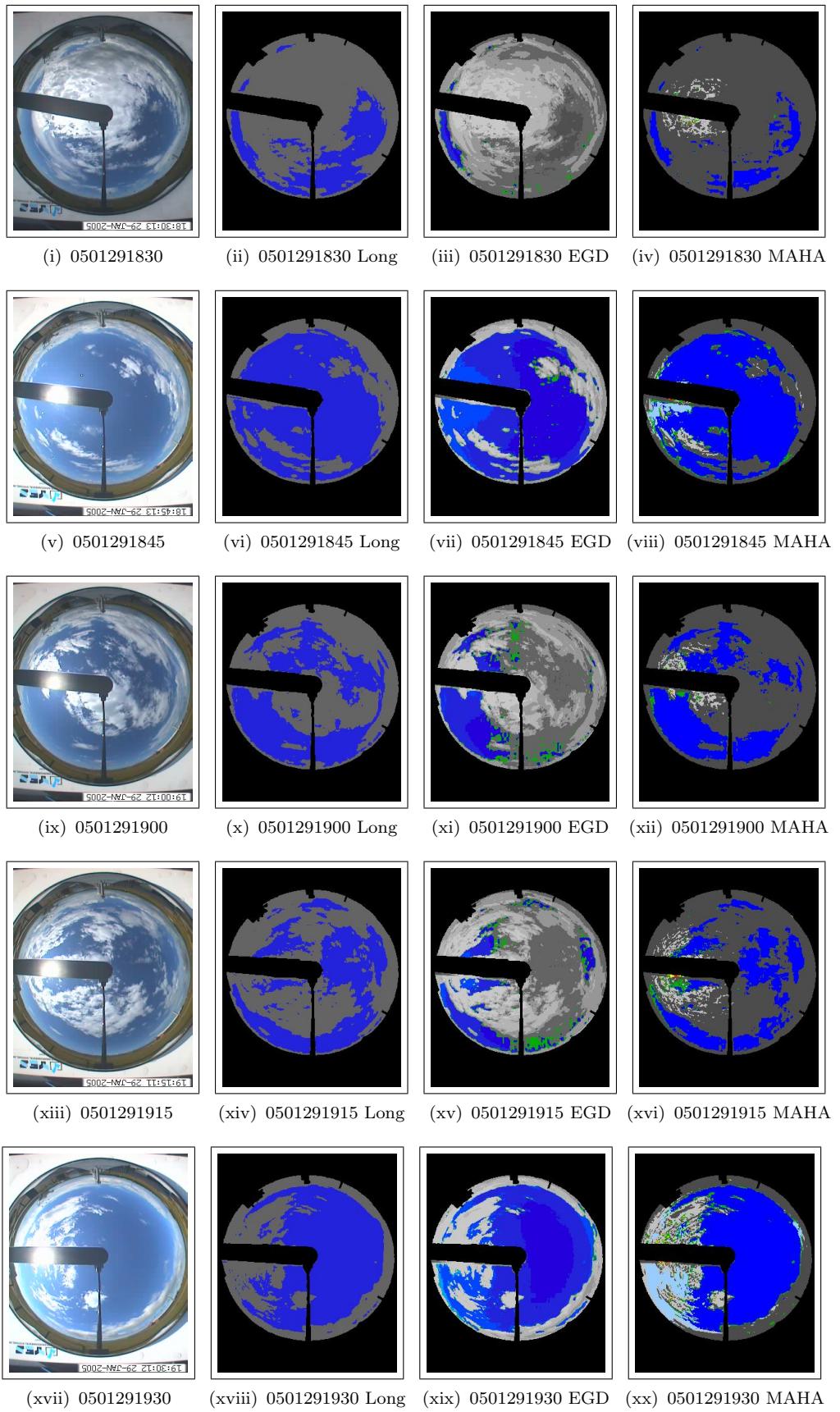


Figure A.329 - Sky images generated from 0501291830 to 0501291930.

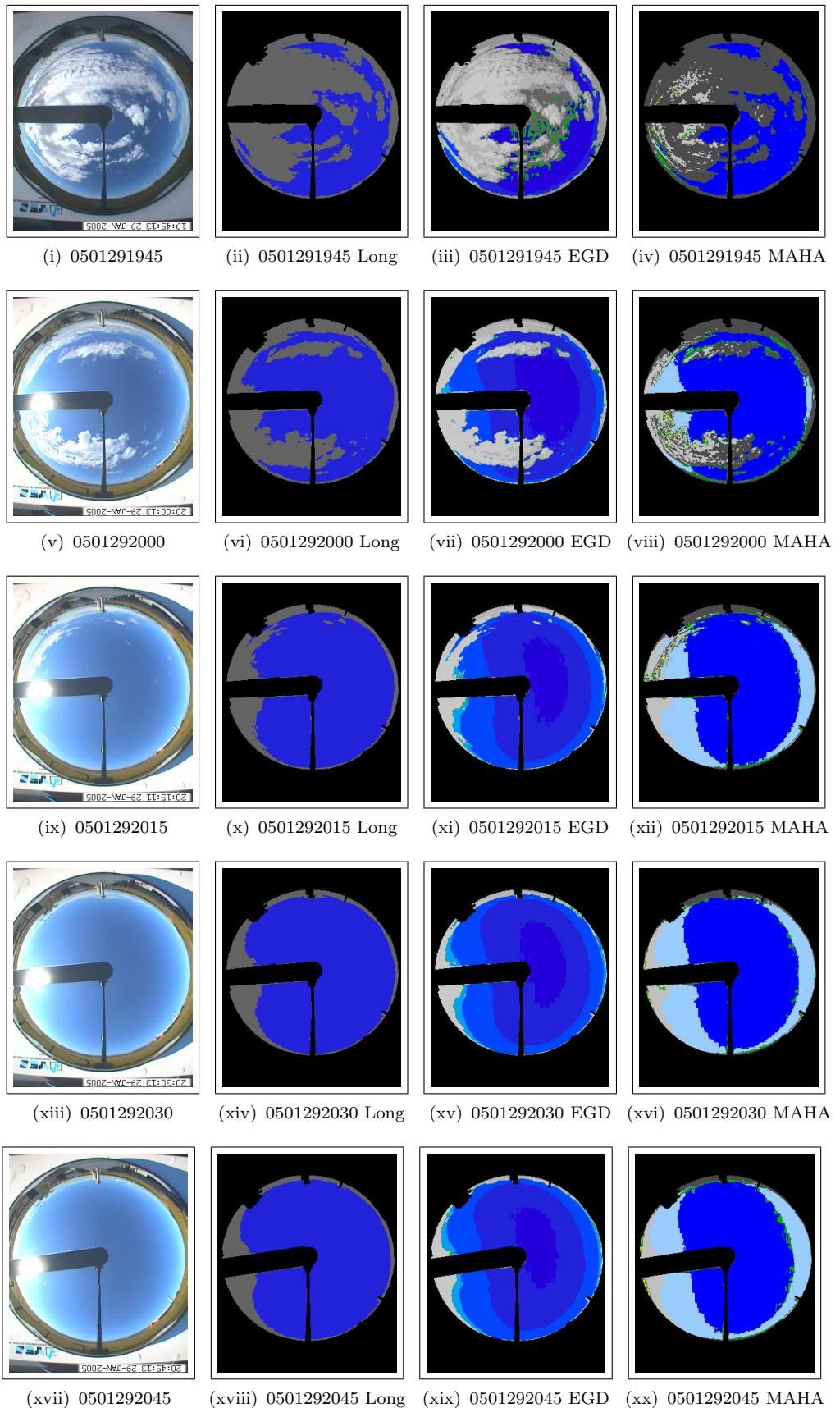


Figure A.330 - Sky images generated from 0501291945 to 0501292045.

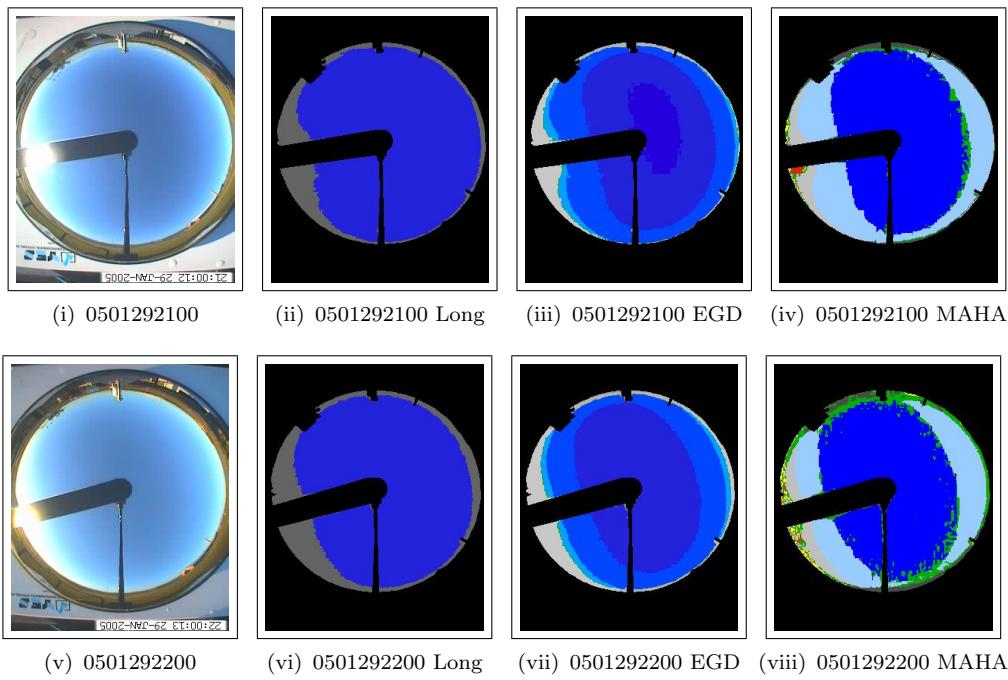


Figure A.331 - Sky images generated from 0501292100 to 0501292200. Images 0501292115, 0501292131 and 0501292145 are missing

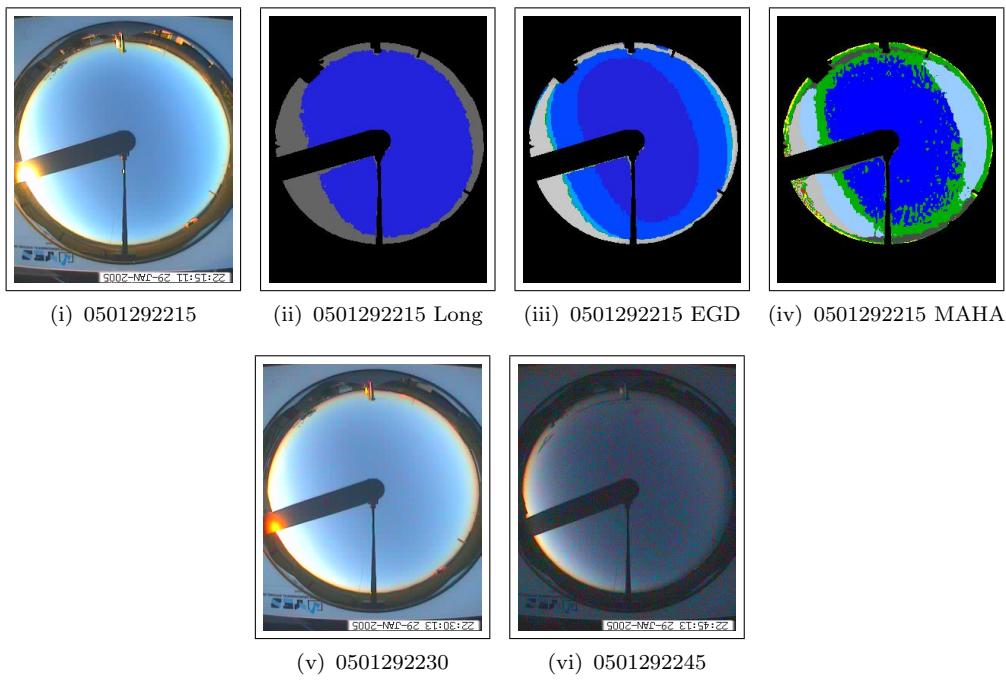


Figure A.332 - Sky images generated from 0501291600 to 0501292215.

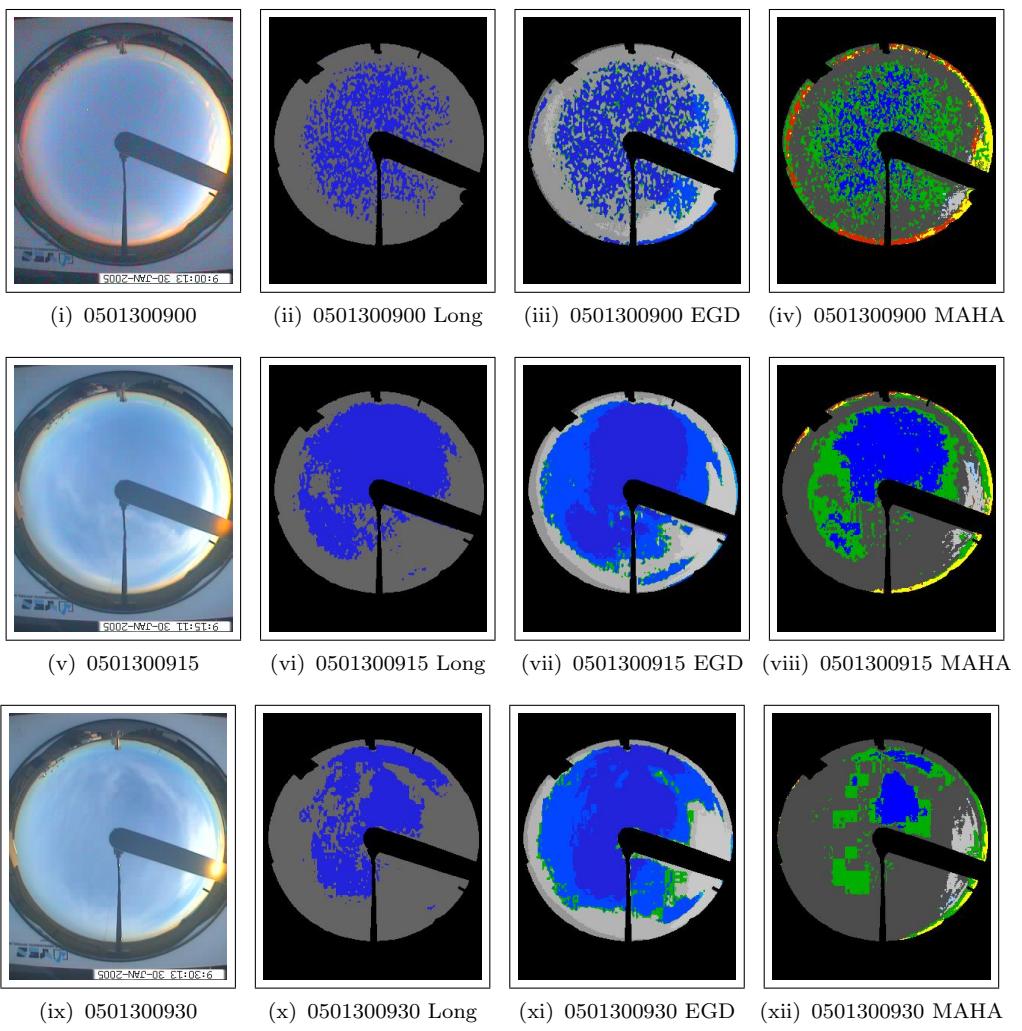


Figure A.333 - Sky images generated from 0501300845 to 0501300930.

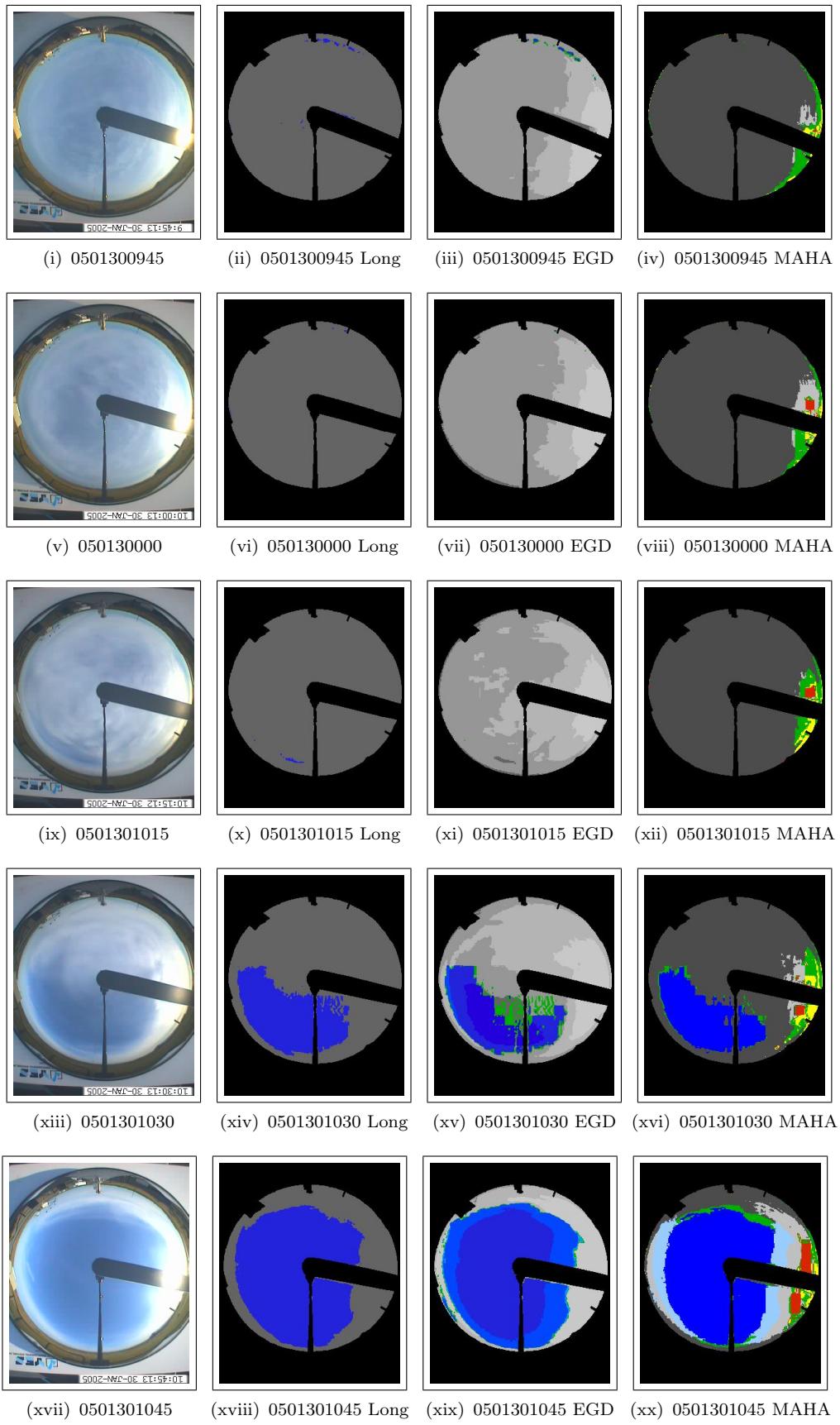


Figure A.334 - Sky images generated from 0501300945 to 0501301045.

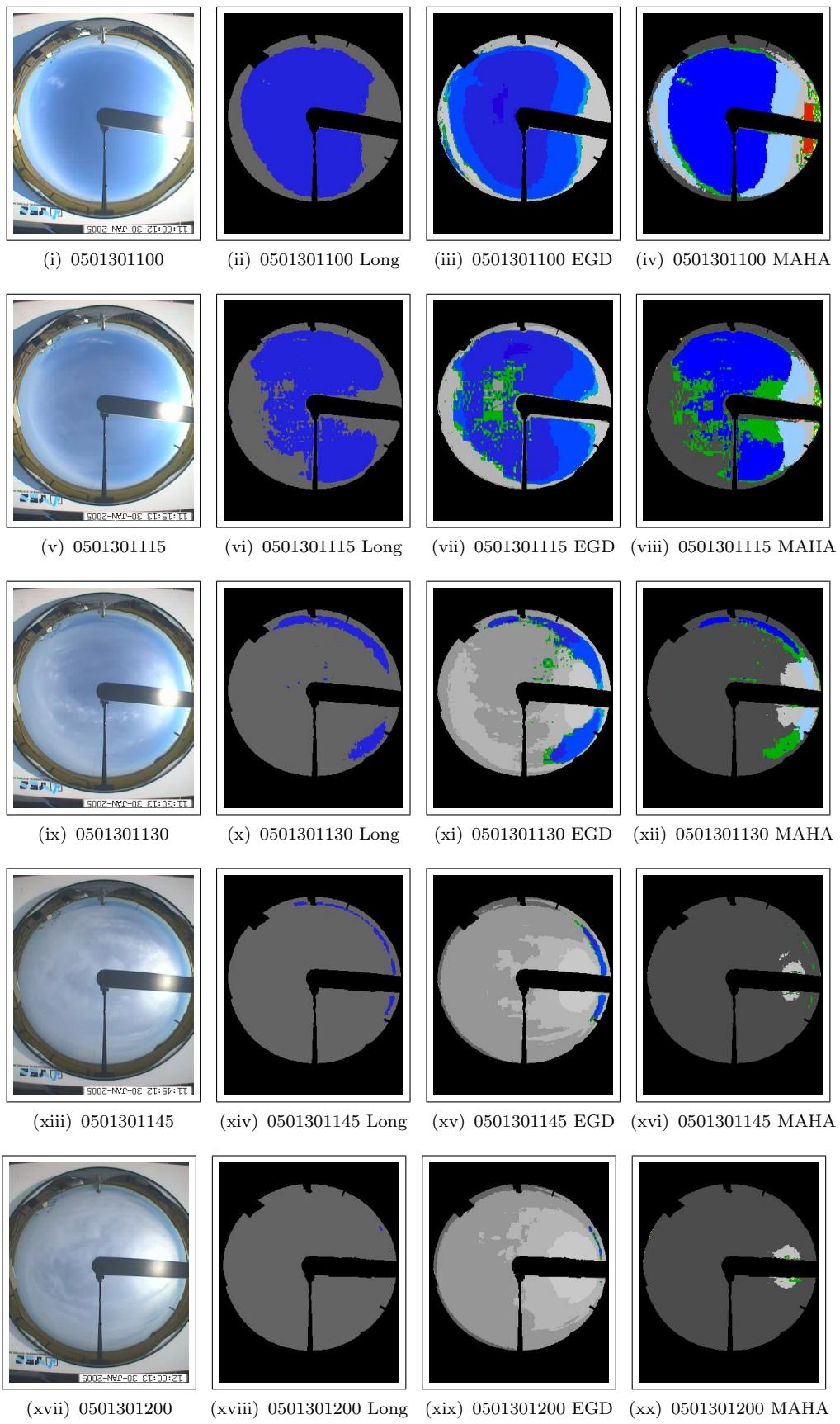


Figure A.335 - Sky images generated from 050130100 to 0501301200.

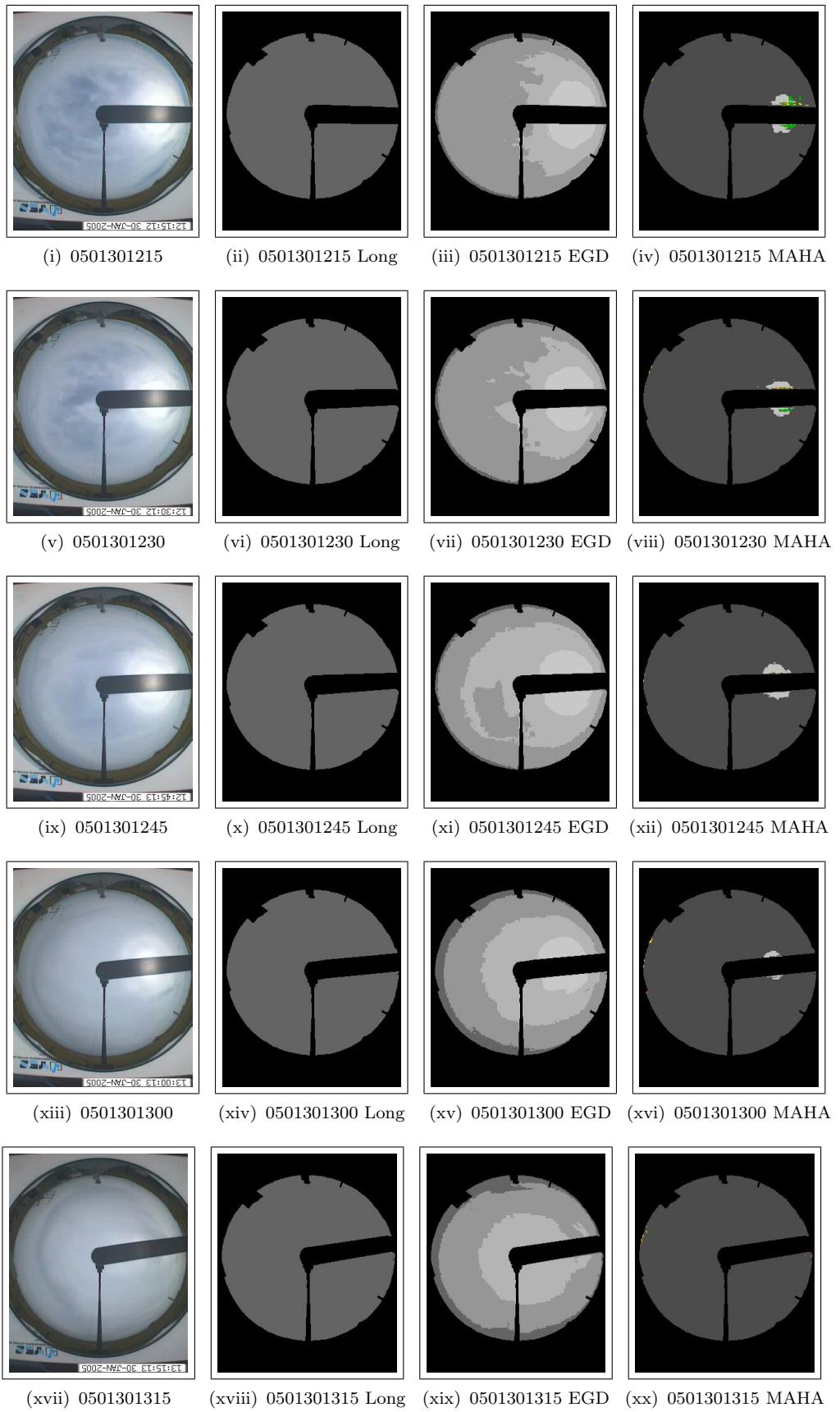


Figure A.336 - Sky images generated from 0501301215 to 0501301315.

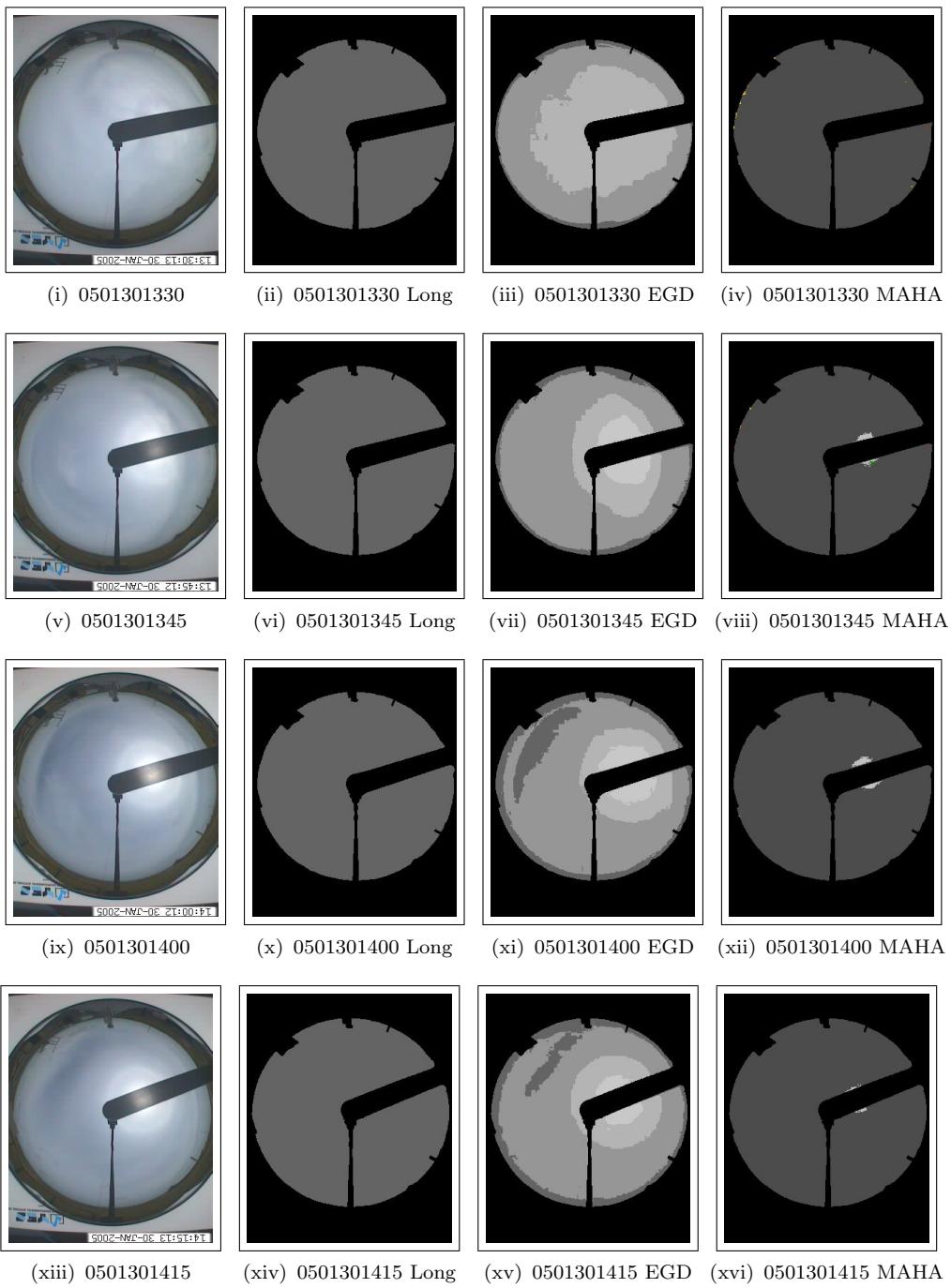


Figure A.337 - Sky images generated from 0501301330 to 0501301415.

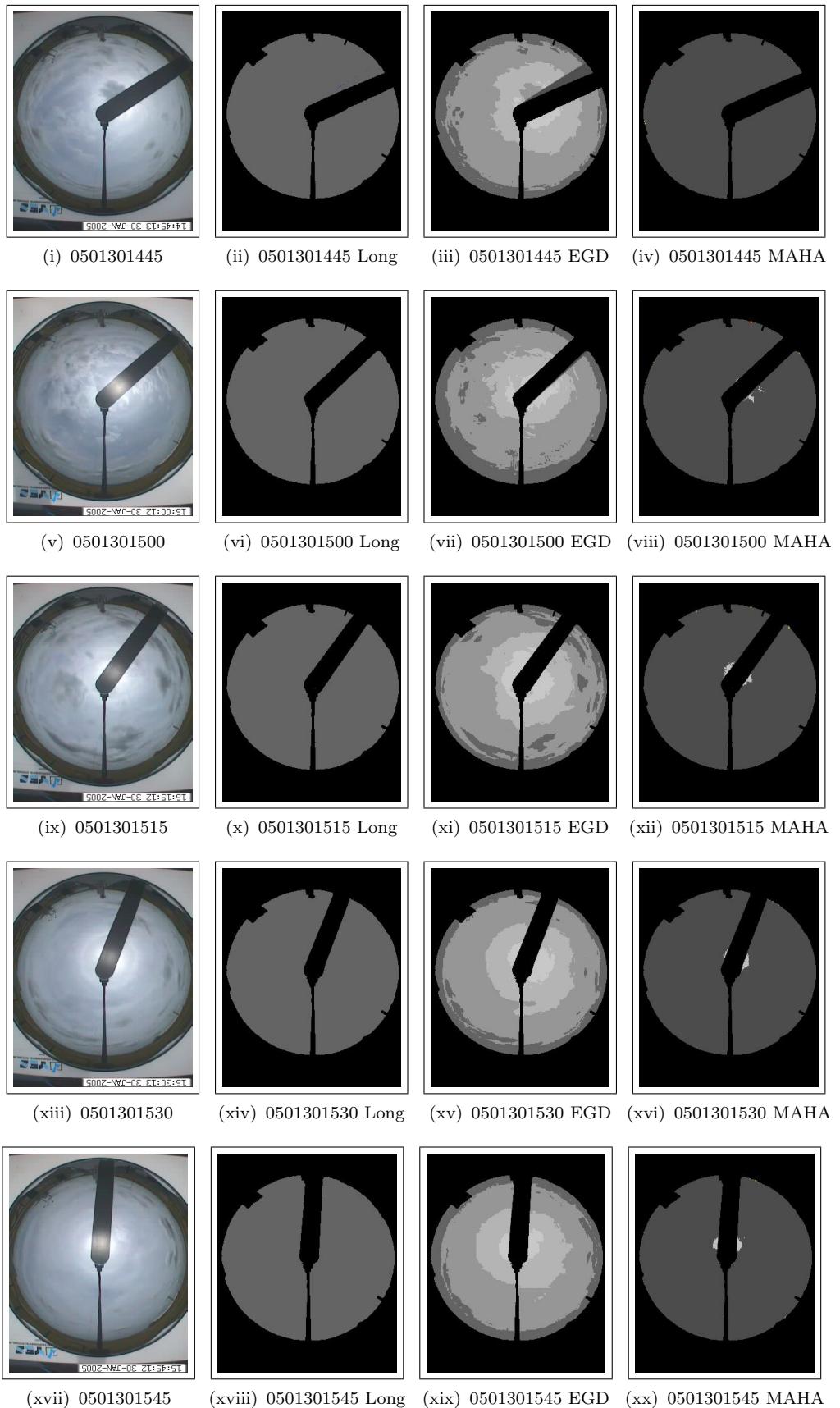


Figure A.338 - Sky images generated from 0501301445 to 0501301545.

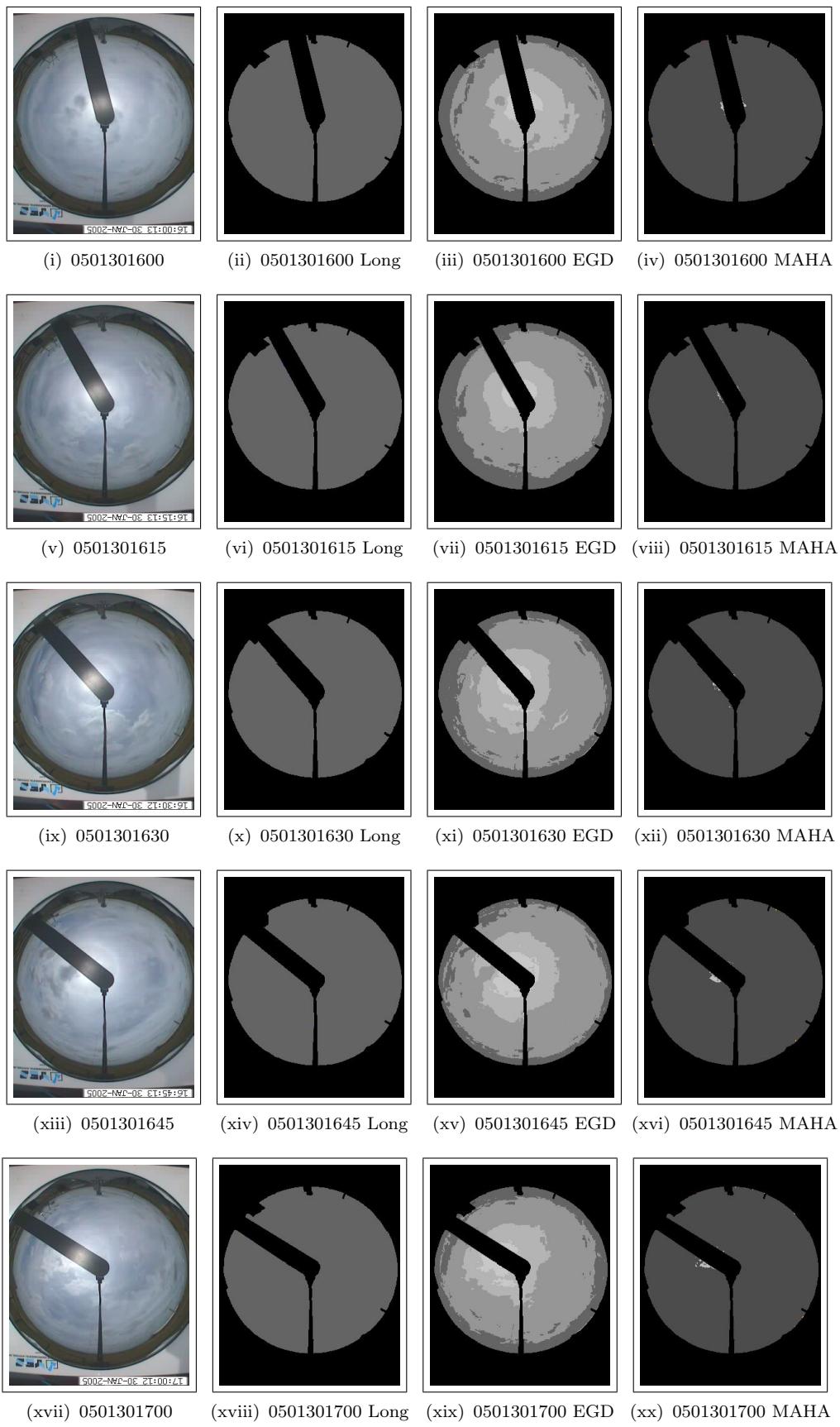


Figure A.339 - Sky images generated from 0501301600 to 0501301700.

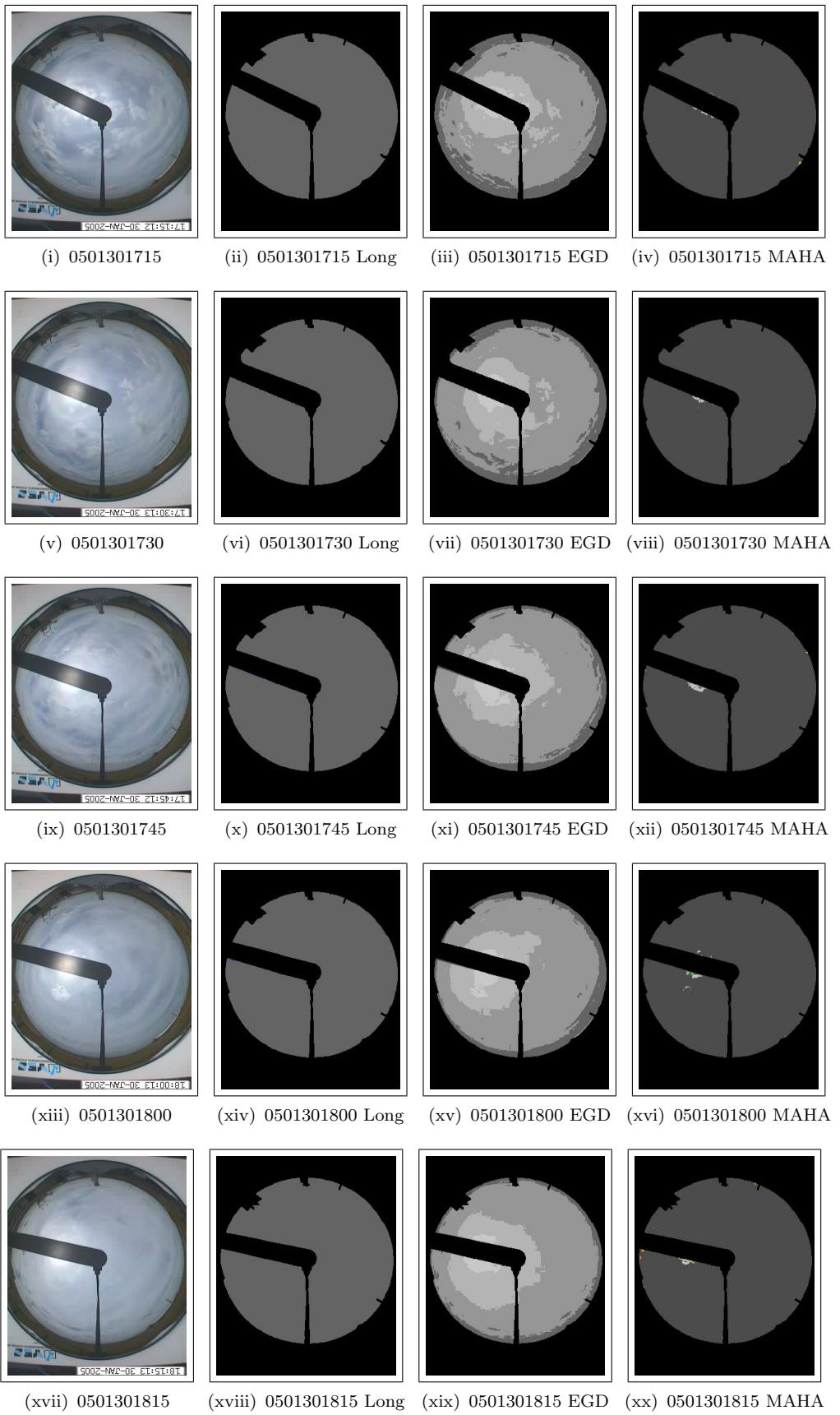


Figure A.340 - Sky images generated from 0501301715 to 0501301815.

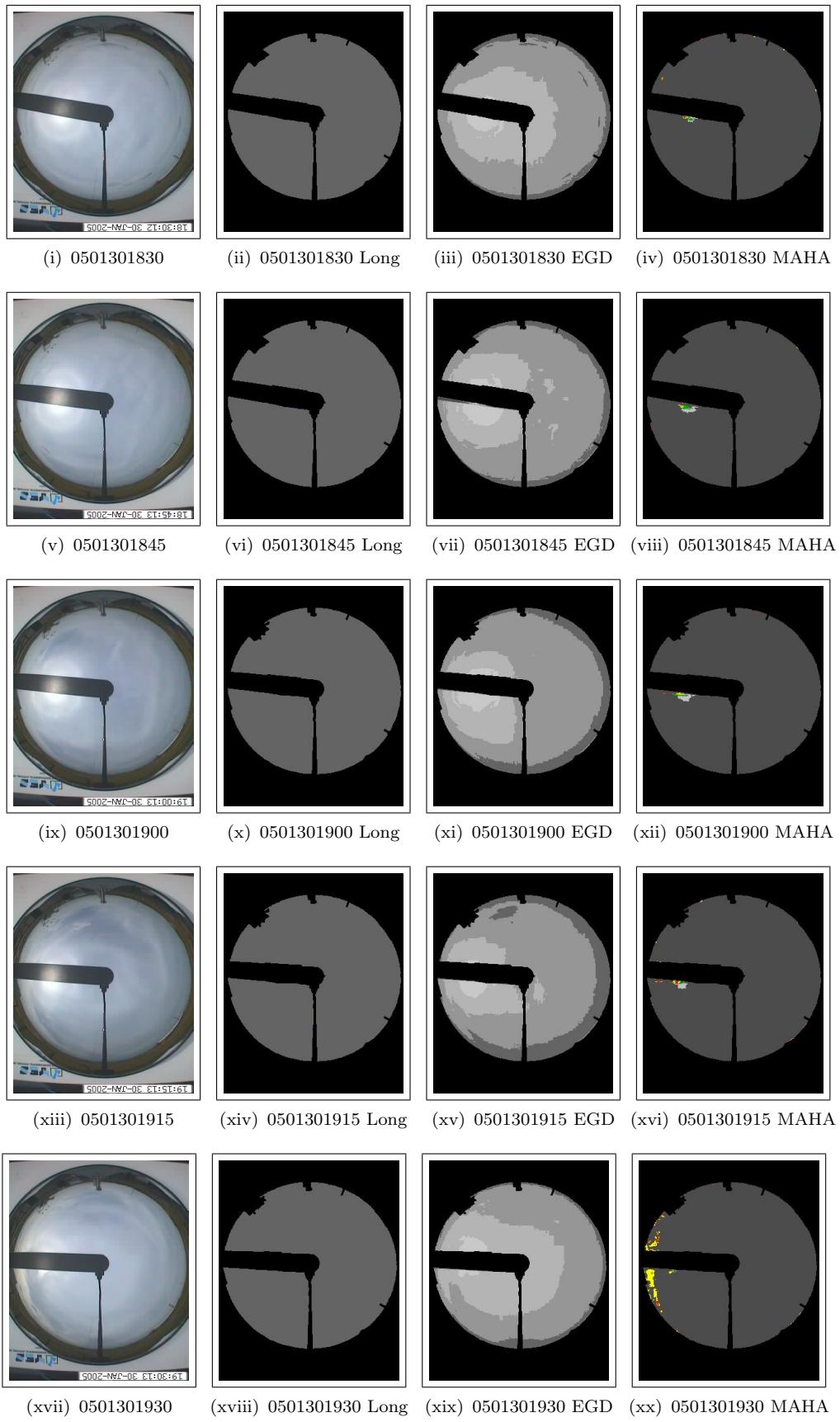


Figure A.341 - Sky images generated from 0501301830 to 0501301930.

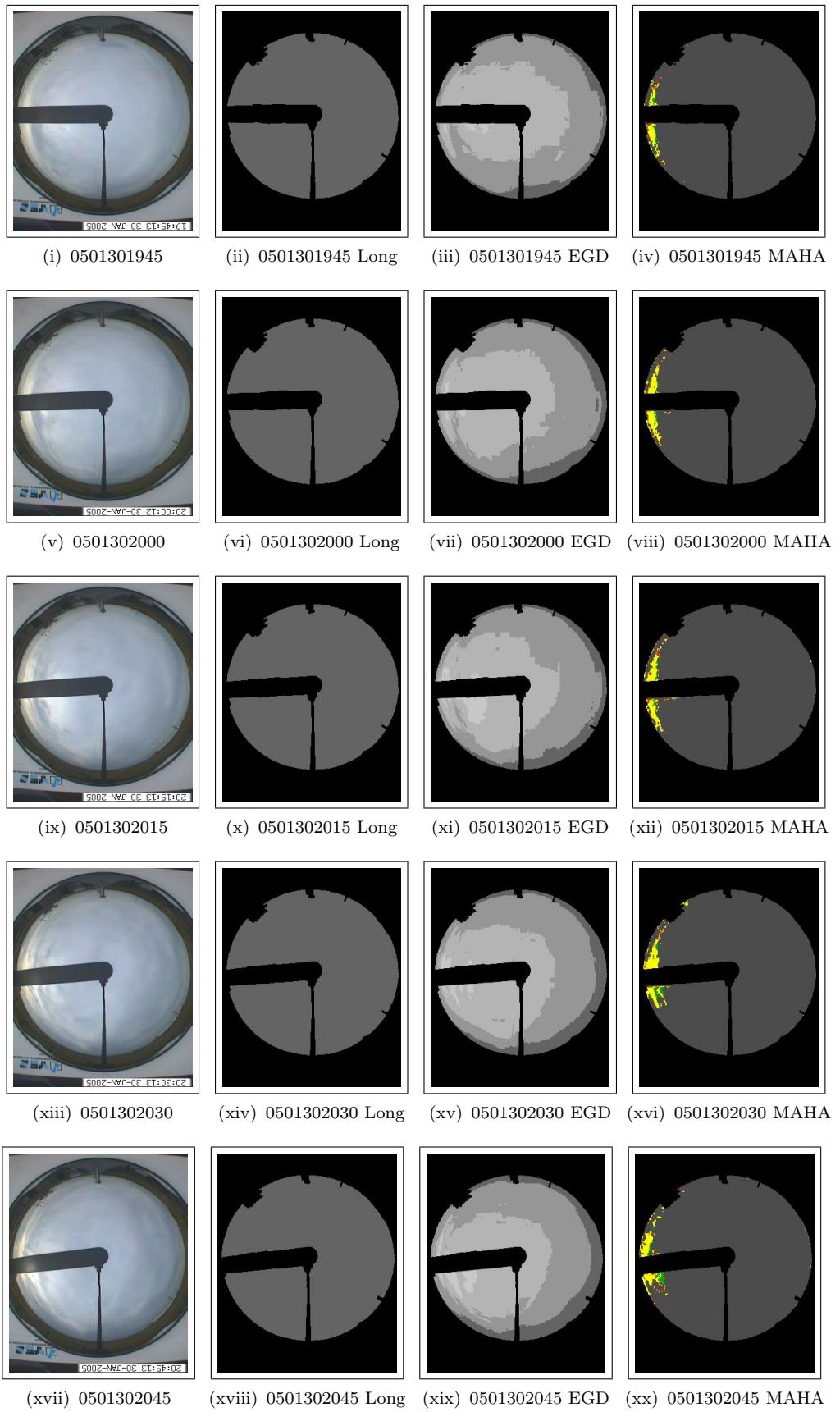


Figure A.342 - Sky images generated from 0501301945 to 0501302045.

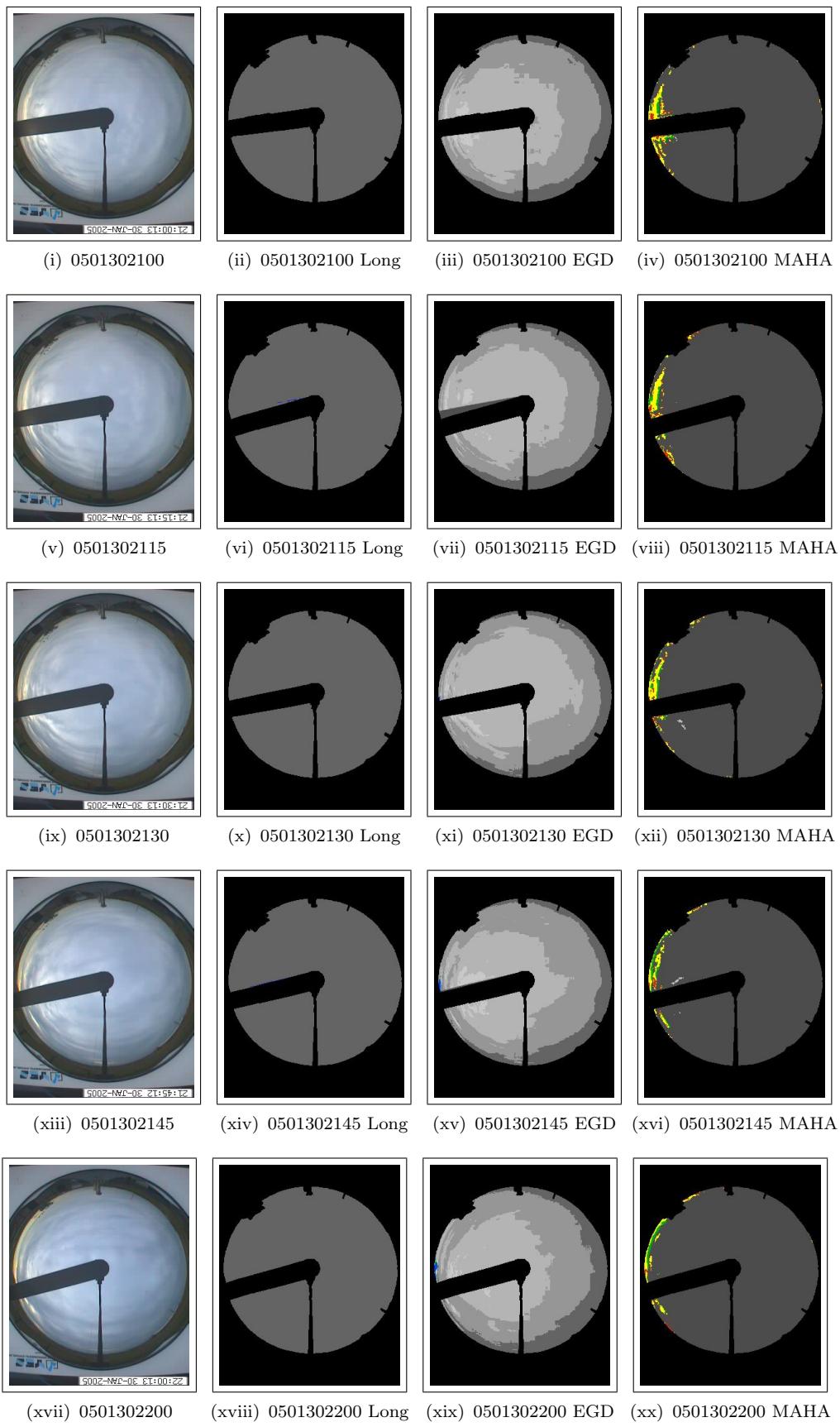


Figure A.343 - Sky images generated from 0501302100 to 0501302200.

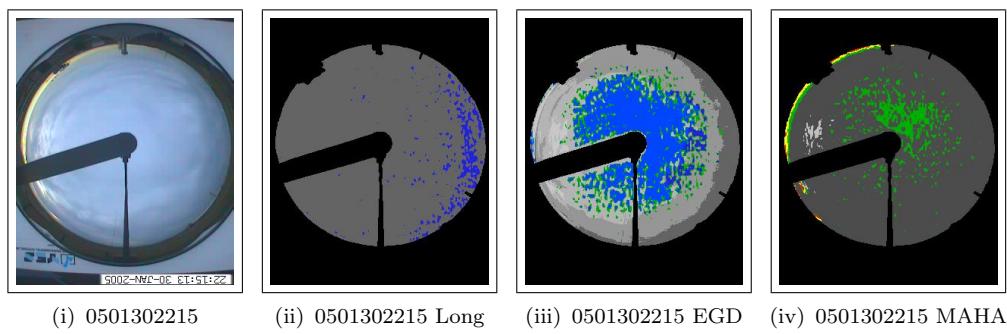


Figure A.344 - Sky images generated for 0501302215.

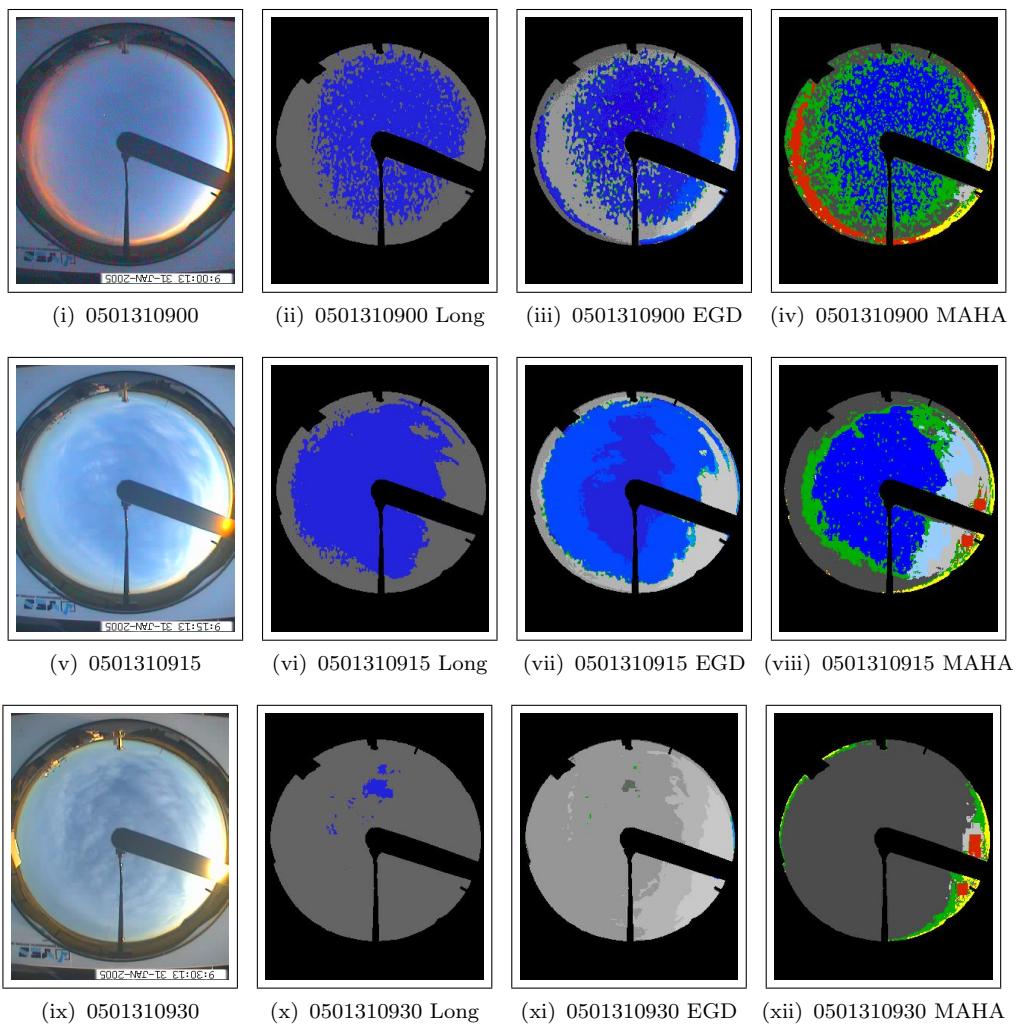


Figure A.345 - Sky images generated from 0501310845 to 0501310930.

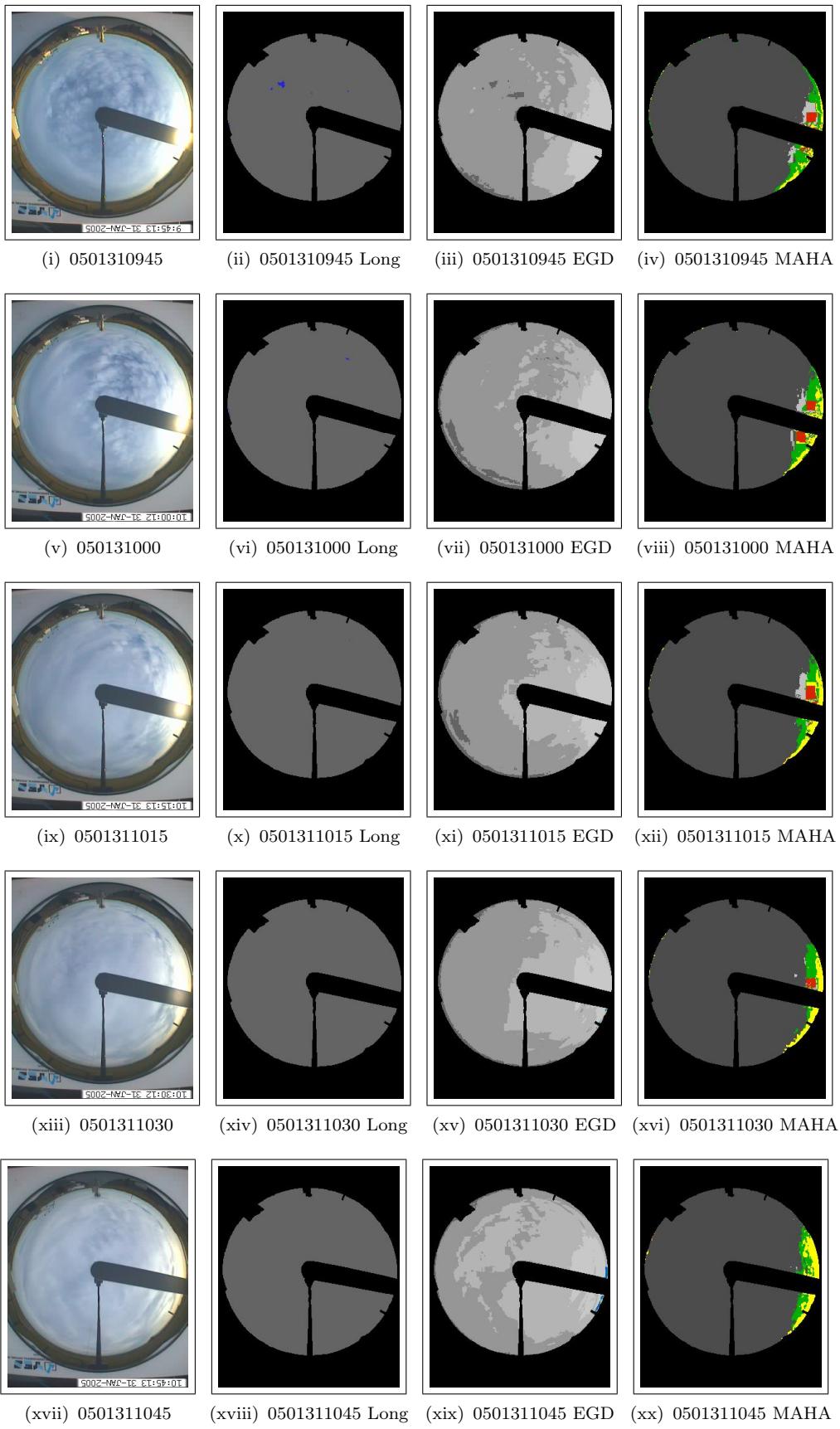


Figure A.346 - Sky images generated from 0501310945 to 0501311045.

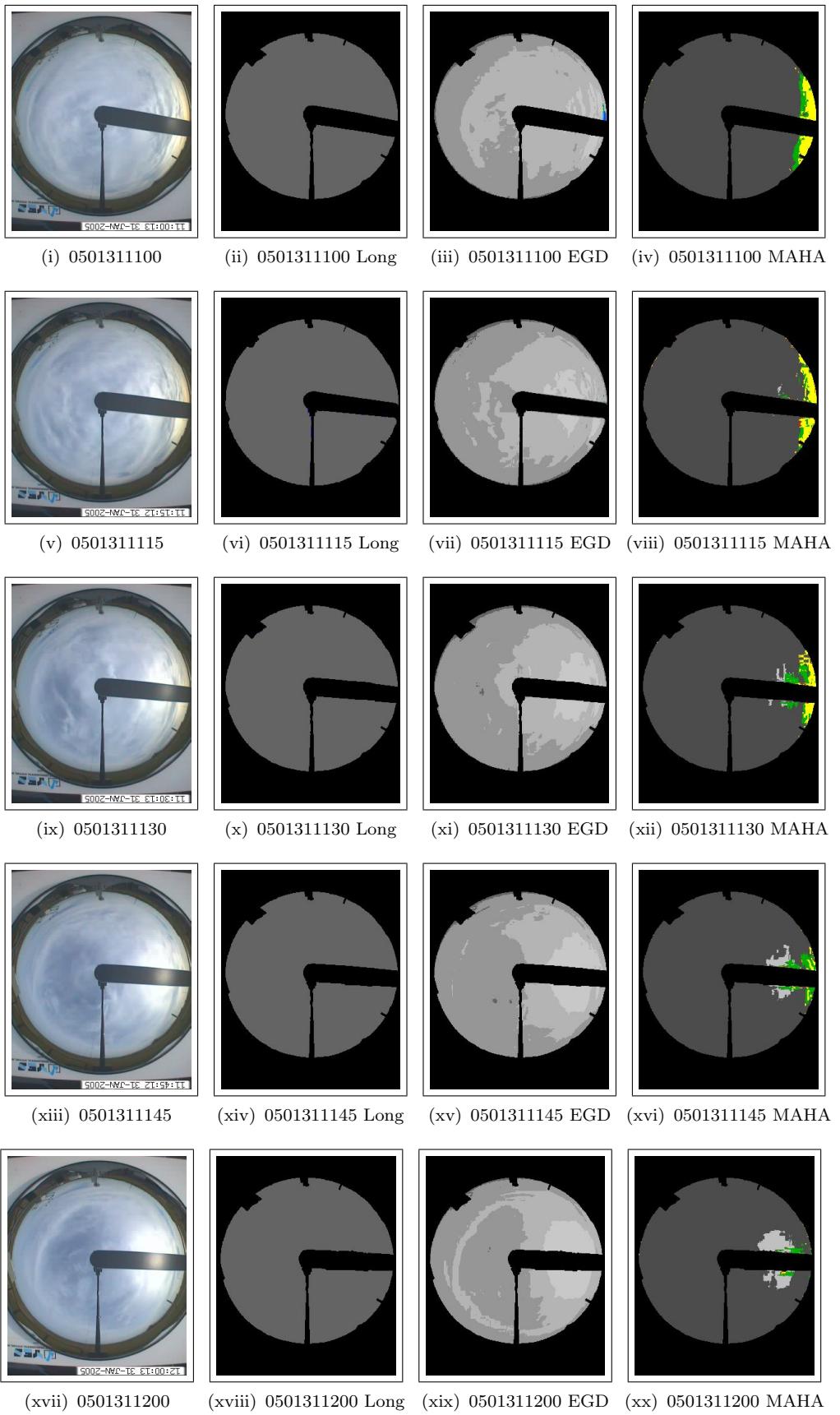


Figure A.347 - Sky images generated from 050131100 to 0501311200.

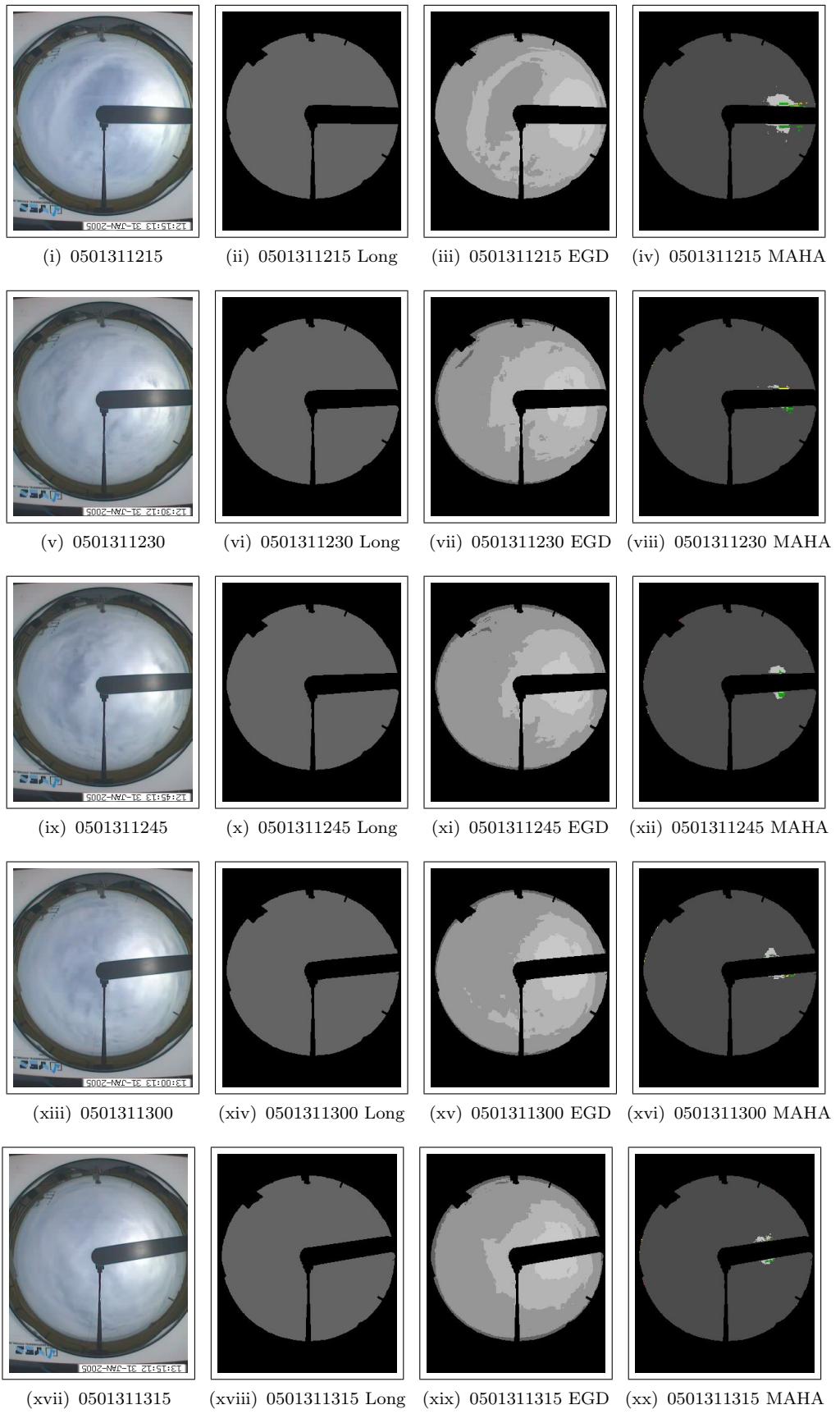


Figure A.348 - Sky images generated from 0501311215 to 0501311315.

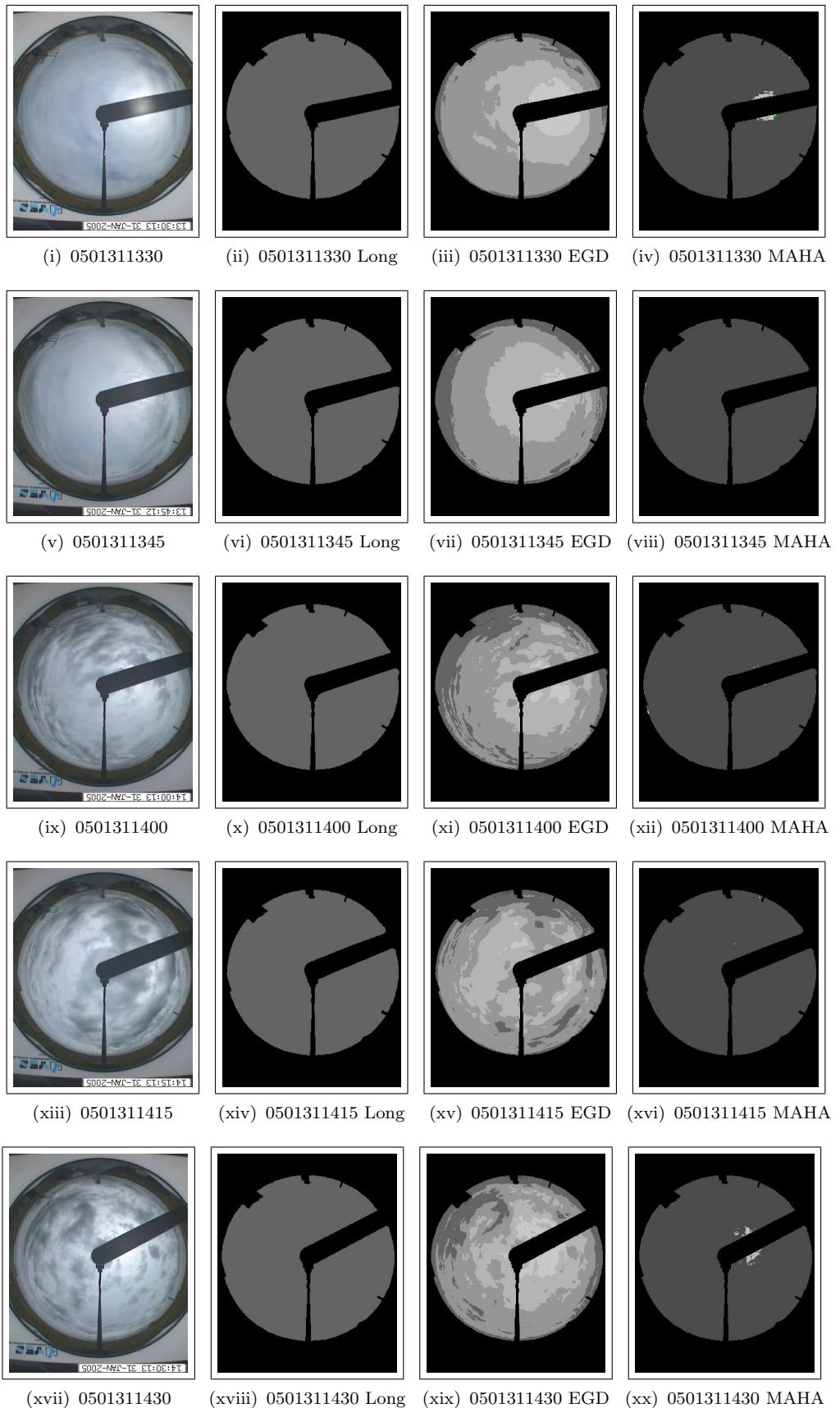


Figure A.349 - Sky images generated from 0501311330 to 0501311430.

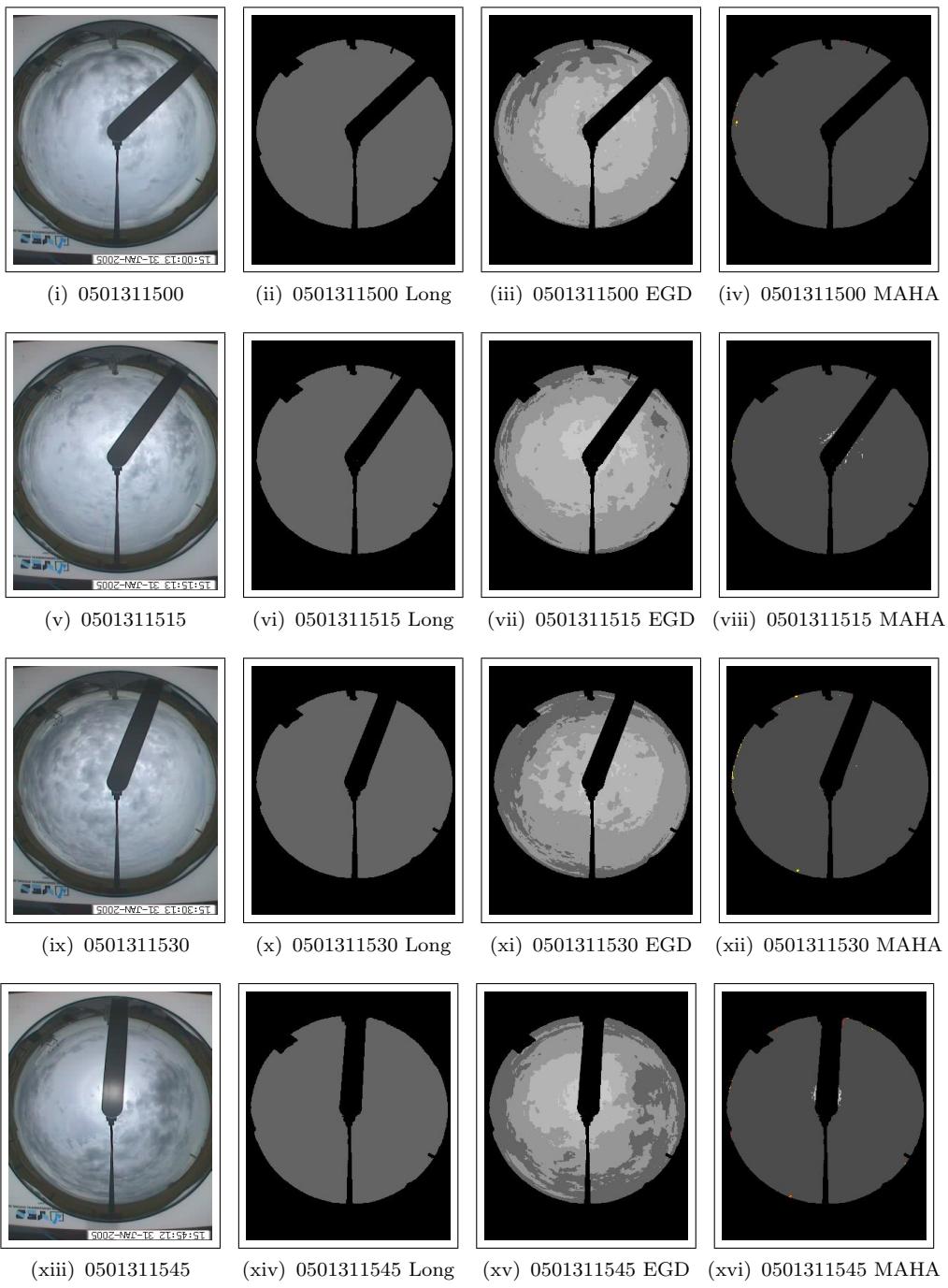


Figure A.350 - Sky images generated from 0501311445 to 0501311545.

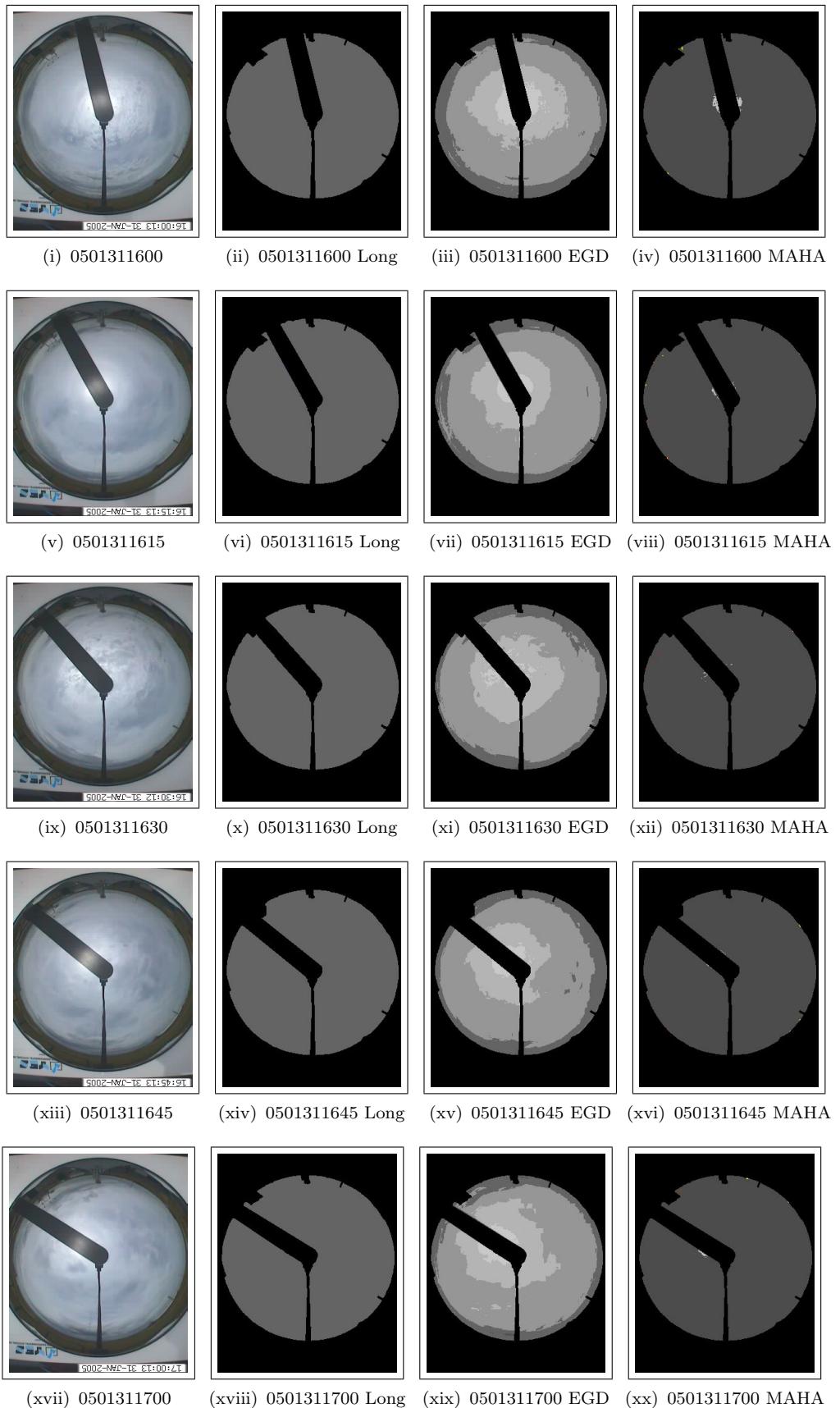


Figure A.351 - Sky images generated from 0501311600 to 0501311700.

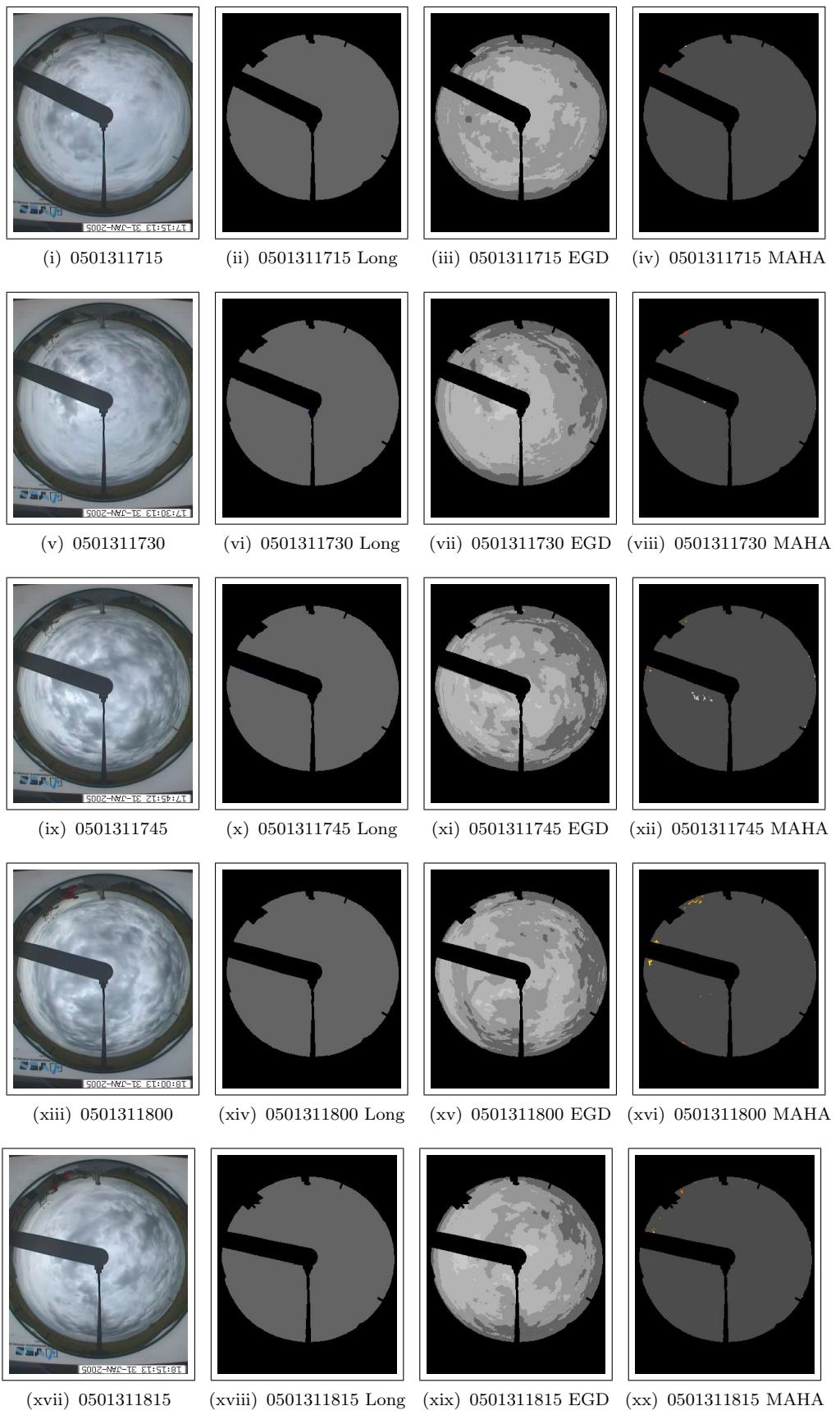


Figure A.352 - Sky images generated from 0501311715 to 0501311815.

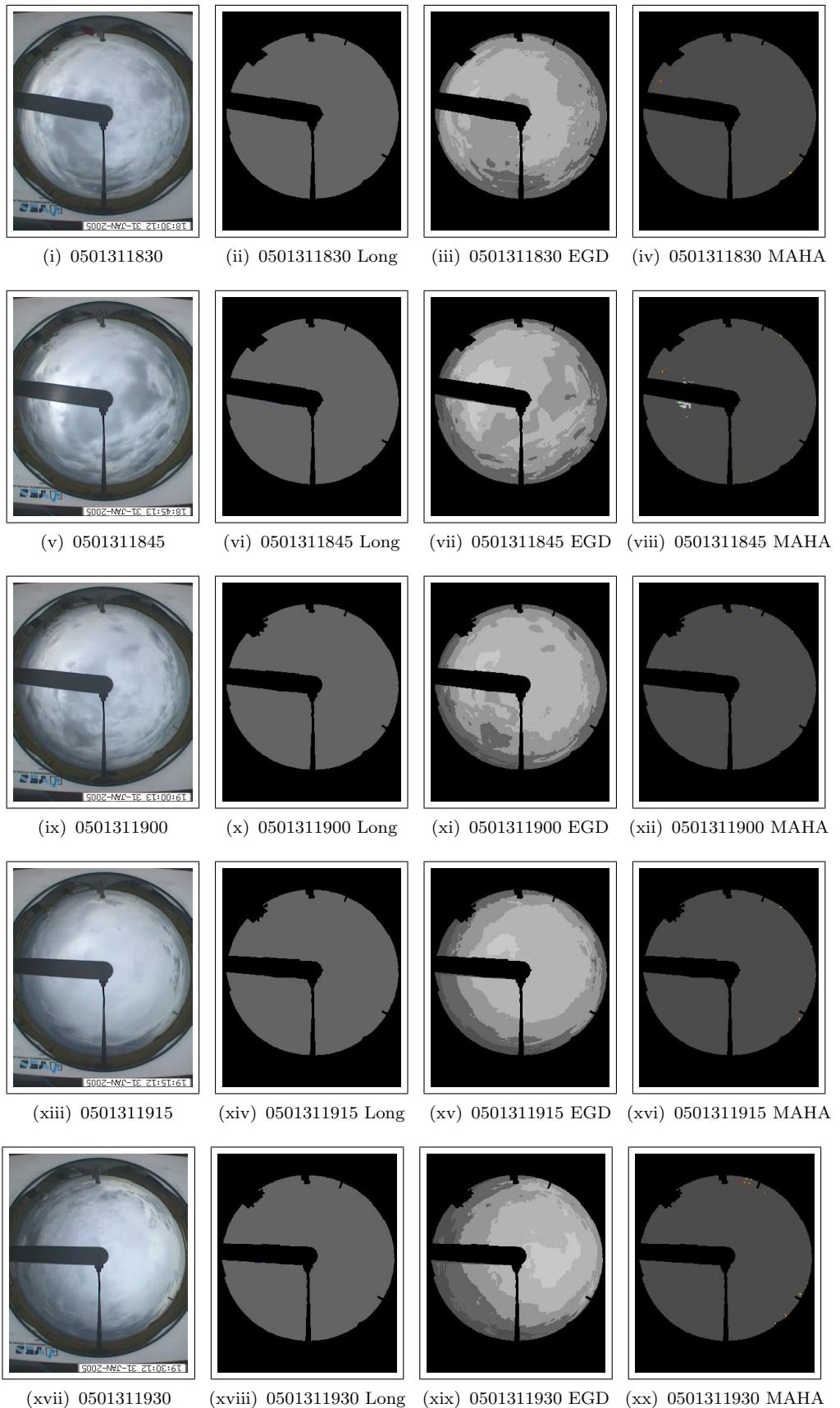


Figure A.353 - Sky images generated from 0501311830 to 0501311930.

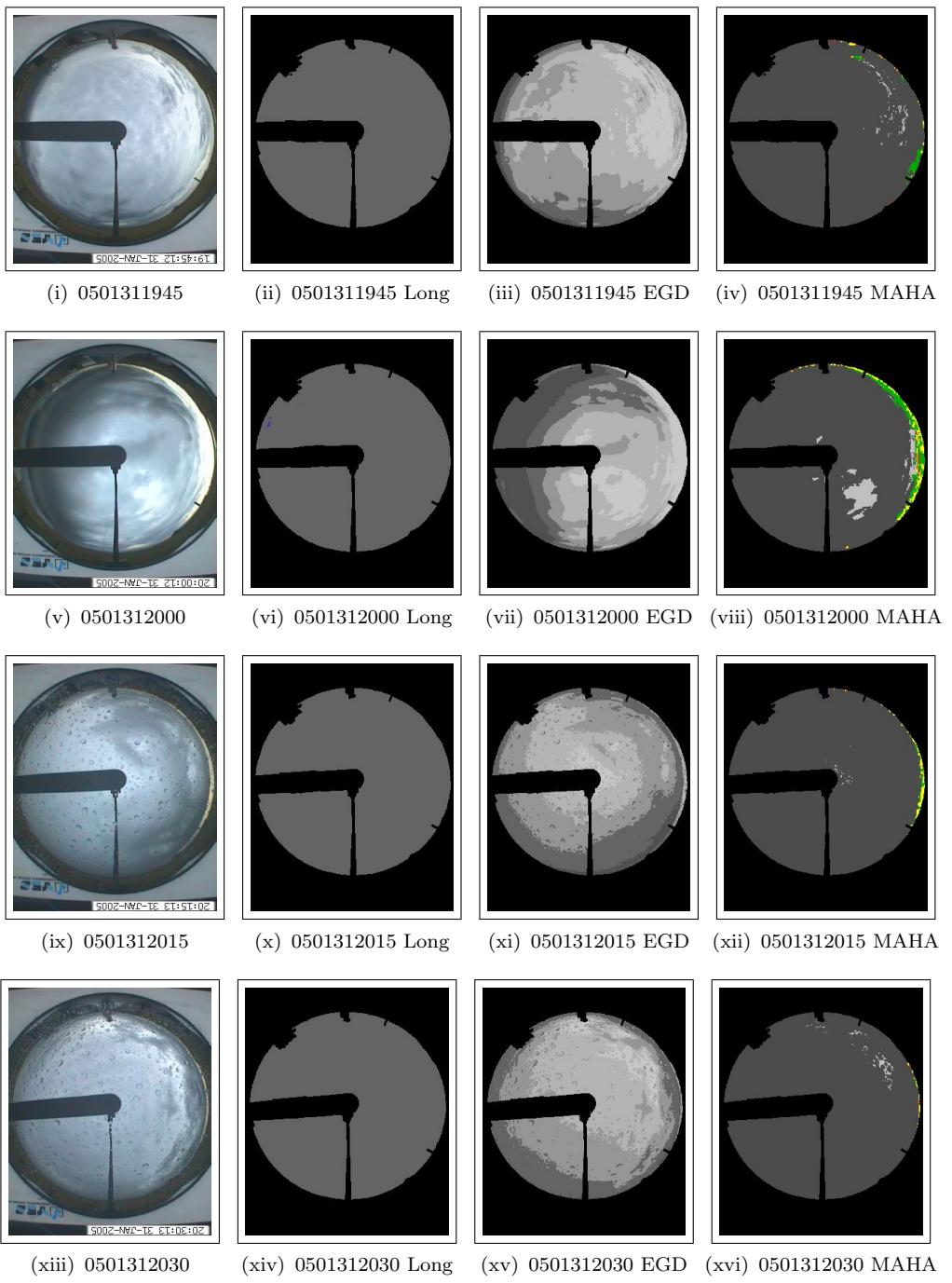
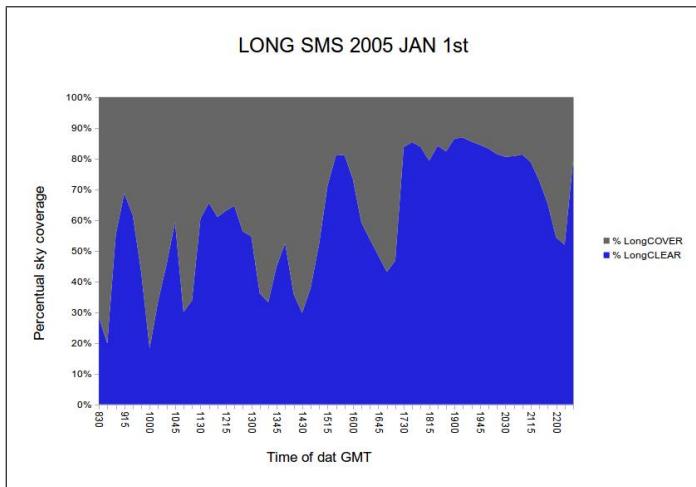
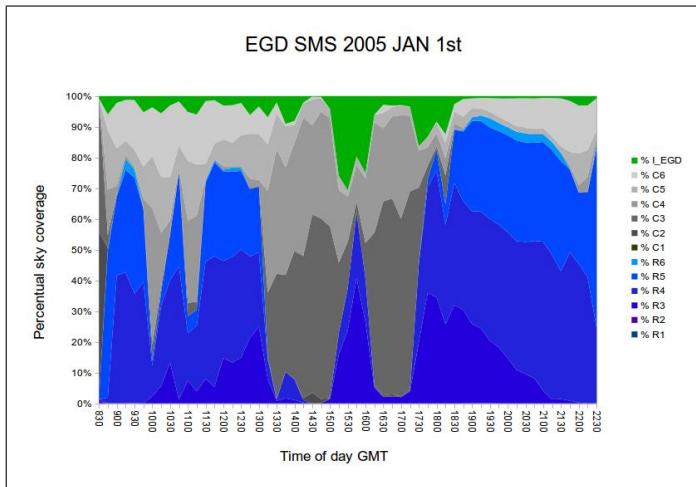


Figure A.354 - Sky images generated from 0501311945 to 0501312030.

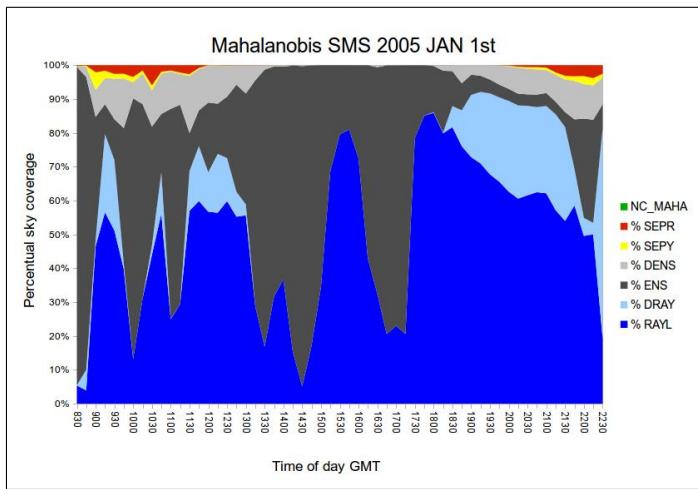
Appendix B - Daily graphic results for 3 methods during 2005 January



(i) LONG

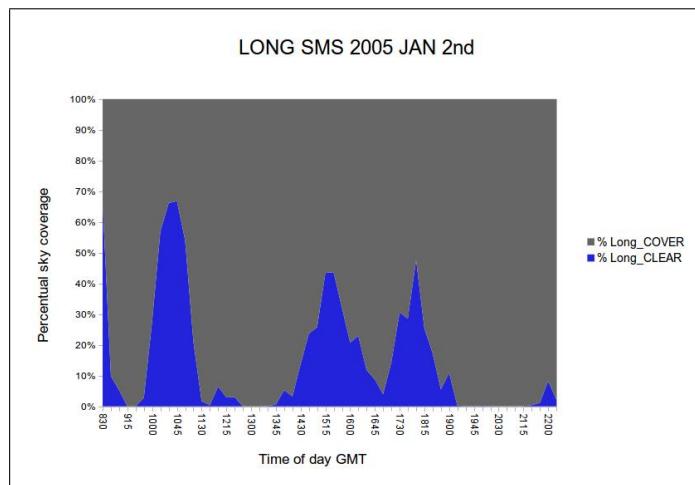


(ii) EGD

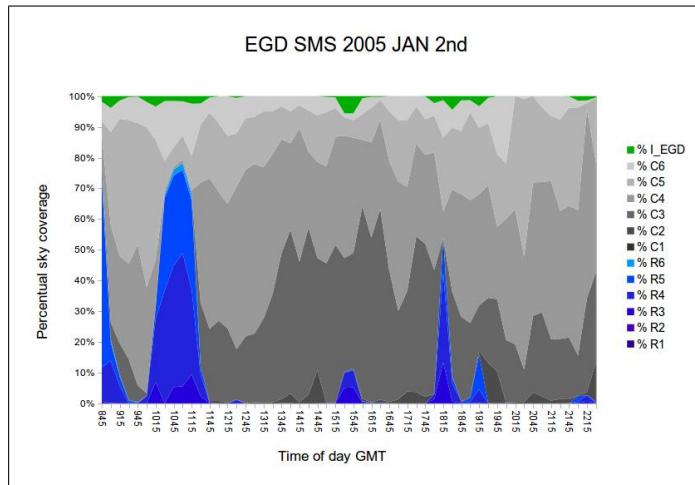


(iii) MAHA.

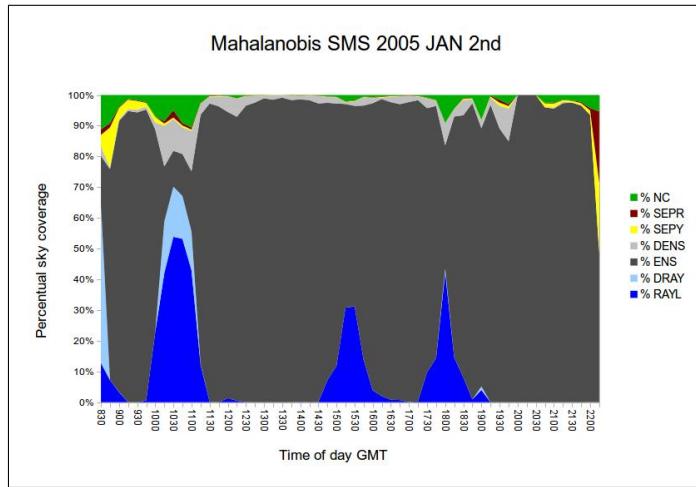
Figure B.1 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 1, 2005.



(i) LONG

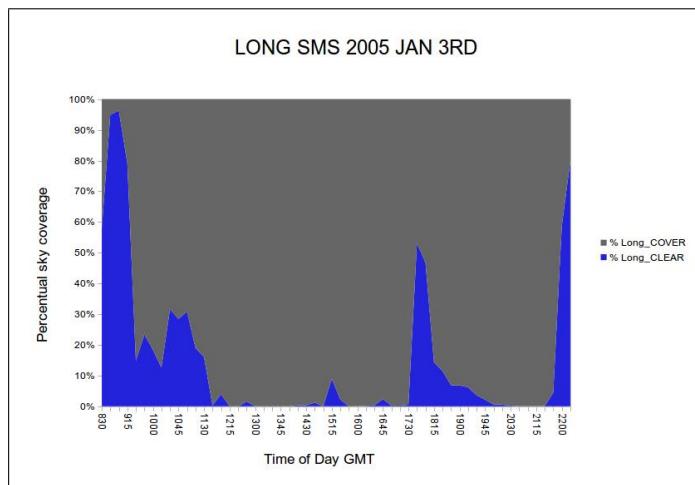


(ii) EGD

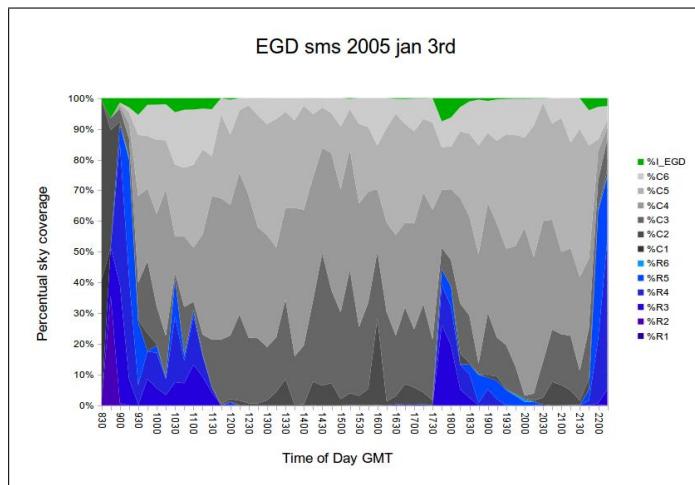


(iii) MAHA.

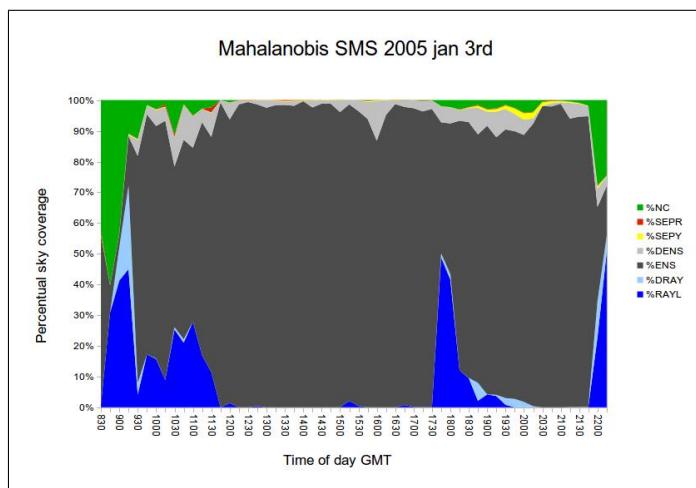
Figure B.2 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 2, 2005.



(i) LONG

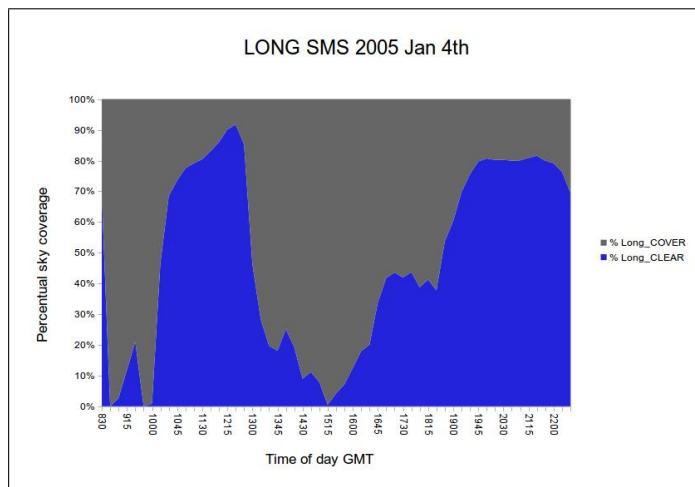


(ii) EGD

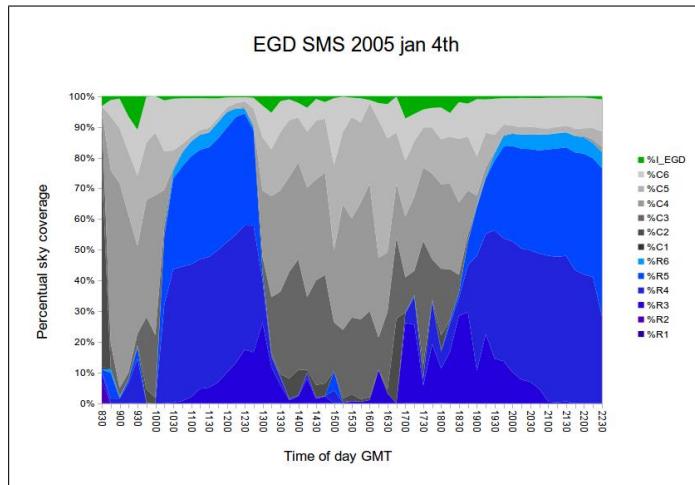


(iii) MAHA.

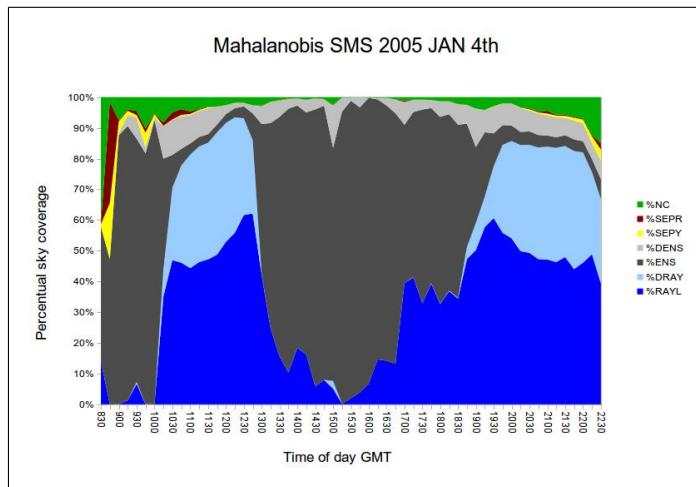
Figure B.3 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 3, 2005.



(i) LONG

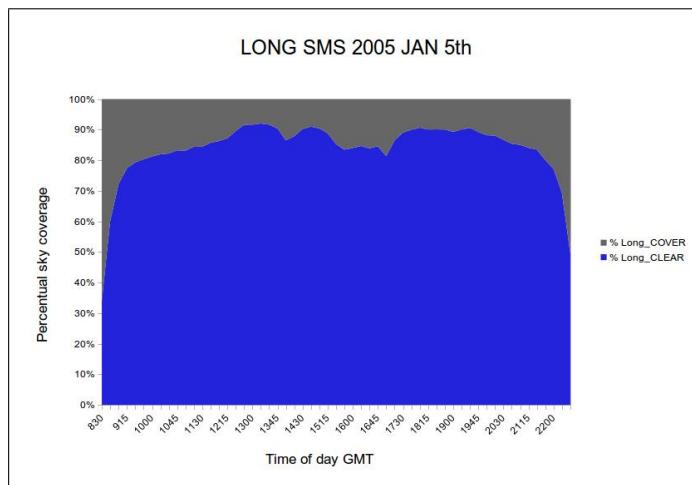


(ii) EGD

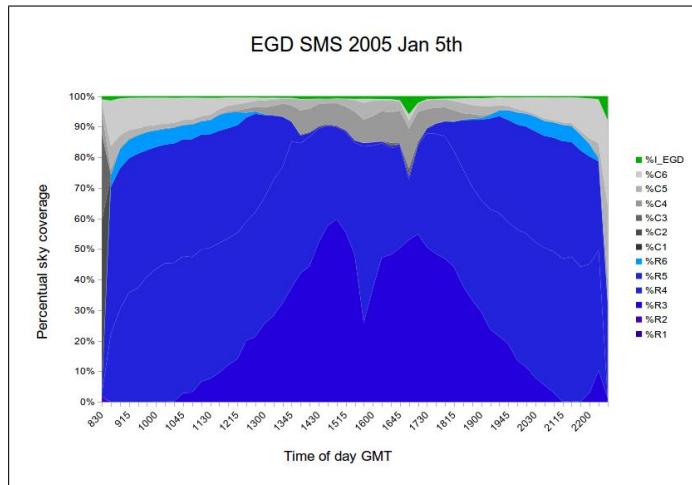


(iii) MAHA.

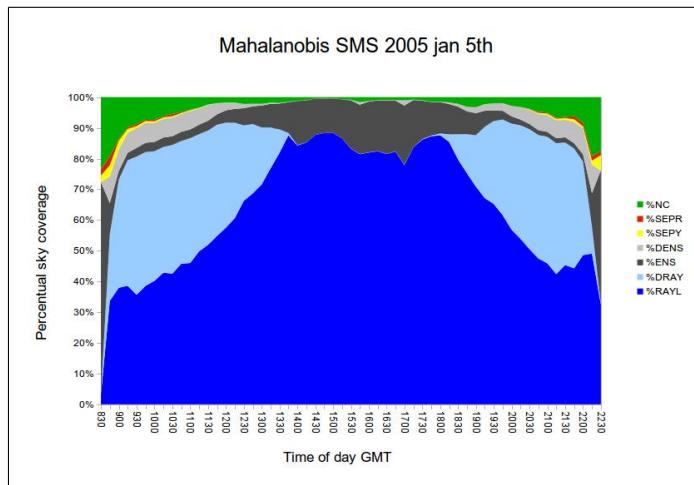
Figure B.4 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 4, 2005.



(i) LONG

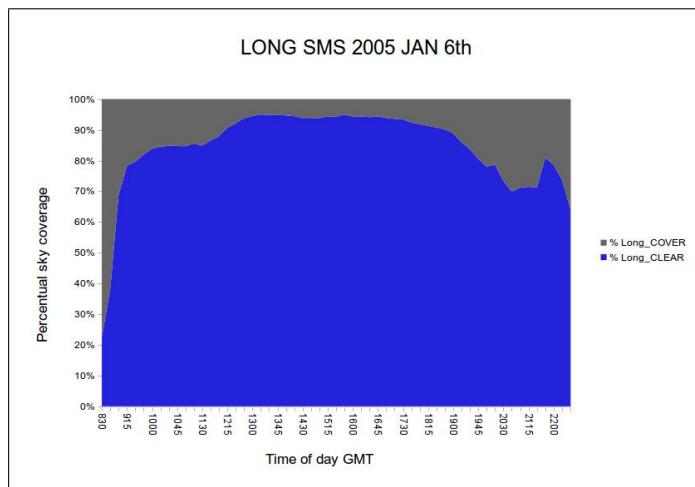


(ii) EGD

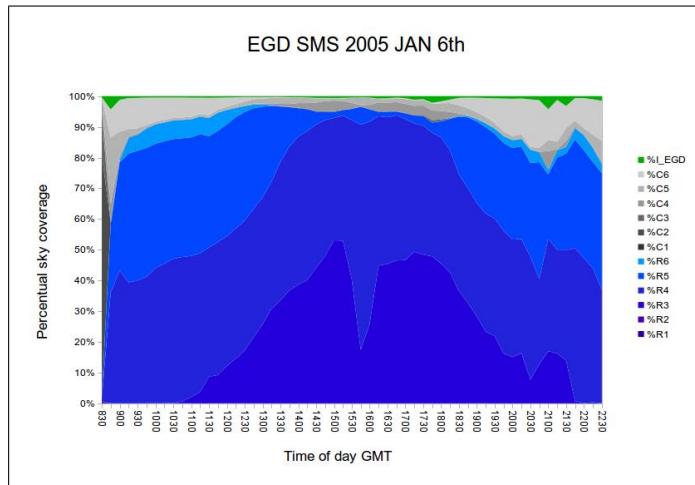


(iii) MAHA.

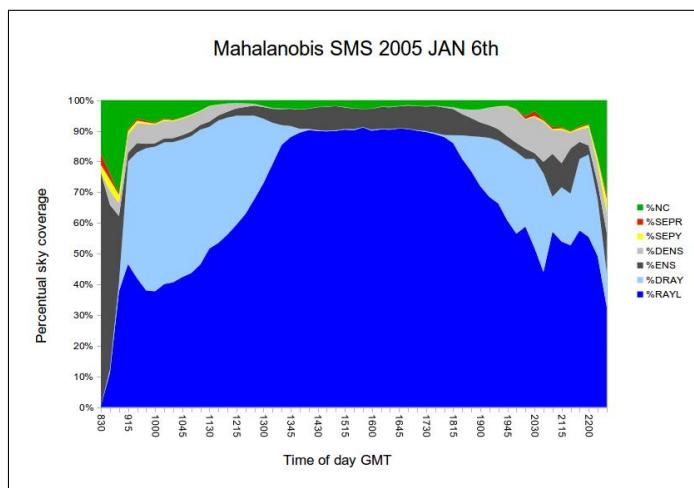
Figure B.5 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 5, 2005.



(i) LONG

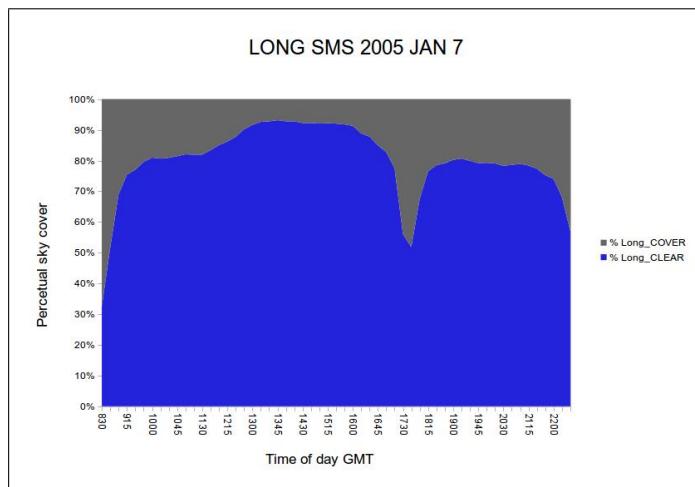


(ii) EGD

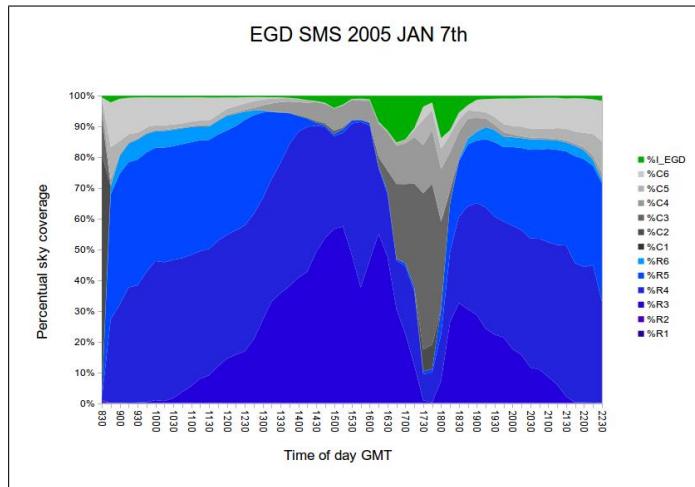


(iii) MAHA.

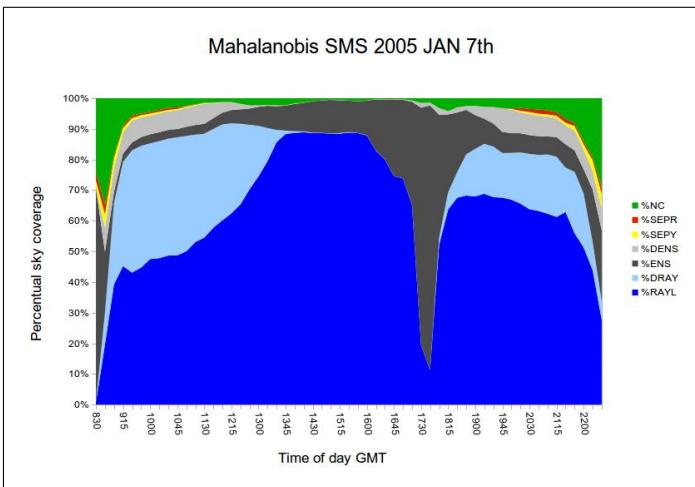
Figure B.6 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 6, 2005.



(i) LONG

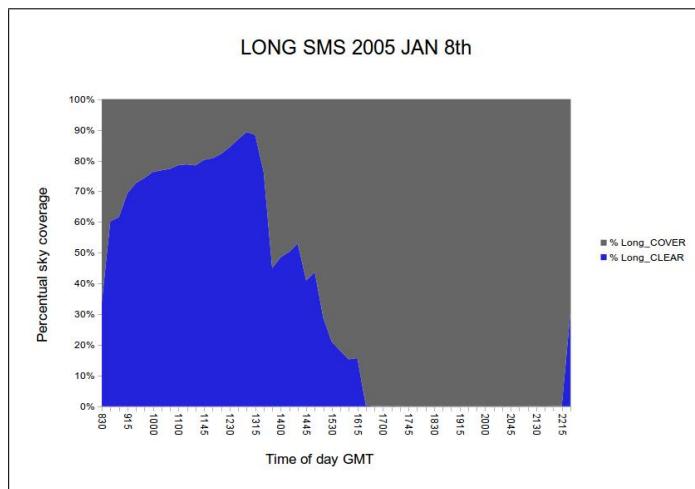


(ii) EGD

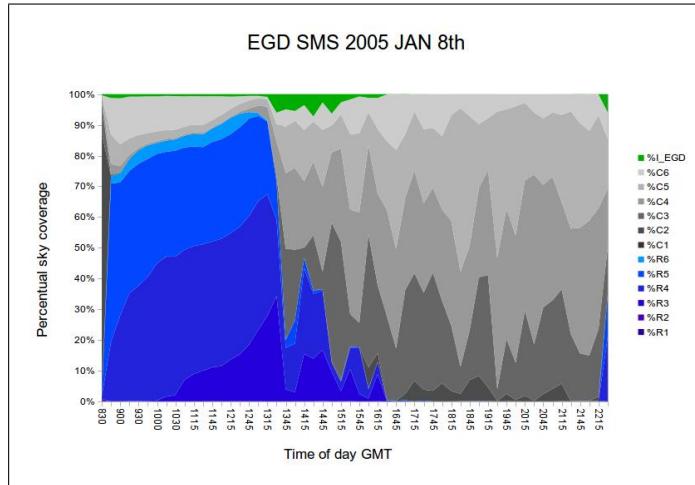


(iii) MAHA.

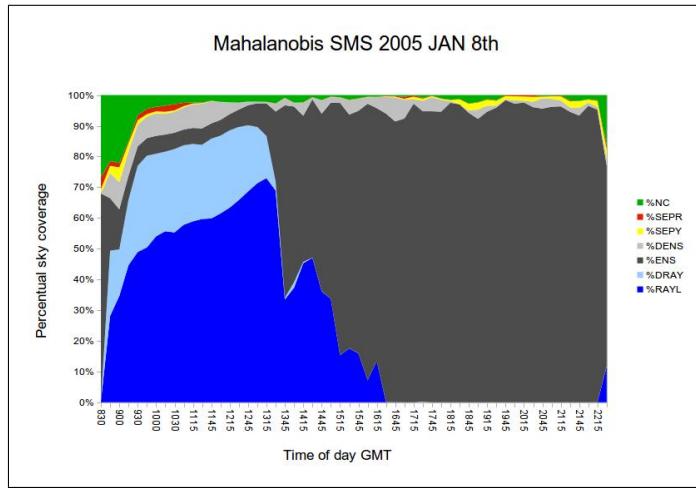
Figure B.7 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 7, 2005.



(i) LONG

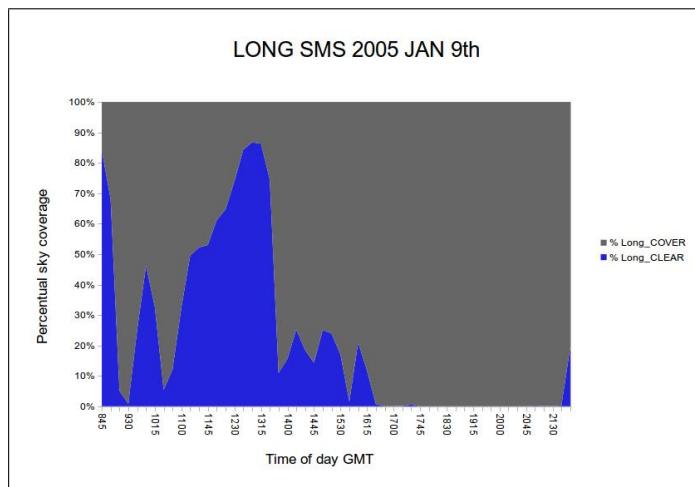


(ii) EGD

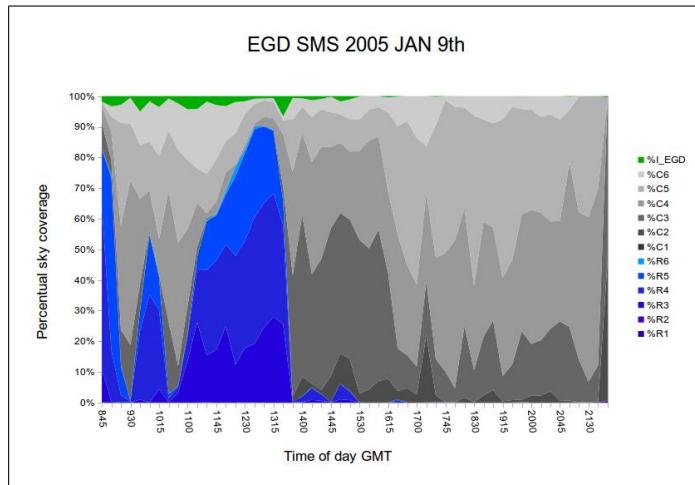


(iii) MAHA.

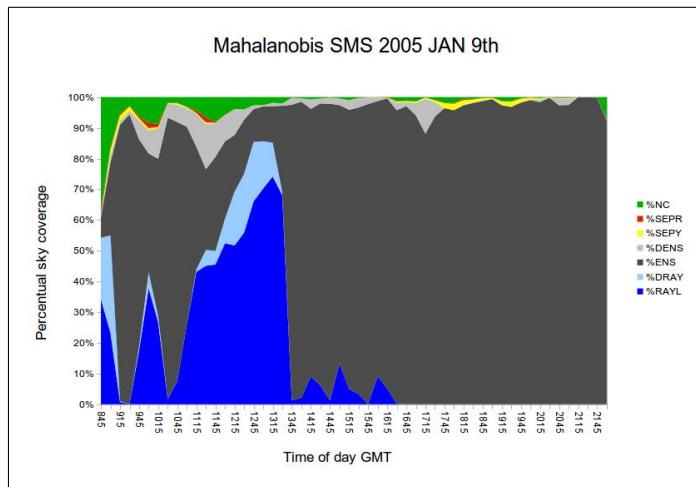
Figure B.8 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 8, 2005.



(i) LONG

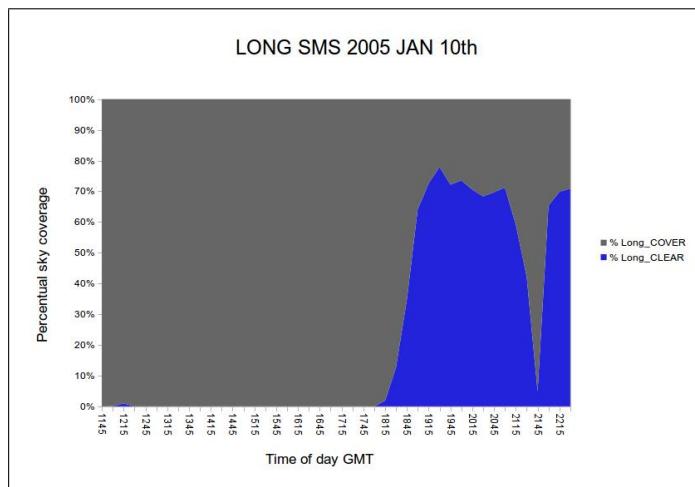


(ii) EGD

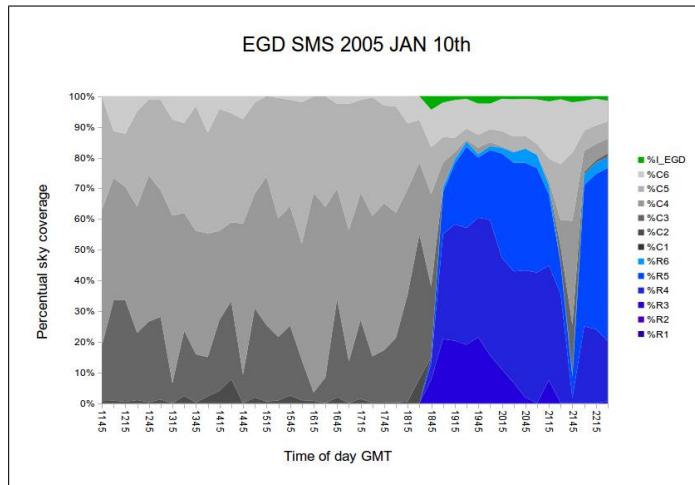


(iii) MAHA.

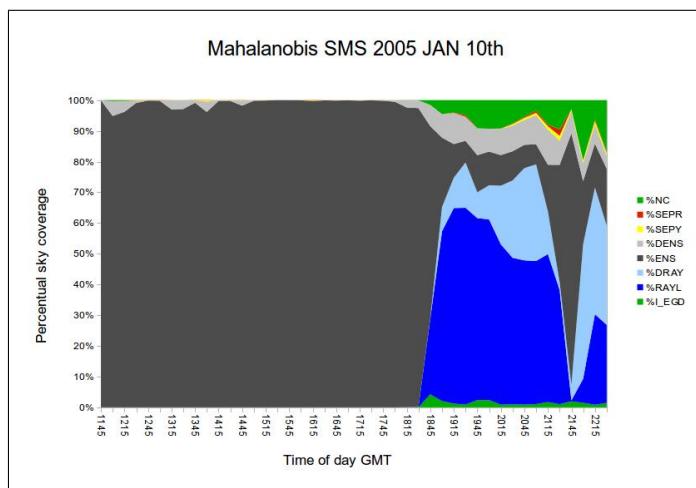
Figure B.9 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 9, 2005.



(i) LONG

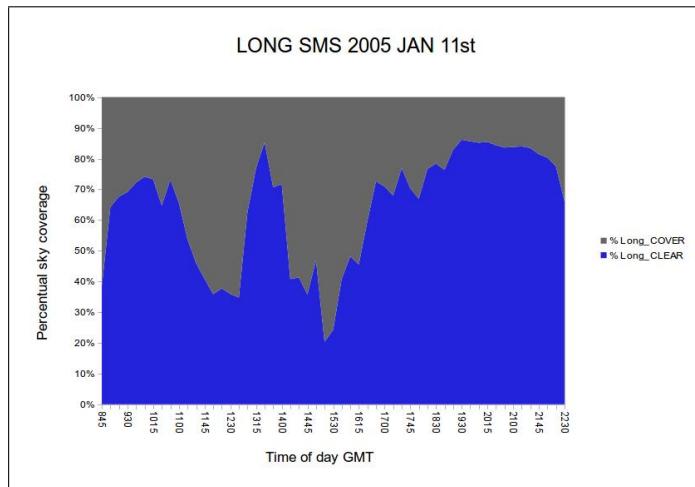


(ii) EGD

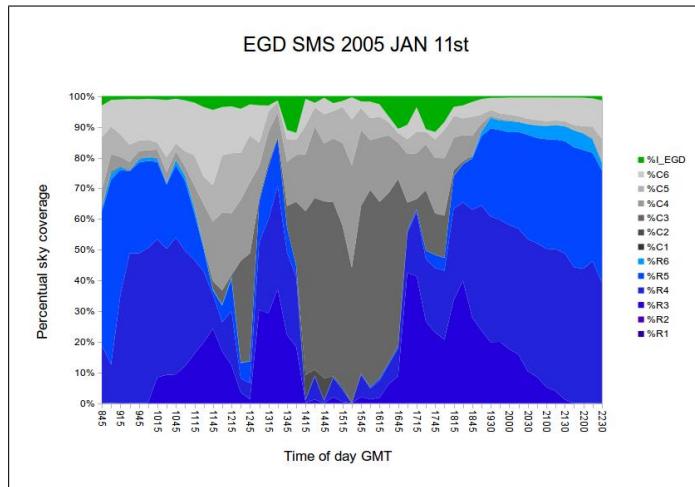


(iii) MAHA.

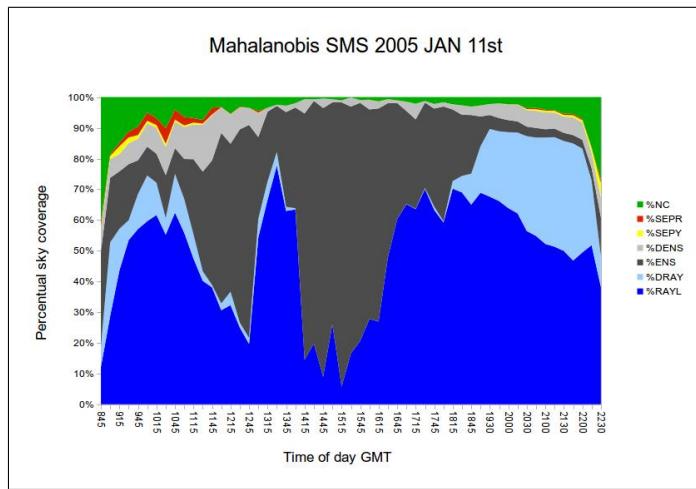
Figure B.10 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 10, 2005.



(i) LONG

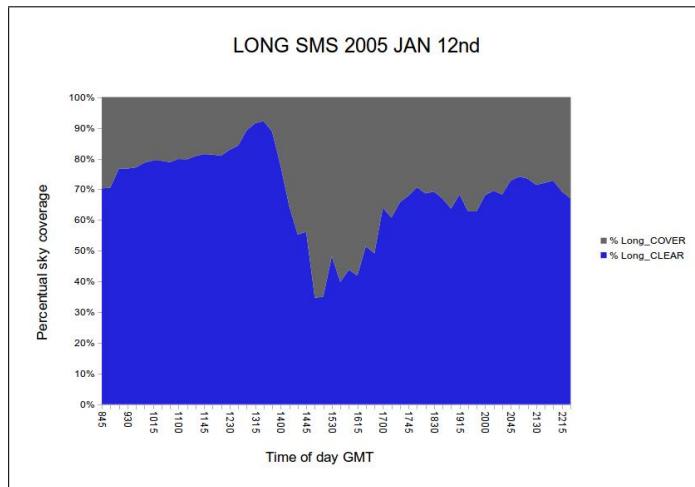


(ii) EGD

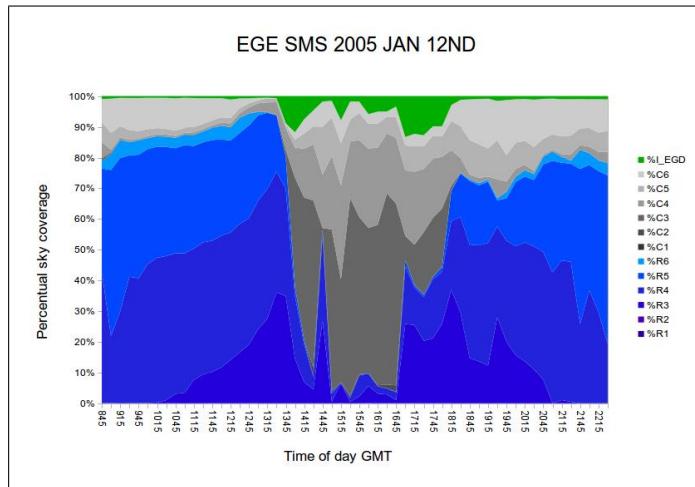


(iii) MAHA.

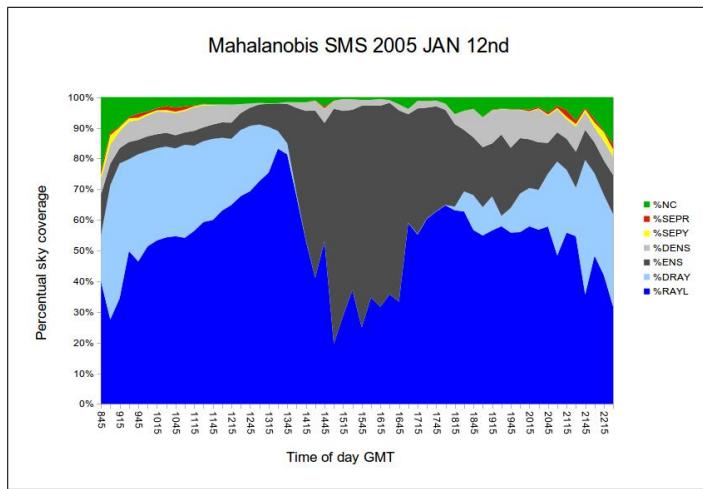
Figure B.11 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 11, 2005.



(i) LONG

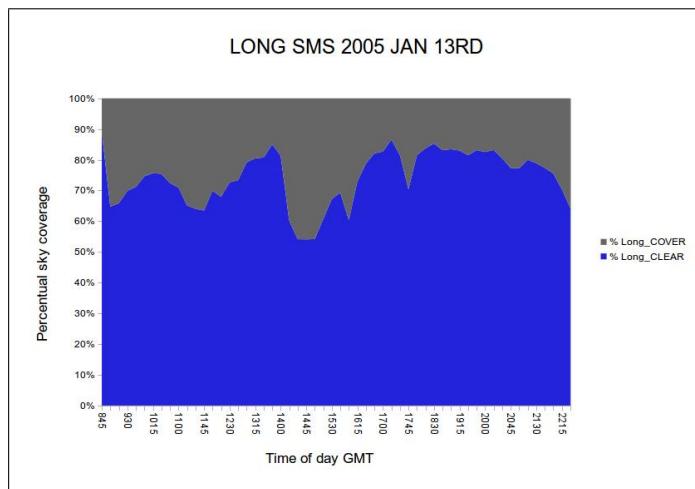


(ii) EGD

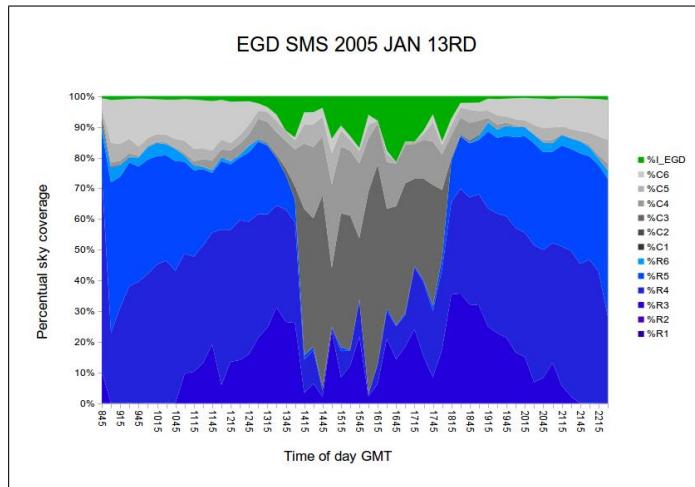


(iii) MAHA.

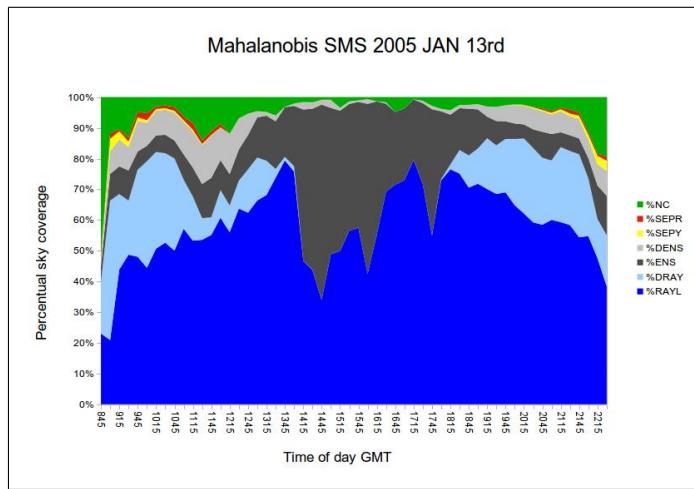
Figure B.12 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 12, 2005.



(i) LONG

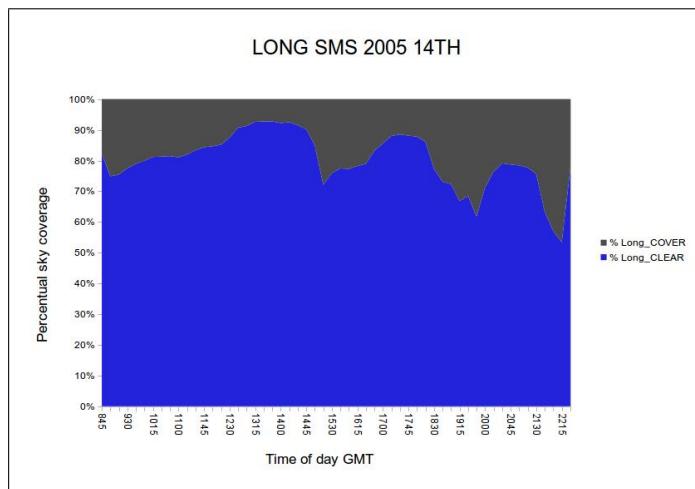


(ii) EGD

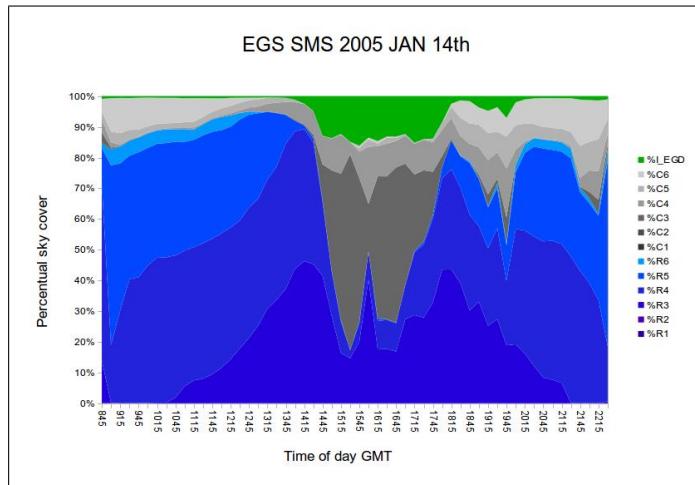


(iii) MAHA.

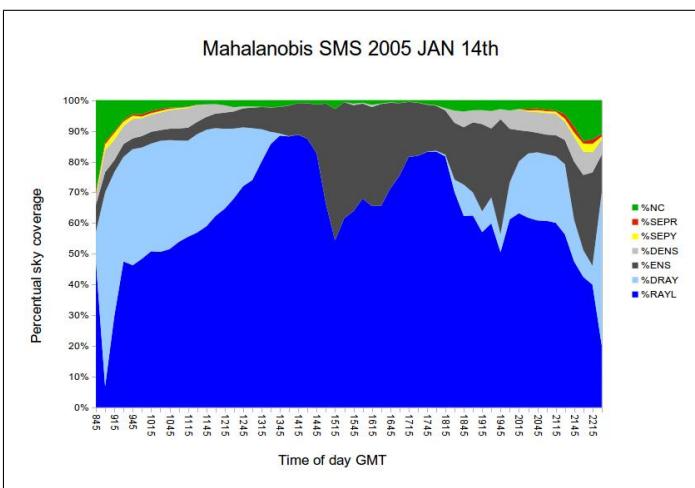
Figure B.13 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 13, 2005.



(i) LONG

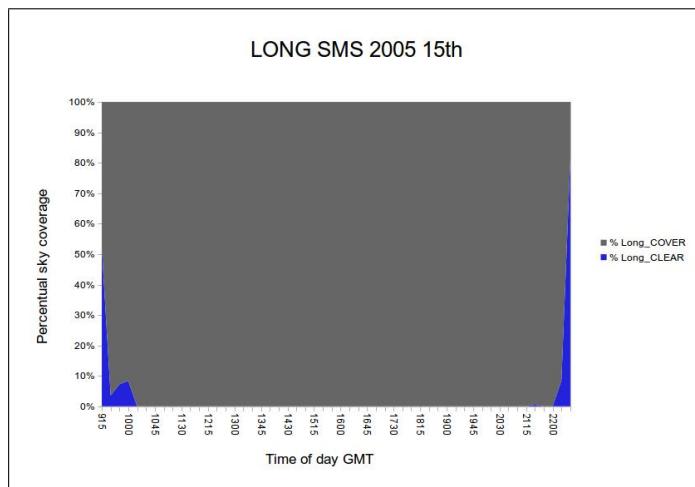


(ii) EGD

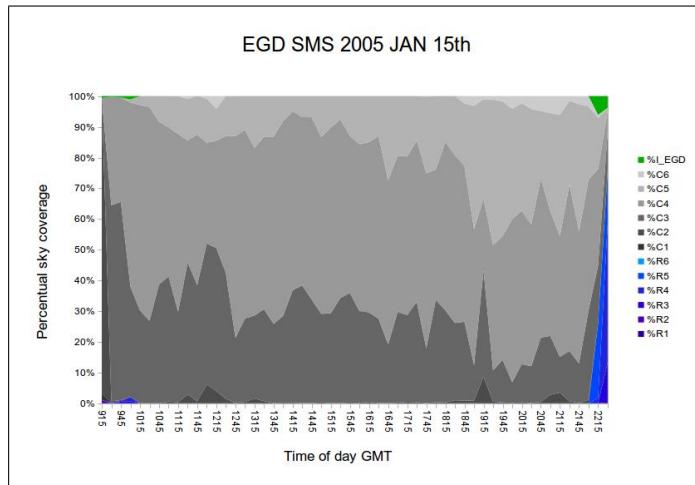


(iii) MAHA.

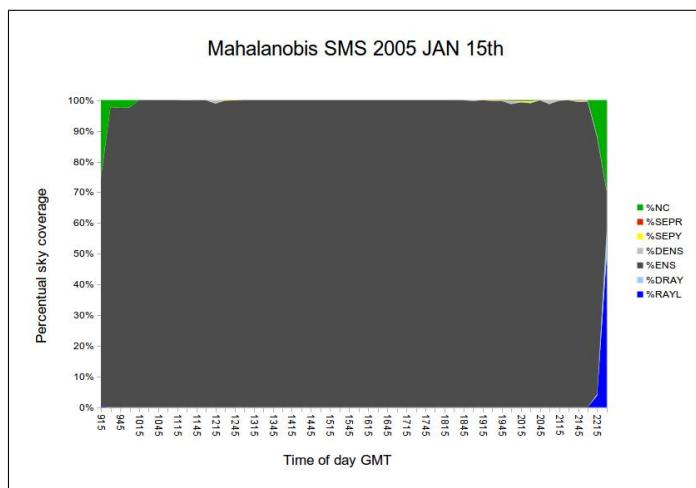
Figure B.14 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 14, 2005.



(i) LONG

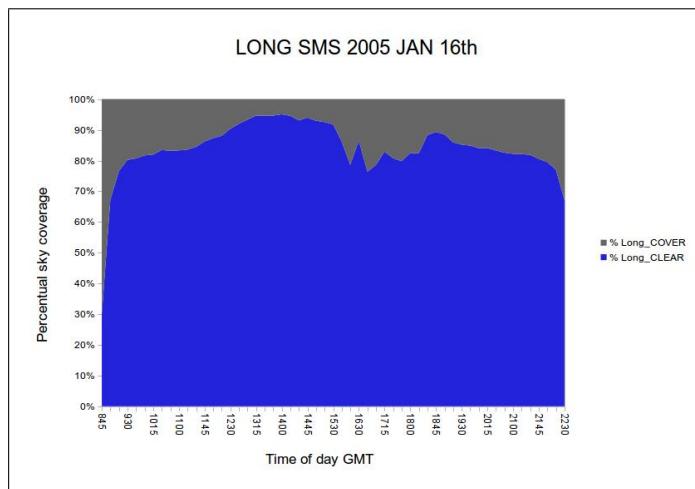


(ii) EGD

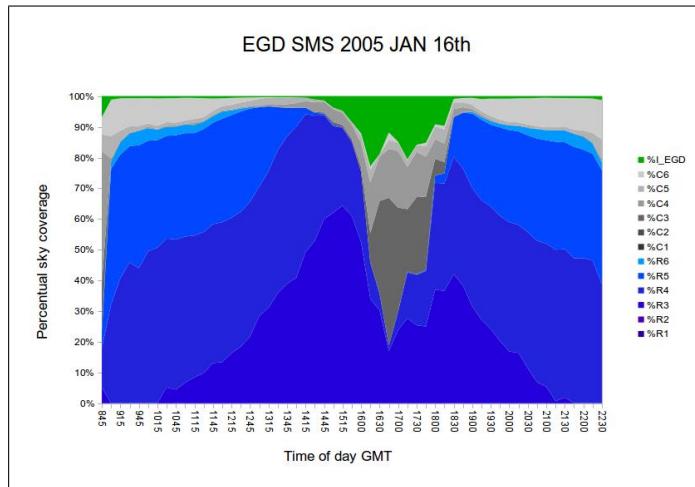


(iii) MAHA.

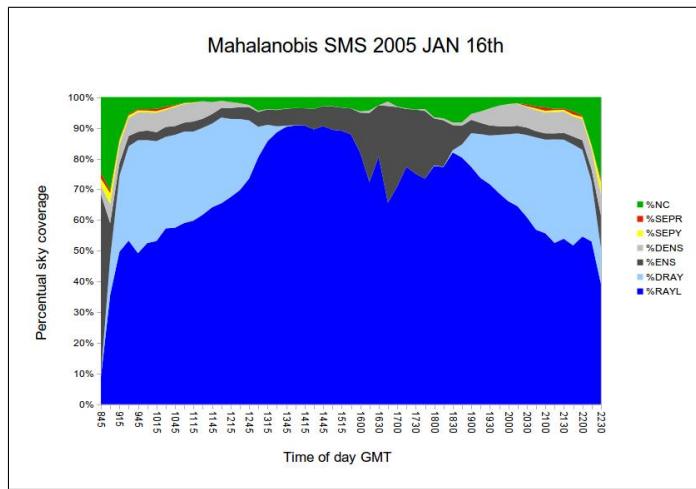
Figure B.15 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 15, 2005.



(i) LONG

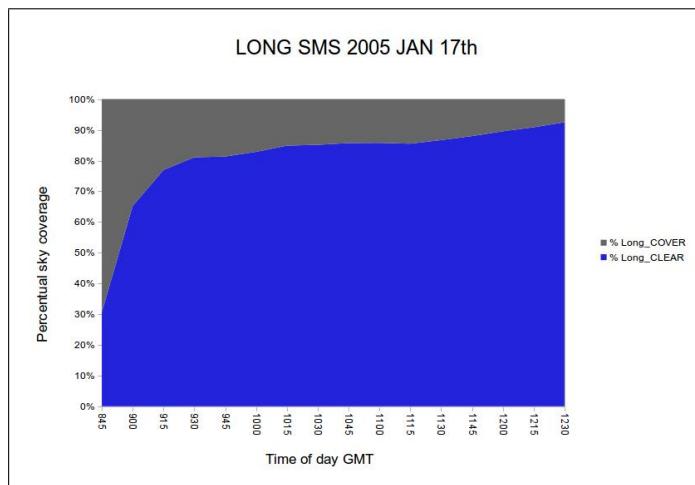


(ii) EGD

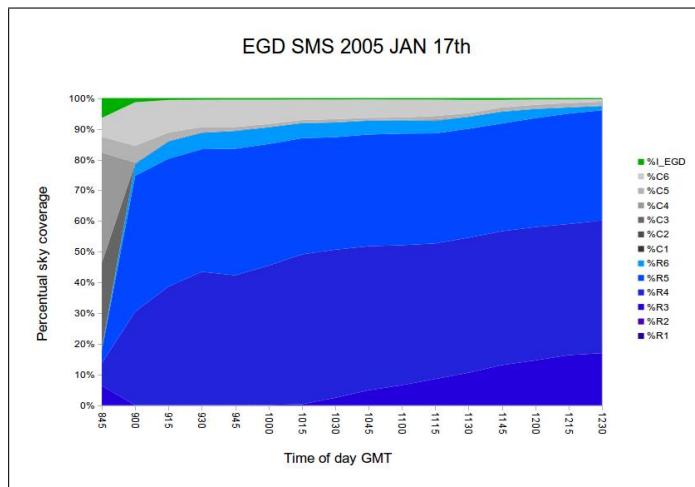


(iii) MAHA.

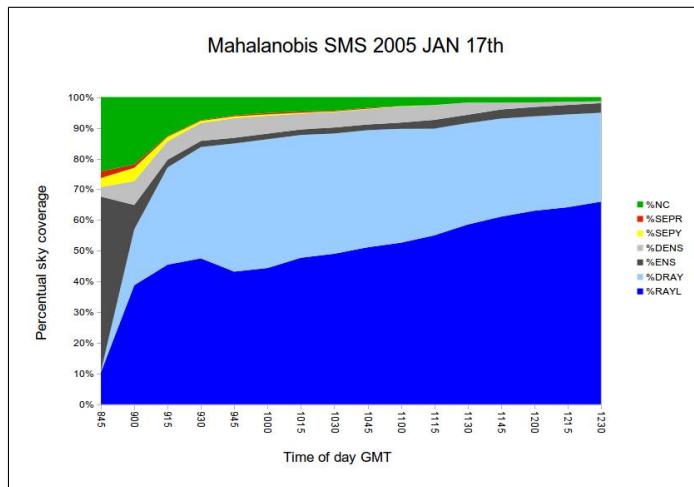
Figure B.16 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 16, 2005.



(i) LONG

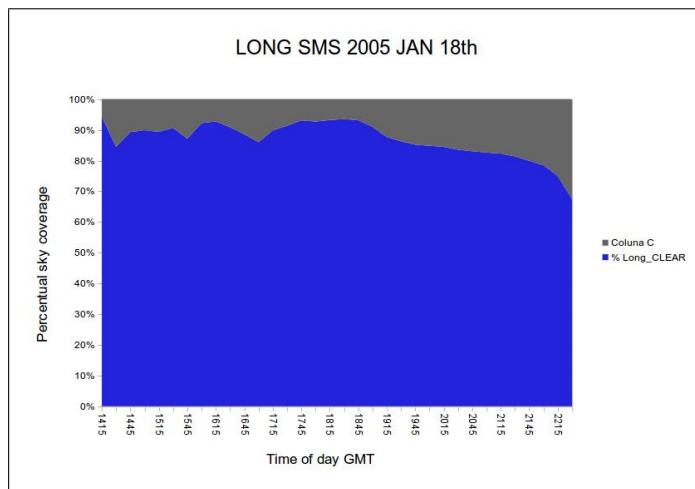


(ii) EGD

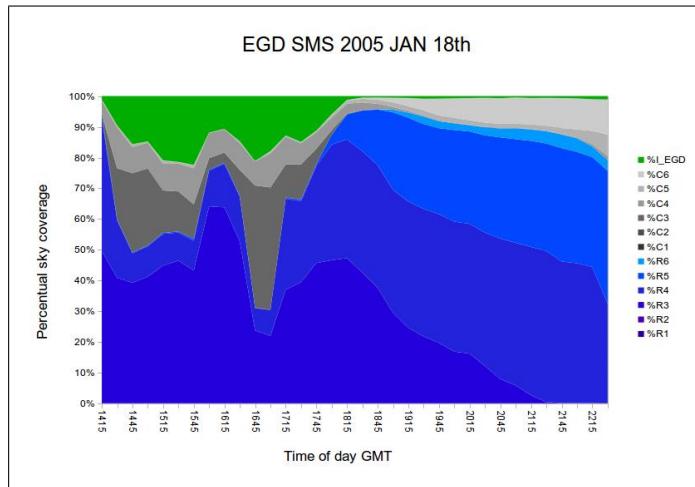


(iii) MAHA.

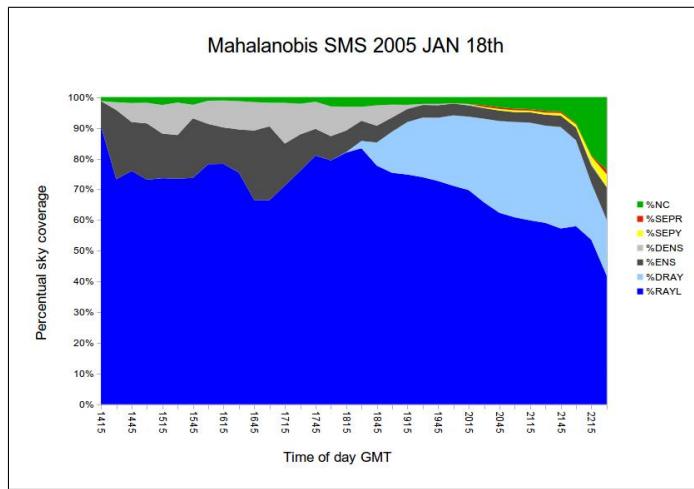
Figure B.17 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 17, 2005.



(i) LONG

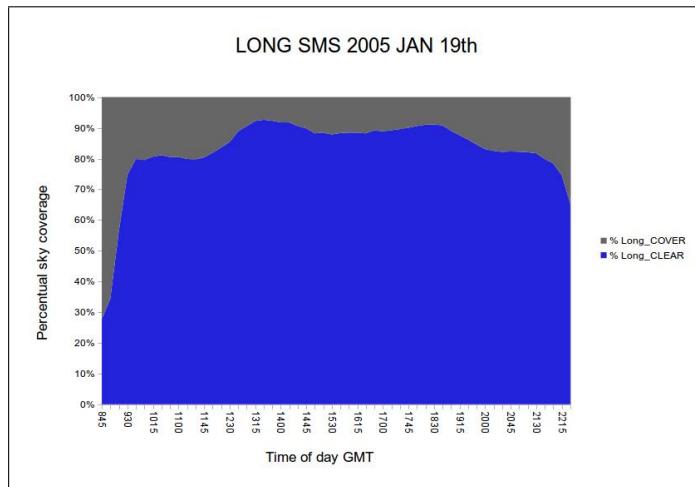


(ii) EGD

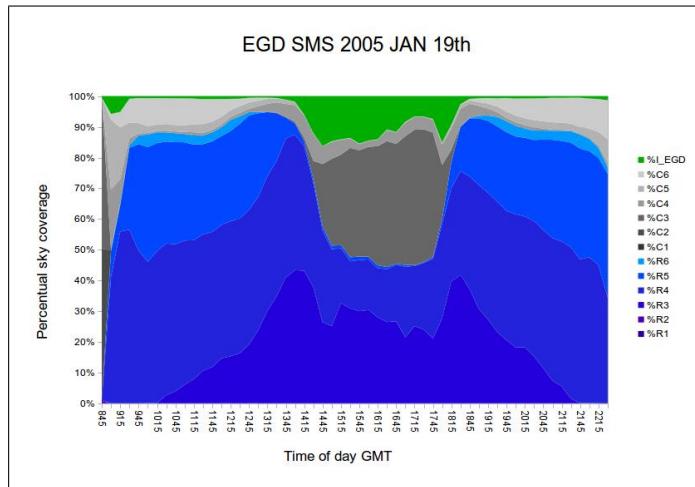


(iii) MAHA.

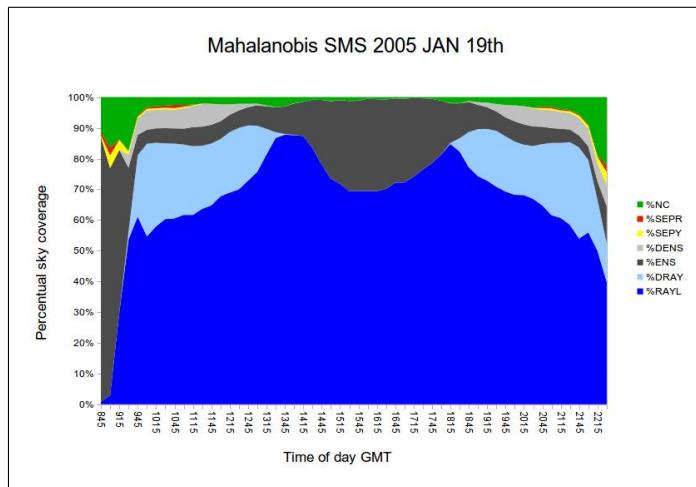
Figure B.18 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 18, 2005.



(i) LONG

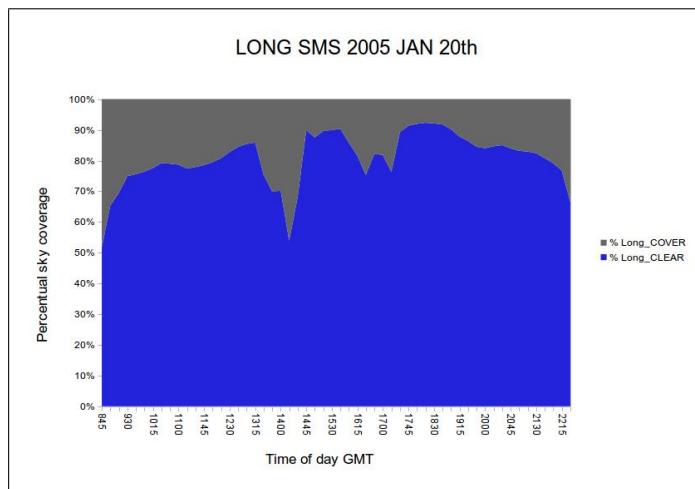


(ii) EGD

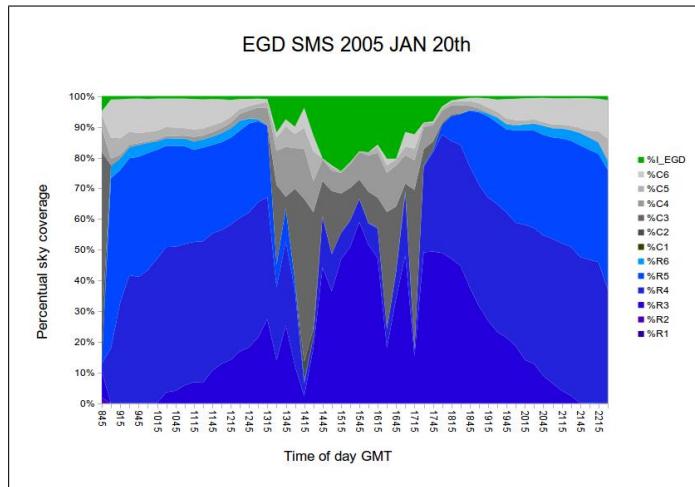


(iii) MAHA.

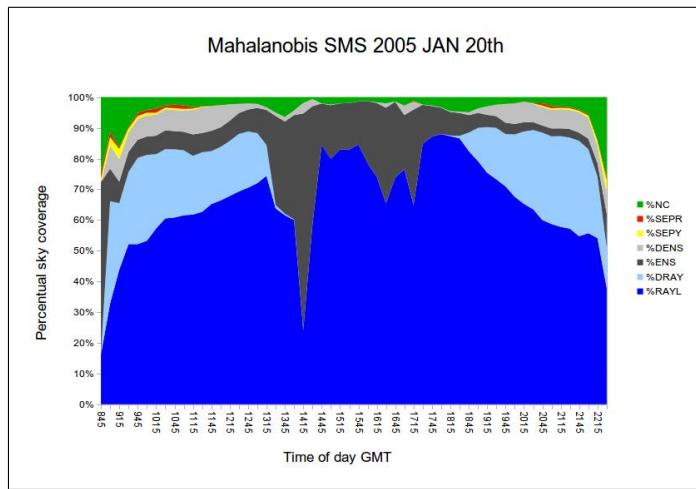
Figure B.19 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 19, 2005.



(i) LONG

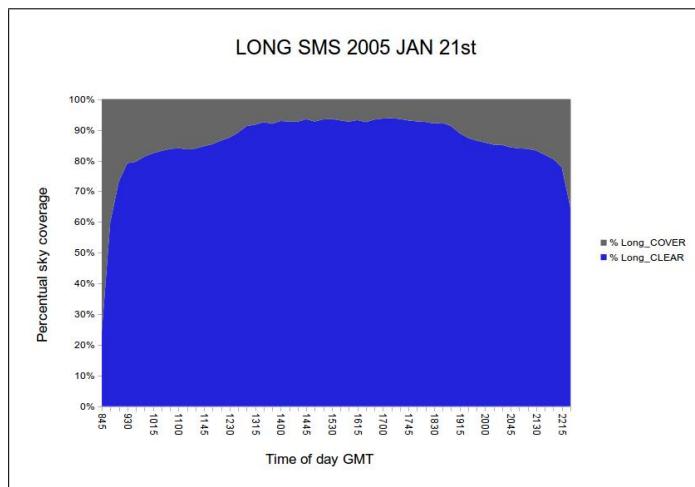


(ii) EGD

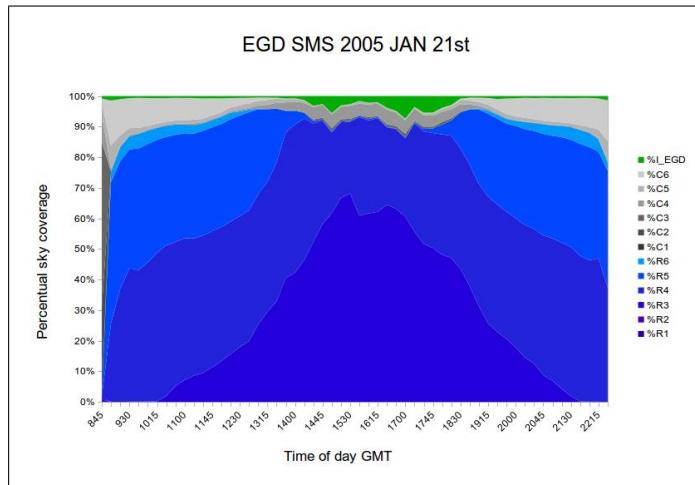


(iii) MAHA.

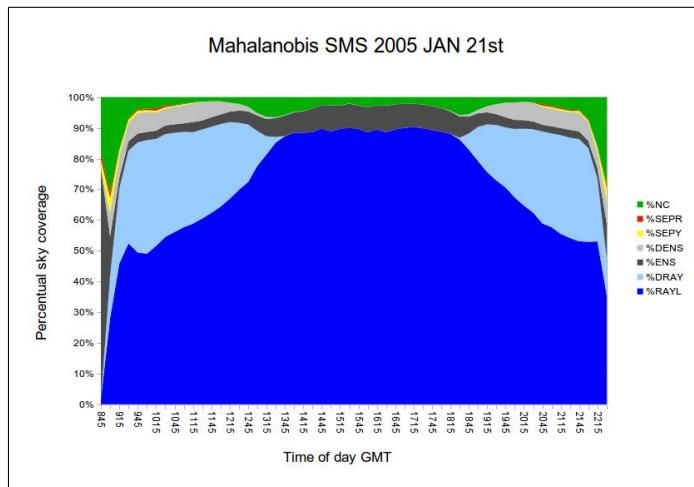
Figure B.20 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 20, 2005.



(i) LONG

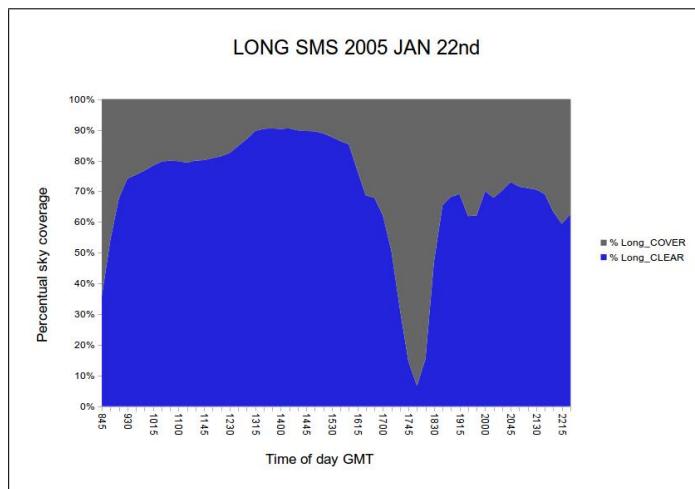


(ii) EGD

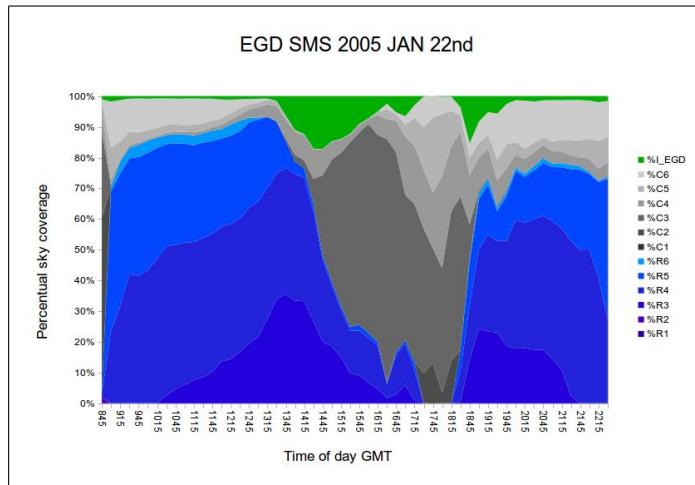


(iii) MAHA.

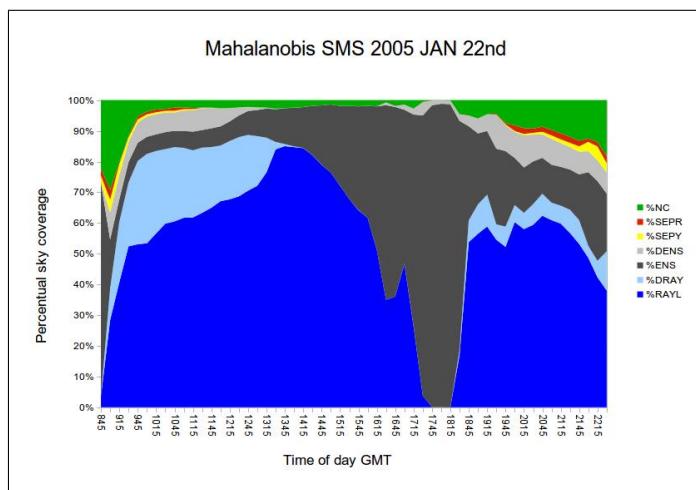
Figure B.21 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 21, 2005.



(i) LONG

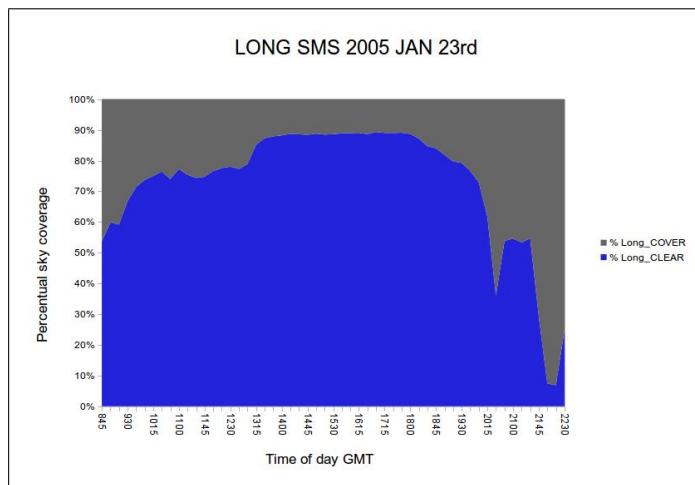


(ii) EGD

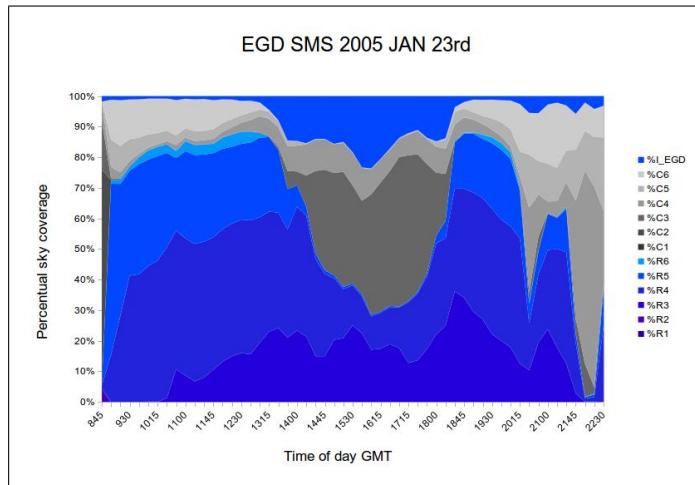


(iii) MAHA.

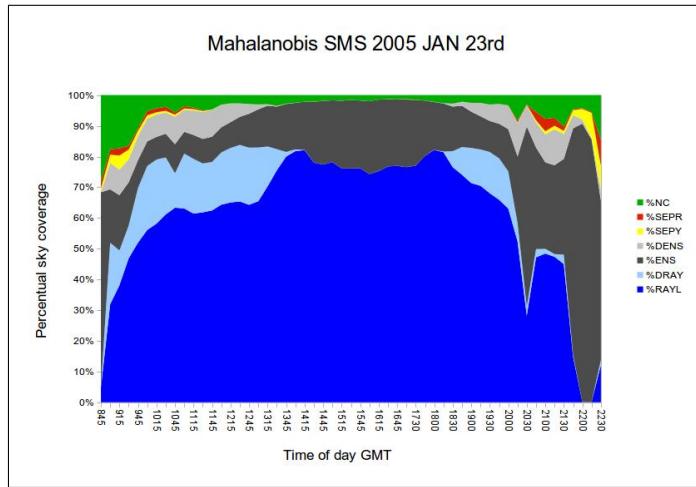
Figure B.22 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 22, 2005.



(i) LONG

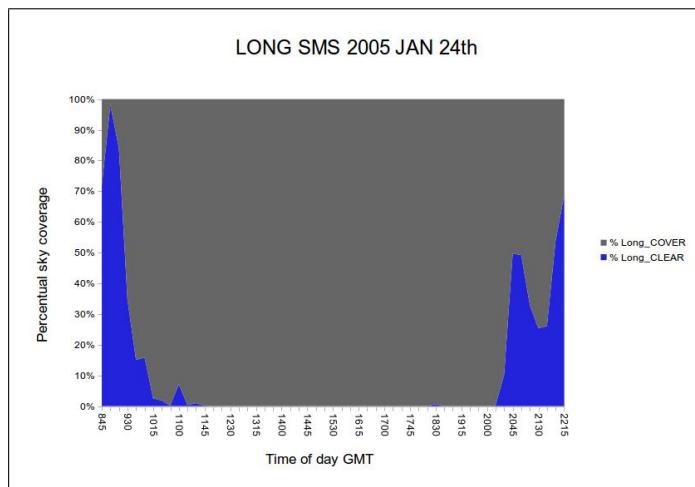


(ii) EGD

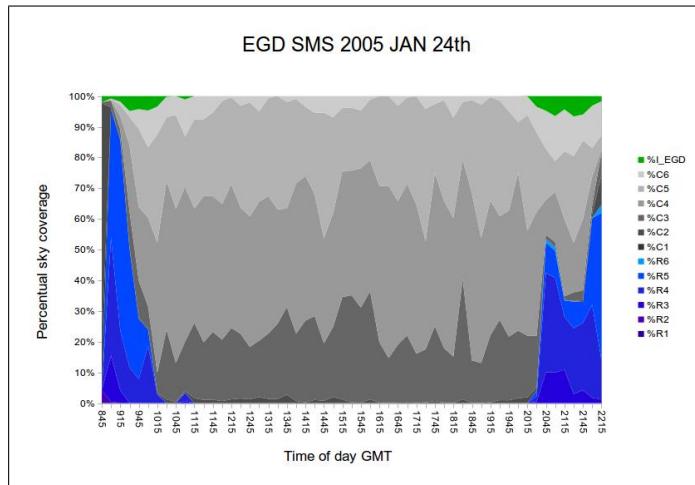


(iii) MAHA.

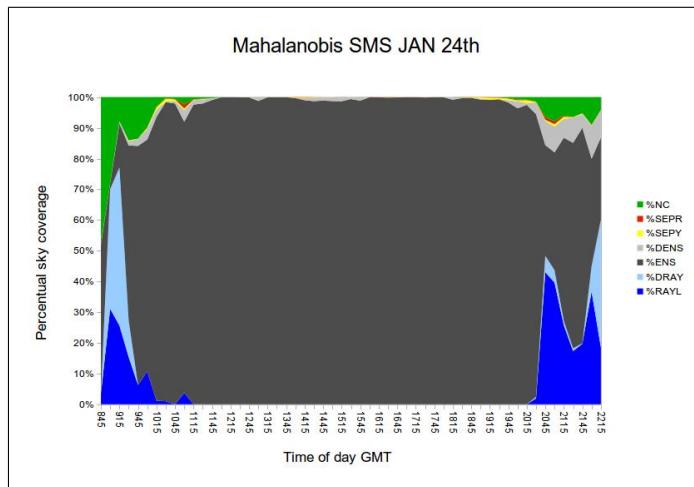
Figure B.23 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 23, 2005.



(i) LONG

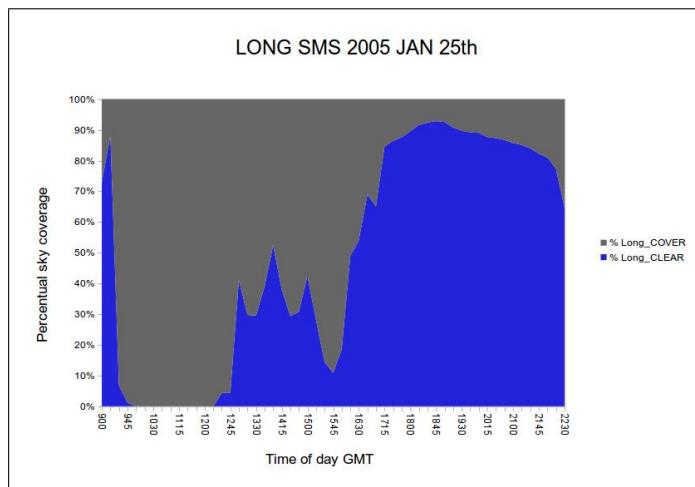


(ii) EGD

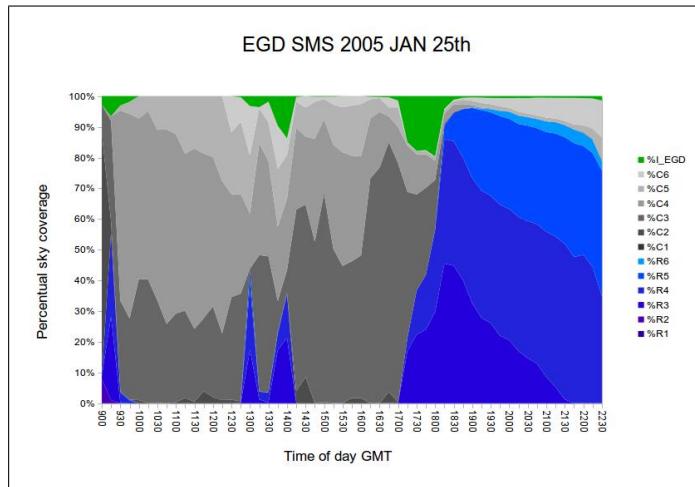


(iii) MAHA.

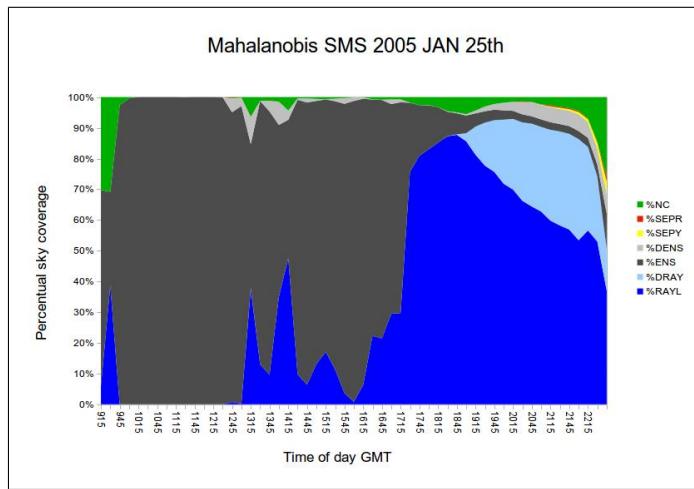
Figure B.24 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 24, 2005.



(i) LONG

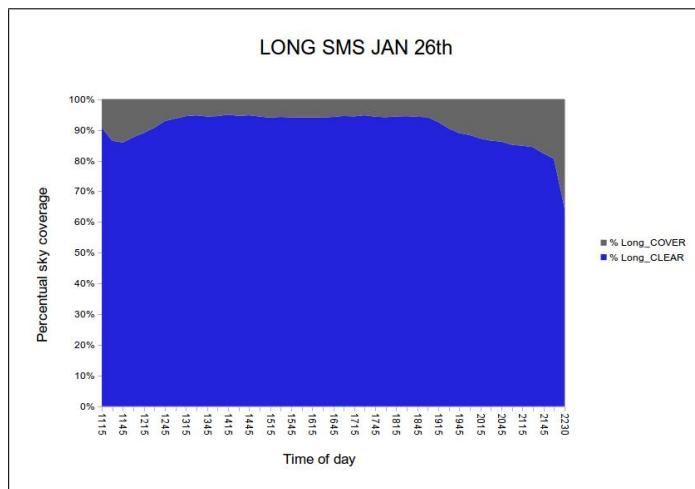


(ii) EGD

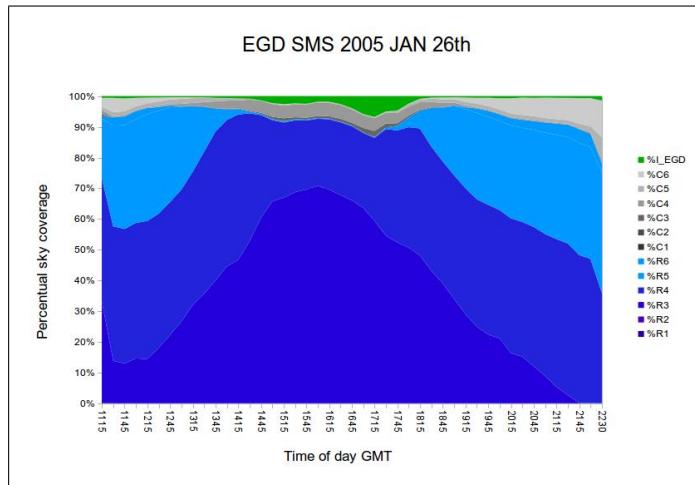


(iii) MAHA.

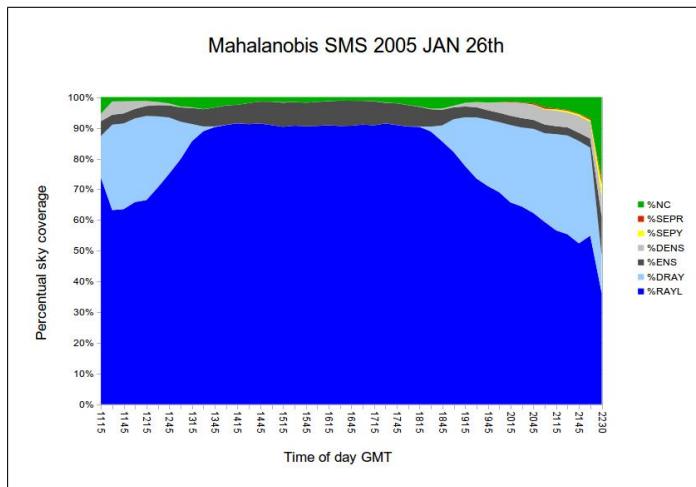
Figure B.25 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 25, 2005.



(i) LONG

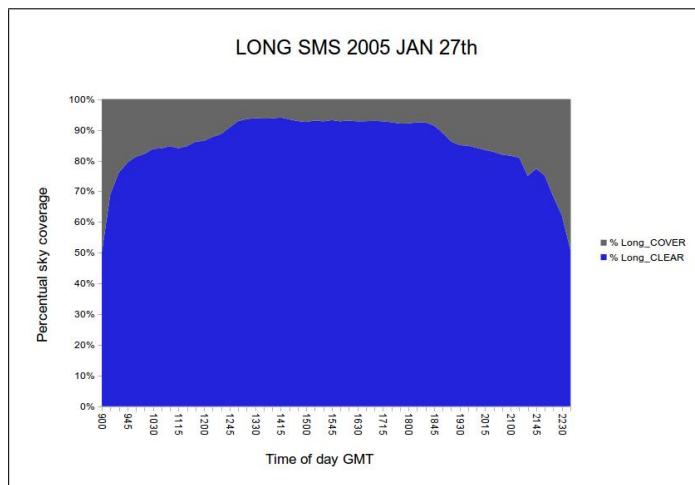


(ii) EGD

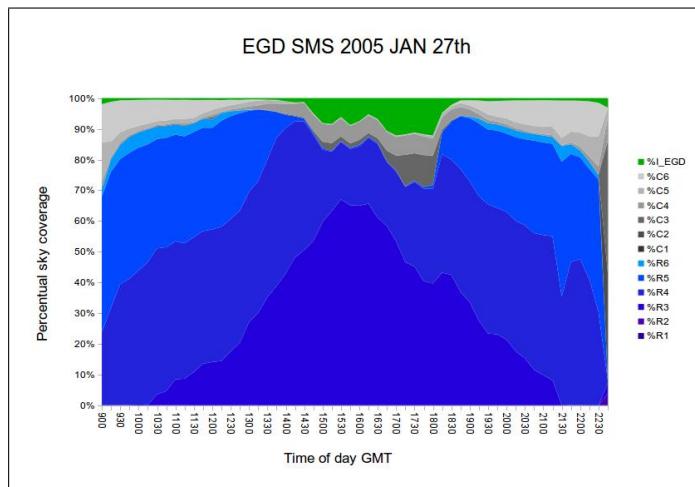


(iii) MAHA.

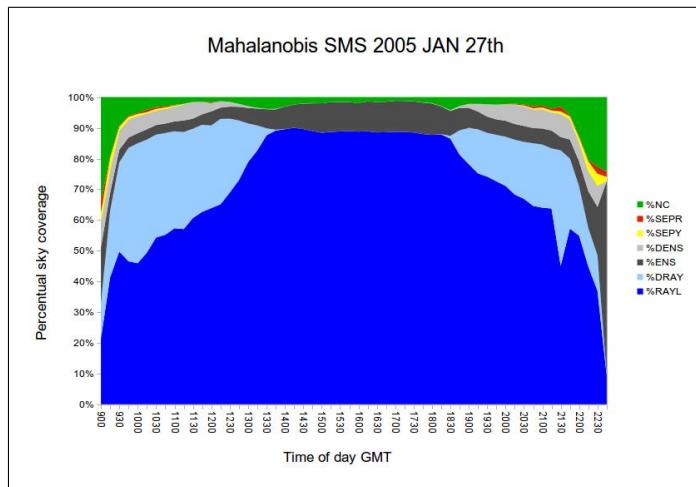
Figure B.26 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 26, 2005.



(i) LONG

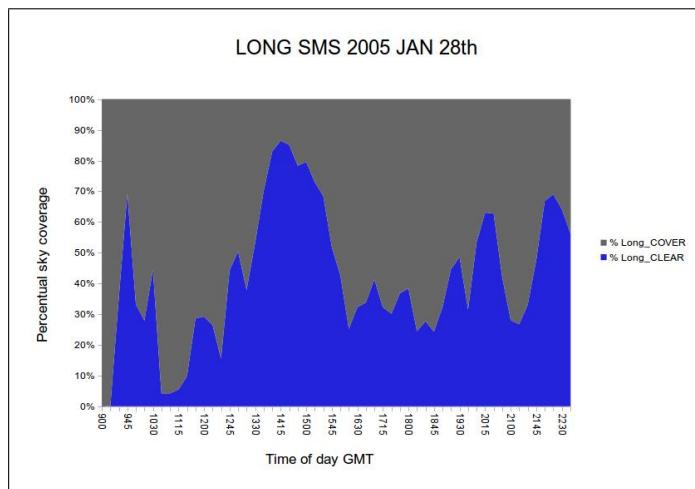


(ii) EGD

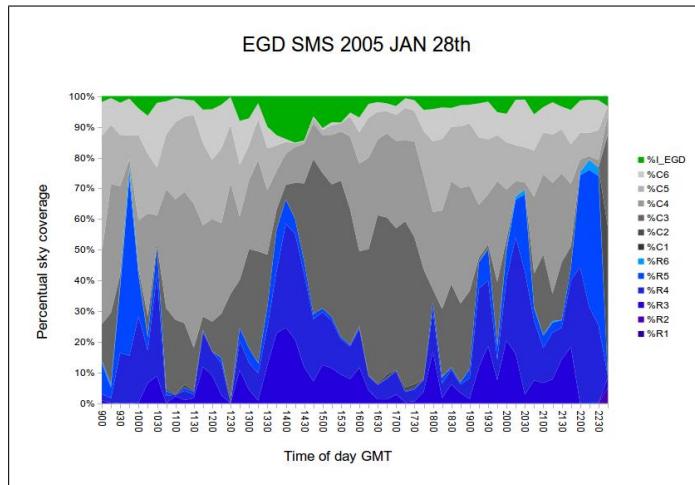


(iii) MAHA.

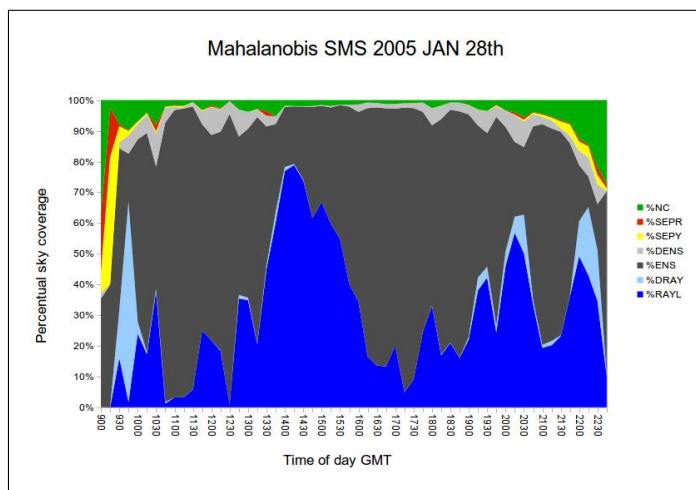
Figure B.27 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 27, 2005.



(i) LONG

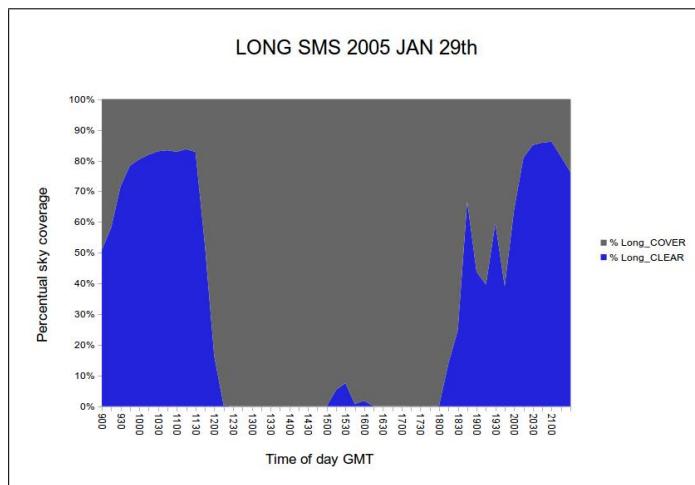


(ii) EGD

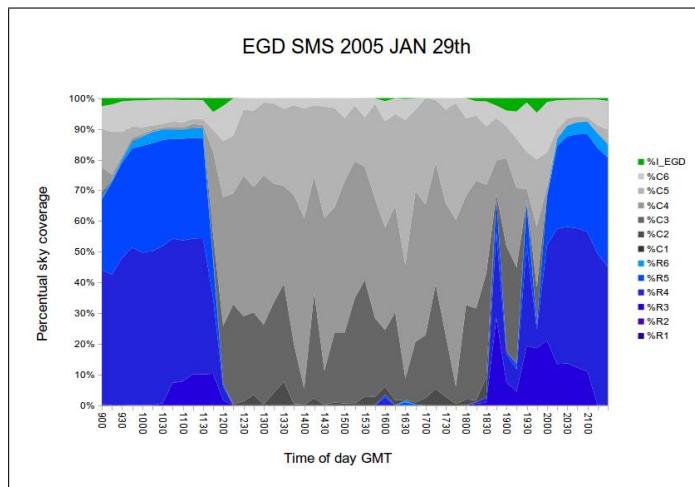


(iii) MAHA.

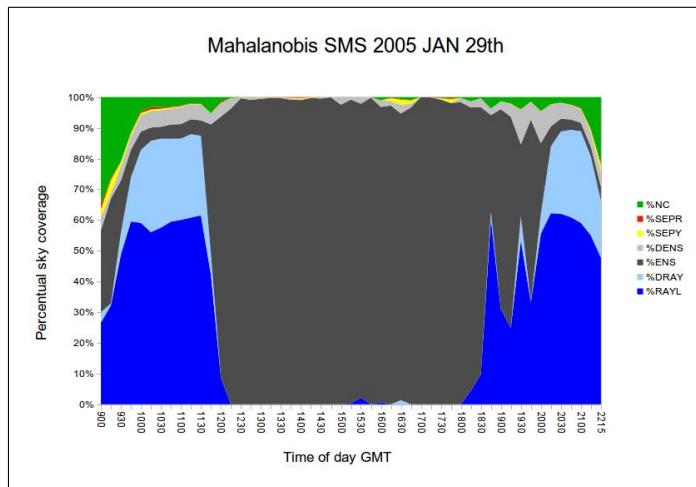
Figure B.28 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 28, 2005.



(i) LONG

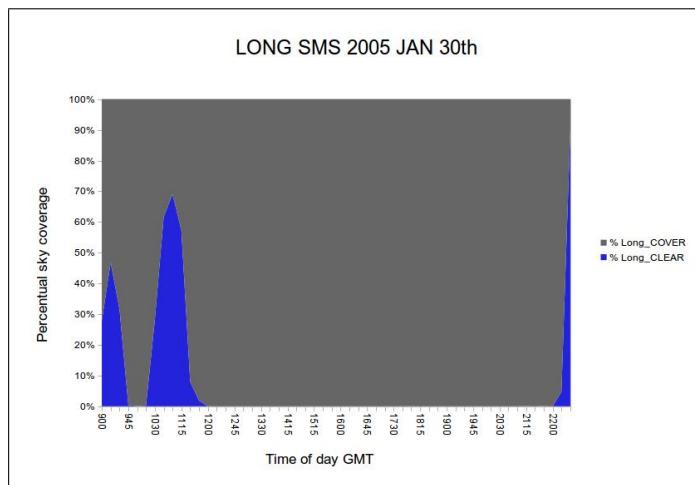


(ii) EGD

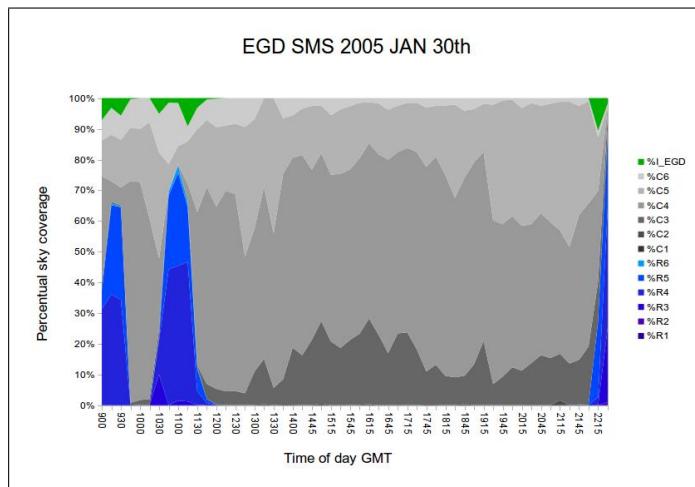


(iii) MAHA.

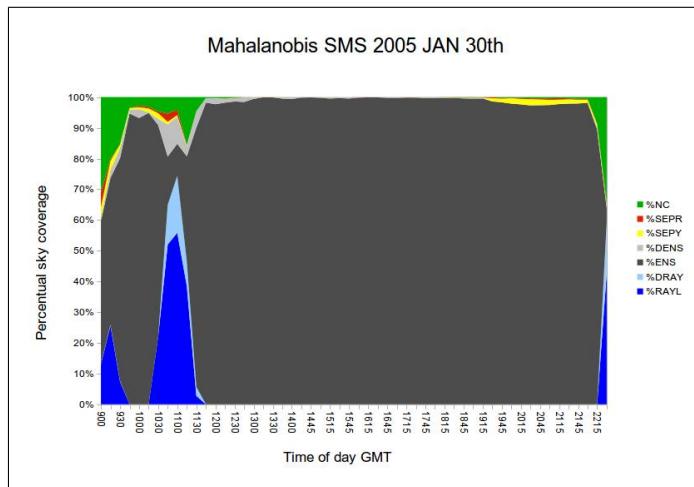
Figure B.29 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 29, 2005.



(i) LONG

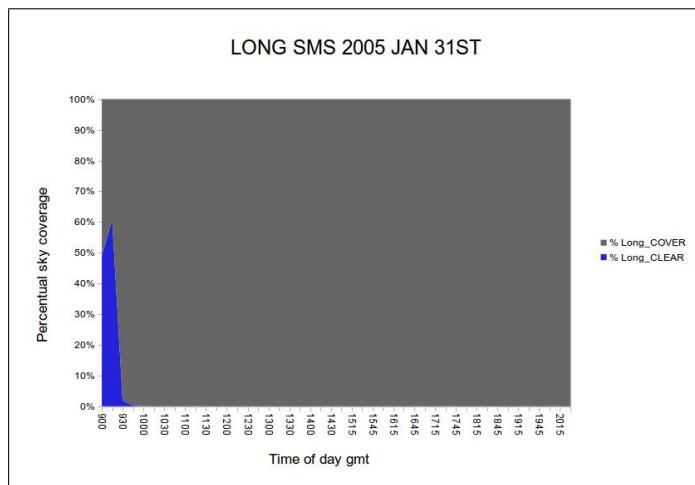


(ii) EGD

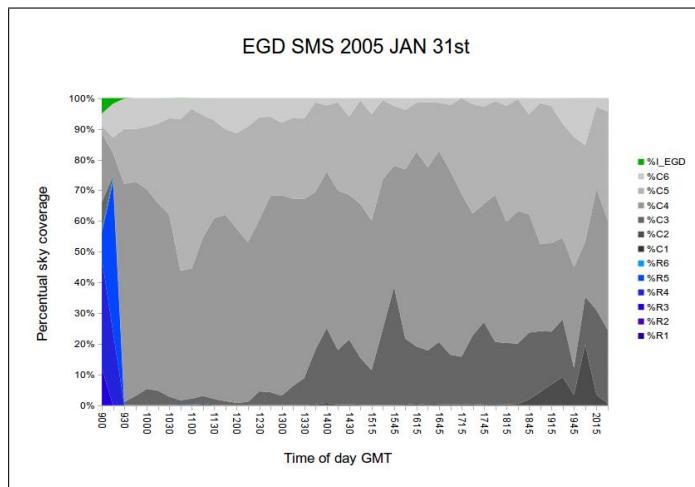


(iii) MAHA.

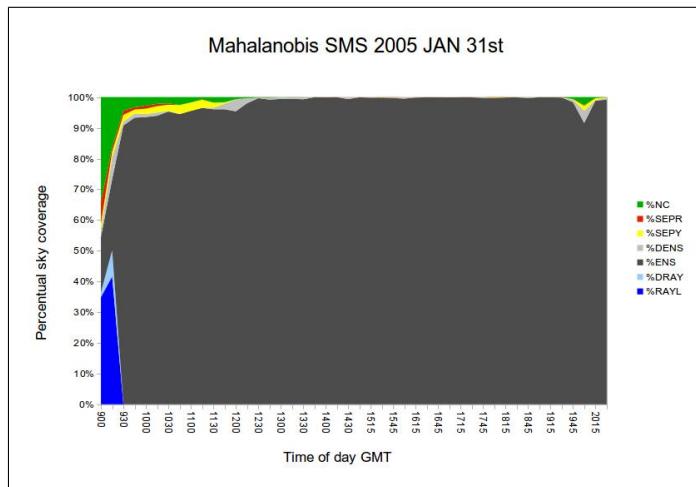
Figure B.30 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 30, 2005.



(i) LONG



(ii) EGD



(iii) MAHA.

Figure B.31 - SMS daily coverage results for LONG, EGD and MAHA classification methods obtained on January 31, 2005.

Appendix C - SURFACE SOLAR RADIATION AND DERIVED DATA

Solar data for January of 2005 São Martinho da Serra. Table headers are related to the following data and parameters:

min: Minute of the day (UTC).

toa: top of atmosphere radiation, estimated.

glo: Global Shortwave Radiation horizontal.

dirH: Direct shortwave radiation horizontal.

diff: Diffuse Shortwave Radiation horizontal.

CF: Cloud Force.

df: diffuse fraction.

kt: clearness index.

op: Opacity.

cos: Cosine of zenith angle θ_z of Min.

Table C.1 - Solar radiation and derived data for SMS jan 1st 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-0.24	-0.48	-0.89	-0.23	0.000	0.000	0.000	-0.126
495	0.00	-0.78	-0.03	-0.72	-0.75	0.000	0.000	0.000	-0.076
510	0.00	0.73	-0.01	1.08	0.70	0.000	0.000	0.000	-0.025
525	37.85	7.00	0.01	7.51	6.76	1.000	0.185	0.815	0.027
540	112.30	29.85	14.87	27.71	28.84	0.928	0.266	0.734	0.079
555	187.37	42.46	47.15	38.36	41.02	0.903	0.227	0.773	0.133
570	262.74	66.06	98.75	62.69	63.82	0.949	0.251	0.749	0.186
585	338.09	154.70	85.75	94.00	149.47	0.608	0.458	0.542	0.239
600	413.09	208.00	78.04	139.90	200.96	0.673	0.504	0.496	0.292
615	487.42	179.90	51.06	137.30	173.81	0.763	0.369	0.631	0.345
630	560.77	265.90	114.35	157.40	256.90	0.592	0.474	0.526	0.397
645	632.82	344.30	233.46	120.00	332.65	0.349	0.544	0.456	0.448
660	703.26	451.00	277.80	180.40	435.74	0.400	0.641	0.359	0.497
675	771.79	263.90	81.17	187.50	254.97	0.710	0.342	0.658	0.546
690	838.11	608.30	493.20	125.70	587.72	0.207	0.726	0.274	0.593
705	901.95	663.50	558.84	113.20	641.05	0.171	0.736	0.264	0.638
720	963.03	719.00	613.72	113.40	694.67	0.158	0.747	0.253	0.681
735	1021.09	768.00	662.99	108.60	742.01	0.141	0.752	0.248	0.722
750	1075.88	823.00	704.65	120.20	795.15	0.146	0.765	0.235	0.761
765	1127.16	886.00	750.20	134.90	856.02	0.152	0.786	0.214	0.797
780	1174.72	871.00	707.07	157.50	841.53	0.181	0.741	0.259	0.831
795	1218.35	823.00	583.22	232.90	795.15	0.283	0.676	0.324	0.862
810	1257.86	873.00	620.73	241.20	843.46	0.276	0.694	0.306	0.890
825	1293.09	1005.00	813.08	178.50	971.00	0.178	0.777	0.223	0.915
840	1323.89	1050.00	869.90	163.50	1014.47	0.156	0.793	0.207	0.936
855	1350.12	1064.00	854.66	191.20	1028.00	0.180	0.788	0.212	0.955
870	1371.66	847.00	559.30	272.90	818.34	0.322	0.617	0.383	0.970
885	1388.44	1063.00	817.05	224.90	1027.03	0.212	0.766	0.234	0.982
900	1400.37	1143.00	965.71	153.70	1104.33	0.134	0.816	0.184	0.990
915	1407.41	1132.00	981.52	124.70	1093.70	0.110	0.804	0.196	0.995
930	1409.52	1120.00	981.00	111.70	1082.10	0.100	0.795	0.205	0.997
945	1406.70	1110.00	968.09	111.20	1072.44	0.100	0.789	0.211	0.995
960	1398.96	1121.00	966.72	119.40	1083.07	0.107	0.801	0.199	0.989
975	1386.33	1131.00	954.07	142.50	1092.73	0.126	0.816	0.184	0.981
990	1368.86	808.00	578.69	201.90	780.66	0.250	0.590	0.410	0.968
1005	1346.63	929.00	716.26	173.90	897.57	0.187	0.690	0.310	0.952
1020	1319.74	1013.00	799.03	173.20	978.73	0.171	0.768	0.232	0.933
1035	1288.30	1015.00	804.60	164.10	980.66	0.162	0.788	0.212	0.911
1050	1252.45	1005.00	859.27	97.40	971.00	0.097	0.802	0.198	0.886
1065	1212.33	965.00	825.75	93.10	932.35	0.096	0.796	0.204	0.857
1080	1168.13	945.00	798.94	98.40	913.03	0.104	0.809	0.191	0.826
1095	1120.02	743.00	578.29	129.10	717.86	0.174	0.663	0.337	0.792
1110	1068.22	794.00	650.53	98.90	767.14	0.125	0.743	0.257	0.756
1125	1012.95	819.00	679.20	89.90	791.29	0.110	0.809	0.191	0.716
1140	954.44	757.00	631.87	76.40	731.39	0.101	0.793	0.207	0.675
1155	892.95	698.30	578.52	72.30	674.67	0.104	0.782	0.218	0.632
1170	828.73	644.00	525.20	70.50	622.21	0.109	0.777	0.223	0.586
1185	762.07	589.80	473.25	70.20	569.84	0.119	0.774	0.226	0.539
1200	693.25	530.70	413.84	70.40	512.74	0.133	0.766	0.234	0.490
1215	622.56	476.70	360.63	70.90	460.57	0.149	0.766	0.234	0.440
1230	550.30	409.90	295.03	72.50	396.03	0.177	0.745	0.255	0.389
1245	476.79	362.90	249.55	71.90	350.62	0.198	0.761	0.239	0.337
1260	402.34	298.20	192.83	67.78	288.11	0.227	0.741	0.259	0.285
1275	327.27	206.30	116.06	63.20	199.32	0.306	0.630	0.370	0.231
1290	251.91	127.40	50.81	61.63	123.09	0.484	0.506	0.494	0.178
1305	176.56	92.70	24.59	58.79	89.56	0.634	0.525	0.475	0.125
1320	101.56	52.39	4.77	45.89	50.62	0.876	0.516	0.484	0.072
1335	27.23	25.18	0.02	26.83	24.33	1.000	0.925	0.075	0.019
1350	0.00	5.22	0.08	6.71	5.05	0.000	0.000	0.000	-0.033
1365	0.00	-1.73	0.22	-0.48	-1.67	0.000	0.000	0.000	-0.084
1380	0.00	-2.51	0.20	-1.34	-2.43	0.000	0.000	0.000	-0.133
1395	0.00	-2.36	0.24	-1.37	-2.28	0.000	0.000	0.000	-0.182
1410	0.00	-2.45	0.34	-1.36	-2.37	0.000	0.000	0.000	-0.229
1425	0.00	-2.35	0.29	-1.38	-2.27	0.000	0.000	0.000	-0.274

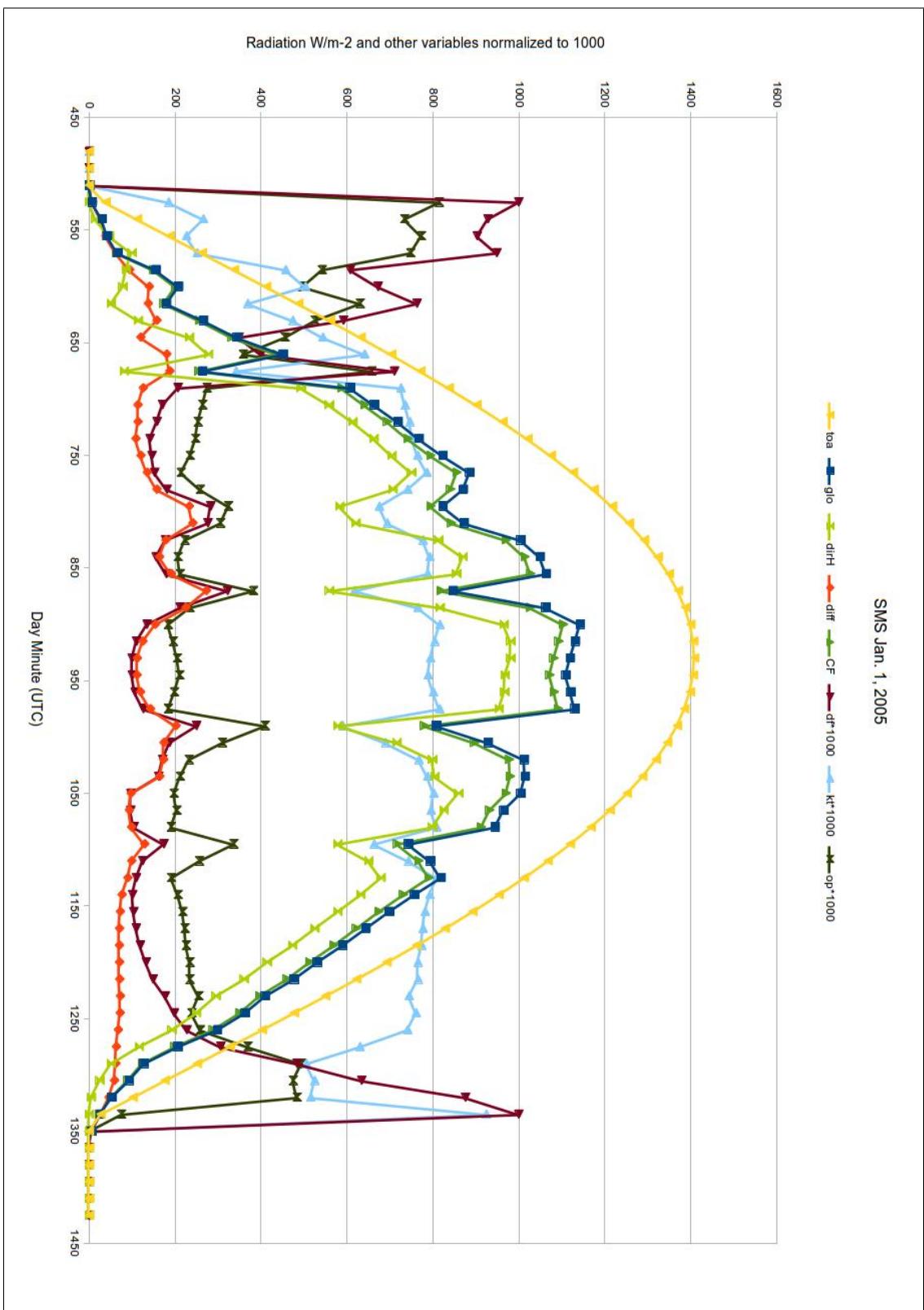


Figure C.1 - Graphic illustrating data measured and calculated on SMS January 1st 2005.

Table C.2 - Solar radiation and derived data for SMS jan 2nd 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	(1.41)	-.01	-1.01	-1.36	0.000	0.000	0.000	-0.126
495	0.00	(1.30)	.00	-.90	-1.26	0.000	0.000	0.000	-0.076
510	0.00	0.80	-.02	1.30	.77	0.000	0.000	0.000	-0.025
525	37.85	3.34	.03	4.10	3.22	1.000	0.088	0.912	0.027
540	112.30	17.96	14.34	19.50	17.35	1.000	0.160	0.840	0.079
555	187.37	37.14	.48	38.39	35.88	1.000	0.198	0.802	0.133
570	262.74	63.11	.20	64.46	60.97	1.000	0.240	0.760	0.186
585	338.09	80.10	1.00	81.20	77.39	1.000	0.237	0.763	0.239
600	413.09	96.10	8.64	91.20	92.85	0.949	0.233	0.767	0.292
615	487.42	104.50	.84	106.40	100.96	1.000	0.214	0.786	0.345
630	560.77	135.70	42.40	97.00	131.11	0.715	0.242	0.758	0.397
645	632.82	416.60	334.35	94.50	402.50	0.227	0.658	0.342	0.448
660	703.26	473.80	385.99	99.30	457.77	0.210	0.674	0.326	0.497
675	771.79	559.80	432.88	136.30	540.86	0.243	0.725	0.275	0.546
690	838.11	707.00	441.04	265.40	683.08	0.375	0.844	0.156	0.593
705	901.95	674.20	314.44	357.20	651.39	0.530	0.747	0.253	0.638
720	963.03	648.60	241.94	399.10	626.65	0.615	0.673	0.327	0.681
735	1021.09	433.30	97.93	334.00	418.64	0.771	0.424	0.576	0.722
750	1075.88	678.80	335.28	340.20	655.83	0.501	0.631	0.369	0.761
765	1127.16	959.00	551.85	394.00	926.55	0.411	0.851	0.149	0.797
780	1174.72	1054.00	476.59	561.10	1018.34	0.532	0.897	0.103	0.831
795	1218.35	628.00	76.00	534.90	606.75	0.852	0.515	0.485	0.862
810	1257.86	683.20	128.65	537.70	660.08	0.787	0.543	0.457	0.890
825	1293.09	669.50	118.44	533.80	646.85	0.797	0.518	0.482	0.915
840	1323.89	539.40	66.20	466.70	521.15	0.865	0.407	0.593	0.936
855	1350.12	907.00	476.03	401.40	876.31	0.443	0.672	0.328	0.955
870	1371.66	1102.00	548.05	521.20	1064.71	0.473	0.803	0.197	0.970
885	1388.44	624.70	168.81	441.20	603.56	0.706	0.450	0.550	0.982
900	1400.37	1267.00	873.60	362.00	1224.13	0.286	0.905	0.095	0.990
915	1407.41	1250.00	909.84	293.00	1207.71	0.234	0.888	0.112	0.995
930	1409.52	1162.00	926.16	195.20	1122.68	0.168	0.824	0.176	0.997
945	1406.70	1196.00	953.16	201.60	1155.53	0.169	0.850	0.150	0.995
960	1398.96	366.00	24.38	340.30	353.62	0.930	0.262	0.738	0.989
975	1386.33	1170.00	752.07	359.20	1130.41	0.307	0.844	0.156	0.981
990	1368.86	1167.00	864.59	260.00	1127.51	0.223	0.853	0.147	0.968
1005	1346.63	848.00	399.08	417.50	819.31	0.492	0.630	0.370	0.952
1020	1319.74	461.10	6.46	450.90	445.50	0.978	0.349	0.651	0.933
1035	1288.30	575.80	16.45	559.50	556.32	0.972	0.447	0.553	0.911
1050	1252.45	887.00	466.75	381.00	856.99	0.430	0.708	0.292	0.886
1065	1212.33	936.00	570.48	324.20	904.33	0.346	0.772	0.228	0.857
1080	1168.13	818.00	490.27	287.40	790.32	0.351	0.700	0.300	0.826
1095	1120.02	389.40	178.56	191.60	376.22	0.492	0.348	0.652	0.792
1110	1068.22	833.00	537.19	252.50	804.82	0.303	0.780	0.220	0.756
1125	1012.95	411.00	72.36	319.10	397.09	0.776	0.406	0.594	0.716
1140	954.44	822.00	480.65	295.10	794.19	0.359	0.861	0.139	0.675
1155	892.95	811.00	500.21	259.10	783.56	0.319	0.908	0.092	0.632
1170	828.73	583.70	232.59	318.20	563.95	0.545	0.704	0.296	0.586
1185	762.07	72.00	-8.19	77.10	69.56	1.000	0.094	0.906	0.539
1200	693.25	12.57	-1.72	15.36	12.14	1.000	0.018	0.982	0.490
1215	622.56	10.95	-8.61	15.45	10.58	1.000	0.018	0.982	0.440
1230	550.30	14.35	.95	12.87	13.86	0.897	0.026	0.974	0.389
1245	476.79	12.26	.06	12.19	11.85	0.994	0.026	0.974	0.337
1260	402.34	7.79	.87	7.39	7.53	0.949	0.019	0.981	0.285
1275	327.27	7.16	.44	7.03	6.92	0.982	0.022	0.978	0.231
1290	251.91	7.15	1.14	6.99	6.91	0.977	0.028	0.972	0.178
1305	176.56	5.33	.00	5.03	5.15	0.944	0.030	0.970	0.125
1320	101.56	3.65	.17	3.50	3.53	0.957	0.036	0.964	0.072
1335	27.23	2.60	.01	2.08	2.51	0.801	0.096	0.904	0.019
1350	0.00	4.94	-.01	4.15	4.77	0.000	0.000	0.000	-0.033
1365	0.00	0.72	.43	.36	.70	0.000	0.000	0.000	-0.084
1380	0.00	(0.32)	-.13	-.57	-.31	0.000	0.000	0.000	-0.133
1395	0.00	(0.29)	-.23	-.95	-.28	0.000	0.000	0.000	-0.182
1410	0.00	0.31	-.58	-.58	.30	0.000	0.000	0.000	-0.229
1425	0.00	0.17	-.35	-.43	.17	0.000	0.000	0.000	-0.274

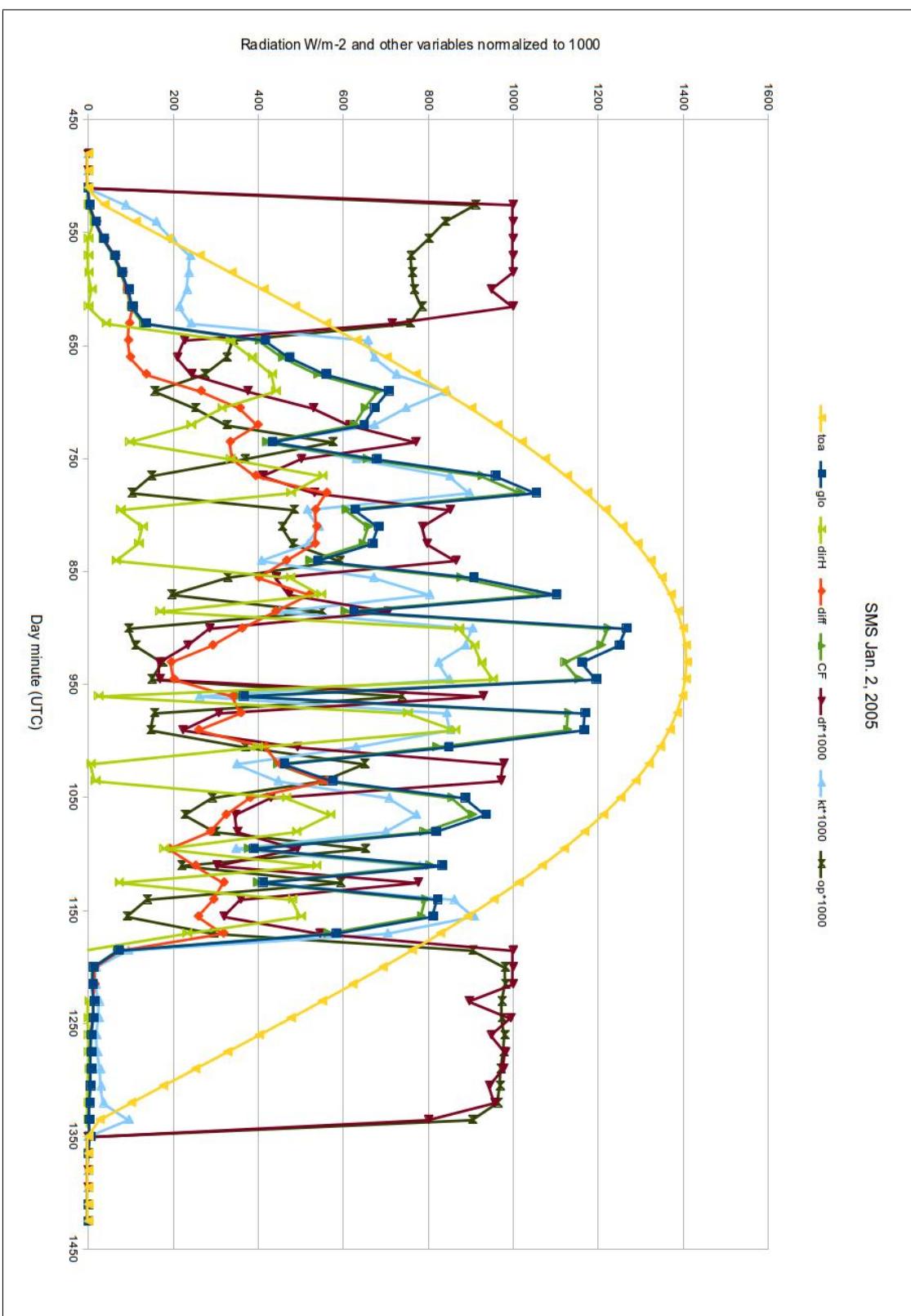


Figure C.2 - Graphic illustrating data measured and calculated on SMS January 2nd 2005.

Table C.3 - Solar radiation and derived data for SMS jan 3rd 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-0.78	-0.13	-0.65	-0.75	0.000	0.000	0.000	-0.126
495	0.00	-0.77	-0.10	-0.71	-0.74	0.000	0.000	0.000	-0.076
510	0.00	-0.94	-0.01	-0.44	-0.91	0.000	0.000	0.000	-0.025
525	37.85	-1.48	0.00	-0.39	-1.43	0.266	-0.039	1.000	0.027
540	112.30	-0.15	0.08	0.58	-0.14	-3.893	-0.001	1.000	0.079
555	187.37	4.66	0.14	5.29	4.50	1.000	0.025	0.975	0.133
570	262.74	21.72	0.32	22.17	20.99	1.000	0.083	0.917	0.186
585	338.09	78.30	0.40	78.30	75.65	1.000	0.232	0.768	0.239
600	413.09	112.70	2.59	110.10	108.89	0.977	0.273	0.727	0.292
615	487.42	339.90	174.55	175.70	328.40	0.517	0.697	0.303	0.345
630	560.77	166.30	6.27	164.30	160.67	0.988	0.297	0.703	0.397
645	632.82	519.10	316.44	215.60	501.54	0.415	0.820	0.180	0.448
660	703.26	150.80	0.25	152.40	145.70	1.000	0.214	0.786	0.497
675	771.79	197.00	16.41	180.40	190.33	0.916	0.255	0.745	0.546
690	838.11	244.80	6.75	238.40	236.52	0.974	0.292	0.708	0.593
705	901.95	255.50	0.81	254.60	246.86	0.996	0.283	0.717	0.638
720	963.03	368.00	18.30	349.00	355.55	0.948	0.382	0.618	0.681
735	1021.09	395.10	6.32	389.90	381.73	0.987	0.387	0.613	0.722
750	1075.88	323.80	-1.56	321.90	312.84	0.994	0.301	0.699	0.761
765	1127.16	438.40	5.00	433.30	423.57	0.988	0.389	0.611	0.797
780	1174.72	502.90	5.18	495.10	485.88	0.984	0.428	0.572	0.831
795	1218.35	504.70	3.92	494.30	487.62	0.979	0.414	0.586	0.862
810	1257.86	440.90	1.79	433.50	425.98	0.983	0.351	0.649	0.890
825	1293.09	293.50	-3.46	291.60	283.57	0.994	0.227	0.773	0.915
840	1323.89	350.00	2.98	344.80	338.16	0.985	0.264	0.736	0.936
855	1350.12	974.00	264.52	681.10	941.04	0.699	0.721	0.279	0.955
870	1371.66	687.90	83.92	596.80	664.62	0.868	0.502	0.498	0.970
885	1388.44	989.00	259.85	698.60	955.54	0.706	0.712	0.288	0.982
900	1400.37	566.60	-1.53	550.60	547.43	0.972	0.405	0.595	0.990
915	1407.41	940.00	379.77	533.40	908.20	0.567	0.668	0.332	0.995
930	1409.52	688.20	42.01	621.90	664.91	0.904	0.488	0.512	0.997
945	1406.70	178.30	-1.65	177.60	172.27	0.996	0.127	0.873	0.995
960	1398.96	179.80	-0.63	177.10	173.72	0.985	0.129	0.871	0.989
975	1386.33	55.90	-11.30	56.93	54.01	1.000	0.040	0.960	0.981
990	1368.86	174.20	3.07	170.80	168.31	0.980	0.127	0.873	0.968
1005	1346.63	545.60	108.20	422.20	527.14	0.774	0.405	0.595	0.952
1020	1319.74	333.50	5.54	329.60	322.22	0.988	0.253	0.747	0.933
1035	1288.30	205.80	2.11	203.90	198.84	0.991	0.160	0.840	0.911
1050	1252.45	439.00	1.53	431.00	424.15	0.982	0.351	0.649	0.886
1065	1212.33	1002.00	691.98	262.20	968.10	0.262	0.827	0.173	0.857
1080	1168.13	1044.00	750.20	244.30	1008.68	0.234	0.894	0.106	0.826
1095	1120.02	154.70	-3.17	155.40	149.47	1.000	0.138	0.862	0.792
1110	1068.22	99.80	-0.86	100.80	96.42	1.000	0.093	0.907	0.756
1125	1012.95	74.20	-0.16	75.20	71.69	1.000	0.073	0.927	0.716
1140	954.44	98.40	0.14	99.10	95.07	1.000	0.103	0.897	0.675
1155	892.95	88.10	-0.16	89.40	85.12	1.000	0.099	0.901	0.632
1170	828.73	66.68	-0.13	67.87	64.42	1.000	0.080	0.920	0.586
1185	762.07	47.94	-0.80	49.83	46.32	1.000	0.063	0.937	0.539
1200	693.25	33.28	-0.52	35.37	32.15	1.000	0.048	0.952	0.490
1215	622.56	36.00	-0.11	37.68	34.78	1.000	0.058	0.942	0.440
1230	550.30	61.04	-0.11	62.14	58.97	1.000	0.111	0.889	0.389
1245	476.79	77.50	-1.59	79.00	74.88	1.000	0.163	0.837	0.337
1260	402.34	51.28	-0.48	52.75	49.54	1.000	0.127	0.873	0.285
1275	327.27	29.41	-0.45	31.05	28.41	1.000	0.090	0.910	0.231
1290	251.91	16.62	-0.68	18.40	16.06	1.000	0.066	0.934	0.178
1305	176.56	12.21	-0.49	13.15	11.80	1.000	0.069	0.931	0.125
1320	101.56	3.60	-0.12	4.66	3.48	1.000	0.035	0.965	0.072
1335	27.23	0.91	-0.04	1.71	0.88	1.000	0.033	0.967	0.019
1350	0.00	-0.57	0.12	-0.05	-0.56	0.000	0.000	0.000	-0.033
1365	0.00	-1.57	0.18	-0.97	-1.51	0.000	0.000	0.000	-0.084
1380	0.00	-1.80	0.14	-1.10	-1.74	0.000	0.000	0.000	-0.133
1395	0.00	-1.72	0.19	-1.03	-1.66	0.000	0.000	0.000	-0.182
1410	0.00	-1.57	0.14	-0.95	-1.51	0.000	0.000	0.000	-0.229
1425	0.00	-1.42	0.11	-0.88	-1.37	0.000	0.000	0.000	-0.274

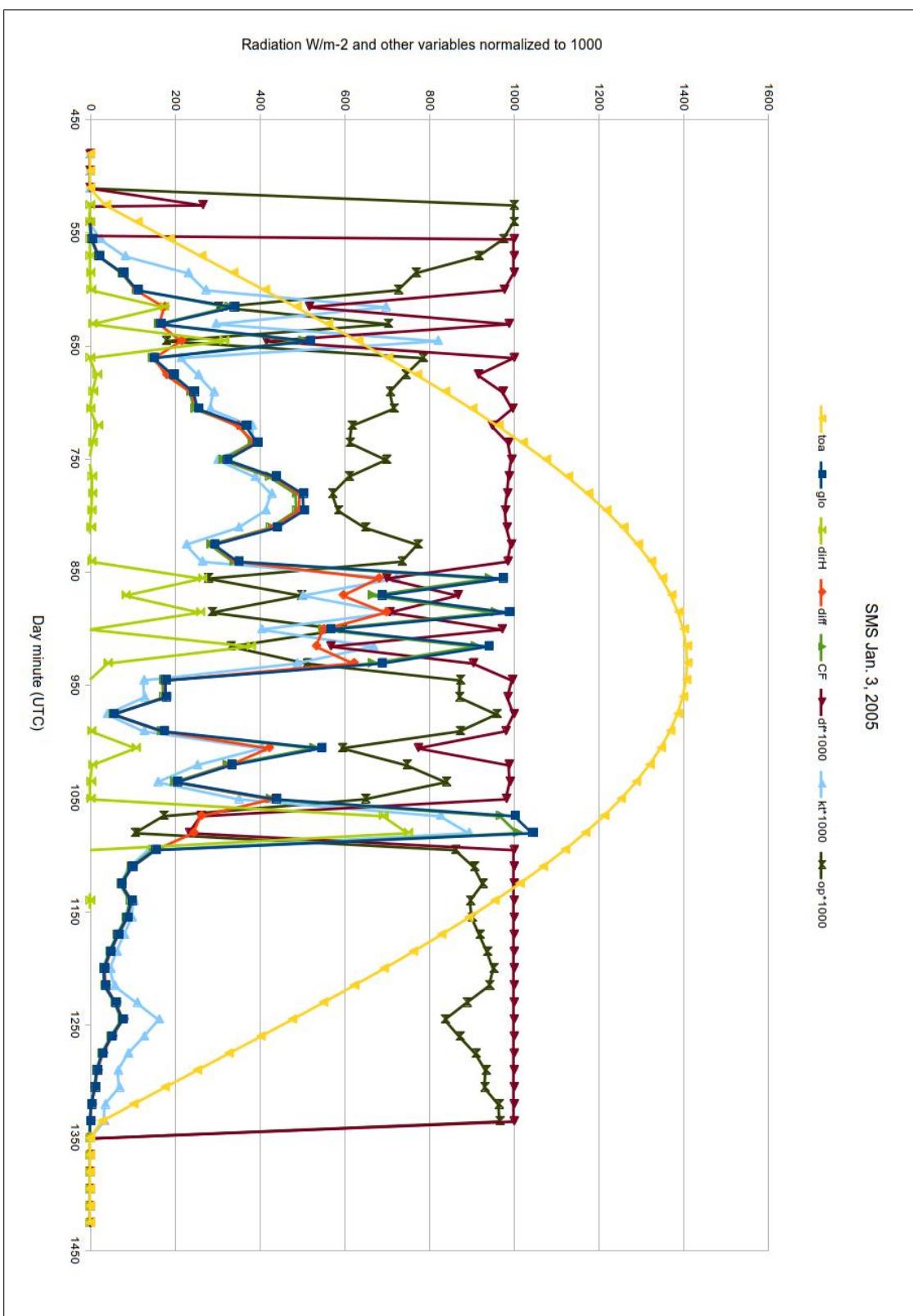


Figure C.3 - Graphic illustrating data measured and calculated on SMS January 3rd 2005.

Table C.4 - Solar radiation and derived data for SMS jan 4th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-1.38	0.00	-0.93	-1.34	0.000	0.000	0.000	-0.126
495	0.00	-1.27	-0.02	-0.86	-1.22	0.000	0.000	0.000	-0.076
510	0.00	-0.23	-0.01	0.21	-0.23	0.000	0.000	0.000	-0.025
525	37.85	16.93	0.03	17.96	16.36	1.000	0.447	0.553	0.027
540	112.30	35.10	18.78	36.88	33.91	1.000	0.313	0.687	0.079
555	187.37	58.95	39.69	61.22	56.96	1.000	0.315	0.685	0.133
570	262.74	84.40	86.23	86.60	81.54	1.000	0.321	0.679	0.186
585	338.09	183.20	8.09	183.90	177.00	1.000	0.542	0.458	0.239
600	413.09	169.80	2.19	170.20	164.05	1.000	0.411	0.589	0.292
615	487.42	101.60	0.99	102.90	98.16	1.000	0.208	0.792	0.345
630	560.77	353.20	288.75	85.10	341.25	0.241	0.630	0.370	0.397
645	632.82	398.10	345.98	76.90	384.63	0.193	0.629	0.371	0.448
660	703.26	452.80	404.39	69.69	437.48	0.154	0.644	0.356	0.497
675	771.79	508.30	460.18	68.08	491.10	0.134	0.659	0.341	0.546
690	838.11	563.90	513.95	67.35	544.82	0.119	0.673	0.327	0.593
705	901.95	617.30	567.77	66.05	596.41	0.107	0.684	0.316	0.638
720	963.03	668.00	613.04	67.21	645.40	0.101	0.694	0.306	0.681
735	1021.09	719.00	662.27	67.20	694.67	0.093	0.704	0.296	0.722
750	1075.88	767.00	702.37	71.20	741.05	0.093	0.713	0.287	0.761
765	1127.16	703.00	618.66	96.00	679.21	0.137	0.624	0.376	0.797
780	1174.72	388.10	138.42	255.70	374.97	0.659	0.330	0.670	0.831
795	1218.35	338.50	13.68	328.80	327.05	0.971	0.278	0.722	0.862
810	1257.86	471.30	103.83	388.00	455.35	0.823	0.375	0.625	0.890
825	1293.09	426.80	12.90	408.60	412.36	0.957	0.330	0.670	0.915
840	1323.89	1006.00	619.70	331.30	971.96	0.329	0.760	0.240	0.936
855	1350.12	284.30	5.50	280.90	274.68	0.988	0.211	0.789	0.955
870	1371.66	421.00	35.74	377.90	406.76	0.898	0.307	0.693	0.970
885	1388.44	472.10	56.86	386.30	456.13	0.818	0.340	0.660	0.982
900	1400.37	154.60	-4.82	155.40	149.37	1.000	0.110	0.890	0.990
915	1407.41	210.70	-3.15	207.00	203.57	0.982	0.150	0.850	0.995
930	1409.52	344.30	1.27	334.90	332.65	0.973	0.244	0.756	0.997
945	1406.70	393.50	1.61	382.50	380.19	0.972	0.280	0.720	0.995
960	1398.96	341.20	4.65	332.30	329.66	0.974	0.244	0.756	0.989
975	1386.33	347.00	6.79	337.10	335.26	0.971	0.250	0.750	0.981
990	1368.86	473.30	17.33	449.10	457.29	0.949	0.346	0.654	0.968
1005	1346.63	684.80	125.44	534.30	661.63	0.780	0.509	0.491	0.952
1020	1319.74	955.00	543.17	390.60	922.69	0.409	0.724	0.276	0.933
1035	1288.30	1168.00	884.78	243.10	1128.48	0.208	0.907	0.093	0.911
1050	1252.45	1166.00	841.56	284.00	1126.55	0.244	0.931	0.069	0.886
1065	1212.33	1079.00	803.46	220.40	1042.49	0.204	0.890	0.110	0.857
1080	1168.13	360.30	4.91	348.20	348.11	0.966	0.308	0.692	0.826
1095	1120.02	714.00	391.50	283.10	689.84	0.396	0.637	0.363	0.792
1110	1068.22	493.70	197.73	258.40	477.00	0.523	0.462	0.538	0.756
1125	1012.95	793.00	551.67	194.10	766.17	0.245	0.783	0.217	0.716
1140	954.44	207.30	49.82	159.60	200.29	0.770	0.217	0.783	0.675
1155	892.95	298.30	152.34	127.60	288.21	0.428	0.334	0.666	0.632
1170	828.73	647.20	486.51	111.40	625.30	0.172	0.781	0.219	0.586
1185	762.07	586.30	466.24	73.60	566.46	0.126	0.769	0.231	0.539
1200	693.25	534.90	421.19	67.10	516.80	0.125	0.772	0.228	0.490
1215	622.56	473.90	364.59	63.78	457.87	0.135	0.761	0.239	0.440
1230	550.30	415.50	310.21	61.72	401.44	0.149	0.755	0.245	0.389
1245	476.79	360.00	256.63	60.19	347.82	0.167	0.755	0.245	0.337
1260	402.34	296.10	201.20	55.94	286.08	0.189	0.736	0.264	0.285
1275	327.27	240.00	154.63	49.29	231.88	0.205	0.733	0.267	0.231
1290	251.91	184.10	108.01	43.61	177.87	0.237	0.731	0.269	0.178
1305	176.56	130.70	65.79	37.45	126.28	0.287	0.740	0.260	0.125
1320	101.56	72.60	25.77	29.30	70.14	0.404	0.715	0.285	0.072
1335	27.23	18.77	4.84	19.59	18.13	1.000	0.689	0.311	0.019
1350	0.00	7.64	-2.84	8.76	7.38	0.000	0.000	0.000	-0.033
1365	0.00	-0.05	0.40	1.25	-0.05	0.000	0.000	0.000	-0.084
1380	0.00	-2.06	0.75	-0.82	-1.99	0.000	0.000	0.000	-0.133
1395	0.00	-1.79	0.56	-1.14	-1.73	0.000	0.000	0.000	-0.182
1410	0.00	-2.02	0.43	-1.11	-1.95	0.000	0.000	0.000	-0.229
1425	0.00	-1.72	0.29	-1.17	-1.67	0.000	0.000	0.000	-0.274

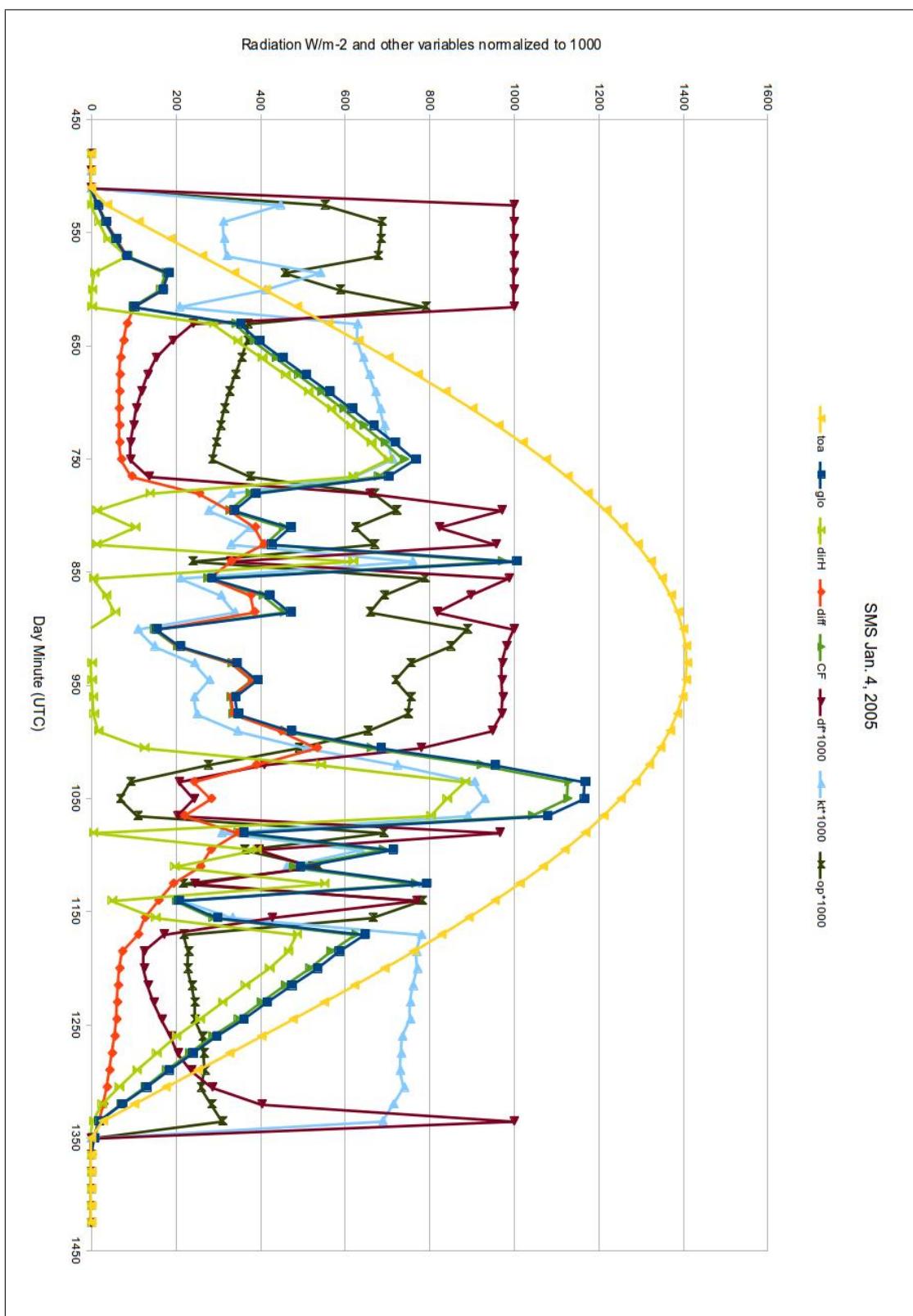


Figure C.4 - Graphic illustrating data measured and calculated on SMS January 4th 2005.

Table C.5 - Solar radiation and derived data for SMS jan 5th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-2.13	-0.02	-1.31	-2.06	0.000	0.000	0.000	-0.126
495	0.00	-2.19	0.06	-1.13	-2.12	0.000	0.000	0.000	-0.076
510	0.00	-0.96	0.03	0.00	-0.93	0.000	0.000	0.000	-0.025
525	37.85	4.25	-0.10	6.34	4.10	1.000	0.112	0.888	0.027
540	112.30	14.05	19.10	16.00	13.57	1.000	0.125	0.875	0.079
555	187.37	23.81	53.20	25.53	23.00	1.000	0.127	0.873	0.133
570	262.74	32.11	95.80	33.66	31.02	1.000	0.122	0.878	0.186
585	338.09	117.50	141.56	41.09	113.52	0.350	0.348	0.652	0.239
600	413.09	217.50	191.78	47.43	210.14	0.218	0.527	0.473	0.292
615	487.42	276.30	245.81	52.25	266.95	0.189	0.567	0.433	0.345
630	560.77	335.50	302.23	55.58	324.15	0.166	0.598	0.402	0.397
645	632.82	393.70	357.17	59.03	380.38	0.150	0.622	0.378	0.448
660	703.26	452.70	412.85	61.39	437.38	0.136	0.644	0.356	0.497
675	771.79	510.20	467.27	63.57	492.94	0.125	0.661	0.339	0.546
690	838.11	565.30	519.29	65.78	546.17	0.116	0.674	0.326	0.593
705	901.95	619.60	570.33	67.66	598.64	0.109	0.687	0.313	0.638
720	963.03	670.30	615.08	71.00	647.62	0.106	0.696	0.304	0.681
735	1021.09	721.00	660.83	73.60	696.61	0.102	0.706	0.294	0.722
750	1075.88	772.00	701.61	79.10	745.88	0.102	0.718	0.282	0.761
765	1127.16	820.00	749.40	77.60	792.26	0.095	0.727	0.273	0.797
780	1174.72	865.00	795.15	75.40	835.73	0.087	0.736	0.264	0.831
795	1218.35	911.00	837.60	74.70	880.18	0.082	0.748	0.252	0.862
810	1257.86	945.00	864.77	76.60	913.03	0.081	0.751	0.249	0.890
825	1293.09	978.00	897.22	76.40	944.91	0.078	0.756	0.244	0.915
840	1323.89	1011.00	922.33	81.80	976.79	0.081	0.764	0.236	0.936
855	1350.12	1036.00	941.56	83.80	1000.95	0.081	0.767	0.233	0.955
870	1371.66	1055.00	959.50	80.90	1019.30	0.077	0.769	0.231	0.970
885	1388.44	1078.00	984.98	77.30	1041.53	0.072	0.776	0.224	0.982
900	1400.37	1091.00	994.44	77.90	1054.09	0.071	0.779	0.221	0.990
915	1407.41	1103.00	1003.42	80.40	1065.68	0.073	0.784	0.216	0.995
930	1409.52	1110.00	1001.93	85.40	1072.44	0.077	0.788	0.212	0.997
945	1406.70	1117.00	1002.91	d 89.60	1079.21	0.080	0.794	0.206	0.995
960	1398.96	1110.00	994.42	84.70	1072.44	0.076	0.793	0.207	0.989
975	1386.33	1104.00	989.37	81.50	1066.65	0.074	0.796	0.204	0.981
990	1368.86	1089.00	964.31	83.30	1052.15	0.076	0.796	0.204	0.968
1005	1346.63	1074.00	949.61	86.30	1037.66	0.080	0.798	0.202	0.952
1020	1319.74	1068.00	909.18	116.90	1031.86	0.109	0.809	0.191	0.933
1035	1288.30	1027.00	893.90	87.30	992.25	0.085	0.797	0.203	0.911
1050	1252.45	996.00	869.02	79.50	962.30	0.080	0.795	0.205	0.886
1065	1212.33	961.00	836.04	76.40	928.48	0.080	0.793	0.207	0.857
1080	1168.13	923.00	795.64	78.20	891.77	0.085	0.790	0.210	0.826
1095	1120.02	885.00	758.91	78.00	855.06	0.088	0.790	0.210	0.792
1110	1068.22	848.00	725.32	74.20	819.31	0.088	0.794	0.206	0.756
1125	1012.95	804.00	677.76	74.60	776.80	0.093	0.794	0.206	0.716
1140	954.44	759.00	635.24	71.40	733.32	0.094	0.795	0.205	0.675
1155	892.95	705.00	585.47	68.11	681.15	0.097	0.790	0.210	0.632
1170	828.73	651.40	536.33	64.70	629.36	0.099	0.786	0.214	0.586
1185	762.07	596.20	482.41	62.87	576.03	0.105	0.782	0.218	0.539
1200	693.25	542.60	433.45	58.84	524.24	0.108	0.783	0.217	0.490
1215	622.56	488.50	383.09	55.76	471.97	0.114	0.785	0.215	0.440
1230	550.30	427.40	324.22	55.10	412.94	0.129	0.777	0.223	0.389
1245	476.79	365.50	267.43	53.14	353.13	0.145	0.767	0.233	0.337
1260	402.34	308.20	214.85	50.12	297.77	0.163	0.766	0.234	0.285
1275	327.27	248.40	162.50	46.62	240.00	0.188	0.759	0.241	0.231
1290	251.91	186.80	110.27	42.53	180.48	0.228	0.742	0.258	0.178
1305	176.56	122.30	58.27	39.38	118.16	0.322	0.693	0.307	0.125
1320	101.56	61.88	17.07	33.70	59.79	0.545	0.609	0.391	0.072
1335	27.23	25.15	4.51	26.38	24.30	1.000	0.924	0.076	0.019
1350	0.00	11.78	-3.02	13.41	11.38	0.000	0.000	0.000	-0.033
1365	0.00	2.33	0.37	3.86	2.25	0.000	0.000	0.000	-0.084
1380	0.00	-2.20	0.32	-1.23	-2.12	0.000	0.000	0.000	-0.133
1395	0.00	-2.52	0.40	-1.29	-2.43	0.000	0.000	0.000	-0.182
1410	0.00	-2.67	0.87	-0.98	-2.58	0.000	0.000	0.000	-0.229
1425	0.00	-1.90	0.14	-1.66	-1.84	0.000	0.000	0.000	-0.274

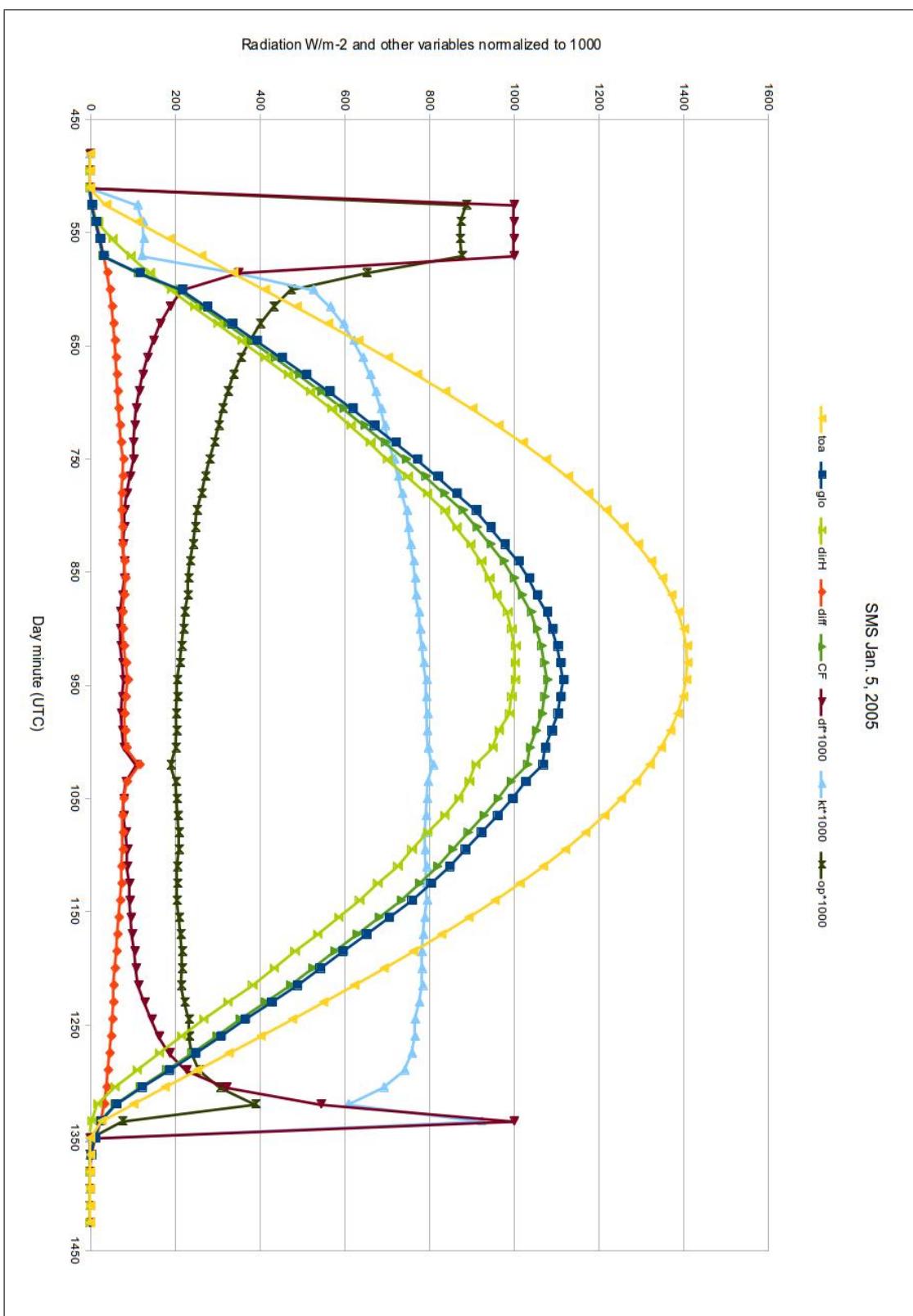


Figure C.5 - Graphic illustrating data measured and calculated on SMS January 5th 2005.

Table C.6 - Solar radiation and derived data for SMS jan 6th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	.00	-1.88	.16	-1.13	-1.82	0.000	0.000	0.000	-0.126
495	.00	-1.88	.08	-1.10	-1.82	0.000	0.000	0.000	-0.076
510	.00	-.56	.00	-.11	-.54	0.000	0.000	0.000	-0.025
525	37.85	4.78	.00	5.67	4.62	1.000	0.126	0.874	0.027
540	112.30	22.65	6.46	18.91	21.88	0.835	0.202	0.798	0.079
555	187.37	45.33	48.15	28.55	43.80	0.630	0.242	0.758	0.133
570	262.74	59.18	97.67	39.00	57.18	0.659	0.225	0.775	0.186
585	338.09	140.40	154.81	42.56	135.65	0.303	0.415	0.585	0.239
600	413.09	249.70	212.12	45.84	241.25	0.184	0.604	0.396	0.292
615	487.42	300.60	270.63	48.21	290.43	0.160	0.617	0.383	0.345
630	560.77	351.50	327.22	50.79	339.61	0.144	0.627	0.373	0.397
645	632.82	409.40	381.79	54.86	395.55	0.134	0.647	0.353	0.448
660	703.26	468.90	437.22	57.39	453.03	0.122	0.667	0.333	0.497
675	771.79	528.40	495.11	58.70	510.52	0.111	0.685	0.315	0.546
690	838.11	583.30	546.56	60.69	563.56	0.104	0.696	0.304	0.593
705	901.95	642.70	604.77	59.47	620.95	0.093	0.713	0.287	0.638
720	963.03	698.90	654.59	60.39	675.25	0.086	0.726	0.274	0.681
735	1021.09	753.00	705.60	59.62	727.52	0.079	0.737	0.263	0.722
750	1075.88	801.00	751.83	60.34	773.90	0.075	0.745	0.255	0.761
765	1127.16	847.00	792.45	61.34	818.34	0.072	0.751	0.249	0.797
780	1174.72	888.00	825.89	63.96	857.95	0.072	0.756	0.244	0.831
795	1218.35	928.00	863.46	64.20	896.60	0.069	0.762	0.238	0.862
810	1257.86	967.00	896.80	65.91	934.28	0.068	0.769	0.231	0.890
825	1293.09	1003.00	930.15	64.73	969.06	0.065	0.776	0.224	0.915
840	1323.89	1032.00	954.17	66.16	997.08	0.064	0.780	0.220	0.936
855	1350.12	1064.00	985.49	65.38	1028.00	0.061	0.788	0.212	0.955
870	1371.66	1081.00	996.36	67.10	1044.42	0.062	0.788	0.212	0.970
885	1388.44	1096.00	1007.57	68.99	1058.92	0.063	0.789	0.211	0.982
900	1400.37	1114.00	1023.16	67.89	1076.31	0.061	0.796	0.204	0.990
915	1407.41	1125.00	1030.29	68.76	1086.94	0.061	0.799	0.201	0.995
930	1409.52	1125.00	1024.86	69.85	1086.94	0.062	0.798	0.202	0.997
945	1406.70	1123.00	1021.82	71.10	1085.00	0.063	0.798	0.202	0.995
960	1398.96	1121.00	1015.20	72.30	1083.07	0.064	0.801	0.199	0.989
975	1386.33	1112.00	1007.02	72.30	1074.38	0.065	0.802	0.198	0.981
990	1368.86	1099.00	986.58	72.70	1061.82	0.066	0.803	0.197	0.968
1005	1346.63	1084.00	971.52	71.70	1047.32	0.066	0.805	0.195	0.952
1020	1319.74	1064.00	949.32	72.20	1028.00	0.068	0.806	0.194	0.933
1035	1288.30	1040.00	915.77	72.10	1004.81	0.069	0.807	0.193	0.911
1050	1252.45	1007.00	880.53	73.70	972.93	0.073	0.804	0.196	0.886
1065	1212.33	979.00	851.47	73.20	945.88	0.075	0.808	0.192	0.857
1080	1168.13	942.00	810.51	74.10	910.13	0.079	0.806	0.194	0.826
1095	1120.02	905.00	777.13	72.60	874.38	0.080	0.808	0.192	0.792
1110	1068.22	866.00	738.92	69.48	836.70	0.080	0.811	0.189	0.756
1125	1012.95	820.00	692.81	69.29	792.26	0.085	0.810	0.190	0.716
1140	954.44	769.00	644.02	71.10	742.98	0.092	0.806	0.194	0.675
1155	892.95	719.00	593.68	71.90	694.67	0.100	0.805	0.195	0.632
1170	828.73	668.50	543.37	73.30	645.88	0.110	0.807	0.193	0.586
1185	762.07	621.20	495.35	73.40	600.18	0.118	0.815	0.185	0.539
1200	693.25	571.30	443.26	74.00	551.97	0.130	0.824	0.176	0.490
1215	622.56	488.30	362.39	77.30	471.78	0.158	0.784	0.216	0.440
1230	550.30	395.70	271.91	82.20	382.31	0.208	0.719	0.281	0.389
1245	476.79	240.20	134.99	80.80	232.07	0.336	0.504	0.496	0.337
1260	402.34	337.00	212.01	81.80	325.60	0.243	0.838	0.162	0.285
1275	327.27	276.40	161.55	75.90	267.05	0.275	0.845	0.155	0.231
1290	251.91	211.70	113.78	62.49	204.54	0.295	0.840	0.160	0.178
1305	176.56	144.90	70.42	44.32	140.00	0.306	0.821	0.179	0.125
1320	101.56	85.70	30.92	32.53	82.80	0.380	0.844	0.156	0.072
1335	27.23	40.59	5.45	21.45	39.22	0.528	0.000	1.000	0.019
1350	.00	8.78	-3.43	10.19	8.48	0.000	0.000	0.000	-0.033
1365	.00	-.09	.22	1.21	-.08	0.000	0.000	0.000	-0.084
1380	.00	-2.39	.30	-1.36	-2.31	0.000	0.000	0.000	-0.133
1395	.00	-2.68	.50	-1.51	-2.59	0.000	0.000	0.000	-0.182
1410	.00	-2.67	.53	-1.60	-2.58	0.000	0.000	0.000	-0.229
1425	.00	-2.89	.98	-1.17	-2.79	0.000	0.000	0.000	-0.274

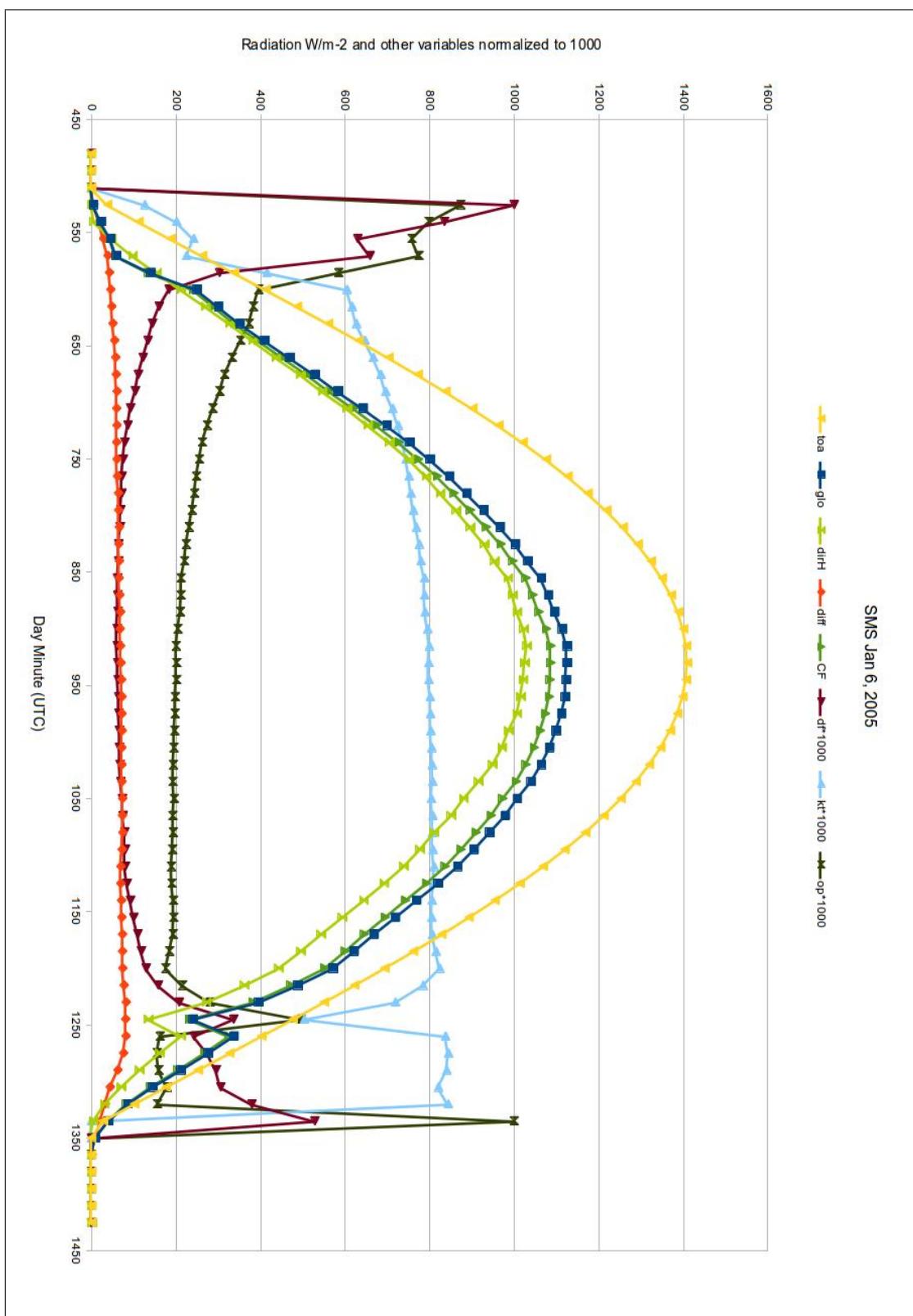


Figure C.6 - Graphic illustrating data measured and calculated on SMS January 6th 2005.

Table C.7 - Solar radiation and derived data for SMS jan 7th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-2.39	0.14	-1.30	-2.31	0.000	0.000	0.000	-0.126
495	0.00	-1.92	-0.19	-1.91	-1.85	0.000	0.000	0.000	-0.076
510	0.00	-1.53	0.00	-0.47	-1.48	0.000	0.000	0.000	-0.025
525	37.85	3.96	0.01	4.67	3.82	1.000	0.105	0.895	0.027
540	112.30	24.00	18.33	15.15	23.19	0.631	0.214	0.786	0.079
555	187.37	63.72	52.98	25.24	61.56	0.396	0.340	0.660	0.133
570	262.74	113.50	98.01	33.55	109.66	0.296	0.432	0.568	0.186
585	338.09	168.40	148.64	40.23	162.70	0.239	0.498	0.502	0.239
600	413.09	226.90	202.77	45.79	219.22	0.202	0.549	0.451	0.292
615	487.42	285.60	256.49	51.60	275.94	0.181	0.586	0.414	0.345
630	560.77	345.30	312.15	55.88	333.62	0.162	0.616	0.384	0.397
645	632.82	406.90	370.60	58.57	393.13	0.144	0.643	0.357	0.448
660	703.26	468.20	429.26	60.73	452.36	0.130	0.666	0.334	0.497
675	771.79	523.20	478.74	64.93	505.50	0.124	0.678	0.322	0.546
690	838.11	579.20	529.96	67.53	559.60	0.117	0.691	0.309	0.593
705	901.95	636.70	584.36	68.21	615.16	0.107	0.706	0.294	0.638
720	963.03	691.90	638.24	68.80	668.49	0.099	0.718	0.282	0.681
735	1021.09	744.00	686.10	70.10	718.83	0.094	0.729	0.271	0.722
750	1075.88	790.00	726.72	72.90	763.27	0.092	0.734	0.266	0.761
765	1127.16	840.00	773.32	74.00	811.58	0.088	0.745	0.255	0.797
780	1174.72	878.00	808.44	76.90	848.29	0.088	0.747	0.253	0.831
795	1218.35	920.00	843.64	77.00	888.87	0.084	0.755	0.245	0.862
810	1257.86	956.00	881.67	77.70	923.65	0.081	0.760	0.240	0.890
825	1293.09	990.00	912.77	78.30	956.50	0.079	0.766	0.234	0.915
840	1323.89	1017.00	937.32	78.70	982.59	0.077	0.768	0.232	0.936
855	1350.12	1047.00	962.57	77.70	1011.57	0.074	0.775	0.225	0.955
870	1371.66	1068.00	969.20	78.50	1031.86	0.074	0.779	0.221	0.970
885	1388.44	1092.00	996.77	77.50	1055.05	0.071	0.786	0.214	0.982
900	1400.37	1102.00	1002.36	81.30	1064.71	0.074	0.787	0.213	0.990
915	1407.41	1100.00	986.49	84.60	1062.78	0.077	0.782	0.218	0.995
930	1409.52	1112.00	1006.92	81.30	1074.38	0.073	0.789	0.211	0.997
945	1406.70	1113.00	1002.91	81.10	1075.34	0.073	0.791	0.209	0.995
960	1398.96	1106.00	987.50	82.10	1068.58	0.074	0.791	0.209	0.989
975	1386.33	1092.00	958.97	90.90	1055.05	0.083	0.788	0.212	0.981
990	1368.86	1075.00	943.98	94.10	1038.63	0.088	0.785	0.215	0.968
1005	1346.63	1059.00	918.18	100.50	1023.17	0.095	0.786	0.214	0.952
1020	1319.74	1048.00	894.24	103.60	1012.54	0.099	0.794	0.206	0.933
1035	1288.30	1026.00	862.00	117.60	991.29	0.115	0.796	0.204	0.911
1050	1252.45	881.00	607.16	235.20	851.19	0.267	0.703	0.297	0.886
1065	1212.33	1061.00	770.01	236.90	1025.10	0.223	0.875	0.125	0.857
1080	1168.13	942.00	738.63	150.30	910.13	0.160	0.806	0.194	0.826
1095	1120.02	877.00	705.84	118.30	847.33	0.135	0.783	0.217	0.792
1110	1068.22	821.00	655.81	114.50	793.22	0.139	0.769	0.231	0.756
1125	1012.95	789.00	630.48	104.90	762.30	0.133	0.779	0.221	0.716
1140	954.44	735.00	581.91	100.90	710.13	0.137	0.770	0.230	0.675
1155	892.95	687.30	540.63	93.70	664.05	0.136	0.770	0.230	0.632
1170	828.73	632.40	490.03	91.10	611.00	0.144	0.763	0.237	0.586
1185	762.07	578.00	435.52	91.70	558.44	0.159	0.758	0.242	0.539
1200	693.25	520.60	385.40	85.70	502.99	0.165	0.751	0.249	0.490
1215	622.56	460.60	332.45	81.60	445.02	0.177	0.740	0.260	0.440
1230	550.30	401.00	277.91	79.20	387.43	0.198	0.729	0.271	0.389
1245	476.79	348.50	234.38	72.90	336.71	0.209	0.731	0.269	0.337
1260	402.34	293.60	187.59	67.21	283.67	0.229	0.730	0.270	0.285
1275	327.27	233.40	138.98	59.85	225.50	0.256	0.713	0.287	0.231
1290	251.91	184.20	99.47	53.00	177.97	0.288	0.731	0.269	0.178
1305	176.56	129.10	58.98	44.05	124.73	0.341	0.731	0.269	0.125
1320	101.56	80.30	26.70	33.85	77.58	0.422	0.791	0.209	0.072
1335	27.23	38.36	4.49	22.74	37.06	0.593	0.000	1.000	0.019
1350	0.00	8.84	-2.02	10.76	8.54	0.000	0.000	0.000	-0.033
1365	0.00	0.14	0.43	1.35	0.14	0.000	0.000	0.000	-0.084
1380	0.00	-2.66	0.87	-0.55	-2.57	0.000	0.000	0.000	-0.133
1395	0.00	-2.04	0.57	-1.19	-1.97	0.000	0.000	0.000	-0.182
1410	0.00	-1.82	0.38	-1.24	-1.76	0.000	0.000	0.000	-0.229
1425	0.00	-2.04	0.04	-1.32	-1.97	0.000	0.000	0.000	-0.274

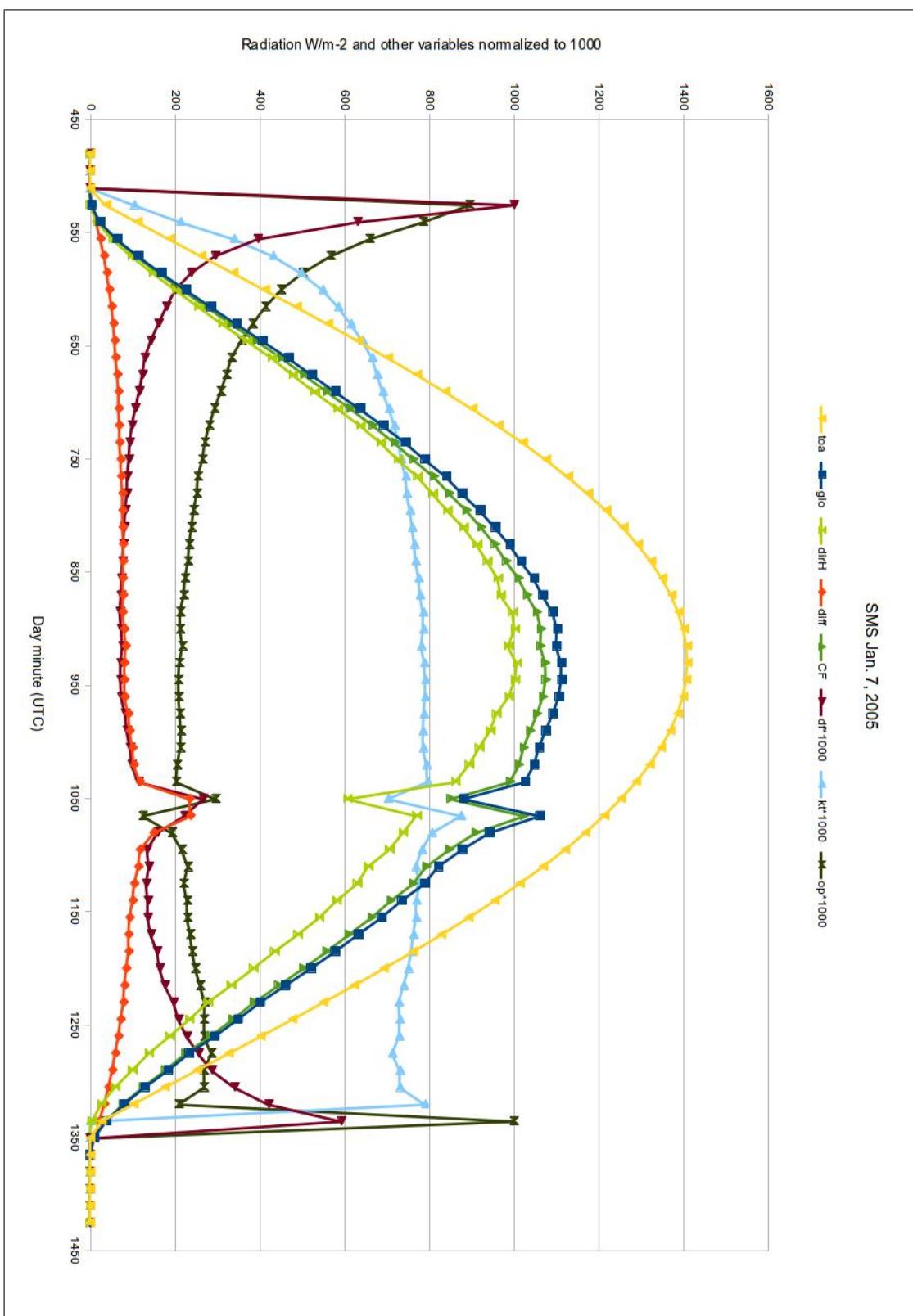


Figure C.7 - Graphic illustrating data measured and calculated on SMS January 7th 2005.

Table C.8 - Solar radiation and derived data for SMS jan 8th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-1.57	0.16	-0.84	-1.52	0.000	0.000	0.000	-0.126
495	0.00	-1.40	-0.11	-1.25	-1.35	0.000	0.000	0.000	-0.076
510	0.00	-0.82	-0.01	-0.35	-0.79	0.000	0.000	0.000	-0.025
525	37.85	3.99	0.05	4.15	3.86	1.000	0.105	0.895	0.027
540	112.30	20.16	10.57	16.21	19.48	0.804	0.180	0.820	0.079
555	187.37	55.54	38.18	28.52	53.66	0.514	0.296	0.704	0.133
570	262.74	99.60	75.63	38.62	96.23	0.388	0.379	0.621	0.186
585	338.09	149.90	119.20	48.10	144.83	0.321	0.443	0.557	0.239
600	413.09	202.50	164.70	56.36	195.65	0.278	0.490	0.510	0.292
615	487.42	257.90	214.36	63.26	249.17	0.245	0.529	0.471	0.345
630	560.77	313.20	265.42	68.14	302.60	0.218	0.559	0.441	0.397
645	632.82	374.10	322.71	72.50	361.44	0.194	0.591	0.409	0.448
660	703.26	432.70	378.53	74.70	418.06	0.173	0.615	0.385	0.497
675	771.79	488.40	431.25	77.70	471.88	0.159	0.633	0.367	0.546
690	838.11	544.60	482.53	81.40	526.17	0.149	0.650	0.350	0.593
705	901.95	597.90	535.88	80.20	577.67	0.134	0.663	0.337	0.638
720	963.03	652.90	586.47	81.80	630.81	0.125	0.678	0.322	0.681
735	1021.09	703.00	634.10	82.60	679.21	0.117	0.688	0.312	0.722
750	1075.88	752.00	677.26	83.40	726.56	0.111	0.699	0.301	0.761
765	1127.16	796.00	716.72	86.50	769.07	0.109	0.706	0.294	0.797
780	1174.72	839.00	752.77	89.50	810.61	0.107	0.714	0.286	0.831
795	1218.35	877.00	779.01	95.90	847.33	0.109	0.720	0.280	0.862
810	1257.86	600.40	380.07	198.00	580.09	0.330	0.477	0.523	0.890
825	1293.09	1078.00	829.54	240.50	1041.53	0.223	0.834	0.166	0.915
840	1323.89	1048.00	835.25	197.10	1012.54	0.188	0.792	0.208	0.936
855	1350.12	500.70	247.42	254.90	483.76	0.509	0.371	0.629	0.955
870	1371.66	1096.00	896.44	175.20	1058.92	0.160	0.799	0.201	0.970
885	1388.44	238.20	-0.46	232.00	230.14	0.974	0.172	0.828	0.982
900	1400.37	1033.00	750.78	273.10	998.05	0.264	0.738	0.262	0.990
915	1407.41	1243.00	905.86	299.40	1200.94	0.241	0.883	0.117	0.995
930	1409.52	277.00	10.50	265.80	267.63	0.960	0.197	0.803	0.997
945	1406.70	241.60	-0.70	233.20	233.43	0.965	0.172	0.828	0.995
960	1398.96	1344.00	906.36	390.70	1298.53	0.291	0.961	0.039	0.989
975	1386.33	328.90	4.04	321.30	317.77	0.977	0.237	0.763	0.981
990	1368.86	194.10	-6.89	189.90	187.53	0.978	0.142	0.858	0.968
1005	1346.63	133.60	-9.09	132.50	129.08	0.992	0.099	0.901	0.952
1020	1319.74	177.70	-4.33	170.70	171.69	0.961	0.135	0.865	0.933
1035	1288.30	106.10	-12.88	106.50	102.51	1.000	0.082	0.918	0.911
1050	1252.45	60.31	-15.48	63.14	58.27	1.000	0.048	0.952	0.886
1065	1212.33	103.10	-2.04	99.90	99.61	0.969	0.085	0.915	0.857
1080	1168.13	88.70	0.38	87.60	85.70	0.988	0.076	0.924	0.826
1095	1120.02	36.62	0.17	36.46	35.38	0.996	0.033	0.967	0.792
1110	1068.22	27.19	1.17	26.12	26.27	0.961	0.025	0.975	0.756
1125	1012.95	20.46	1.66	20.36	19.77	0.995	0.020	0.980	0.716
1140	954.44	13.46	1.59	12.92	13.00	0.960	0.014	0.986	0.675
1155	892.95	11.66	3.38	10.89	11.27	0.934	0.013	0.987	0.632
1170	828.73	8.38	-3.94	8.93	8.10	1.000	0.010	0.990	0.586
1185	762.07	24.45	0.24	23.48	23.62	0.960	0.032	0.968	0.539
1200	693.25	21.82	1.05	21.23	21.08	0.973	0.031	0.969	0.490
1215	622.56	37.64	0.53	36.79	36.37	0.977	0.060	0.940	0.440
1230	550.30	32.84	1.02	32.31	31.73	0.984	0.060	0.940	0.389
1245	476.79	32.12	0.93	31.95	31.03	0.995	0.067	0.933	0.337
1260	402.34	23.92	0.87	23.92	23.11	1.000	0.059	0.941	0.285
1275	327.27	21.85	1.24	21.38	21.11	0.978	0.067	0.933	0.231
1290	251.91	10.33	-1.19	12.12	9.98	1.000	0.041	0.959	0.178
1305	176.56	18.50	-0.40	19.13	17.87	1.000	0.105	0.895	0.125
1320	101.56	26.95	0.00	26.84	26.04	0.996	0.265	0.735	0.072
1335	27.23	34.08	0.05	34.11	32.93	1.000	0.000	1.000	0.019
1350	0.00	11.37	0.00	11.81	10.99	0.000	0.000	0.000	-0.033
1365	0.00	3.72	0.04	4.31	3.59	0.000	0.000	0.000	-0.084
1380	0.00	-1.38	0.01	-0.80	-1.34	0.000	0.000	0.000	-0.133
1395	0.00	-1.40	-0.10	-0.98	-1.36	0.000	0.000	0.000	-0.182
1410	0.00	-1.55	-0.95	-1.52	-1.49	0.000	0.000	0.000	-0.229
1425	0.00	-1.37	-0.63	-0.96	-1.33	0.000	0.000	0.000	-0.274

SMS Jan. 8, 2005

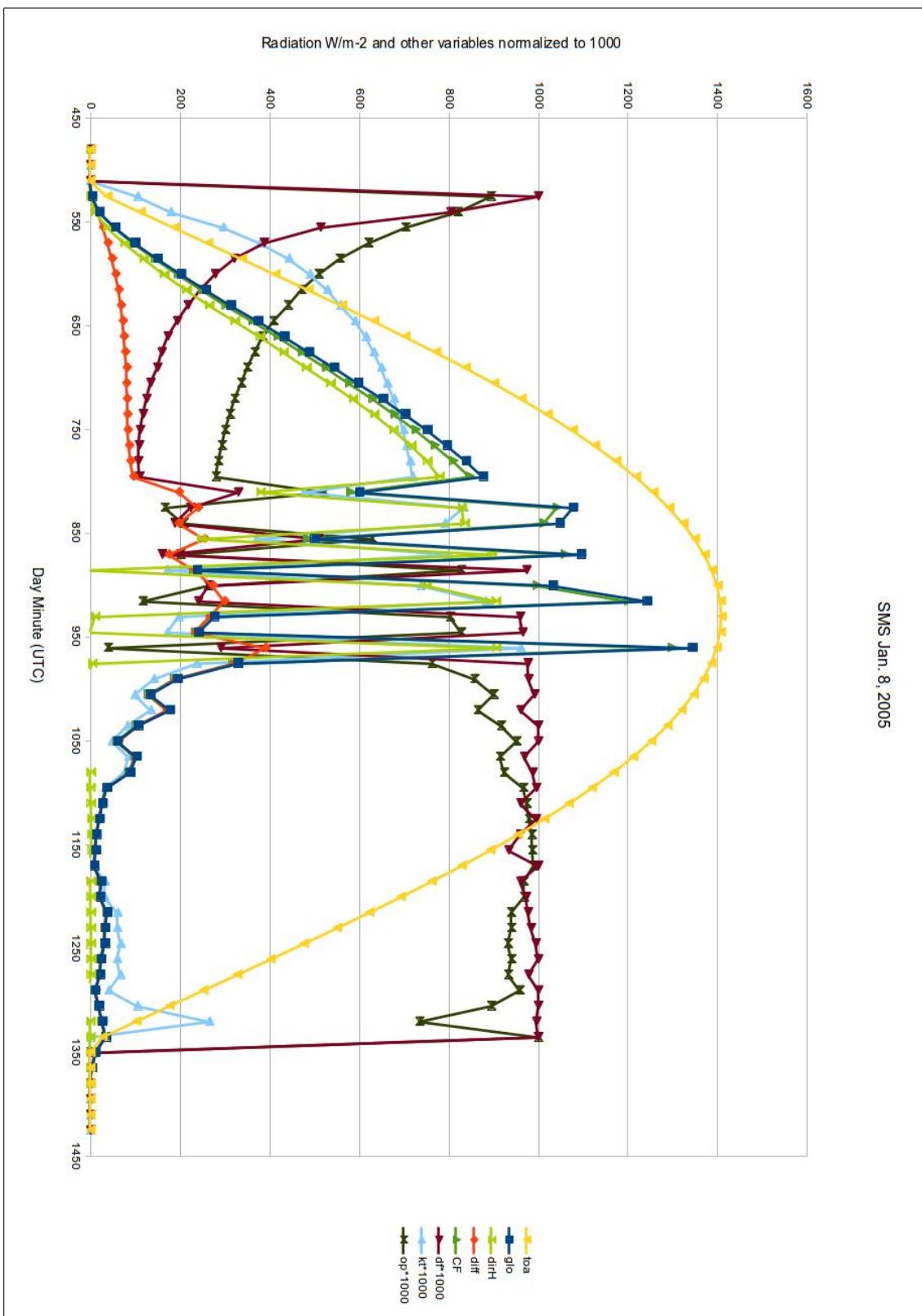


Figure C.8 - Graphic illustrating data measured and calculated on SMS January 8th 2005.

Table C.9 - Solar radiation and derived data for SMS jan 9th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-1.41	-0.05	-1.09	-1.36	0.000	0.000	0.000	-0.126
495	0.00	-1.09	-0.05	-0.84	-1.06	0.000	0.000	0.000	-0.076
510	0.00	-0.34	-0.02	-0.25	-0.33	0.000	0.000	0.000	-0.025
525	37.85	1.83	0.03	1.97	1.77	1.000	0.048	0.952	0.027
540	112.30	10.28	1.38	10.21	9.93	0.993	0.092	0.908	0.079
555	187.37	32.45	0.06	32.38	31.35	0.998	0.173	0.827	0.133
570	262.74	126.60	71.12	68.98	122.32	0.545	0.482	0.518	0.186
585	338.09	158.40	83.91	87.10	153.04	0.550	0.469	0.531	0.239
600	413.09	198.80	126.31	86.50	192.07	0.435	0.481	0.519	0.292
615	487.42	240.00	138.24	114.00	231.88	0.475	0.492	0.508	0.345
630	560.77	434.80	233.30	217.60	420.09	0.500	0.775	0.225	0.397
645	632.82	177.30	4.46	171.60	171.30	0.968	0.280	0.720	0.448
660	703.26	205.60	11.01	190.80	198.64	0.928	0.292	0.708	0.497
675	771.79	215.20	11.56	202.20	207.92	0.940	0.279	0.721	0.546
690	838.11	319.10	126.62	190.20	308.30	0.596	0.381	0.619	0.593
705	901.95	514.70	334.92	186.80	497.29	0.363	0.571	0.429	0.638
720	963.03	702.00	587.83	130.70	678.25	0.186	0.729	0.271	0.681
735	1021.09	725.00	627.60	109.80	700.47	0.151	0.710	0.290	0.722
750	1075.88	768.00	672.69	104.00	742.01	0.135	0.714	0.286	0.761
765	1127.16	798.00	713.53	91.20	771.00	0.114	0.708	0.292	0.797
780	1174.72	840.00	748.62	94.90	811.58	0.113	0.715	0.285	0.831
795	1218.35	872.00	774.70	97.20	842.50	0.111	0.716	0.284	0.862
810	1257.86	938.00	809.61	124.20	906.26	0.132	0.746	0.254	0.890
825	1293.09	635.60	80.30	541.30	614.09	0.852	0.492	0.508	0.915
840	1323.89	1228.00	849.30	361.60	1186.45	0.294	0.928	0.072	0.936
855	1350.12	1230.00	872.81	333.50	1188.38	0.271	0.911	0.089	0.955
870	1371.66	1117.00	672.52	424.10	1079.21	0.380	0.814	0.186	0.970
885	1388.44	1435.00	896.60	503.00	1386.45	0.351	0.000	1.000	0.982
900	1400.37	1227.00	886.48	306.60	1185.48	0.250	0.876	0.124	0.990
915	1407.41	1289.00	854.10	396.10	1245.39	0.307	0.916	0.084	0.995
930	1409.52	1406.00	890.27	469.60	1358.43	0.334	0.998	0.002	0.997
945	1406.70	594.10	54.14	509.40	574.00	0.857	0.422	0.578	0.995
960	1398.96	765.00	361.85	371.80	739.12	0.486	0.547	0.453	0.989
975	1386.33	298.60	0.04	287.80	288.50	0.964	0.215	0.785	0.981
990	1368.86	131.50	-3.49	128.80	127.05	0.979	0.096	0.904	0.968
1005	1346.63	121.30	-0.60	118.10	117.20	0.974	0.090	0.910	0.952
1020	1319.74	39.20	-2.16	39.07	37.87	0.997	0.030	0.970	0.933
1035	1288.30	31.62	-6.69	32.86	30.55	1.000	0.025	0.975	0.911
1050	1252.45	11.93	-5.04	13.00	11.53	1.000	0.010	0.990	0.886
1065	1212.33	15.01	-3.14	14.96	14.50	0.997	0.012	0.988	0.857
1080	1168.13	23.57	-2.56	23.72	22.77	1.000	0.020	0.980	0.826
1095	1120.02	55.47	-1.34	54.00	53.59	0.973	0.050	0.950	0.792
1110	1068.22	61.85	1.45	60.07	59.76	0.971	0.058	0.942	0.756
1125	1012.95	91.50	2.26	89.10	88.40	0.974	0.090	0.910	0.716
1140	954.44	85.90	3.61	82.90	82.99	0.965	0.090	0.910	0.675
1155	892.95	42.22	1.01	40.56	40.79	0.961	0.047	0.953	0.632
1170	828.73	39.29	-1.92	40.31	37.96	1.000	0.047	0.953	0.586
1185	762.07	31.36	-2.25	31.94	30.30	1.000	0.041	0.959	0.539
1200	693.25	34.44	-0.71	34.36	33.27	0.998	0.050	0.950	0.490
1215	622.56	27.83	-0.46	27.92	26.89	1.000	0.045	0.955	0.440
1230	550.30	26.08	-0.41	26.44	25.20	1.000	0.047	0.953	0.389
1245	476.79	8.56	-0.86	9.02	8.27	1.000	0.018	0.982	0.337
1260	402.34	4.19	-0.99	5.17	4.04	1.000	0.010	0.990	0.285
1275	327.27	4.39	-0.74	4.80	4.24	1.000	0.013	0.987	0.231
1290	251.91	4.44	-0.11	4.61	4.29	1.000	0.018	0.982	0.178
1305	176.56	3.75	0.03	4.04	3.63	1.000	0.021	0.979	0.125
1320	101.56	0.94	0.03	1.06	0.91	1.000	0.009	0.991	0.072
1335	27.23	-0.31	0.01	-0.22	-0.30	0.694	-0.012	1.000	0.019
1350	0.00	-0.86	0.11	-0.26	-0.83	0.000	0.000	0.000	-0.033
1365	0.00	-0.75	0.06	-0.37	-0.73	0.000	0.000	0.000	-0.084
1380	0.00	-0.70	0.03	-0.41	-0.67	0.000	0.000	0.000	-0.133
1395	0.00	-0.78	0.26	-0.21	-0.75	0.000	0.000	0.000	-0.182
1410	0.00	-0.38	-0.05	-0.37	-0.36	0.000	0.000	0.000	-0.229
1425	0.00	-0.46	-0.17	-0.52	-0.44	0.000	0.000	0.000	-0.274

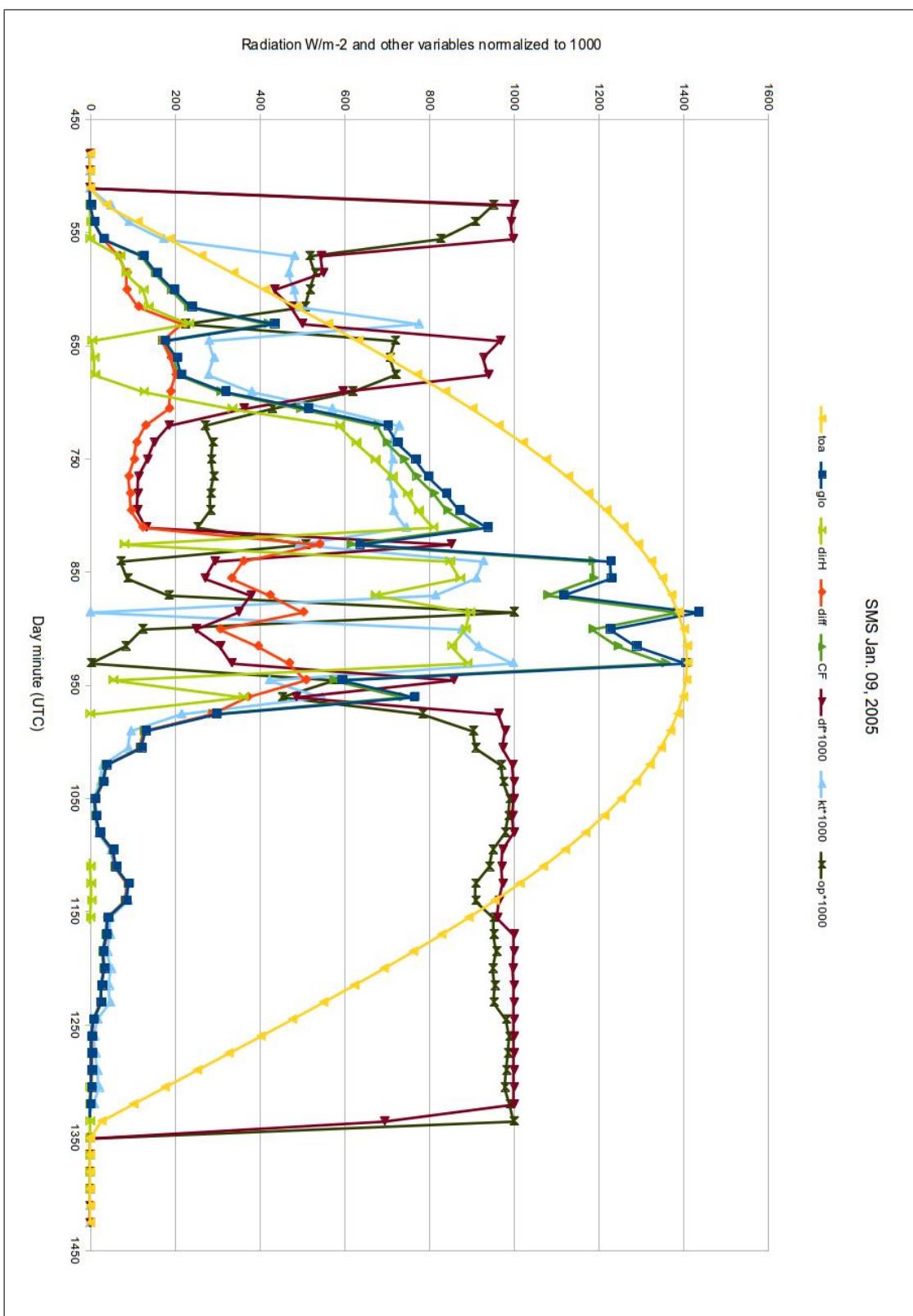


Figure C.9 - Graphic illustrating data measured and calculated on SMS January 9th 2005.

Table C.10 - Solar radiation and derived data for SMS jan 10th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-0.54	-0.03	-0.37	-0.53	0.000	0.000	0.000	-0.126
495	0.00	-0.63	0.05	-0.25	-0.61	0.000	0.000	0.000	-0.076
510	0.00	-0.56	0.01	-0.23	-0.54	0.000	0.000	0.000	-0.025
525	37.85	0.42	-0.01	0.72	0.40	1.000	0.011	0.989	0.027
540	112.30	4.23	0.00	4.32	4.08	1.000	0.038	0.962	0.079
555	187.37	8.20	0.03	8.12	7.92	0.990	0.044	0.956	0.133
570	262.74	15.88	0.12	15.67	15.34	0.987	0.060	0.940	0.186
585	338.09	21.20	0.01	20.95	20.48	0.988	0.063	0.937	0.239
600	413.09	31.08	0.11	30.51	30.03	0.982	0.075	0.925	0.292
615	487.42	43.87	0.29	43.12	42.39	0.983	0.090	0.910	0.345
630	560.77	103.30	0.64	101.60	99.80	0.984	0.184	0.816	0.397
645	632.82	134.20	0.64	131.90	129.66	0.983	0.212	0.788	0.448
660	703.26	286.40	2.55	280.50	276.71	0.979	0.407	0.593	0.497
675	771.79	164.60	-0.34	162.30	159.03	0.986	0.213	0.787	0.546
690	838.11	197.10	0.03	194.00	190.43	0.984	0.235	0.765	0.593
705	901.95	233.60	1.82	228.80	225.70	0.979	0.259	0.741	0.638
720	963.03	664.10	81.60	525.10	641.63	0.791	0.690	0.310	0.681
735	1021.09	453.50	16.99	423.40	438.16	0.934	0.444	0.556	0.722
750	1075.88	310.50	0.18	304.50	299.99	0.981	0.289	0.711	0.761
765	1127.16	212.40	1.49	208.10	205.21	0.980	0.188	0.812	0.797
780	1174.72	274.00	2.98	267.40	264.73	0.976	0.233	0.767	0.831
795	1218.35	204.00	2.78	199.00	197.10	0.975	0.167	0.833	0.862
810	1257.86	370.80	7.22	360.60	358.25	0.972	0.295	0.705	0.890
825	1293.09	213.60	0.63	209.00	206.37	0.978	0.165	0.835	0.915
840	1323.89	143.30	0.59	140.40	138.45	0.980	0.108	0.892	0.936
855	1350.12	435.20	7.98	420.20	420.48	0.966	0.322	0.678	0.955
870	1371.66	356.50	3.47	344.20	344.44	0.965	0.260	0.740	0.970
885	1388.44	203.50	-1.30	198.00	196.61	0.973	0.147	0.853	0.982
900	1400.37	279.50	4.38	269.30	270.04	0.964	0.200	0.800	0.990
915	1407.41	86.20	-3.83	84.70	83.28	0.983	0.061	0.939	0.995
930	1409.52	195.80	1.59	188.50	189.18	0.963	0.139	0.861	0.997
945	1406.70	393.90	4.35	378.80	380.57	0.962	0.280	0.720	0.995
960	1398.96	224.30	2.52	216.30	216.71	0.964	0.160	0.840	0.989
975	1386.33	103.60	-0.46	100.70	100.09	0.972	0.075	0.925	0.981
990	1368.86	213.80	1.92	206.80	206.57	0.967	0.156	0.844	0.968
1005	1346.63	378.60	3.34	364.70	365.79	0.963	0.281	0.719	0.952
1020	1319.74	350.00	2.98	338.10	338.16	0.966	0.265	0.735	0.933
1035	1288.30	423.30	5.60	409.80	408.98	0.968	0.329	0.671	0.911
1050	1252.45	380.60	3.17	370.40	367.72	0.973	0.304	0.696	0.886
1065	1212.33	438.40	4.67	427.00	423.57	0.974	0.362	0.638	0.857
1080	1168.13	470.70	4.73	458.90	454.77	0.975	0.403	0.597	0.826
1095	1120.02	523.70	12.56	501.40	505.98	0.957	0.468	0.532	0.792
1110	1068.22	641.90	135.54	476.10	620.18	0.742	0.601	0.399	0.756
1125	1012.95	722.00	363.74	316.50	697.57	0.438	0.713	0.287	0.716
1140	954.44	792.00	593.39	137.80	765.20	0.174	0.830	0.170	0.675
1155	892.95	713.00	536.21	118.50	688.88	0.166	0.798	0.202	0.632
1170	828.73	634.00	471.86	107.60	612.55	0.170	0.765	0.235	0.586
1185	762.07	619.80	441.99	122.00	598.83	0.197	0.813	0.187	0.539
1200	693.25	556.40	406.48	93.60	537.57	0.168	0.803	0.197	0.490
1215	622.56	496.10	353.58	88.40	479.31	0.178	0.797	0.203	0.440
1230	550.30	438.60	302.82	84.30	423.76	0.192	0.797	0.203	0.389
1245	476.79	370.70	251.58	70.40	358.16	0.190	0.777	0.223	0.337
1260	402.34	170.00	85.23	69.21	164.25	0.407	0.423	0.577	0.285
1275	327.27	280.10	146.41	94.00	270.62	0.336	0.856	0.144	0.231
1290	251.91	216.70	93.38	91.30	209.37	0.421	0.860	0.140	0.178
1305	176.56	37.75	-1.06	39.65	36.47	1.000	0.214	0.786	0.125
1320	101.56	25.84	-0.32	27.18	24.97	1.000	0.254	0.746	0.072
1335	27.23	27.02	1.97	19.53	26.11	0.723	0.992	0.008	0.019
1350	0.00	8.39	0.05	9.01	8.11	0.000	0.000	0.000	-0.033
1365	0.00	1.53	0.12	2.12	1.48	0.000	0.000	0.000	-0.084
1380	0.00	-0.99	0.04	-0.64	-0.95	0.000	0.000	0.000	-0.133
1395	0.00	-0.95	0.02	-0.62	-0.92	0.000	0.000	0.000	-0.182
1410	0.00	-1.41	0.14	-0.84	-1.36	0.000	0.000	0.000	-0.229
1425	0.00	-1.48	0.36	-0.80	-1.43	0.000	0.000	0.000	-0.274

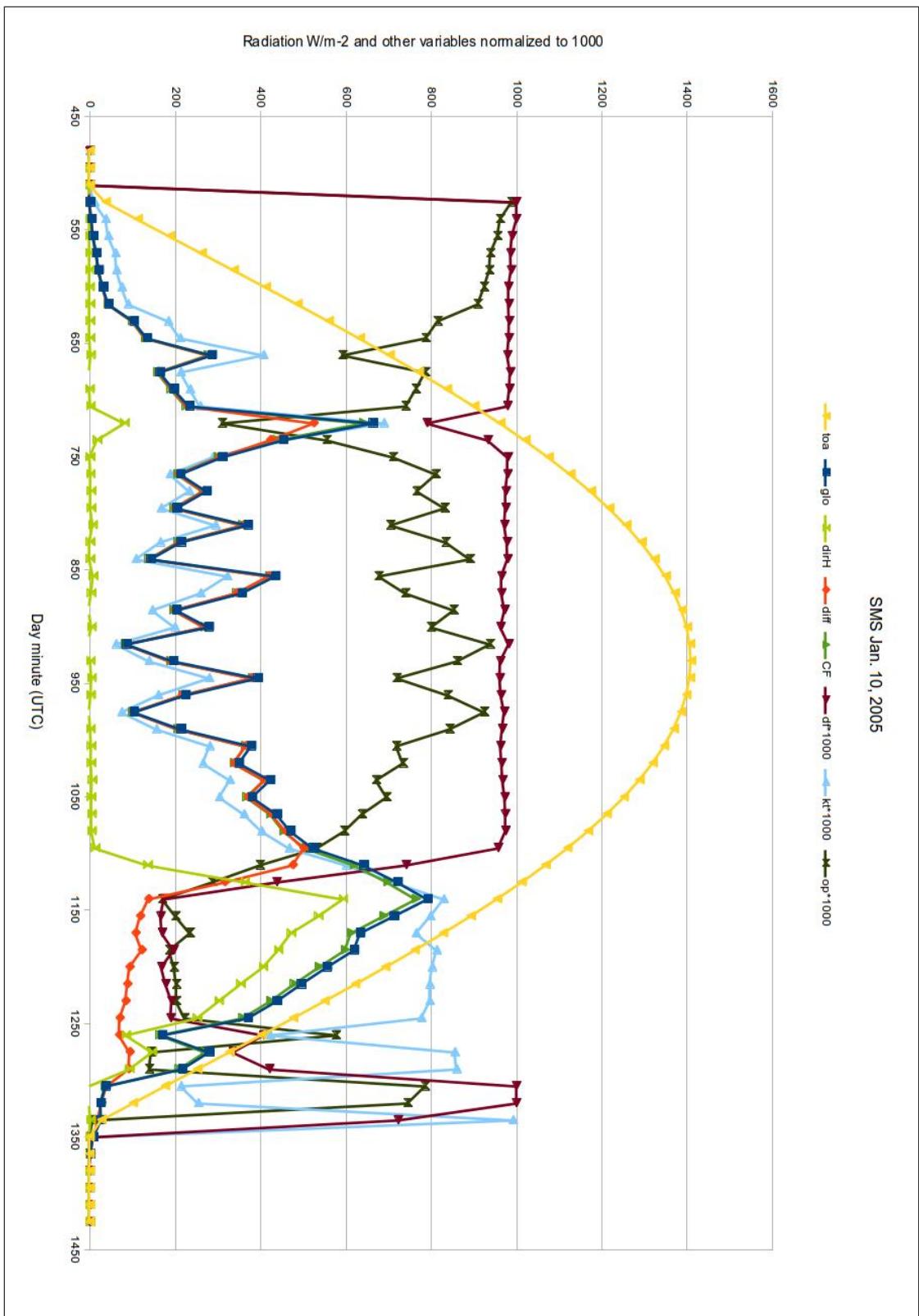


Figure C.10 - Graphic illustrating data measured and calculated on SMS January 10th 2005.

Table C.11 - Solar radiation and derived data for SMS jan 11th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-0.54	-0.03	-0.37	-0.53	0.000	0.000	0.000	-0.126
495	0.00	-0.63	0.05	-0.25	-0.61	0.000	0.000	0.000	-0.076
510	0.00	-0.56	0.01	-0.23	-0.54	0.000	0.000	0.000	-0.025
525	37.85	0.42	-0.01	0.72	0.40	1.000	0.011	0.989	0.027
540	112.30	4.23	0.00	4.32	4.08	1.000	0.038	0.962	0.079
555	187.37	8.20	0.03	8.12	7.92	0.990	0.044	0.956	0.133
570	262.74	15.88	0.12	15.67	15.34	0.987	0.060	0.940	0.186
585	338.09	21.20	0.01	20.95	20.48	0.988	0.063	0.937	0.239
600	413.09	31.08	0.11	30.51	30.03	0.982	0.075	0.925	0.292
615	487.42	43.87	0.29	43.12	42.39	0.983	0.090	0.910	0.345
630	560.77	103.30	0.64	101.60	99.80	0.984	0.184	0.816	0.397
645	632.82	134.20	0.64	131.90	129.66	0.983	0.212	0.788	0.448
660	703.26	286.40	2.55	280.50	276.71	0.979	0.407	0.593	0.497
675	771.79	164.60	-0.34	162.30	159.03	0.986	0.213	0.787	0.546
690	838.11	197.10	0.03	194.00	190.43	0.984	0.235	0.765	0.593
705	901.95	233.60	1.82	228.80	225.70	0.979	0.259	0.741	0.638
720	963.03	664.10	81.60	525.10	641.63	0.791	0.690	0.310	0.681
735	1021.09	453.50	16.99	423.40	438.16	0.934	0.444	0.556	0.722
750	1075.88	310.50	0.18	304.50	299.99	0.981	0.289	0.711	0.761
765	1127.16	212.40	1.49	208.10	205.21	0.980	0.188	0.812	0.797
780	1174.72	274.00	2.98	267.40	264.73	0.976	0.233	0.767	0.831
795	1218.35	204.00	2.78	199.00	197.10	0.975	0.167	0.833	0.862
810	1257.86	370.80	7.22	360.60	358.25	0.972	0.295	0.705	0.890
825	1293.09	213.60	0.63	209.00	206.37	0.978	0.165	0.835	0.915
840	1323.89	143.30	0.59	140.40	138.45	0.980	0.108	0.892	0.936
855	1350.12	435.20	7.98	420.20	420.48	0.966	0.322	0.678	0.955
870	1371.66	356.50	3.47	344.20	344.44	0.965	0.260	0.740	0.970
885	1388.44	203.50	-1.30	198.00	196.61	0.973	0.147	0.853	0.982
900	1400.37	279.50	4.38	269.30	270.04	0.964	0.200	0.800	0.990
915	1407.41	86.20	-3.83	84.70	83.28	0.983	0.061	0.939	0.995
930	1409.52	195.80	1.59	188.50	189.18	0.963	0.139	0.861	0.997
945	1406.70	393.90	4.35	378.80	380.57	0.962	0.280	0.720	0.995
960	1398.96	224.30	2.52	216.30	216.71	0.964	0.160	0.840	0.989
975	1386.33	103.60	-0.46	100.70	100.09	0.972	0.075	0.925	0.981
990	1368.86	213.80	1.92	206.80	206.57	0.967	0.156	0.844	0.968
1005	1346.63	378.60	3.34	364.70	365.79	0.963	0.281	0.719	0.952
1020	1319.74	350.00	2.98	338.10	338.16	0.966	0.265	0.735	0.933
1035	1288.30	423.30	5.60	409.80	408.98	0.968	0.329	0.671	0.911
1050	1252.45	380.60	3.17	370.40	367.72	0.973	0.304	0.696	0.886
1065	1212.33	438.40	4.67	427.00	423.57	0.974	0.362	0.638	0.857
1080	1168.13	470.70	4.73	458.90	454.77	0.975	0.403	0.597	0.826
1095	1120.02	523.70	12.56	501.40	505.98	0.957	0.468	0.532	0.792
1110	1068.22	641.90	135.54	476.10	620.18	0.742	0.601	0.399	0.756
1125	1012.95	722.00	363.74	316.50	697.57	0.438	0.713	0.287	0.716
1140	954.44	792.00	593.39	137.80	765.20	0.174	0.830	0.170	0.675
1155	892.95	713.00	536.21	118.50	688.88	0.166	0.798	0.202	0.632
1170	828.73	634.00	471.86	107.60	612.55	0.170	0.765	0.235	0.586
1185	762.07	619.80	441.99	122.00	598.83	0.197	0.813	0.187	0.539
1200	693.25	556.40	406.48	93.60	537.57	0.168	0.803	0.197	0.490
1215	622.56	496.10	353.58	88.40	479.31	0.178	0.797	0.203	0.440
1230	550.30	438.60	302.82	84.30	423.76	0.192	0.797	0.203	0.389
1245	476.79	370.70	251.58	70.40	358.16	0.190	0.777	0.223	0.337
1260	402.34	170.00	85.23	69.21	164.25	0.407	0.423	0.577	0.285
1275	327.27	280.10	146.41	94.00	270.62	0.336	0.856	0.144	0.231
1290	251.91	216.70	93.38	91.30	209.37	0.421	0.860	0.140	0.178
1305	176.56	37.75	-1.06	39.65	36.47	1.000	0.214	0.786	0.125
1320	101.56	25.84	-0.32	27.18	24.97	1.000	0.254	0.746	0.072
1335	27.23	27.02	1.97	19.53	26.11	0.723	0.992	0.008	0.019
1350	0.00	8.39	0.05	9.01	8.11	0.000	0.000	0.000	-0.033
1365	0.00	1.53	0.12	2.12	1.48	0.000	0.000	0.000	-0.084
1380	0.00	-0.99	0.04	-0.63	-0.95	0.000	0.000	0.000	-0.133
1395	0.00	-0.95	0.02	-0.62	-0.92	0.000	0.000	0.000	-0.182
1410	0.00	-1.41	0.14	-0.84	-1.36	0.000	0.000	0.000	-0.229
1425	0.00	-1.48	0.36	-0.80	-1.43	0.000	0.000	0.000	-0.274

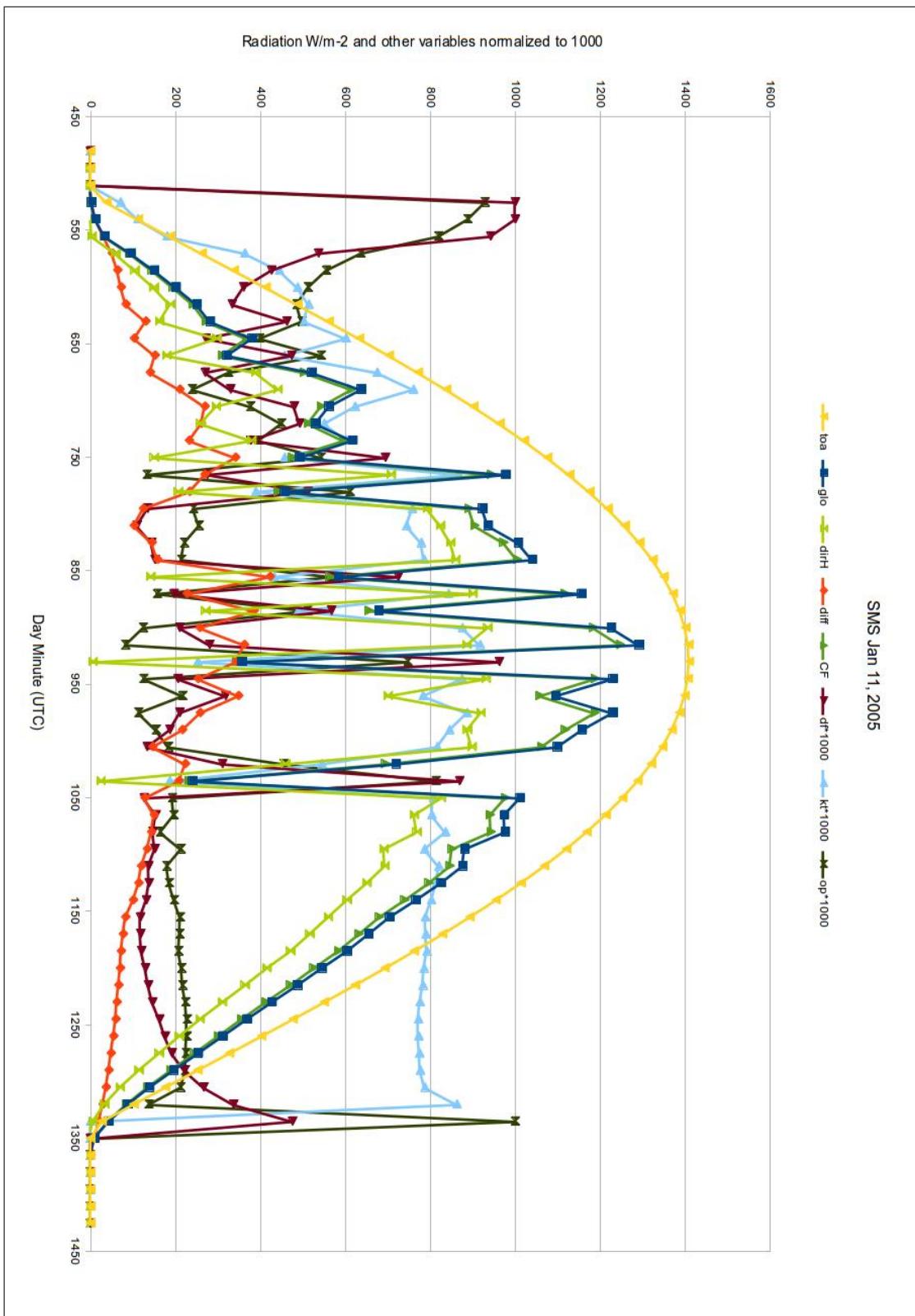


Figure C.11 - Graphic illustrating data measured and calculated on SMS January 11th 2005.

Table C.12 - Solar radiation and derived data for SMS jan 12th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-1.72	-0.03	-1.24	-1.66	0.000	0.000	0.000	-0.126
495	0.00	-1.88	0.02	-1.16	-1.82	0.000	0.000	0.000	-0.076
510	0.00	-1.49	0.01	-0.75	-1.44	0.000	0.000	0.000	-0.025
525	37.85	1.35	-0.02	2.24	1.31	1.000	0.036	0.964	0.027
540	112.30	10.19	4.35	10.47	9.85	1.000	0.091	0.909	0.079
555	187.37	37.71	25.80	21.08	36.43	0.559	0.201	0.799	0.133
570	262.74	88.70	79.50	35.79	85.70	0.403	0.338	0.662	0.186
585	338.09	146.60	124.80	44.77	141.64	0.305	0.434	0.566	0.239
600	413.09	203.80	176.09	52.15	196.90	0.256	0.493	0.507	0.292
615	487.42	259.40	225.60	58.58	250.62	0.226	0.532	0.468	0.345
630	560.77	316.50	278.83	64.27	305.79	0.203	0.564	0.436	0.397
645	632.82	374.60	331.21	69.44	361.93	0.185	0.592	0.408	0.448
660	703.26	434.80	388.97	70.60	420.09	0.162	0.618	0.382	0.497
675	771.79	495.00	444.89	73.20	478.25	0.148	0.641	0.359	0.546
690	838.11	551.20	496.17	75.80	532.55	0.138	0.658	0.342	0.593
705	901.95	609.50	549.91	77.00	588.88	0.126	0.676	0.324	0.638
720	963.03	665.70	598.73	81.20	643.18	0.122	0.691	0.309	0.681
735	1021.09	713.00	638.44	84.50	688.88	0.119	0.698	0.302	0.722
750	1075.88	765.00	684.87	84.80	739.12	0.111	0.711	0.289	0.761
765	1127.16	808.00	722.30	87.80	780.66	0.109	0.717	0.283	0.797
780	1174.72	852.00	760.25	88.20	823.17	0.104	0.725	0.275	0.831
795	1218.35	894.00	800.55	88.00	863.75	0.098	0.734	0.266	0.862
810	1257.86	933.00	834.52	90.20	901.43	0.097	0.742	0.258	0.890
825	1293.09	969.00	852.41	103.80	936.21	0.107	0.749	0.251	0.915
840	1323.89	939.00	729.44	197.20	907.23	0.210	0.709	0.291	0.936
855	1350.12	833.00	614.69	199.70	804.82	0.240	0.617	0.383	0.955
870	1371.66	729.00	394.96	285.40	704.33	0.391	0.531	0.469	0.970
885	1388.44	234.00	6.58	224.70	226.08	0.960	0.169	0.831	0.982
900	1400.37	803.00	414.61	366.40	775.83	0.456	0.573	0.427	0.990
915	1407.41	283.80	7.22	273.40	274.20	0.963	0.202	0.798	0.995
930	1409.52	373.90	40.47	330.50	361.25	0.884	0.265	0.735	0.997
945	1406.70	1245.00	954.16	247.10	1202.88	0.198	0.885	0.115	0.995
960	1398.96	1237.00	953.85	229.40	1195.15	0.185	0.884	0.116	0.989
975	1386.33	1242.00	956.03	239.60	1199.98	0.193	0.896	0.104	0.981
990	1368.86	1169.00	938.17	185.30	1129.45	0.159	0.854	0.146	0.968
1005	1346.63	1183.00	898.18	232.70	1142.97	0.197	0.878	0.122	0.952
1020	1319.74	1045.00	841.97	152.40	1009.64	0.146	0.792	0.208	0.933
1035	1288.30	1015.00	775.44	170.00	980.66	0.167	0.788	0.212	0.911
1050	1252.45	1056.00	853.07	150.30	1020.27	0.142	0.843	0.157	0.886
1065	1212.33	1026.00	817.17	147.30	991.29	0.144	0.846	0.154	0.857
1080	1168.13	1004.00	787.38	159.00	970.03	0.158	0.859	0.141	0.826
1095	1120.02	921.00	706.63	154.40	889.84	0.168	0.822	0.178	0.792
1110	1068.22	877.00	673.95	135.20	847.33	0.154	0.821	0.179	0.756
1125	1012.95	150.00	10.85	137.20	144.92	0.915	0.148	0.852	0.716
1140	954.44	245.40	102.07	138.00	237.10	0.562	0.257	0.743	0.675
1155	892.95	121.90	-4.20	122.40	117.78	1.000	0.137	0.863	0.632
1170	828.73	667.70	449.58	155.60	645.11	0.233	0.806	0.194	0.586
1185	762.07	649.00	440.91	149.10	627.04	0.230	0.852	0.148	0.539
1200	693.25	557.30	393.24	106.50	538.44	0.191	0.804	0.196	0.490
1215	622.56	492.50	339.49	99.10	475.84	0.201	0.791	0.209	0.440
1230	550.30	412.50	269.77	94.40	398.54	0.229	0.750	0.250	0.389
1245	476.79	347.10	222.27	79.40	335.36	0.229	0.728	0.272	0.337
1260	402.34	177.50	88.65	68.90	171.49	0.388	0.441	0.559	0.285
1275	327.27	209.40	109.33	70.00	202.31	0.334	0.640	0.360	0.231
1290	251.91	176.80	85.08	61.94	170.82	0.350	0.702	0.298	0.178
1305	176.56	42.23	0.22	43.02	40.80	1.000	0.239	0.761	0.125
1320	101.56	66.03	18.20	33.60	63.80	0.509	0.650	0.350	0.072
1335	27.23	23.57	0.74	21.93	22.77	0.930	0.866	0.134	0.019
1350	0.00	8.06	-0.33	9.04	7.79	0.000	0.000	0.000	-0.033
1365	0.00	-0.19	0.24	0.79	-0.18	0.000	0.000	0.000	-0.084
1380	0.00	-2.04	0.55	-1.03	-1.97	0.000	0.000	0.000	-0.233
1395	0.00	-2.02	0.24	-1.23	-1.95	0.000	0.000	0.000	-0.182
1410	0.00	-2.07	0.62	-0.98	-2.00	0.000	0.000	0.000	-0.229

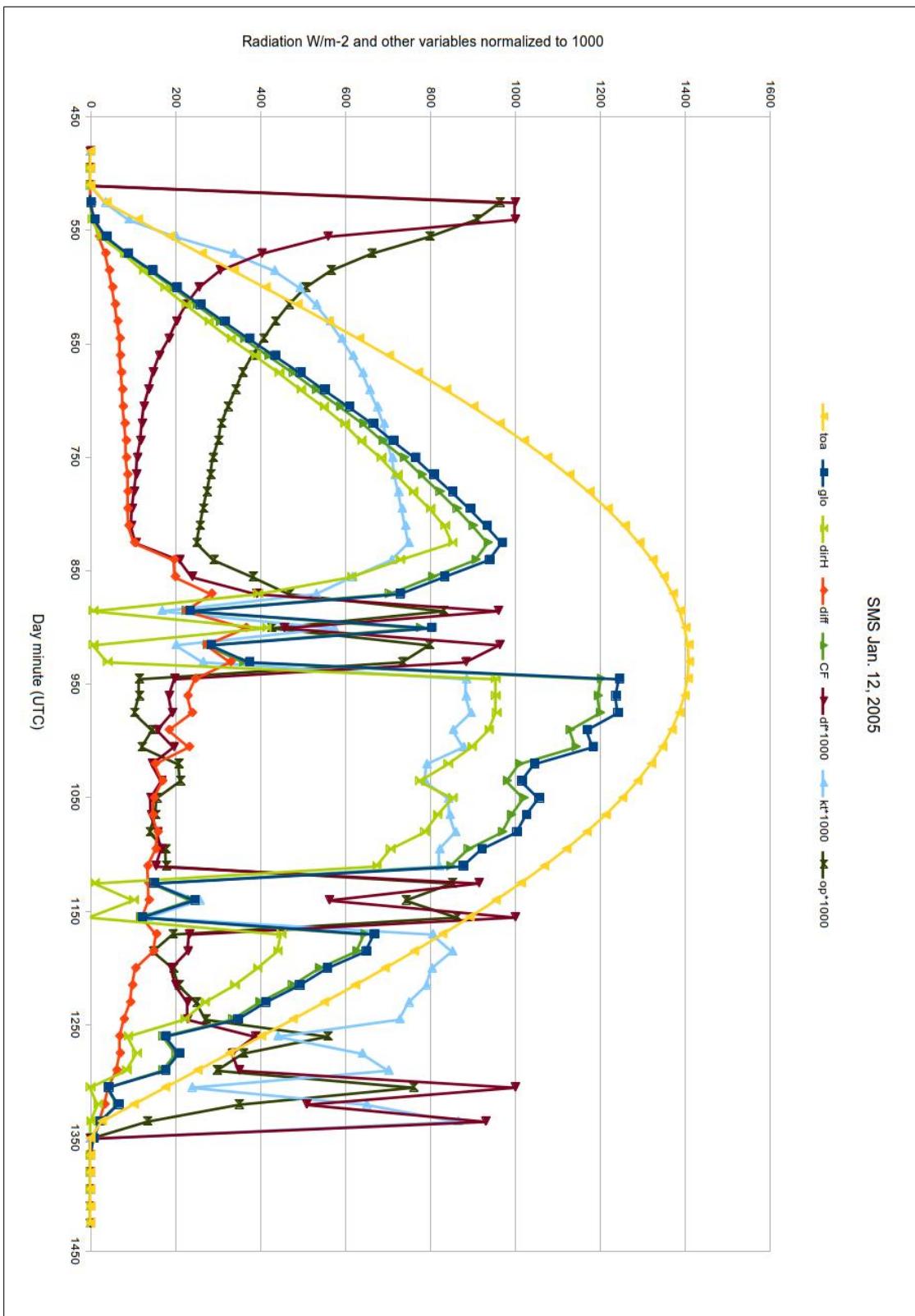


Figure C.12 - Graphic illustrating data measured and calculated on SMS January 12th 2005.

Table C.13 - Solar radiation and derived data for SMS jan 13th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-2.20	0.15	-1.11	-2.12	0.000	0.000	0.000	-0.126
495	0.00	-2.30	0.15	-1.07	-2.22	0.000	0.000	0.000	-0.076
510	0.00	-1.86	0.03	-0.86	-1.80	0.000	0.000	0.000	-0.025
525	37.85	0.31	0.00	0.98	0.30	1.000	0.008	0.992	0.027
540	112.30	10.13	3.90	10.51	9.79	1.000	0.090	0.910	0.079
555	187.37	41.51	24.12	26.70	40.11	0.643	0.222	0.778	0.133
570	262.74	79.40	61.53	41.86	76.71	0.527	0.302	0.698	0.186
585	338.09	132.50	100.55	51.65	128.02	0.390	0.392	0.608	0.239
600	413.09	174.00	143.02	52.02	168.11	0.299	0.421	0.579	0.292
615	487.42	239.90	206.33	58.11	231.78	0.242	0.492	0.508	0.345
630	560.77	320.50	284.78	64.46	309.66	0.201	0.572	0.428	0.397
645	632.82	379.20	334.35	73.40	366.37	0.194	0.599	0.401	0.448
660	703.26	439.20	371.07	93.30	424.34	0.212	0.625	0.375	0.497
675	771.79	433.80	336.92	115.20	419.12	0.266	0.562	0.438	0.546
690	838.11	423.70	304.81	131.50	409.36	0.310	0.506	0.494	0.593
705	901.95	539.60	401.97	149.20	521.34	0.277	0.598	0.402	0.638
720	963.03	608.70	484.98	134.50	588.10	0.221	0.632	0.368	0.681
735	1021.09	722.00	603.05	129.50	697.57	0.179	0.707	0.293	0.722
750	1075.88	625.30	490.82	137.20	604.14	0.219	0.581	0.419	0.761
765	1127.16	789.00	671.27	118.30	762.30	0.150	0.700	0.300	0.797
780	1174.72	842.00	726.18	115.10	813.51	0.137	0.717	0.283	0.831
795	1218.35	878.00	762.63	115.20	848.29	0.131	0.721	0.279	0.862
810	1257.86	874.00	744.66	121.00	844.43	0.138	0.695	0.305	0.890
825	1293.09	969.00	857.89	101.20	936.21	0.104	0.749	0.251	0.915
840	1323.89	1000.00	870.83	115.00	966.17	0.115	0.755	0.245	0.936
855	1350.12	1101.00	902.41	176.30	1063.75	0.160	0.815	0.185	0.955
870	1371.66	1135.00	919.72	191.50	1096.60	0.169	0.827	0.173	0.970
885	1388.44	1171.00	937.84	208.40	1131.38	0.178	0.843	0.157	0.982
900	1400.37	518.40	276.05	240.80	500.86	0.465	0.370	0.630	0.990
915	1407.41	1153.00	948.67	164.00	1113.99	0.142	0.819	0.181	0.995
930	1409.52	1172.00	976.01	155.30	1132.35	0.133	0.831	0.169	0.997
945	1406.70	1139.00	966.10	130.20	1100.46	0.114	0.810	0.190	0.995
960	1398.96	1079.00	840.06	192.70	1042.49	0.179	0.771	0.229	0.989
975	1386.33	1101.00	930.53	120.20	1063.75	0.109	0.794	0.206	0.981
990	1368.86	1049.00	871.37	130.60	1013.51	0.125	0.766	0.234	0.968
1005	1346.63	1080.00	916.27	109.70	1043.46	0.102	0.802	0.198	0.952
1020	1319.74	1047.00	884.91	111.80	1011.57	0.107	0.793	0.207	0.933
1035	1288.30	1028.00	871.12	99.50	993.22	0.097	0.798	0.202	0.911
1050	1252.45	1018.00	839.79	117.20	983.56	0.115	0.813	0.187	0.886
1065	1212.33	1017.00	787.16	163.40	982.59	0.161	0.839	0.161	0.857
1080	1168.13	940.00	755.16	120.40	908.20	0.128	0.805	0.195	0.826
1095	1120.02	843.00	650.38	126.80	814.48	0.150	0.753	0.247	0.792
1110	1068.22	859.00	688.30	103.80	829.94	0.121	0.804	0.196	0.756
1125	1012.95	804.00	637.64	102.10	776.80	0.127	0.794	0.206	0.716
1140	954.44	761.00	596.09	100.70	735.25	0.132	0.797	0.203	0.675
1155	892.95	699.70	550.10	89.10	676.03	0.127	0.784	0.216	0.632
1170	828.73	657.70	508.20	89.60	635.45	0.136	0.794	0.206	0.586
1185	762.07	596.00	456.00	80.80	575.83	0.136	0.782	0.218	0.539
1200	693.25	538.90	405.50	76.30	520.67	0.142	0.777	0.223	0.490
1215	622.56	488.30	364.59	67.70	471.78	0.139	0.784	0.216	0.440
1230	550.30	433.60	310.21	70.60	418.93	0.163	0.788	0.212	0.389
1245	476.79	375.20	252.25	73.40	362.51	0.196	0.787	0.213	0.337
1260	402.34	312.20	195.87	71.10	301.64	0.228	0.776	0.224	0.285
1275	327.27	246.60	148.86	57.50	238.26	0.233	0.753	0.247	0.231
1290	251.91	186.80	101.15	52.14	180.48	0.279	0.742	0.258	0.178
1305	176.56	130.70	59.43	44.01	126.28	0.337	0.740	0.260	0.125
1320	101.56	81.90	26.61	35.39	79.13	0.432	0.806	0.194	0.072
1335	27.23	38.91	4.32	23.87	37.59	0.613	0.000	1.000	0.019
1350	0.00	9.14	-0.76	10.26	8.83	0.000	0.000	0.000	-0.033
1365	0.00	-0.45	0.40	1.14	-0.44	0.000	0.000	0.000	-0.084
1380	0.00	-2.30	0.48	-1.17	-2.22	0.000	0.000	0.000	-0.133
1395	0.00	-2.34	0.36	-1.32	-2.26	0.000	0.000	0.000	-0.182
1410	0.00	-2.35	0.34	-1.39	-2.27	0.000	0.000	0.000	-0.229
1425	0.00	-2.51	0.64	-1.25	-2.42	0.000	0.000	0.000	-0.274

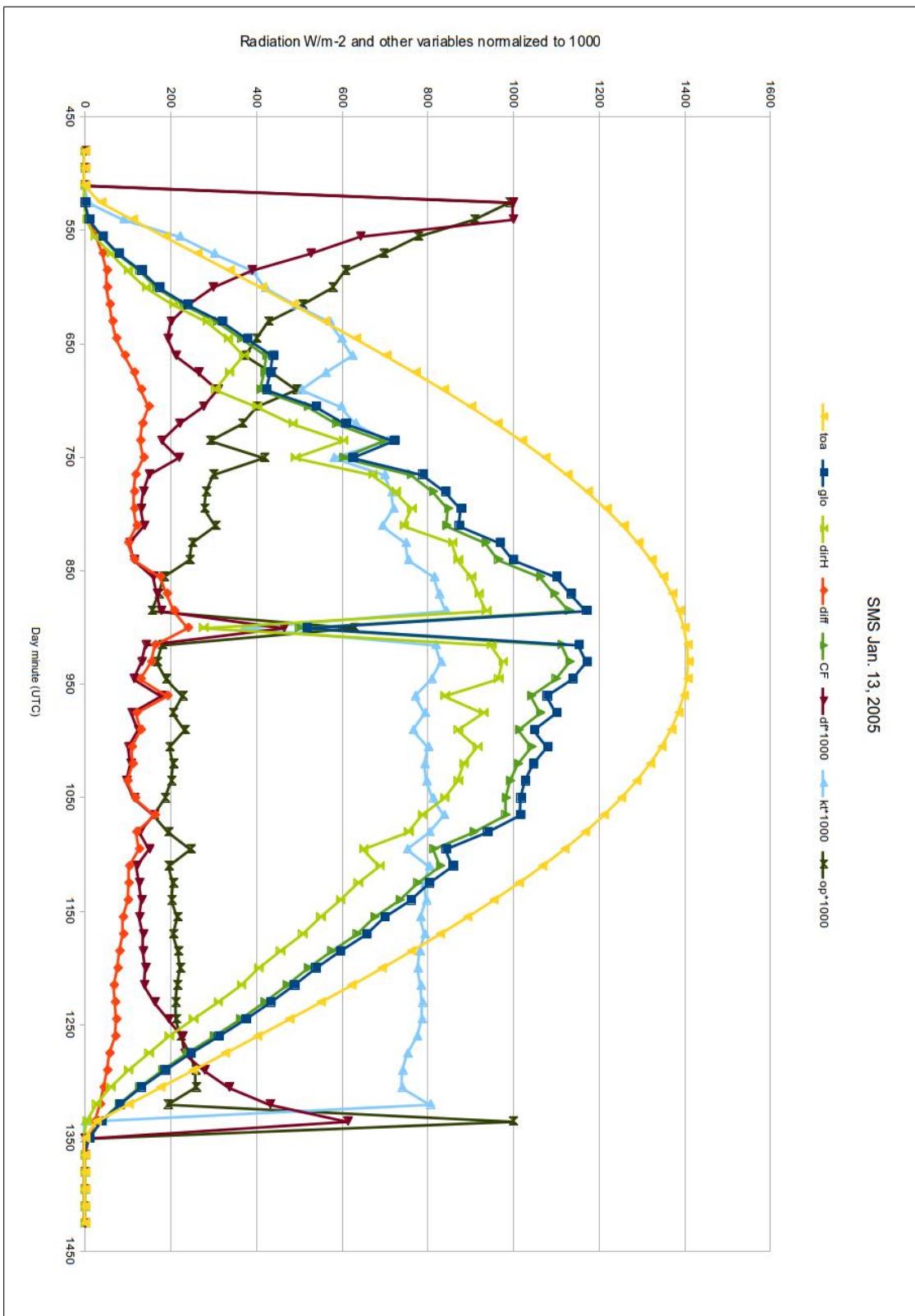


Figure C.13 - Graphic illustrating data measured and calculated on SMS January 13th 2005.

Table C.14 - Solar radiation and derived data for SMS jan 14th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-2.36	0.10	-1.44	-2.28	0.000	0.000	0.000	-0.126
495	0.00	-2.20	-0.11	-1.77	-2.13	0.000	0.000	0.000	-0.076
510	0.00	-2.30	0.01	-1.35	-2.22	0.000	0.000	0.000	-0.025
525	37.85	0.25	0.02	0.86	0.24	1.000	0.007	0.993	0.027
540	112.30	8.15	2.29	8.19	7.87	1.000	0.073	0.927	0.079
555	187.37	31.79	20.04	19.28	30.71	0.606	0.170	0.830	0.133
570	262.74	73.30	76.14	32.43	70.82	0.442	0.279	0.721	0.186
585	338.09	149.50	137.71	40.68	144.44	0.272	0.442	0.558	0.239
600	413.09	208.30	191.75	47.30	201.25	0.227	0.504	0.496	0.292
615	487.42	265.40	244.77	52.25	256.42	0.197	0.545	0.456	0.345
630	560.77	323.90	299.85	56.60	312.94	0.175	0.578	0.422	0.397
645	632.82	383.90	356.28	60.02	370.91	0.156	0.607	0.393	0.448
660	703.26	444.90	411.85	64.04	429.85	0.144	0.633	0.367	0.497
675	771.79	504.60	466.73	66.24	487.53	0.131	0.654	0.346	0.546
690	838.11	561.00	519.29	67.34	542.02	0.120	0.669	0.331	0.593
705	901.95	618.20	570.33	69.50	597.28	0.112	0.685	0.315	0.638
720	963.03	670.80	615.76	73.30	648.10	0.109	0.697	0.303	0.681
735	1021.09	721.00	659.38	75.80	696.61	0.105	0.706	0.294	0.722
750	1075.88	773.00	706.18	77.20	746.85	0.100	0.718	0.282	0.761
765	1127.16	824.00	750.20	78.50	796.12	0.095	0.731	0.269	0.797
780	1174.72	865.00	785.18	80.10	835.73	0.093	0.736	0.264	0.831
795	1218.35	911.00	828.99	79.80	880.18	0.088	0.748	0.252	0.862
810	1257.86	942.00	851.42	82.80	910.13	0.088	0.749	0.251	0.890
825	1293.09	978.00	883.50	82.50	944.91	0.084	0.756	0.244	0.915
840	1323.89	1005.00	903.61	84.70	971.00	0.084	0.759	0.241	0.936
855	1350.12	1034.00	930.10	85.20	999.01	0.082	0.766	0.234	0.955
870	1371.66	1051.00	933.30	90.80	1015.44	0.086	0.766	0.234	0.970
885	1388.44	1076.00	952.57	94.50	1039.59	0.088	0.775	0.225	0.982
900	1400.37	1091.00	952.84	105.80	1054.09	0.097	0.779	0.221	0.990
915	1407.41	1095.00	938.71	122.00	1057.95	0.111	0.778	0.222	0.995
930	1409.52	1117.00	968.04	107.10	1079.21	0.096	0.792	0.208	0.997
945	1406.70	1112.00	945.20	122.80	1074.38	0.110	0.791	0.209	0.995
960	1398.96	1114.00	948.91	114.50	1076.31	0.103	0.796	0.204	0.989
975	1386.33	1087.00	920.73	124.20	1050.22	0.114	0.784	0.216	0.981
990	1368.86	1094.00	924.62	117.90	1056.98	0.108	0.799	0.201	0.968
1005	1346.63	1068.00	903.89	111.20	1031.86	0.104	0.793	0.207	0.952
1020	1319.74	1051.00	892.38	102.30	1015.44	0.097	0.796	0.204	0.933
1035	1288.30	1014.00	862.00	94.60	979.69	0.093	0.787	0.213	0.911
1050	1252.45	983.00	831.81	94.50	949.74	0.096	0.785	0.215	0.886
1065	1212.33	948.00	793.17	94.10	915.92	0.099	0.782	0.218	0.857
1080	1168.13	920.00	764.24	94.80	888.87	0.103	0.788	0.212	0.826
1095	1120.02	893.00	732.77	95.70	862.79	0.107	0.797	0.203	0.792
1110	1068.22	733.00	507.73	178.90	708.20	0.244	0.686	0.314	0.756
1125	1012.95	822.00	626.90	130.80	794.19	0.159	0.811	0.189	0.716
1140	954.44	787.00	594.74	128.60	760.37	0.163	0.825	0.175	0.675
1155	892.95	753.00	538.73	151.90	727.52	0.202	0.843	0.157	0.632
1170	828.73	678.50	488.27	130.50	655.54	0.192	0.819	0.181	0.586
1185	762.07	671.60	441.99	169.90	648.88	0.253	0.881	0.119	0.539
1200	693.25	553.20	394.71	100.40	534.48	0.181	0.798	0.202	0.490
1215	622.56	481.00	344.34	81.60	464.73	0.170	0.773	0.227	0.440
1230	550.30	421.10	296.59	72.00	406.85	0.171	0.765	0.235	0.389
1245	476.79	359.50	243.14	68.87	347.34	0.192	0.754	0.246	0.337
1260	402.34	298.90	190.32	65.10	288.79	0.218	0.743	0.257	0.285
1275	327.27	240.00	140.86	60.31	231.88	0.251	0.733	0.267	0.231
1290	251.91	170.50	87.52	53.22	164.73	0.312	0.677	0.323	0.178
1305	176.56	124.70	47.19	55.60	120.48	0.446	0.706	0.294	0.125
1320	101.56	74.00	19.66	39.35	71.50	0.532	0.729	0.271	0.072
1335	27.23	25.63	0.81	23.67	24.76	0.924	0.941	0.059	0.019
1350	0.00	5.06	0.09	6.23	4.89	0.000	0.000	0.000	-0.033
1365	0.00	-1.12	0.18	0.14	-1.08	0.000	0.000	0.000	-0.084
1380	0.00	-2.09	0.25	-1.14	-2.02	0.000	0.000	0.000	-0.133
1395	0.00	-1.26	0.08	-0.93	-1.21	0.000	0.000	0.000	-0.182
1410	0.00	-1.10	-0.14	-0.97	-1.06	0.000	0.000	0.000	-0.229
1425	0.00	-1.40	0.36	-0.63	-1.35	0.000	0.000	0.000	-0.274

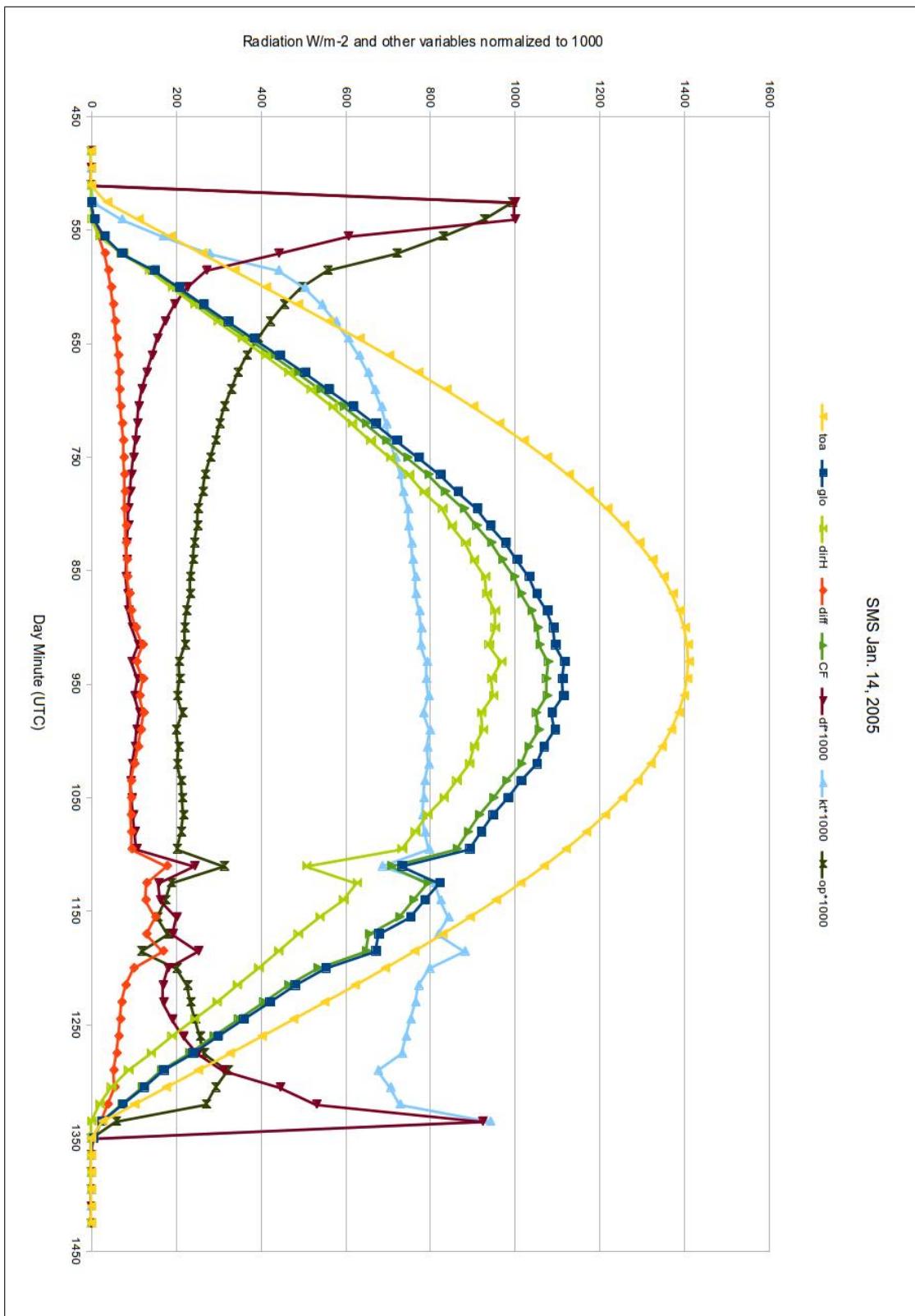


Figure C.14 - Graphic illustrating data measured and calculated on SMS January 14th 2005.

Table C.15 - Solar radiation and derived data for SMS jan 15th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-0.77	-0.03	-0.62	-0.74	0.000	0.000	0.000	-0.126
495	0.00	-1.04	0.02	-0.75	-1.00	0.000	0.000	0.000	-0.076
510	0.00	-0.94	0.00	-0.65	-0.91	0.000	0.000	0.000	-0.025
525	37.85	-0.71	0.00	-0.37	-0.69	0.522	-0.019	1.000	0.027
540	112.30	-3.16	-0.78	-0.25	-3.06	0.078	-0.028	1.000	0.079
555	187.37	-0.21	-0.12	0.37	-0.20	-1.761	-0.001	1.000	0.133
570	262.74	2.85	-0.05	3.13	2.75	1.000	0.011	0.989	0.186
585	338.09	2.66	0.00	2.84	2.57	1.000	0.008	0.992	0.239
600	413.09	3.14	-0.01	3.27	3.03	1.000	0.008	0.992	0.292
615	487.42	8.84	0.00	8.84	8.54	1.000	0.018	0.982	0.345
630	560.77	11.22	0.08	11.12	10.84	0.991	0.020	0.980	0.397
645	632.82	13.50	-0.05	13.36	13.04	0.990	0.021	0.979	0.448
660	703.26	15.51	0.11	15.20	14.99	0.980	0.022	0.978	0.497
675	771.79	37.46	0.66	36.52	36.19	0.975	0.049	0.951	0.546
690	838.11	58.36	-0.19	57.52	56.39	0.986	0.070	0.930	0.593
705	901.95	58.78	0.00	57.92	56.79	0.985	0.065	0.935	0.638
720	963.03	103.40	-0.01	102.00	99.90	0.986	0.107	0.893	0.681
735	1021.09	74.90	1.58	73.40	72.37	0.980	0.073	0.927	0.722
750	1075.88	59.93	1.05	58.90	57.90	0.983	0.056	0.944	0.761
765	1127.16	42.15	0.25	41.40	40.72	0.982	0.037	0.963	0.797
780	1174.72	29.52	-1.75	29.31	28.52	0.993	0.025	0.975	0.831
795	1218.35	26.33	-2.68	26.13	25.44	0.992	0.022	0.978	0.862
810	1257.86	27.19	-1.13	26.75	26.27	0.984	0.022	0.978	0.890
825	1293.09	25.44	-0.39	24.80	24.58	0.975	0.020	0.980	0.915
840	1323.89	32.92	0.33	32.00	31.81	0.972	0.025	0.975	0.936
855	1350.12	46.41	0.40	45.04	44.84	0.970	0.034	0.966	0.955
870	1371.66	73.80	-0.38	71.50	71.30	0.969	0.054	0.946	0.970
885	1388.44	80.40	0.09	77.70	77.68	0.966	0.058	0.942	0.982
900	1400.37	77.00	-0.83	74.80	74.39	0.971	0.055	0.945	0.990
915	1407.41	83.60	-0.93	81.00	80.77	0.969	0.059	0.941	0.995
930	1409.52	100.50	-0.18	96.70	97.10	0.962	0.071	0.929	0.997
945	1406.70	131.20	0.74	126.90	126.76	0.967	0.093	0.907	0.995
960	1398.96	106.40	0.60	102.30	102.80	0.961	0.076	0.924	0.989
975	1386.33	145.70	0.17	141.00	140.77	0.968	0.105	0.895	0.981
990	1368.86	162.30	0.86	157.00	156.81	0.967	0.119	0.881	0.968
1005	1346.63	133.50	0.17	129.90	128.98	0.973	0.099	0.901	0.952
1020	1319.74	154.20	1.17	149.50	148.98	0.970	0.117	0.883	0.933
1035	1288.30	141.00	1.93	136.60	136.23	0.969	0.109	0.891	0.911
1050	1252.45	174.40	0.30	169.50	168.50	0.972	0.139	0.861	0.886
1065	1212.33	138.90	0.30	135.00	134.20	0.972	0.115	0.885	0.857
1080	1168.13	123.60	0.25	120.00	119.42	0.971	0.106	0.894	0.826
1095	1120.02	114.90	-0.03	112.30	111.01	0.977	0.103	0.897	0.792
1110	1068.22	160.50	1.13	157.20	155.07	0.979	0.150	0.850	0.756
1125	1012.95	137.90	1.01	135.00	133.23	0.979	0.136	0.864	0.716
1140	954.44	128.40	0.42	126.50	124.06	0.985	0.135	0.865	0.675
1155	892.95	223.40	1.83	218.70	215.84	0.979	0.250	0.750	0.632
1170	828.73	255.20	2.79	248.90	246.57	0.975	0.308	0.692	0.586
1185	762.07	288.20	9.54	271.40	278.45	0.942	0.378	0.622	0.539
1200	693.25	359.30	54.67	275.80	347.14	0.768	0.518	0.482	0.490
1215	622.56	257.50	9.57	238.80	248.79	0.927	0.414	0.586	0.440
1230	550.30	200.60	7.36	187.50	193.81	0.935	0.365	0.635	0.389
1245	476.79	184.50	0.45	181.20	178.26	0.982	0.387	0.613	0.337
1260	402.34	135.60	-0.13	133.80	131.01	0.987	0.337	0.663	0.285
1275	327.27	89.30	-0.14	88.20	86.28	0.988	0.273	0.727	0.231
1290	251.91	83.60	-0.01	82.70	80.77	0.989	0.332	0.668	0.178
1305	176.56	41.86	-0.05	41.55	40.44	0.993	0.237	0.763	0.125
1320	101.56	39.20	-0.04	39.06	37.87	0.996	0.386	0.614	0.072
1335	27.23	15.49	-0.01	15.81	14.97	1.000	0.569	0.431	0.019
1350	0.00	2.36	-0.02	2.61	2.28	0.000	0.000	0.000	-0.033
1365	0.00	4.85	0.02	5.53	4.69	0.000	0.000	0.000	-0.084
1380	0.00	-1.25	0.08	-0.57	-1.21	0.000	0.000	0.000	-0.133
1395	0.00	-1.31	0.09	-0.85	-1.27	0.000	0.000	0.000	-0.182
1410	0.00	-1.41	0.10	-0.84	-1.36	0.000	0.000	0.000	-0.229
1425	0.00	-1.43	0.12	-0.88	-1.38	0.000	0.000	0.000	-0.274

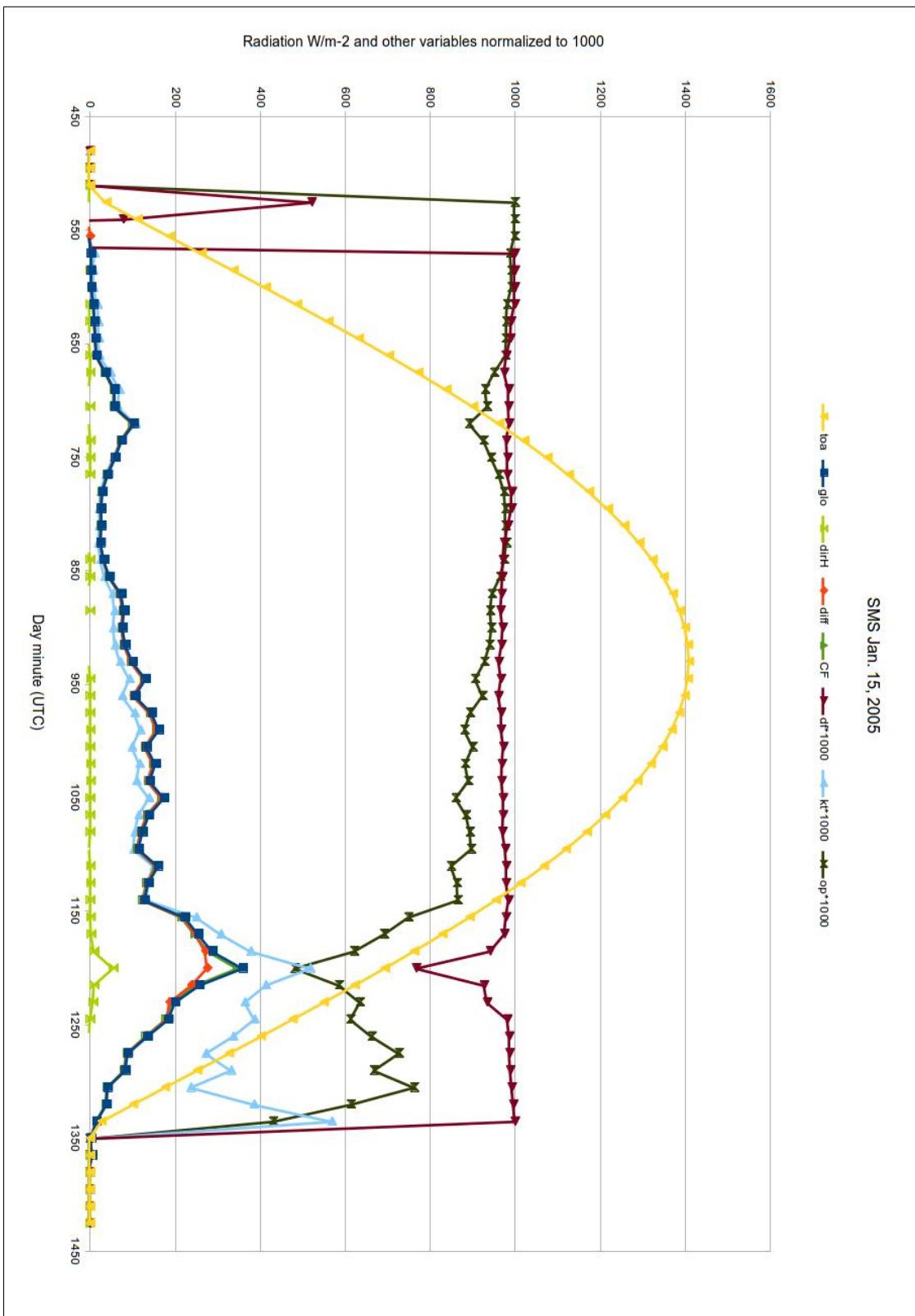


Figure C.15 - Graphic illustrating data measured and calculated on SMS January 15th 2005.

Table C.16 - Solar radiation and derived data for SMS jan 16th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-2.20	0.08	-1.43	-2.13	0.000	0.000	0.000	-0.126
495	0.00	-2.50	0.10	-1.42	-2.41	0.000	0.000	0.000	-0.076
510	0.00	-2.20	0.02	-1.11	-2.12	0.000	0.000	0.000	-0.025
525	37.85	0.34	-0.04	1.51	0.33	1.000	0.009	0.991	0.027
540	112.30	11.67	5.31	10.89	11.28	0.933	0.104	0.896	0.079
555	187.37	46.41	21.12	22.60	44.84	0.487	0.248	0.752	0.133
570	262.74	78.80	88.64	32.70	76.13	0.415	0.300	0.700	0.186
585	338.09	150.00	144.10	39.61	144.92	0.264	0.444	0.556	0.239
600	413.09	210.00	198.71	47.05	202.89	0.224	0.508	0.492	0.292
615	487.42	269.30	252.70	53.13	260.19	0.197	0.553	0.447	0.345
630	560.77	329.30	309.77	57.39	318.16	0.174	0.587	0.413	0.397
645	632.82	389.90	366.57	61.10	376.71	0.157	0.616	0.384	0.448
660	703.26	453.20	426.78	62.73	437.87	0.138	0.644	0.356	0.497
675	771.79	512.50	482.56	63.90	495.16	0.125	0.664	0.336	0.546
690	838.11	572.80	538.26	65.67	553.42	0.115	0.683	0.317	0.593
705	901.95	630.50	591.38	66.65	609.17	0.106	0.699	0.301	0.638
720	963.03	689.70	647.77	66.31	666.36	0.096	0.716	0.284	0.681
735	1021.09	743.00	694.05	68.66	717.86	0.092	0.728	0.272	0.722
750	1075.88	795.00	743.46	67.94	768.10	0.085	0.739	0.261	0.761
765	1127.16	844.00	785.28	69.86	815.44	0.083	0.749	0.251	0.797
780	1174.72	895.00	832.54	69.67	864.72	0.078	0.762	0.238	0.831
795	1218.35	939.00	876.38	66.28	907.23	0.071	0.771	0.229	0.862
810	1257.86	974.00	905.70	66.26	941.04	0.068	0.774	0.226	0.890
825	1293.09	1011.00	940.21	66.10	976.79	0.065	0.782	0.218	0.915
840	1323.89	1041.00	963.54	66.96	1005.78	0.064	0.786	0.214	0.936
855	1350.12	1057.00	969.25	72.10	1021.24	0.068	0.783	0.217	0.955
870	1371.66	1078.00	983.75	74.90	1041.53	0.069	0.786	0.214	0.970
885	1388.44	1103.00	1005.60	73.10	1065.68	0.066	0.794	0.206	0.982
900	1400.37	1117.00	1013.26	75.00	1079.21	0.067	0.798	0.202	0.990
915	1407.41	1126.00	1015.36	77.90	1087.90	0.069	0.800	0.200	0.995
930	1409.52	1130.00	1012.90	81.90	1091.77	0.072	0.802	0.198	0.997
945	1406.70	1125.00	991.97	91.30	1086.94	0.081	0.800	0.200	0.995
960	1398.96	1125.00	976.61	102.50	1086.94	0.091	0.804	0.196	0.989
975	1386.33	1138.00	974.66	115.60	1099.50	0.102	0.821	0.179	0.981
990	1368.86	1110.00	962.38	92.90	1072.44	0.084	0.811	0.189	0.968
1005	1346.63	1128.00	922.94	153.40	1089.83	0.136	0.838	0.162	0.952
1020	1319.74	1088.00	921.31	110.00	1051.19	0.101	0.824	0.176	0.933
1035	1288.30	1056.00	892.99	101.70	1020.27	0.096	0.820	0.180	0.911
1050	1252.45	1029.00	864.59	104.80	994.18	0.102	0.822	0.178	0.886
1065	1212.33	1006.00	825.75	117.80	971.96	0.117	0.830	0.170	0.857
1080	1168.13	956.00	792.33	99.80	923.65	0.104	0.818	0.182	0.826
1095	1120.02	917.00	749.41	102.70	885.97	0.112	0.819	0.181	0.792
1110	1068.22	875.00	723.06	87.60	845.39	0.100	0.819	0.181	0.756
1125	1012.95	830.00	681.35	84.20	801.92	0.101	0.819	0.181	0.716
1140	954.44	780.00	633.22	81.50	753.61	0.104	0.817	0.183	0.675
1155	892.95	727.00	577.89	83.40	702.40	0.115	0.814	0.186	0.632
1170	828.73	674.00	529.30	80.80	651.20	0.120	0.813	0.187	0.586
1185	762.07	619.00	479.18	77.60	598.06	0.125	0.812	0.188	0.539
1200	693.25	560.40	425.12	75.50	541.44	0.135	0.808	0.192	0.490
1215	622.56	500.80	371.20	71.70	483.86	0.143	0.804	0.196	0.440
1230	550.30	441.70	318.78	67.31	426.76	0.152	0.803	0.197	0.389
1245	476.79	379.00	262.37	64.55	366.18	0.170	0.795	0.205	0.337
1260	402.34	317.60	209.45	60.69	306.85	0.191	0.789	0.211	0.285
1275	327.27	257.30	160.35	54.31	248.59	0.211	0.786	0.214	0.231
1290	251.91	199.40	113.42	48.15	192.65	0.241	0.792	0.208	0.178
1305	176.56	142.70	69.41	41.53	137.87	0.291	0.808	0.192	0.125
1320	101.56	87.60	30.99	33.35	84.64	0.381	0.863	0.137	0.072
1335	27.23	41.89	5.44	22.80	40.47	0.544	0.000	1.000	0.019
1350	0.00	9.49	-2.63	10.62	9.17	0.000	0.000	0.000	-0.033
1365	0.00	-0.41	0.48	1.41	-0.39	0.000	0.000	0.000	-0.084
1380	0.00	-2.45	0.56	-1.14	-2.37	0.000	0.000	0.000	-0.133
1395	0.00	-2.34	0.28	-1.60	-2.26	0.000	0.000	0.000	-0.182
1410	0.00	-2.35	0.51	-1.25	-2.27	0.000	0.000	0.000	-0.229
1425	0.00	-2.29	0.63	-1.24	-2.21	0.000	0.000	0.000	-0.274

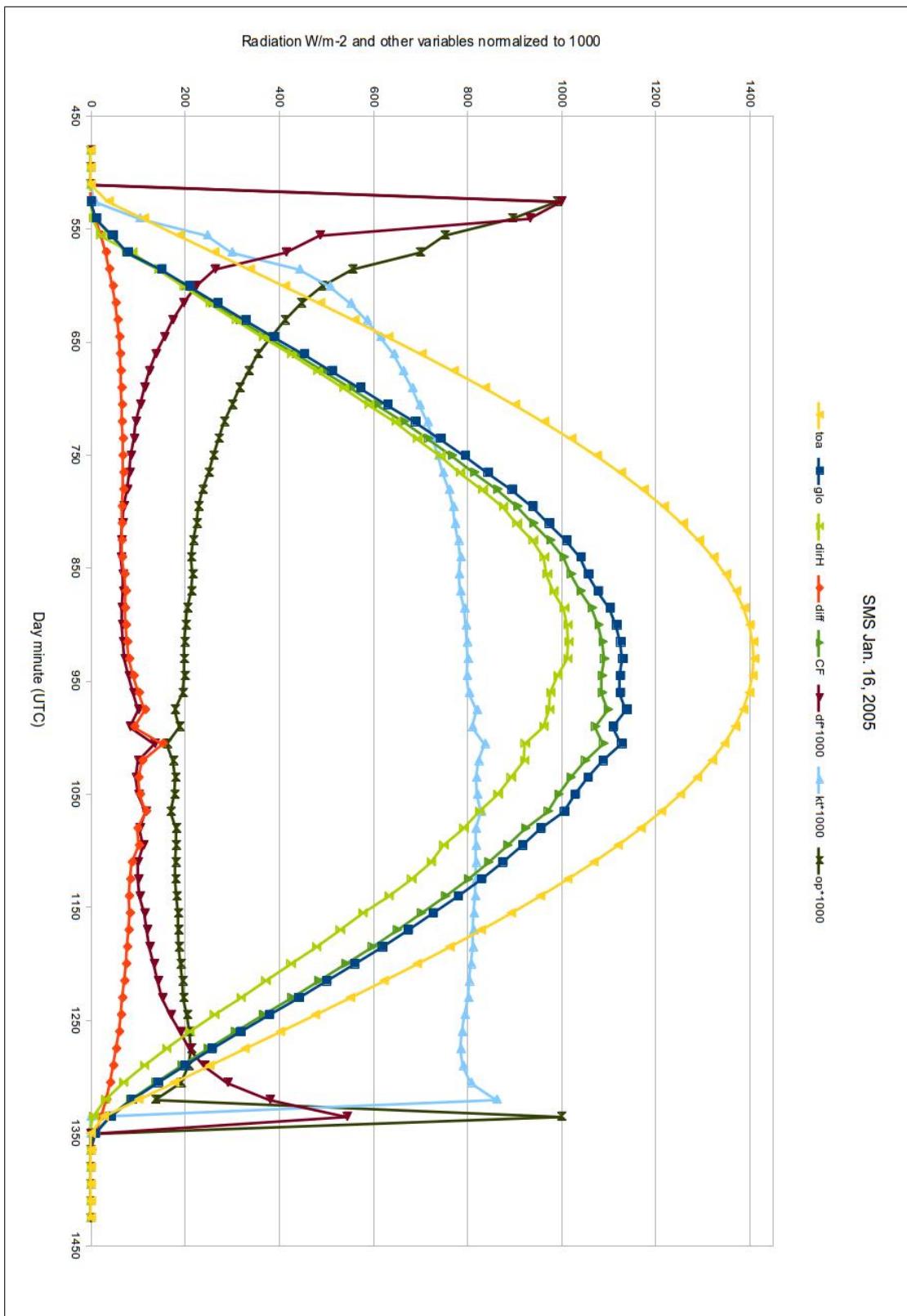


Figure C.16 - Graphic illustrating data measured and calculated on SMS January 16th 2005.

Table C.17 - Solar radiation and derived data for SMS jan 17th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-2.80	0.08	-1.59	-2.71	0.000	0.000	0.000	-0.126
495	0.00	-2.47	-0.22	-2.02	-2.38	0.000	0.000	0.000	-0.076
510	0.00	-2.52	-0.02	-1.48	-2.43	0.000	0.000	0.000	-0.025
525	37.85	-0.08	-0.02	1.22	-0.08	-14.464	-0.002	1.000	0.027
540	112.30	11.66	13.61	9.28	11.27	0.796	0.104	0.896	0.079
555	187.37	46.94	19.03	19.35	45.35	0.412	0.251	0.749	0.133
570	262.74	72.90	99.53	27.96	70.43	0.384	0.277	0.723	0.186
585	338.09	151.00	151.49	35.35	145.89	0.234	0.447	0.553	0.239
600	413.09	211.40	208.32	40.45	204.25	0.191	0.512	0.488	0.292
615	487.42	273.40	267.53	44.19	264.15	0.162	0.561	0.439	0.345
630	560.77	333.90	326.42	47.41	322.60	0.142	0.595	0.405	0.397
645	632.82	393.50	382.69	50.86	380.19	0.129	0.622	0.378	0.448
660	703.26	452.70	436.73	54.46	437.38	0.120	0.644	0.356	0.497
675	771.79	508.70	487.47	58.43	491.49	0.115	0.659	0.341	0.546
690	838.11	569.40	543.59	59.91	550.13	0.105	0.679	0.321	0.593
705	901.95	628.00	596.48	61.48	606.75	0.098	0.696	0.304	0.638
720	963.03	686.30	650.50	62.17	663.08	0.091	0.713	0.287	0.681
735	1021.09	741.00	700.55	62.92	715.93	0.085	0.726	0.274	0.722
750	1075.88	792.00	747.27	63.88	765.20	0.081	0.736	0.264	0.761
765	1127.16	847.00	797.24	62.93	818.34	0.074	0.751	0.249	0.797
780	1174.72	891.00	835.03	64.10	860.85	0.072	0.758	0.242	0.831
795	1218.35	933.00	873.80	64.42	901.43	0.069	0.766	0.234	0.862
810	1257.86	972.00	907.47	64.43	939.11	0.066	0.773	0.227	0.890
825	1293.09	1012.00	941.12	64.34	977.76	0.064	0.783	0.217	0.915
840	1323.89	1040.00	964.47	64.64	1004.81	0.062	0.786	0.214	0.936
855	1350.12	1069.00	988.35	64.40	1032.83	0.060	0.792	0.208	0.955
870	1371.66	1090.00	1005.10	65.73	1053.12	0.060	0.795	0.205	0.970
885	1388.44	1110.00	1016.41	65.69	1072.44	0.059	0.799	0.201	0.982
900	1400.37	1131.00	1037.03	64.25	1092.73	0.057	0.808	0.192	0.990
915	1407.41	1139.00	1041.24	63.66	1100.46	0.056	0.809	0.191	0.995
930	1409.52	1152.00	1047.79	62.65	1113.02	0.054	0.817	0.183	0.997
945	1406.70	1153.00	1046.69	62.54	1113.99	0.054	0.820	0.180	0.995
960	1398.96	1147.00	1035.98	63.43	1108.19	0.055	0.820	0.180	0.989
975	1386.33	1138.00	1023.68	63.94	1099.50	0.056	0.821	0.179	0.981
990	1368.86	1127.00	1008.85	63.91	1088.87	0.057	0.823	0.177	0.968
1005	1346.63	1110.00	988.66	64.33	1072.44	0.058	0.824	0.176	0.952
1020	1319.74	1089.00	967.05	64.82	1052.15	0.060	0.825	0.175	0.933
1035	1288.30	1060.00	933.08	65.83	1024.13	0.062	0.823	0.177	0.911
1050	1252.45	1036.00	907.11	64.57	1000.95	0.062	0.827	0.173	0.886
1065	1212.33	1004.00	873.77	64.02	970.03	0.064	0.828	0.172	0.857
1080	1168.13	969.00	840.25	63.08	936.21	0.065	0.830	0.170	0.826
1095	1120.02	931.00	800.90	62.77	899.50	0.067	0.831	0.169	0.792
1110	1068.22	886.00	755.55	62.19	856.02	0.070	0.829	0.171	0.756
1125	1012.95	845.00	716.45	60.23	816.41	0.071	0.834	0.166	0.716
1140	954.44	792.00	663.59	60.09	765.20	0.076	0.830	0.170	0.675
1155	892.95	745.00	618.31	58.55	719.79	0.079	0.834	0.166	0.632
1170	828.73	684.60	560.37	58.23	661.44	0.085	0.826	0.174	0.586
1185	762.07	630.30	508.28	57.16	608.97	0.091	0.827	0.173	0.539
1200	693.25	572.60	454.04	55.06	553.23	0.096	0.826	0.174	0.490
1215	622.56	514.40	400.26	53.16	497.00	0.103	0.826	0.174	0.440
1230	550.30	454.30	345.24	49.83	438.93	0.110	0.826	0.174	0.389
1245	476.79	397.10	293.73	46.63	383.66	0.117	0.833	0.167	0.337
1260	402.34	335.30	237.91	44.22	323.96	0.132	0.833	0.167	0.285
1275	327.27	272.00	183.10	41.01	262.80	0.151	0.831	0.169	0.231
1290	251.91	209.00	129.71	37.31	201.93	0.179	0.830	0.170	0.178
1305	176.56	150.30	81.43	32.47	145.21	0.216	0.851	0.149	0.125
1320	101.56	95.20	39.64	26.28	91.98	0.276	0.937	0.063	0.072
1335	27.23	13.25	0.20	14.92	12.80	1.000	0.487	0.513	0.019
1350	0.00	3.90	-0.52	5.83	3.77	0.000	0.000	0.000	-0.033
1365	0.00	-1.77	0.58	-0.06	-1.71	0.000	0.000	0.000	-0.084
1380	0.00	-2.82	0.60	-1.66	-2.72	0.000	0.000	0.000	-0.133
1395	0.00	-2.81	0.55	-1.53	-2.71	0.000	0.000	0.000	-0.182
1410	0.00	-2.81	0.34	-1.56	-2.71	0.000	0.000	0.000	-0.229
1425	0.00	-2.81	0.67	-1.43	-2.71	0.000	0.000	0.000	-0.274

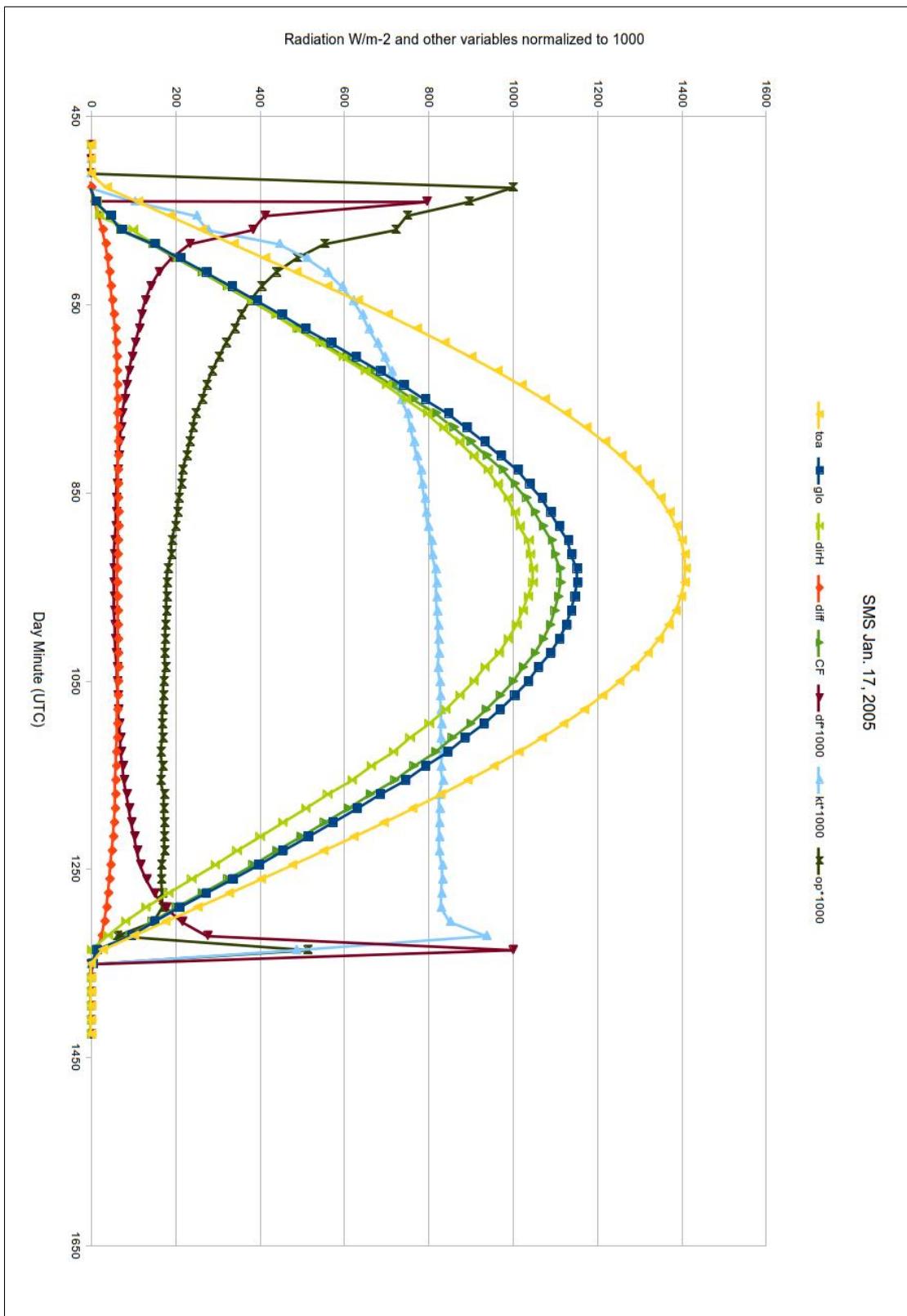


Figure C.17 - Graphic illustrating data measured and calculated on SMS January 17th 2005.

Table C.18 - Solar radiation and derived data for SMS jan 18th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-2.20	0.05	-1.40	-2.12	0.000	0.000	0.000	-0.126
495	0.00	-2.84	0.21	-0.63	-2.74	0.000	0.000	0.000	-0.076
510	0.00	-1.73	0.01	-1.78	-1.67	0.000	0.000	0.000	-0.025
525	37.85	-0.31	0.12	-0.64	-0.30	1.000	-0.008	1.000	0.027
540	112.30	6.87	3.02	6.52	6.64	0.949	0.061	0.939	0.079
555	187.37	38.94	16.67	20.23	37.62	0.520	0.208	0.792	0.133
570	262.74	67.97	85.13	30.03	65.67	0.442	0.259	0.741	0.186
585	338.09	139.50	136.35	37.86	134.78	0.271	0.413	0.587	0.239
600	413.09	197.70	192.46	43.36	191.01	0.219	0.479	0.521	0.292
615	487.42	256.60	250.29	47.59	247.92	0.185	0.526	0.474	0.345
630	560.77	315.20	306.59	51.75	304.54	0.164	0.562	0.438	0.397
645	632.82	373.20	358.07	55.85	360.57	0.150	0.590	0.410	0.448
660	703.26	433.00	413.35	58.87	418.35	0.136	0.616	0.384	0.497
675	771.79	491.90	467.82	61.47	475.26	0.125	0.637	0.363	0.546
690	838.11	550.60	522.25	63.67	531.97	0.116	0.657	0.343	0.593
705	901.95	607.60	574.15	65.65	587.04	0.108	0.674	0.326	0.638
720	963.03	662.90	622.57	68.09	640.47	0.103	0.688	0.312	0.681
735	1021.09	715.00	668.05	69.42	690.81	0.097	0.700	0.300	0.722
750	1075.88	766.00	711.50	70.80	740.08	0.092	0.712	0.288	0.761
765	1127.16	816.00	755.78	71.70	788.39	0.088	0.724	0.276	0.797
780	1174.72	856.00	782.68	76.50	827.04	0.089	0.729	0.271	0.831
795	1218.35	896.00	814.34	79.40	865.68	0.089	0.735	0.265	0.862
810	1257.86	934.00	848.76	80.50	902.40	0.086	0.743	0.257	0.890
825	1293.09	972.00	881.67	80.20	939.11	0.083	0.752	0.248	0.915
840	1323.89	1005.00	912.97	80.20	971.00	0.080	0.759	0.241	0.936
855	1350.12	1034.00	938.70	80.10	999.01	0.077	0.766	0.234	0.955
870	1371.66	1080.00	959.50	101.60	1043.46	0.094	0.787	0.213	0.970
885	1388.44	1085.00	960.43	98.60	1048.29	0.091	0.781	0.219	0.982
900	1400.37	1103.00	974.63	98.50	1065.68	0.089	0.788	0.212	0.990
915	1407.41	1101.00	964.59	102.60	1063.75	0.093	0.782	0.218	0.995
930	1409.52	1108.00	970.03	97.10	1070.51	0.088	0.786	0.214	0.997
945	1406.70	1117.00	970.08	106.50	1079.21	0.095	0.794	0.206	0.995
960	1398.96	1072.00	931.10	96.30	1035.73	0.090	0.766	0.234	0.989
975	1386.33	1096.00	957.99	88.70	1058.92	0.081	0.791	0.209	0.981
990	1368.86	1092.00	949.79	92.20	1055.05	0.084	0.798	0.202	0.968
1005	1346.63	1083.00	929.61	99.60	1046.36	0.092	0.804	0.196	0.952
1020	1319.74	1055.00	894.24	103.40	1019.30	0.098	0.799	0.201	0.933
1035	1288.30	1032.00	878.41	94.80	997.08	0.092	0.801	0.199	0.911
1050	1252.45	1005.00	853.96	88.70	971.00	0.088	0.802	0.198	0.886
1065	1212.33	977.00	830.89	82.20	943.94	0.084	0.806	0.194	0.857
1080	1168.13	938.00	788.20	85.60	906.26	0.091	0.803	0.197	0.826
1095	1120.02	897.00	753.37	79.40	866.65	0.089	0.801	0.199	0.792
1110	1068.22	859.00	717.77	75.80	829.94	0.088	0.804	0.196	0.756
1125	1012.95	813.00	671.32	75.30	785.49	0.093	0.803	0.197	0.716
1140	954.44	765.00	625.11	74.80	739.12	0.098	0.802	0.198	0.675
1155	892.95	709.00	567.79	76.00	685.01	0.107	0.794	0.206	0.632
1170	828.73	658.90	521.09	75.00	636.61	0.114	0.795	0.205	0.586
1185	762.07	602.10	465.70	74.10	581.73	0.123	0.790	0.210	0.539
1200	693.25	545.60	413.84	71.10	527.14	0.130	0.787	0.213	0.490
1215	622.56	487.80	362.39	67.96	471.30	0.139	0.784	0.216	0.440
1230	550.30	427.60	307.88	64.77	413.13	0.151	0.777	0.223	0.389
1245	476.79	365.30	253.26	61.55	352.94	0.168	0.766	0.234	0.337
1260	402.34	307.00	204.04	57.33	296.61	0.187	0.763	0.237	0.285
1275	327.27	245.50	153.24	52.46	237.19	0.214	0.750	0.250	0.231
1290	251.91	187.40	105.98	46.89	181.06	0.250	0.744	0.256	0.178
1305	176.56	131.90	63.91	39.69	127.44	0.301	0.747	0.253	0.125
1320	101.56	80.60	28.54	31.33	77.87	0.389	0.794	0.206	0.072
1335	27.23	36.90	4.73	21.61	35.65	0.586	0.000	1.000	0.019
1350	0.00	7.61	-1.71	9.26	7.35	0.000	0.000	0.000	-0.033
1365	0.00	-0.31	0.41	0.93	-0.30	0.000	0.000	0.000	-0.084
1380	0.00	-2.25	0.41	-1.27	-2.17	0.000	0.000	0.000	-0.133
1395	0.00	-2.31	0.30	-1.36	-2.24	0.000	0.000	0.000	-0.182
1410	0.00	-2.19	0.09	-1.59	-2.12	0.000	0.000	0.000	-0.229
1425	0.00	-2.21	0.12	-1.44	-2.13	0.000	0.000	0.000	-0.274

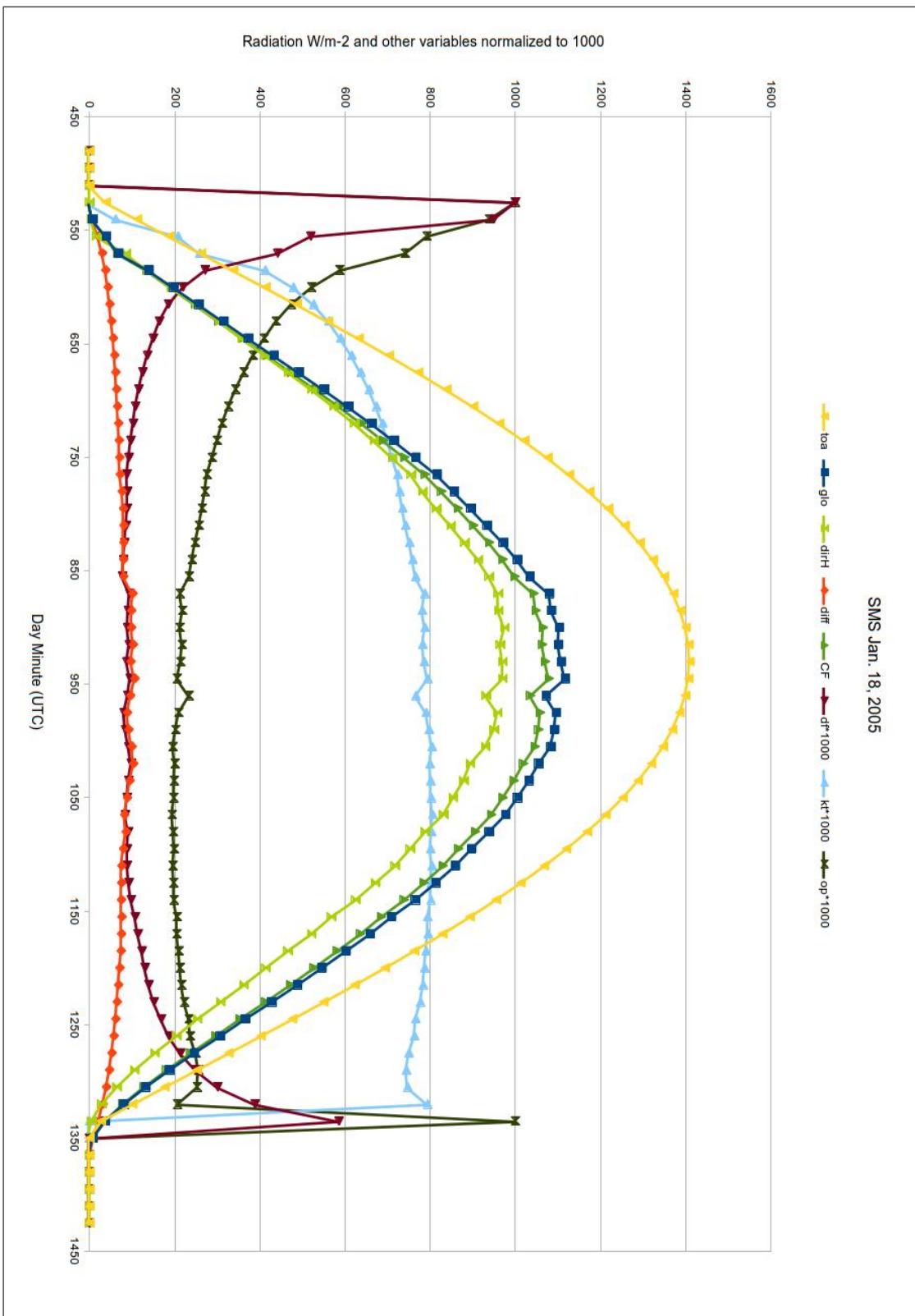


Figure C.18 - Graphic illustrating data measured and calculated on SMS January 18th 2005.

Table C.19 - Solar radiation and derived data for SMS jan 19th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-1.95	0.11	-1.23	-1.88	0.000	0.000	0.000	-0.126
495	0.00	-1.91	0.06	-1.19	-1.85	0.000	0.000	0.000	-0.076
510	0.00	-1.26	-0.01	-0.93	-1.21	0.000	0.000	0.000	-0.025
525	37.85	0.30	0.01	0.61	0.29	1.000	0.008	0.992	0.027
540	112.30	9.16	0.83	9.30	8.85	1.000	0.082	0.918	0.079
555	187.37	45.58	6.92	22.67	44.04	0.497	0.243	0.757	0.133
570	262.74	88.70	43.00	34.96	85.70	0.394	0.338	0.662	0.186
585	338.09	156.70	124.39	42.76	151.40	0.273	0.463	0.537	0.239
600	413.09	202.10	177.12	47.99	195.26	0.237	0.489	0.511	0.292
615	487.42	246.10	225.36	54.71	237.77	0.222	0.505	0.495	0.345
630	560.77	303.60	277.04	62.29	293.33	0.205	0.541	0.459	0.397
645	632.82	353.70	319.13	68.83	341.73	0.195	0.559	0.441	0.448
660	703.26	419.10	379.03	73.60	404.92	0.176	0.596	0.404	0.497
675	771.79	479.10	432.88	77.80	462.89	0.162	0.621	0.379	0.546
690	838.11	539.80	486.09	81.60	521.54	0.151	0.644	0.356	0.593
705	901.95	596.40	535.88	83.90	576.22	0.141	0.661	0.339	0.638
720	963.03	651.90	585.79	85.40	629.84	0.131	0.677	0.323	0.681
735	1021.09	706.00	636.99	84.70	682.11	0.120	0.691	0.309	0.722
750	1075.88	760.00	688.67	84.00	734.29	0.111	0.706	0.294	0.761
765	1127.16	812.00	744.62	79.60	784.53	0.098	0.720	0.280	0.797
780	1174.72	854.00	776.04	83.30	825.10	0.098	0.727	0.273	0.831
795	1218.35	900.00	819.51	81.40	869.55	0.090	0.739	0.261	0.862
810	1257.86	937.00	848.76	84.20	905.30	0.090	0.745	0.255	0.890
825	1293.09	970.00	877.10	85.30	937.18	0.088	0.750	0.250	0.915
840	1323.89	1001.00	900.80	87.10	967.13	0.087	0.756	0.244	0.936
855	1350.12	1028.00	922.46	89.10	993.22	0.087	0.761	0.239	0.955
870	1371.66	1052.00	934.27	95.80	1016.41	0.091	0.767	0.233	0.970
885	1388.44	1060.00	930.97	102.30	1024.13	0.097	0.763	0.237	0.982
900	1400.37	1076.00	941.94	105.50	1039.59	0.098	0.768	0.232	0.990
915	1407.41	1088.00	948.67	104.70	1051.19	0.096	0.773	0.227	0.995
930	1409.52	1086.00	943.11	107.20	1049.26	0.099	0.770	0.230	0.997
945	1406.70	1086.00	934.26	108.70	1049.26	0.100	0.772	0.228	0.995
960	1398.96	1092.00	942.97	105.50	1055.05	0.097	0.781	0.219	0.989
975	1386.33	1077.00	921.71	108.10	1040.56	0.100	0.777	0.223	0.981
990	1368.86	1067.00	908.16	108.70	1030.90	0.102	0.779	0.221	0.968
1005	1346.63	1060.00	901.99	105.50	1024.13	0.100	0.787	0.213	0.952
1020	1319.74	1036.00	872.77	107.30	1000.95	0.104	0.785	0.215	0.933
1035	1288.30	1023.00	865.65	98.80	988.39	0.097	0.794	0.206	0.911
1050	1252.45	1004.00	845.10	95.90	970.03	0.096	0.802	0.198	0.886
1065	1212.33	966.00	806.03	96.80	933.32	0.100	0.797	0.203	0.857
1080	1168.13	935.00	776.64	92.80	903.36	0.099	0.800	0.200	0.826
1095	1120.02	901.00	744.65	88.90	870.51	0.099	0.804	0.196	0.792
1110	1068.22	857.00	701.90	87.60	828.00	0.102	0.802	0.198	0.756
1125	1012.95	812.00	659.85	85.70	784.53	0.106	0.802	0.198	0.716
1140	954.44	763.00	613.64	82.90	737.18	0.109	0.799	0.201	0.675
1155	892.95	718.00	569.68	80.60	693.71	0.112	0.804	0.196	0.632
1170	828.73	669.20	526.96	77.00	646.56	0.115	0.808	0.193	0.586
1185	762.07	609.90	472.71	74.30	589.26	0.122	0.800	0.200	0.539
1200	693.25	547.60	412.86	75.70	529.07	0.138	0.790	0.210	0.490
1215	622.56	489.50	361.07	72.10	472.94	0.147	0.786	0.214	0.440
1230	550.30	427.10	303.21	69.94	412.65	0.164	0.776	0.224	0.389
1245	476.79	368.90	254.27	64.16	356.42	0.174	0.774	0.226	0.337
1260	402.34	310.80	206.32	57.91	300.28	0.186	0.772	0.228	0.285
1275	327.27	252.00	157.71	52.74	243.47	0.209	0.770	0.230	0.231
1290	251.91	193.60	111.61	45.54	187.05	0.235	0.769	0.231	0.178
1305	176.56	137.00	67.81	38.81	132.36	0.283	0.776	0.224	0.125
1320	101.56	83.50	30.63	30.81	80.67	0.369	0.822	0.178	0.072
1335	27.23	37.53	5.04	20.81	36.26	0.554	0.000	1.000	0.019
1350	0.00	7.87	-1.89	9.13	7.60	0.000	0.000	0.000	-0.033
1365	0.00	-0.81	0.41	0.49	-0.78	0.000	0.000	0.000	-0.084
1380	0.00	-2.66	0.57	-1.21	-2.57	0.000	0.000	0.000	-0.133
1395	0.00	-2.35	0.27	-1.65	-2.27	0.000	0.000	0.000	-0.182
1410	0.00	-2.20	-0.14	-1.74	-2.12	0.000	0.000	0.000	-0.229
1425	0.00	-2.47	0.29	-1.44	-2.39	0.000	0.000	0.000	-0.274

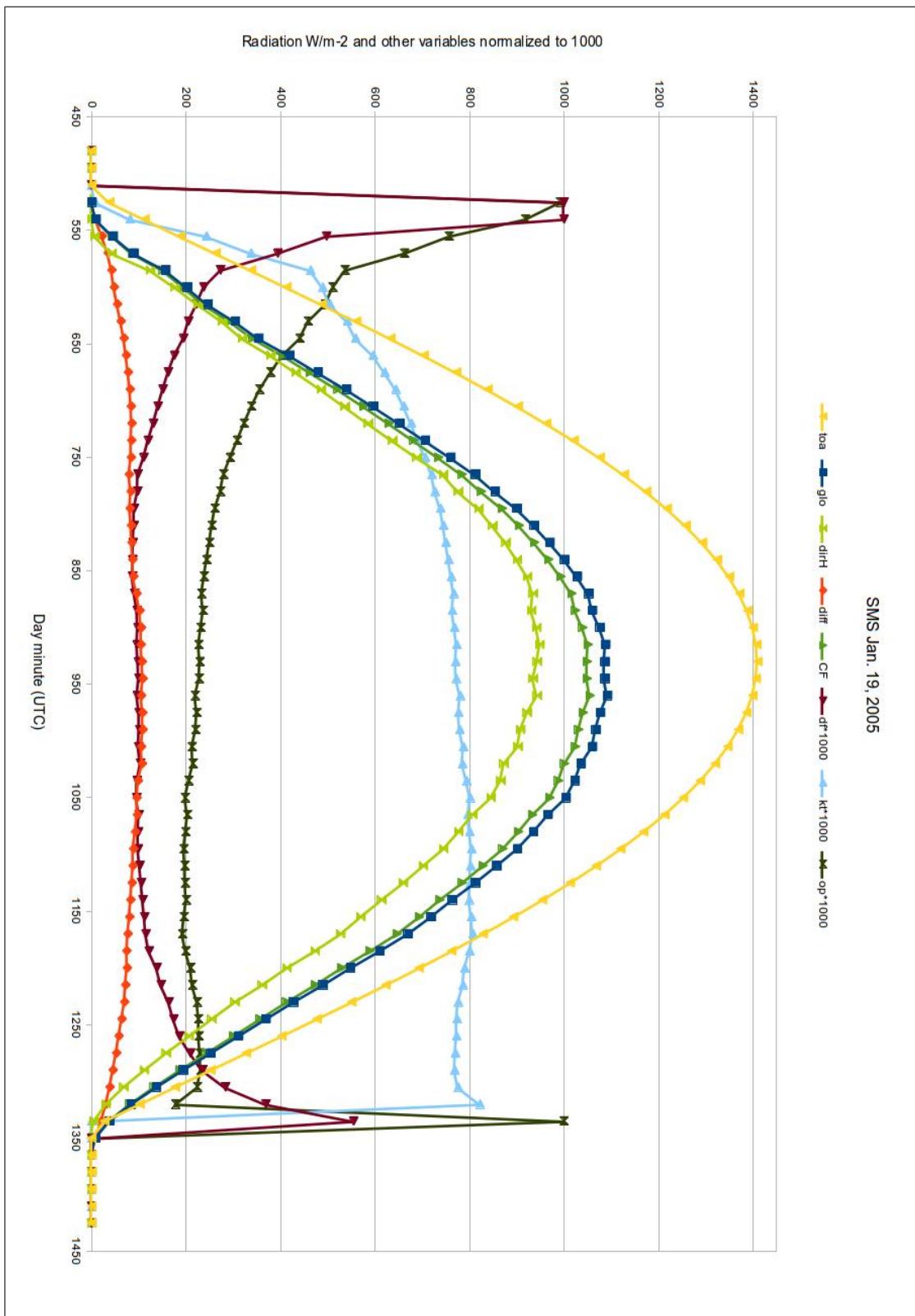


Figure C.19 - Graphic illustrating data measured and calculated on SMS January 19th 2005.

Table C.20 - Solar radiation and derived data for SMS jan 20th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-2.18	0.03	-1.22	-2.11	0.000	0.000	0.000	-0.126
495	0.00	-2.20	0.10	-1.11	-2.12	0.000	0.000	0.000	-0.076
510	0.00	-2.20	0.03	-1.11	-2.12	0.000	0.000	0.000	-0.025
525	37.85	-0.50	-0.05	0.54	-0.48	-1.087	-0.013	1.000	0.027
540	112.30	6.88	1.74	7.19	6.65	1.000	0.061	0.939	0.079
555	187.37	32.51	12.99	20.58	31.41	0.633	0.174	0.826	0.133
570	262.74	69.09	64.13	32.41	66.75	0.469	0.263	0.737	0.186
585	338.09	121.00	107.39	43.48	116.91	0.359	0.358	0.642	0.239
600	413.09	175.70	154.76	53.12	169.76	0.302	0.425	0.575	0.292
615	487.42	229.20	201.33	61.62	221.45	0.269	0.470	0.530	0.345
630	560.77	291.80	268.99	65.14	281.93	0.223	0.520	0.480	0.397
645	632.82	347.30	317.34	72.50	335.55	0.209	0.549	0.451	0.448
660	703.26	404.50	363.61	78.40	390.81	0.194	0.575	0.425	0.497
675	771.79	459.80	407.23	86.00	444.24	0.187	0.596	0.404	0.546
690	838.11	518.90	460.01	88.80	501.34	0.171	0.619	0.381	0.593
705	901.95	579.20	516.74	89.00	559.60	0.154	0.642	0.358	0.638
720	963.03	633.60	564.67	91.80	612.16	0.145	0.658	0.342	0.681
735	1021.09	686.60	608.83	93.90	663.37	0.137	0.672	0.328	0.722
750	1075.88	743.00	664.32	92.40	717.86	0.124	0.691	0.309	0.761
765	1127.16	788.00	702.37	94.90	761.34	0.120	0.699	0.301	0.797
780	1174.72	835.00	736.99	100.70	806.75	0.121	0.711	0.289	0.831
795	1218.35	880.00	772.11	104.30	850.23	0.119	0.722	0.278	0.862
810	1257.86	950.00	779.36	158.50	917.86	0.167	0.755	0.245	0.890
825	1293.09	995.00	851.49	128.90	961.33	0.130	0.769	0.231	0.915
840	1323.89	1040.00	873.64	149.30	1004.81	0.144	0.786	0.214	0.936
855	1350.12	1035.00	755.35	268.10	999.98	0.259	0.767	0.233	0.955
870	1371.66	511.70	226.24	260.50	494.39	0.509	0.373	0.627	0.970
885	1388.44	1073.00	948.65	92.20	1036.70	0.086	0.773	0.227	0.982
900	1400.37	1089.00	949.87	102.70	1052.15	0.094	0.778	0.222	0.990
915	1407.41	1096.00	963.60	92.80	1058.92	0.085	0.779	0.221	0.995
930	1409.52	1102.00	967.04	92.10	1064.71	0.084	0.782	0.218	0.997
945	1406.70	1109.00	973.06	89.60	1071.48	0.081	0.788	0.212	0.995
960	1398.96	1113.00	970.67	95.70	1075.34	0.086	0.796	0.204	0.989
975	1386.33	1109.00	952.11	106.70	1071.48	0.096	0.800	0.200	0.981
990	1368.86	1132.00	927.52	147.10	1093.70	0.130	0.827	0.173	0.968
1005	1346.63	1082.00	918.18	105.40	1045.39	0.097	0.803	0.197	0.952
1020	1319.74	1107.00	897.04	149.20	1069.54	0.135	0.839	0.161	0.933
1035	1288.30	956.00	703.45	190.30	923.65	0.199	0.742	0.258	0.911
1050	1252.45	1009.00	854.85	86.50	974.86	0.086	0.806	0.194	0.886
1065	1212.33	978.00	825.75	83.10	944.91	0.085	0.807	0.193	0.857
1080	1168.13	942.00	793.16	79.40	910.13	0.084	0.806	0.194	0.826
1095	1120.02	910.00	759.70	78.90	879.21	0.087	0.812	0.188	0.792
1110	1068.22	868.00	719.28	77.70	838.63	0.090	0.813	0.187	0.756
1125	1012.95	816.00	666.30	77.40	788.39	0.095	0.806	0.194	0.716
1140	954.44	779.00	632.54	74.60	752.64	0.096	0.816	0.184	0.675
1155	892.95	730.00	584.21	73.90	705.30	0.101	0.818	0.182	0.632
1170	828.73	677.40	533.99	74.60	654.48	0.110	0.817	0.183	0.586
1185	762.07	615.00	472.17	76.30	594.19	0.124	0.807	0.193	0.539
1200	693.25	553.50	416.29	73.10	534.77	0.132	0.798	0.202	0.490
1215	622.56	503.50	375.60	65.67	486.46	0.130	0.809	0.191	0.440
1230	550.30	445.70	324.61	61.50	430.62	0.138	0.810	0.190	0.389
1245	476.79	383.30	268.77	59.04	370.33	0.154	0.804	0.196	0.337
1260	402.34	319.60	213.15	56.68	308.79	0.177	0.794	0.206	0.285
1275	327.27	257.00	161.11	52.29	248.30	0.203	0.785	0.215	0.231
1290	251.91	200.20	115.01	46.75	193.43	0.234	0.795	0.205	0.178
1305	176.56	136.90	66.51	40.47	132.27	0.296	0.775	0.225	0.125
1320	101.56	82.20	29.09	32.50	79.42	0.395	0.809	0.191	0.072
1335	27.23	37.56	4.93	21.91	36.29	0.583	0.000	1.000	0.019
1350	0.00	7.69	-1.58	9.69	7.43	0.000	0.000	0.000	-0.033
1365	0.00	-0.96	0.59	1.13	-0.92	0.000	0.000	0.000	-0.084
1380	0.00	-2.67	0.59	-1.29	-2.57	0.000	0.000	0.000	-0.133
1395	0.00	-2.46	0.34	-1.66	-2.37	0.000	0.000	0.000	-0.182
1410	0.00	-2.61	0.26	-1.56	-2.52	0.000	0.000	0.000	-0.229
1425	0.00	-2.52	0.48	-1.50	-2.44	0.000	0.000	0.000	-0.274

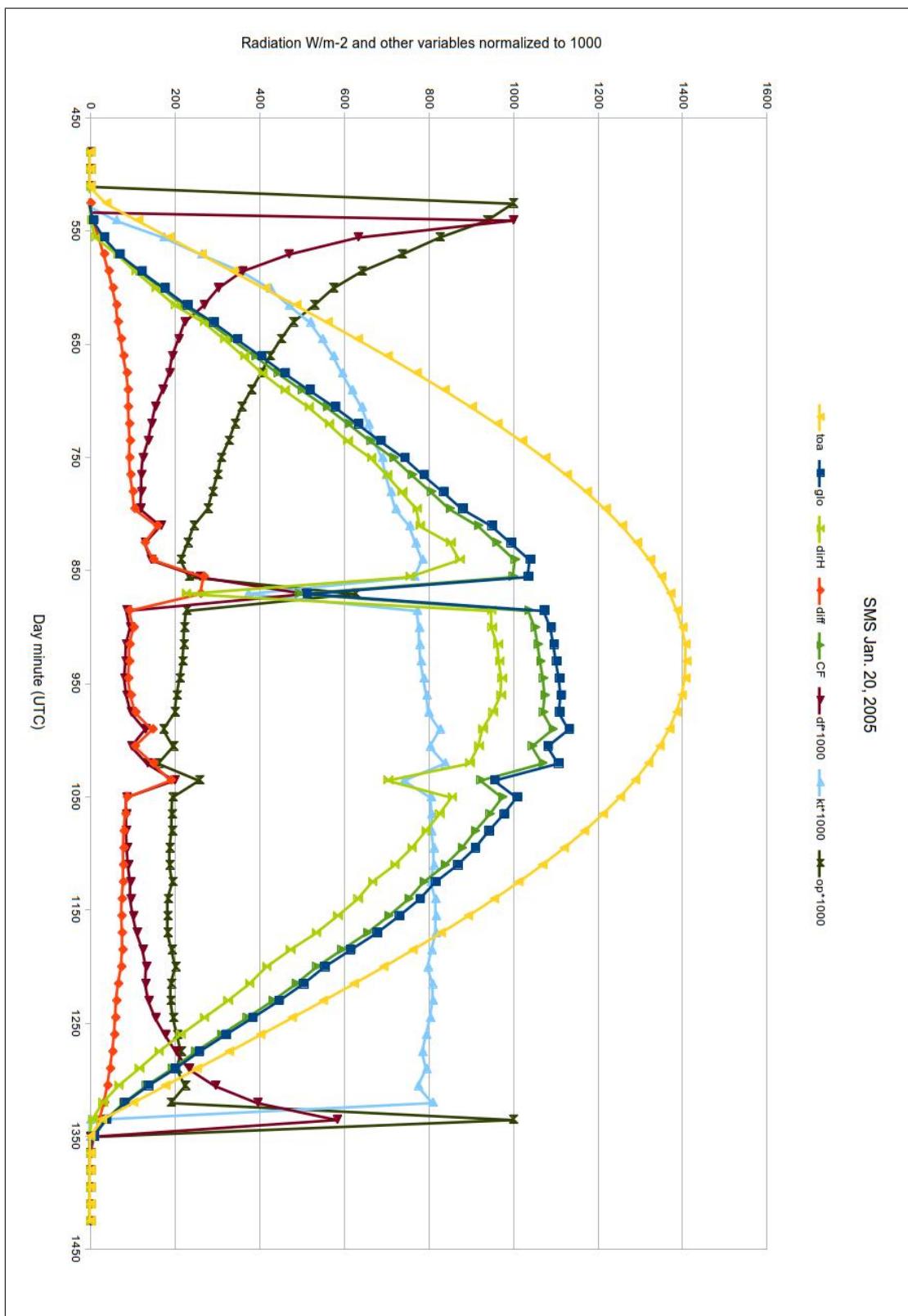


Figure C.20 - Graphic illustrating data measured and calculated on SMS January 20th 2005.

Table C.21 - Solar radiation and derived data for SMS jan 21th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-2.50	0.06	-1.46	-2.41	0.000	0.000	0.000	-0.126
495	0.00	-2.33	0.11	-1.19	-2.25	0.000	0.000	0.000	-0.076
510	0.00	-1.89	0.00	-1.47	-1.82	0.000	0.000	0.000	-0.025
525	37.85	-0.61	0.02	0.02	-0.59	-0.030	-0.016	1.000	0.027
540	112.30	6.56	1.67	7.18	6.34	1.000	0.058	0.942	0.079
555	187.37	34.56	24.15	19.19	33.39	0.555	0.184	0.816	0.133
570	262.74	79.40	82.44	29.42	76.71	0.371	0.302	0.698	0.186
585	338.09	134.70	135.11	37.16	130.14	0.276	0.398	0.602	0.239
600	413.09	194.20	191.20	43.40	187.63	0.223	0.470	0.530	0.292
615	487.42	254.20	245.81	48.98	245.60	0.193	0.522	0.478	0.345
630	560.77	313.90	301.83	53.71	303.28	0.171	0.560	0.440	0.397
645	632.82	374.00	358.52	57.42	361.35	0.154	0.591	0.409	0.448
660	703.26	434.10	414.34	60.05	419.41	0.138	0.617	0.383	0.497
675	771.79	494.10	467.82	63.31	477.38	0.128	0.640	0.360	0.546
690	838.11	554.40	522.25	65.89	535.64	0.119	0.661	0.339	0.593
705	901.95	612.70	573.52	68.08	591.97	0.111	0.679	0.321	0.638
720	963.03	670.90	625.98	69.66	648.20	0.104	0.697	0.303	0.681
735	1021.09	724.00	670.21	72.70	699.50	0.100	0.709	0.291	0.722
750	1075.88	775.00	713.79	75.40	748.78	0.097	0.720	0.280	0.761
765	1127.16	826.00	761.36	76.90	798.05	0.093	0.733	0.267	0.797
780	1174.72	868.00	799.30	79.10	838.63	0.091	0.739	0.261	0.831
795	1218.35	912.00	840.19	80.80	881.14	0.089	0.749	0.251	0.862
810	1257.86	954.00	883.45	79.40	921.72	0.083	0.758	0.242	0.890
825	1293.09	985.00	906.37	81.80	951.67	0.083	0.762	0.238	0.915
840	1323.89	1021.00	932.63	78.30	986.45	0.077	0.771	0.229	0.936
855	1350.12	1039.00	941.56	82.60	1003.85	0.080	0.770	0.230	0.955
870	1371.66	1066.00	969.20	80.70	1029.93	0.076	0.777	0.223	0.970
885	1388.44	1092.00	993.82	76.50	1055.05	0.070	0.786	0.214	0.982
900	1400.37	1099.00	996.42	79.00	1061.82	0.072	0.785	0.215	0.990
915	1407.41	1113.00	1002.42	75.80	1075.34	0.068	0.791	0.209	0.995
930	1409.52	1124.00	1017.88	73.90	1085.97	0.066	0.797	0.203	0.997
945	1406.70	1108.00	989.98	80.10	1070.51	0.072	0.788	0.212	0.995
960	1398.96	1116.00	996.40	80.60	1078.24	0.072	0.798	0.202	0.989
975	1386.33	1107.00	987.40	79.10	1069.54	0.071	0.799	0.201	0.981
990	1368.86	1092.00	958.51	79.00	1055.05	0.072	0.798	0.202	0.968
1005	1346.63	1080.00	948.66	78.60	1043.46	0.073	0.802	0.198	0.952
1020	1319.74	1064.00	937.18	75.70	1028.00	0.071	0.806	0.194	0.933
1035	1288.30	1044.00	917.59	72.70	1008.68	0.070	0.810	0.190	0.911
1050	1252.45	1010.00	877.88	74.20	975.83	0.073	0.806	0.194	0.886
1065	1212.33	981.00	843.76	74.40	947.81	0.076	0.809	0.191	0.857
1080	1168.13	942.00	799.77	77.30	910.13	0.082	0.806	0.194	0.826
1095	1120.02	901.00	754.95	78.20	870.51	0.087	0.804	0.196	0.792
1110	1068.22	859.00	713.24	80.60	829.94	0.094	0.804	0.196	0.756
1125	1012.95	813.00	669.17	78.80	785.49	0.097	0.803	0.197	0.716
1140	954.44	770.00	629.84	74.70	743.95	0.097	0.807	0.193	0.675
1155	892.95	723.00	584.21	73.00	698.54	0.101	0.810	0.190	0.632
1170	828.73	666.20	529.30	71.70	643.66	0.108	0.804	0.196	0.586
1185	762.07	611.90	480.79	69.04	591.20	0.113	0.803	0.197	0.539
1200	693.25	557.10	430.02	65.97	538.25	0.118	0.804	0.196	0.490
1215	622.56	497.70	376.04	62.99	480.86	0.127	0.799	0.201	0.440
1230	550.30	438.30	322.28	59.68	423.47	0.136	0.796	0.204	0.389
1245	476.79	379.20	269.79	56.07	366.37	0.148	0.795	0.205	0.337
1260	402.34	317.20	215.99	52.34	306.47	0.165	0.788	0.212	0.285
1275	327.27	257.40	166.20	47.46	248.69	0.184	0.786	0.214	0.231
1290	251.91	198.30	117.83	42.26	191.59	0.213	0.787	0.213	0.178
1305	176.56	140.40	72.51	36.23	135.65	0.258	0.795	0.205	0.125
1320	101.56	85.90	33.77	28.67	82.99	0.334	0.846	0.154	0.072
1335	27.23	39.21	6.19	19.35	37.88	0.493	0.000	1.000	0.019
1350	0.00	7.09	-2.69	8.60	6.85	0.000	0.000	0.000	-0.033
1365	0.00	-0.96	0.48	0.53	-0.93	0.000	0.000	0.000	-0.084
1380	0.00	-2.80	0.56	-1.29	-2.70	0.000	0.000	0.000	-0.133
1395	0.00	-2.44	0.28	-1.69	-2.35	0.000	0.000	0.000	-0.182
1410	0.00	-3.09	0.81	-1.29	-2.99	0.000	0.000	0.000	-0.229
1425	0.00	-2.95	0.57	-1.64	-2.85	0.000	0.000	0.000	-0.274

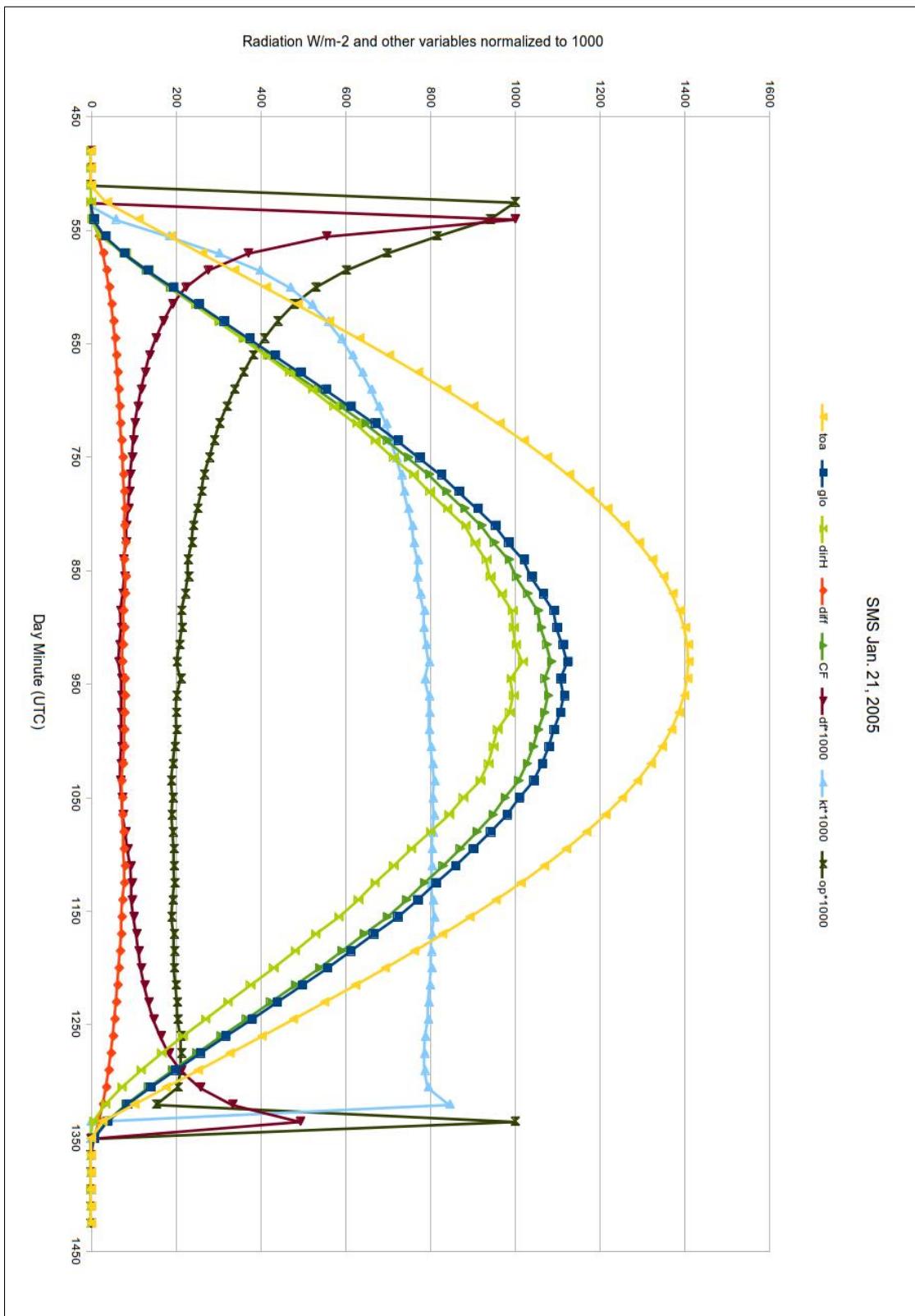


Figure C.21 - Graphic illustrating data measured and calculated on SMS January 21th 2005.

Table C.22 - Solar radiation and derived data for SMS jan 22th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-2.10	-0.05	-1.47	-2.03	0.000	0.000	0.000	-0.126
495	0.00	-2.23	0.12	-1.10	-2.15	0.000	0.000	0.000	-0.076
510	0.00	-1.61	-0.05	-1.54	-1.55	0.000	0.000	0.000	-0.025
525	37.85	-0.94	0.00	0.01	-0.91	-0.013	-0.025	1.000	0.027
540	112.30	6.39	1.26	7.12	6.17	1.000	0.057	0.943	0.079
555	187.37	30.33	22.41	19.05	29.30	0.628	0.162	0.838	0.133
570	262.74	70.20	65.77	30.82	67.82	0.439	0.267	0.733	0.186
585	338.09	120.50	112.25	40.96	116.42	0.340	0.356	0.644	0.239
600	413.09	176.20	163.56	49.10	170.24	0.279	0.427	0.573	0.292
615	487.42	233.10	214.78	55.98	225.21	0.240	0.478	0.522	0.345
630	560.77	292.40	269.35	61.71	282.51	0.211	0.521	0.479	0.397
645	632.82	351.10	324.05	66.28	339.22	0.189	0.555	0.445	0.448
660	703.26	407.70	373.55	72.10	393.91	0.177	0.580	0.420	0.497
675	771.79	464.90	424.15	76.20	449.17	0.164	0.602	0.398	0.546
690	838.11	525.60	479.57	78.90	507.82	0.150	0.627	0.373	0.593
705	901.95	583.60	530.13	82.20	563.85	0.141	0.647	0.353	0.638
720	963.03	635.60	572.17	86.50	614.09	0.136	0.660	0.340	0.681
735	1021.09	689.20	617.49	89.10	665.88	0.129	0.675	0.325	0.722
750	1075.88	741.00	661.28	90.90	715.93	0.123	0.689	0.311	0.761
765	1127.16	793.00	709.54	91.90	766.17	0.116	0.704	0.296	0.797
780	1174.72	837.00	746.96	92.70	808.68	0.111	0.713	0.287	0.831
795	1218.35	880.00	784.18	94.10	850.23	0.107	0.722	0.278	0.862
810	1257.86	919.00	818.51	93.50	887.91	0.102	0.731	0.269	0.890
825	1293.09	953.00	851.49	94.30	920.76	0.099	0.737	0.263	0.915
840	1323.89	982.00	873.64	95.10	948.77	0.097	0.742	0.258	0.936
855	1350.12	1009.00	897.63	96.20	974.86	0.095	0.747	0.253	0.955
870	1371.66	1029.00	906.14	100.80	994.18	0.098	0.750	0.250	0.970
885	1388.44	1048.00	917.22	102.00	1012.54	0.097	0.755	0.245	0.982
900	1400.37	1061.00	926.09	104.60	1025.10	0.099	0.758	0.242	0.990
915	1407.41	1075.00	929.75	107.20	1038.63	0.100	0.764	0.236	0.995
930	1409.52	1073.00	925.17	110.30	1036.70	0.103	0.761	0.239	0.997
945	1406.70	1071.00	913.37	114.90	1034.76	0.107	0.761	0.239	0.995
960	1398.96	1071.00	906.36	117.40	1034.76	0.110	0.766	0.234	0.989
975	1386.33	1080.00	907.00	128.60	1043.46	0.119	0.779	0.221	0.981
990	1368.86	666.40	437.04	194.40	643.85	0.292	0.487	0.513	0.968
1005	1346.63	1068.00	851.51	161.30	1031.86	0.151	0.793	0.207	0.952
1020	1319.74	442.30	186.78	231.20	427.33	0.523	0.335	0.665	0.933
1035	1288.30	1081.00	790.93	232.50	1044.42	0.215	0.839	0.161	0.911
1050	1252.45	510.70	49.07	447.90	493.42	0.877	0.408	0.592	0.886
1065	1212.33	562.70	39.24	510.70	543.66	0.908	0.464	0.536	0.857
1080	1168.13	633.50	85.18	526.70	612.07	0.831	0.542	0.458	0.826
1095	1120.02	833.00	322.42	461.80	804.82	0.554	0.744	0.256	0.792
1110	1068.22	875.00	619.55	191.60	845.39	0.219	0.819	0.181	0.756
1125	1012.95	796.00	589.64	147.40	769.07	0.185	0.786	0.214	0.716
1140	954.44	750.00	543.43	143.90	724.62	0.192	0.786	0.214	0.675
1155	892.95	698.00	492.00	144.00	674.38	0.206	0.782	0.218	0.632
1170	828.73	653.10	433.76	163.80	631.00	0.251	0.788	0.212	0.586
1185	762.07	578.40	374.34	149.70	558.83	0.259	0.759	0.241	0.539
1200	693.25	509.20	327.05	131.80	491.97	0.259	0.735	0.265	0.490
1215	622.56	456.40	281.41	126.70	440.96	0.278	0.733	0.267	0.440
1230	550.30	393.60	239.76	108.40	380.28	0.275	0.715	0.285	0.389
1245	476.79	337.00	199.84	94.50	325.60	0.280	0.707	0.293	0.337
1260	402.34	280.10	156.74	87.10	270.62	0.311	0.696	0.304	0.285
1275	327.27	219.60	114.30	75.10	212.17	0.342	0.671	0.329	0.231
1290	251.91	166.70	77.43	63.74	161.06	0.382	0.662	0.338	0.178
1305	176.56	112.20	42.61	51.23	108.40	0.457	0.635	0.365	0.125
1320	101.56	68.36	17.98	38.41	66.05	0.562	0.673	0.327	0.072
1335	27.23	29.90	2.31	22.92	28.89	0.767	0.000	1.000	0.019
1350	0.00	6.98	-0.57	8.86	6.74	0.000	0.000	0.000	-0.033
1365	0.00	-1.03	0.49	0.16	-1.00	0.000	0.000	0.000	-0.084
1380	0.00	-2.29	0.48	-1.13	-2.21	0.000	0.000	0.000	-0.133
1395	0.00	-2.37	0.50	-1.15	-2.29	0.000	0.000	0.000	-0.182
1410	0.00	-2.26	0.24	-1.41	-2.19	0.000	0.000	0.000	-0.229
1425	0.00	-2.35	0.38	-1.30	-2.27	0.000	0.000	0.000	-0.274

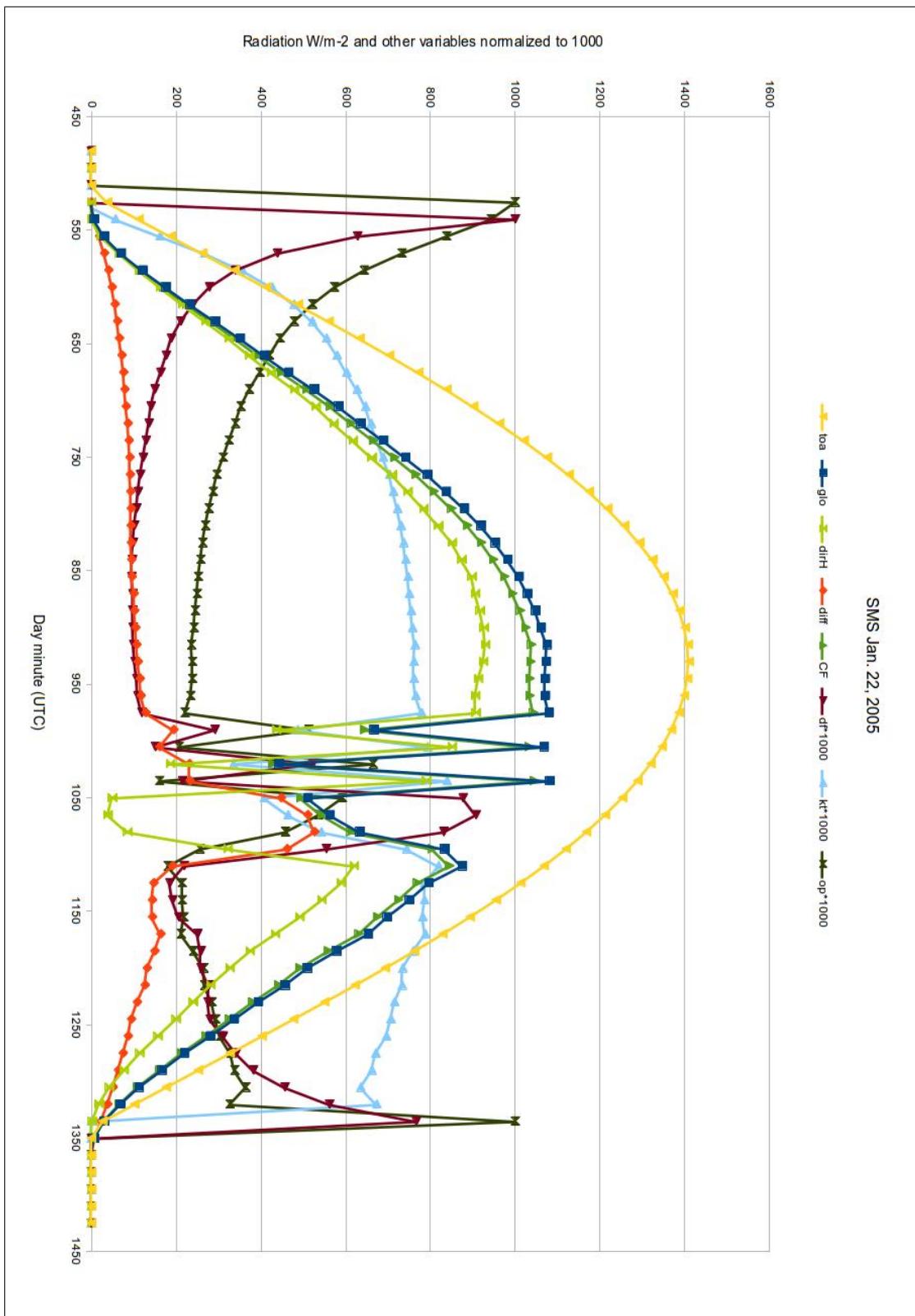


Figure C.22 - Graphic illustrating data measured and calculated on SMS January 22th 2005.

Table C.23 - Solar radiation and derived data for SMS jan 23th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-2.02	0.10	-1.15	-1.95	0.000	0.000	0.000	-0.126
495	0.00	-1.93	-0.12	-1.58	-1.87	0.000	0.000	0.000	-0.076
510	0.00	-2.03	-0.01	-1.46	-1.96	0.000	0.000	0.000	-0.025
525	37.85	-1.37	-0.01	-0.35	-1.32	0.258	-0.036	1.000	0.027
540	112.30	5.19	0.47	6.10	5.01	1.000	0.046	0.954	0.079
555	187.37	25.99	18.26	18.66	25.11	0.718	0.139	0.861	0.133
570	262.74	63.37	53.54	33.04	61.23	0.521	0.241	0.759	0.186
585	338.09	110.10	95.15	43.81	106.37	0.398	0.326	0.674	0.239
600	413.09	165.00	145.56	52.68	159.42	0.319	0.399	0.601	0.292
615	487.42	222.00	197.64	60.19	214.49	0.271	0.455	0.545	0.345
630	560.77	279.50	249.92	66.94	270.04	0.239	0.498	0.502	0.397
645	632.82	350.50	304.58	84.70	338.64	0.242	0.554	0.446	0.448
660	703.26	397.30	357.14	78.60	383.86	0.198	0.565	0.435	0.497
675	771.79	455.00	407.77	83.50	439.61	0.184	0.590	0.410	0.546
690	838.11	514.10	461.19	89.60	496.71	0.174	0.613	0.387	0.593
705	901.95	569.90	510.36	92.60	550.62	0.162	0.632	0.368	0.638
720	963.03	623.90	554.46	95.10	602.79	0.152	0.648	0.352	0.681
735	1021.09	676.10	599.44	98.40	653.22	0.146	0.662	0.338	0.722
750	1075.88	727.00	643.78	100.10	702.40	0.138	0.676	0.324	0.761
765	1127.16	771.00	683.23	103.70	744.91	0.135	0.684	0.316	0.797
780	1174.72	820.00	722.86	107.10	792.26	0.131	0.698	0.302	0.831
795	1218.35	869.00	768.67	104.20	839.60	0.120	0.713	0.287	0.862
810	1257.86	904.00	798.93	103.30	873.41	0.114	0.719	0.281	0.890
825	1293.09	933.00	824.05	103.10	901.43	0.111	0.722	0.278	0.915
840	1323.89	977.00	867.09	99.30	943.94	0.102	0.738	0.262	0.936
855	1350.12	1005.00	895.72	97.50	971.00	0.097	0.744	0.256	0.955
870	1371.66	1024.00	904.20	100.40	989.35	0.098	0.747	0.253	0.970
885	1388.44	1048.00	924.10	99.50	1012.54	0.095	0.755	0.245	0.982
900	1400.37	1060.00	933.03	98.20	1024.13	0.093	0.757	0.243	0.990
915	1407.41	1077.00	948.67	97.90	1040.56	0.091	0.765	0.235	0.995
930	1409.52	1089.00	956.07	95.50	1052.15	0.088	0.773	0.227	0.997
945	1406.70	1086.00	947.19	96.60	1049.26	0.089	0.772	0.228	0.995
960	1398.96	1085.00	941.98	97.30	1048.29	0.090	0.776	0.224	0.989
975	1386.33	1078.00	937.40	96.50	1041.53	0.090	0.778	0.222	0.981
990	1368.86	1069.00	923.65	95.30	1032.83	0.089	0.781	0.219	0.968
1005	1346.63	1053.00	905.80	95.90	1017.37	0.091	0.782	0.218	0.952
1020	1319.74	1034.00	886.77	95.80	999.01	0.093	0.783	0.217	0.933
1035	1288.30	1010.00	856.54	94.90	975.83	0.094	0.784	0.216	0.911
1050	1252.45	987.00	834.47	93.30	953.60	0.095	0.788	0.212	0.886
1065	1212.33	948.00	788.02	95.30	915.92	0.101	0.782	0.218	0.857
1080	1168.13	920.00	760.11	95.80	888.87	0.104	0.788	0.212	0.826
1095	1120.02	883.00	723.26	97.10	853.12	0.110	0.788	0.212	0.792
1110	1068.22	843.00	683.01	97.70	814.48	0.116	0.789	0.211	0.756
1125	1012.95	801.00	642.66	94.40	773.90	0.118	0.791	0.209	0.716
1140	954.44	749.00	591.36	94.90	723.66	0.127	0.785	0.215	0.675
1155	892.95	699.50	542.52	94.10	675.83	0.135	0.783	0.217	0.632
1170	828.73	644.70	491.20	91.50	622.89	0.142	0.778	0.222	0.586
1185	762.07	588.30	439.29	88.90	568.39	0.151	0.772	0.228	0.539
1200	693.25	533.80	384.91	93.20	515.74	0.175	0.770	0.230	0.490
1215	622.56	534.20	338.17	137.90	516.13	0.258	0.858	0.142	0.440
1230	550.30	516.50	284.52	179.90	499.02	0.348	0.939	0.061	0.389
1245	476.79	292.60	112.43	155.90	282.70	0.533	0.614	0.386	0.337
1260	402.34	125.40	4.49	120.30	121.16	0.959	0.312	0.688	0.285
1275	327.27	280.30	134.24	108.30	270.82	0.386	0.856	0.144	0.231
1290	251.91	198.90	91.60	78.10	192.17	0.393	0.790	0.210	0.178
1305	176.56	160.20	53.12	83.60	154.78	0.522	0.907	0.093	0.125
1320	101.56	109.30	22.72	71.00	105.60	0.650	0.000	1.000	0.072
1335	27.23	49.97	3.29	39.75	48.28	0.795	0.000	1.000	0.019
1350	0.00	9.46	-0.83	10.90	9.14	0.000	0.000	0.000	-0.033
1365	0.00	-1.62	0.48	0.55	-1.57	0.000	0.000	0.000	-0.084
1380	0.00	-0.95	0.13	-1.99	-0.92	0.000	0.000	0.000	-0.133
1395	0.00	-2.04	0.06	-1.05	-1.97	0.000	0.000	0.000	-0.182
1410	0.00	-2.01	-0.23	-1.55	-1.94	0.000	0.000	0.000	-0.229
1425	0.00	-2.21	0.87	-0.71	-2.14	0.000	0.000	0.000	-0.274

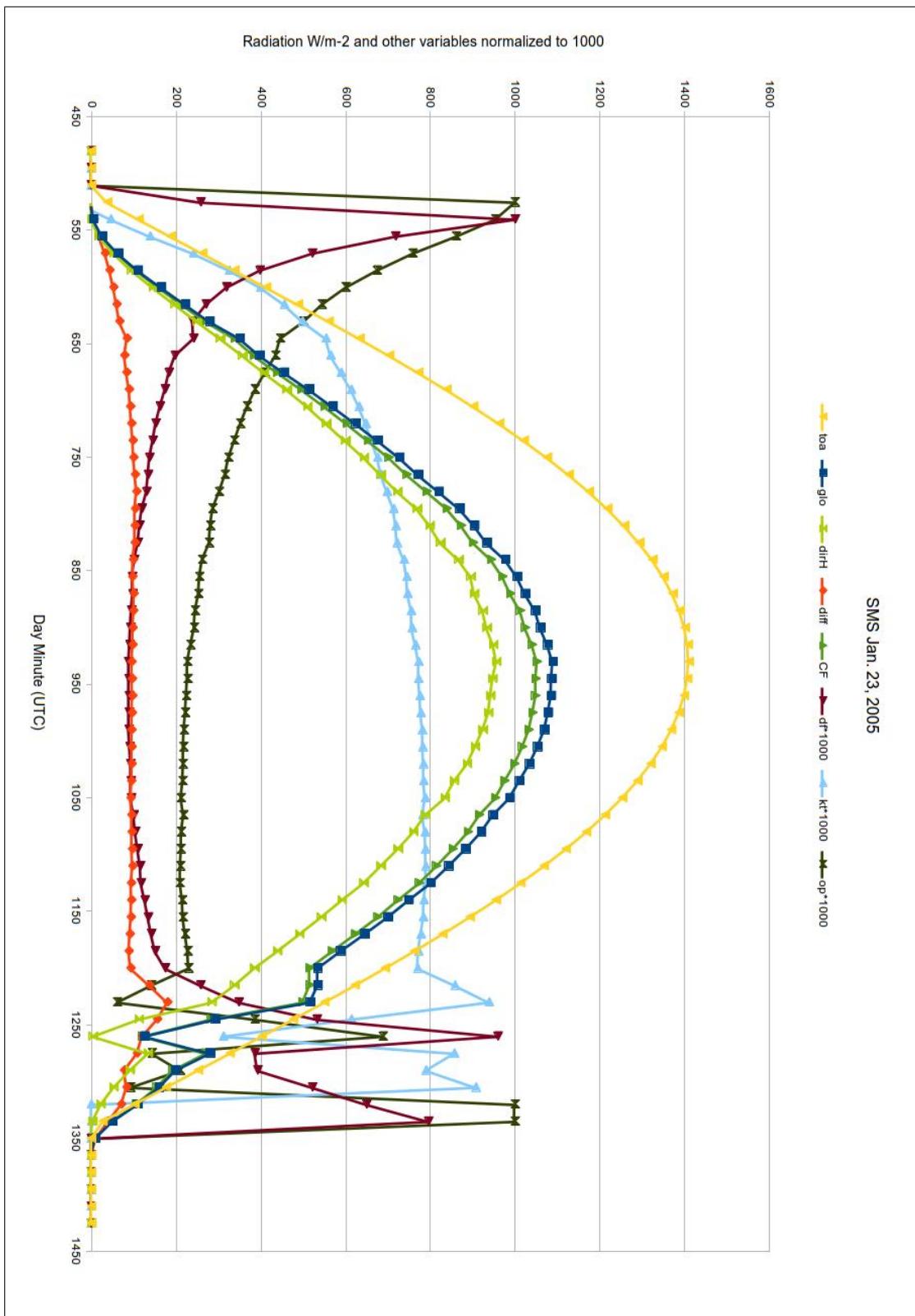


Figure C.23 - Graphic illustrating data measured and calculated on SMS January 23th 2005.

Table C.24 - Solar radiation and derived data for SMS jan 24th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-1.25	-0.11	-0.74	-1.21	0.000	0.000	0.000	-0.126
495	0.00	-1.09	-0.05	-0.90	-1.05	0.000	0.000	0.000	-0.076
510	0.00	-1.25	-0.01	-0.96	-1.21	0.000	0.000	0.000	-0.025
525	37.85	-0.94	0.01	-0.46	-0.91	0.491	-0.025	1.000	0.027
540	112.30	1.34	0.00	1.92	1.29	1.000	0.012	0.988	0.079
555	187.37	6.21	0.03	6.85	6.00	1.000	0.033	0.967	0.133
570	262.74	20.18	0.08	20.22	19.50	1.000	0.077	0.923	0.186
585	338.09	41.76	0.23	41.61	40.35	0.996	0.124	0.876	0.239
600	413.09	60.16	0.31	59.76	58.12	0.993	0.146	0.854	0.292
615	487.42	98.10	1.14	96.70	94.78	0.986	0.201	0.799	0.345
630	560.77	137.70	1.23	135.90	133.04	0.987	0.246	0.754	0.397
645	632.82	154.30	4.78	149.20	149.08	0.967	0.244	0.756	0.448
660	703.26	218.70	6.63	210.60	211.30	0.963	0.311	0.689	0.497
675	771.79	276.20	15.30	259.70	266.85	0.940	0.358	0.642	0.546
690	838.11	282.70	4.69	275.90	273.13	0.976	0.337	0.663	0.593
705	901.95	322.50	3.41	316.30	311.59	0.981	0.358	0.642	0.638
720	963.03	327.00	1.24	321.30	315.94	0.983	0.340	0.660	0.681
735	1021.09	322.60	1.62	315.40	311.68	0.978	0.316	0.684	0.722
750	1075.88	380.40	3.13	372.20	367.53	0.978	0.354	0.646	0.761
765	1127.16	366.40	2.58	358.20	354.00	0.978	0.325	0.675	0.797
780	1174.72	512.00	39.67	462.90	494.68	0.904	0.436	0.564	0.831
795	1218.35	402.00	0.94	393.20	388.40	0.978	0.330	0.670	0.862
810	1257.86	354.60	1.56	346.00	342.60	0.976	0.282	0.718	0.890
825	1293.09	365.00	4.44	355.50	352.65	0.974	0.282	0.718	0.915
840	1323.89	207.20	-3.24	203.00	200.19	0.980	0.157	0.843	0.936
855	1350.12	202.50	-2.63	197.90	195.65	0.977	0.150	0.850	0.955
870	1371.66	280.50	-1.90	273.30	271.01	0.974	0.204	0.796	0.970
885	1388.44	399.20	1.13	386.50	385.69	0.968	0.288	0.712	0.982
900	1400.37	636.30	9.46	609.00	614.77	0.957	0.454	0.546	0.990
915	1407.41	583.20	32.56	528.30	563.47	0.906	0.414	0.586	0.995
930	1409.52	589.20	31.02	533.20	569.26	0.905	0.418	0.582	0.997
945	1406.70	625.10	14.09	590.90	603.95	0.945	0.444	0.556	0.995
960	1398.96	506.10	9.40	489.20	488.98	0.967	0.362	0.638	0.989
975	1386.33	504.20	5.41	487.30	487.14	0.966	0.364	0.636	0.981
990	1368.86	408.80	5.24	396.60	394.97	0.970	0.299	0.701	0.968
1005	1346.63	523.40	8.89	506.90	505.69	0.968	0.389	0.611	0.952
1020	1319.74	509.00	9.86	492.00	491.78	0.967	0.386	0.614	0.933
1035	1288.30	416.50	2.62	404.30	402.41	0.971	0.323	0.677	0.911
1050	1252.45	542.60	11.45	524.30	524.24	0.966	0.433	0.567	0.886
1065	1212.33	561.40	14.28	545.00	542.41	0.971	0.463	0.537	0.857
1080	1168.13	453.30	6.54	440.80	437.96	0.972	0.388	0.612	0.826
1095	1120.02	586.30	72.64	496.50	566.46	0.847	0.523	0.477	0.792
1110	1068.22	464.20	4.00	453.50	448.49	0.977	0.435	0.565	0.756
1125	1012.95	319.00	-0.82	312.60	308.21	0.980	0.315	0.685	0.716
1140	954.44	371.20	7.87	354.70	358.64	0.956	0.389	0.611	0.675
1155	892.95	302.70	0.99	296.70	292.46	0.980	0.339	0.661	0.632
1170	828.73	295.70	1.36	290.20	285.70	0.981	0.357	0.643	0.586
1185	762.07	291.90	1.03	286.90	282.02	0.983	0.383	0.617	0.539
1200	693.25	462.90	151.41	279.50	447.24	0.604	0.668	0.332	0.490
1215	622.56	263.90	0.71	260.10	254.97	0.986	0.424	0.576	0.440
1230	550.30	338.10	73.17	245.20	326.66	0.725	0.614	0.386	0.389
1245	476.79	335.30	168.75	131.70	323.96	0.393	0.703	0.297	0.337
1260	402.34	329.10	170.18	119.10	317.96	0.362	0.818	0.182	0.285
1275	327.27	170.30	27.15	134.30	164.54	0.789	0.520	0.480	0.231
1290	251.91	95.60	-0.31	95.30	92.37	0.997	0.380	0.620	0.178
1305	176.56	61.56	-0.34	61.78	59.48	1.000	0.349	0.651	0.125
1320	101.56	25.25	-0.20	25.91	24.40	1.000	0.249	0.751	0.072
1335	27.23	7.54	-0.04	8.09	7.28	1.000	0.277	0.723	0.019
1350	0.00	-1.41	0.23	0.56	-1.36	0.000	0.000	0.000	-0.033
1365	0.00	-1.44	0.45	-0.19	-1.39	0.000	0.000	0.000	-0.084
1380	0.00	-0.79	0.04	-0.49	-0.76	0.000	0.000	0.000	-0.133
1395	0.00	-0.36	0.23	-0.02	-0.34	0.000	0.000	0.000	-0.182
1410	0.00	-0.50	-0.12	-0.41	-0.49	0.000	0.000	0.000	-0.229
1425	0.00	-0.64	0.06	-0.37	-0.62	0.000	0.000	0.000	-0.274

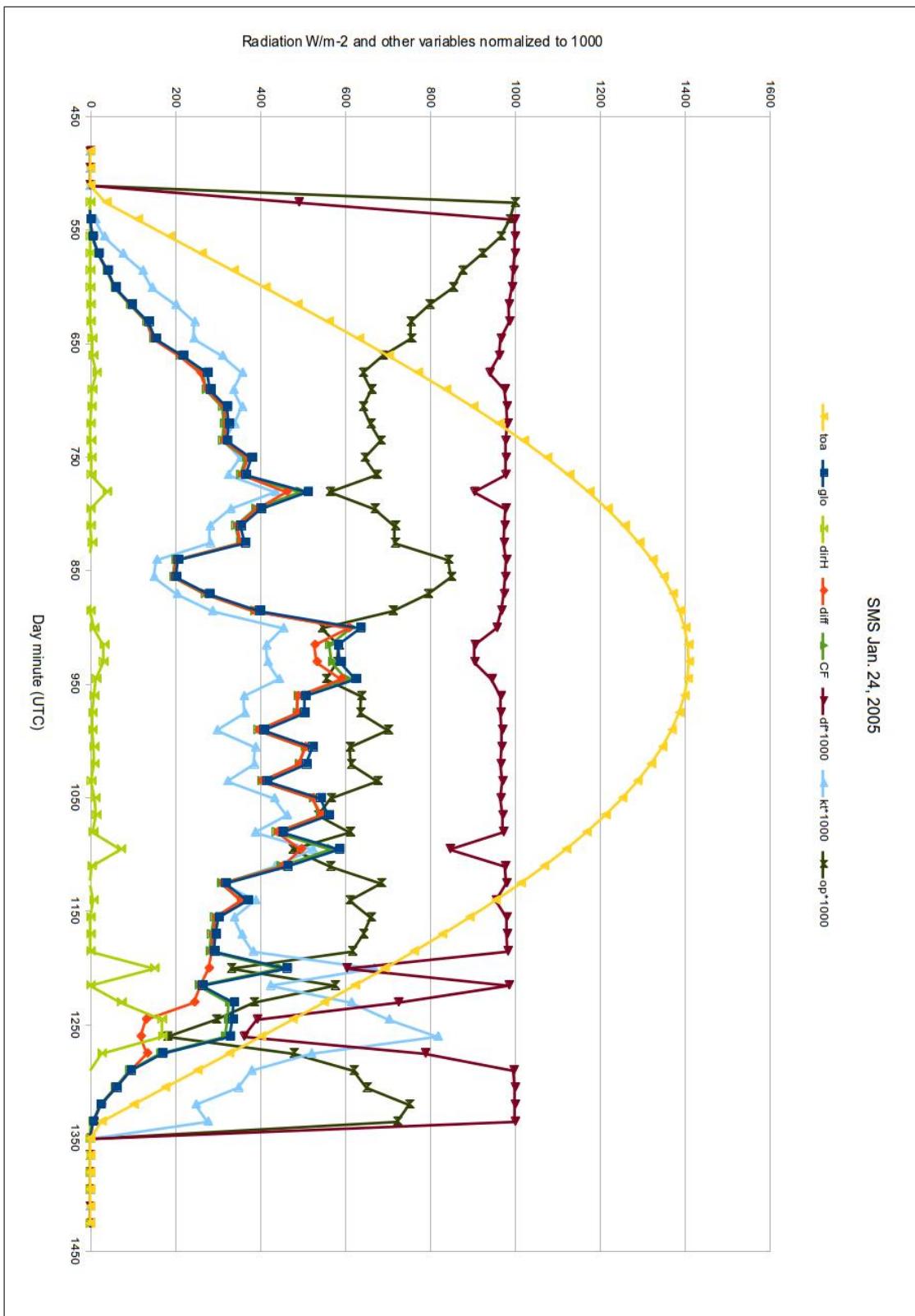


Figure C.24 - Graphic illustrating data measured and calculated on SMS January 24th 2005.

Table C.25 - Solar radiation and derived data for SMS jan 25th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-0.63	-0.05	-0.37	-0.61	0.000	0.000	0.000	-0.126
495	0.00	-0.63	0.00	-0.33	-0.61	0.000	0.000	0.000	-0.076
510	0.00	-0.63	-0.02	-0.36	-0.60	0.000	0.000	0.000	-0.025
525	37.85	-0.69	0.00	-0.09	-0.67	0.133	-0.018	1.000	0.027
540	112.30	0.34	-0.02	0.76	0.33	1.000	0.003	0.997	0.079
555	187.37	1.64	-0.09	2.10	1.59	1.000	0.009	0.991	0.133
570	262.74	4.63	-0.33	5.25	4.47	1.000	0.018	0.982	0.186
585	338.09	6.94	-0.09	7.13	6.71	1.000	0.021	0.979	0.239
600	413.09	22.38	-0.37	22.71	21.62	1.000	0.054	0.946	0.292
615	487.42	17.95	-0.44	18.14	17.34	1.000	0.037	0.963	0.345
630	560.77	34.55	-0.20	34.41	33.38	0.996	0.062	0.938	0.397
645	632.82	29.35	-0.36	29.20	28.36	0.995	0.046	0.954	0.448
660	703.26	69.15	-0.03	68.30	66.81	0.988	0.098	0.902	0.497
675	771.79	100.70	-0.12	98.90	97.29	0.982	0.130	0.870	0.546
690	838.11	90.50	0.00	89.00	87.44	0.983	0.108	0.892	0.593
705	901.95	73.00	0.34	72.10	70.53	0.988	0.081	0.919	0.638
720	963.03	111.80	0.01	110.10	108.02	0.985	0.116	0.884	0.681
735	1021.09	173.90	1.06	170.80	168.02	0.982	0.170	0.830	0.722
750	1075.88	535.60	56.77	469.70	517.48	0.877	0.498	0.502	0.761
765	1127.16	675.40	190.22	476.80	652.55	0.706	0.599	0.401	0.797
780	1174.72	927.00	657.22	268.60	895.64	0.290	0.789	0.211	0.831
795	1218.35	1051.00	767.80	279.60	1015.44	0.266	0.863	0.137	0.862
810	1257.86	694.10	347.87	334.80	670.62	0.482	0.552	0.448	0.890
825	1293.09	317.50	7.86	301.50	306.76	0.950	0.246	0.754	0.915
840	1323.89	978.00	710.71	243.60	944.91	0.249	0.739	0.261	0.936
855	1350.12	1164.00	888.08	247.30	1124.62	0.212	0.862	0.138	0.955
870	1371.66	982.00	548.24	400.00	948.77	0.407	0.716	0.284	0.970
885	1388.44	1209.00	915.26	254.40	1168.09	0.210	0.871	0.129	0.982
900	1400.37	1185.00	925.10	210.70	1144.91	0.178	0.846	0.154	0.990
915	1407.41	1292.00	931.74	304.70	1248.29	0.236	0.918	0.082	0.995
930	1409.52	1003.00	532.47	427.10	969.06	0.426	0.712	0.288	0.997
945	1406.70	484.50	5.59	470.10	468.11	0.970	0.344	0.656	0.995
960	1398.96	380.20	0.38	369.20	367.34	0.971	0.272	0.728	0.989
975	1386.33	1187.00	926.61	200.50	1146.84	0.169	0.856	0.144	0.981
990	1368.86	1150.00	885.89	199.40	1111.09	0.173	0.840	0.160	0.968
1005	1346.63	1057.00	782.93	212.50	1021.24	0.201	0.785	0.215	0.952
1020	1319.74	1110.00	841.97	202.50	1072.44	0.182	0.841	0.159	0.933
1035	1288.30	1035.00	861.09	105.30	999.98	0.102	0.803	0.197	0.911
1050	1252.45	1014.00	847.76	94.50	979.69	0.093	0.810	0.190	0.886
1065	1212.33	982.00	815.46	92.60	948.77	0.094	0.810	0.190	0.857
1080	1168.13	950.00	787.38	87.40	917.86	0.092	0.813	0.187	0.826
1095	1120.02	919.00	762.08	79.30	887.91	0.086	0.821	0.179	0.792
1110	1068.22	877.00	723.81	75.90	847.33	0.087	0.821	0.179	0.756
1125	1012.95	832.00	681.35	73.20	803.85	0.088	0.821	0.179	0.716
1140	954.44	780.00	630.52	72.60	753.61	0.093	0.817	0.183	0.675
1155	892.95	729.00	584.21	69.90	704.33	0.096	0.816	0.184	0.632
1170	828.73	677.90	538.09	67.39	654.96	0.099	0.818	0.182	0.586
1185	762.07	627.40	493.19	62.97	606.17	0.100	0.823	0.177	0.539
1200	693.25	570.60	442.28	59.57	551.29	0.104	0.823	0.177	0.490
1215	622.56	512.10	389.69	57.16	494.77	0.112	0.823	0.177	0.440
1230	550.30	449.30	333.57	54.96	434.10	0.122	0.816	0.184	0.389
1245	476.79	387.50	278.22	52.55	374.39	0.136	0.813	0.187	0.337
1260	402.34	324.00	223.68	49.39	313.04	0.152	0.805	0.195	0.285
1275	327.27	261.10	170.37	46.08	252.27	0.176	0.798	0.202	0.231
1290	251.91	198.60	118.98	41.66	191.88	0.210	0.788	0.212	0.178
1305	176.56	138.10	72.07	35.73	133.43	0.259	0.782	0.218	0.125
1320	101.56	84.30	33.77	28.04	81.45	0.333	0.830	0.170	0.072
1335	27.23	34.73	5.40	18.86	33.55	0.543	0.000	1.000	0.019
1350	0.00	6.11	-2.26	7.82	5.91	0.000	0.000	0.000	-0.033
1365	0.00	-1.46	0.50	0.07	-1.41	0.000	0.000	0.000	-0.084
1380	0.00	-2.93	0.45	-1.58	-2.83	0.000	0.000	0.000	-0.133
1395	0.00	-2.87	0.41	-1.59	-2.78	0.000	0.000	0.000	-0.182
1410	0.00	-2.77	0.49	-1.53	-2.68	0.000	0.000	0.000	-0.229
1425	0.00	-2.51	0.16	-1.73	-2.43	0.000	0.000	0.000	-0.274

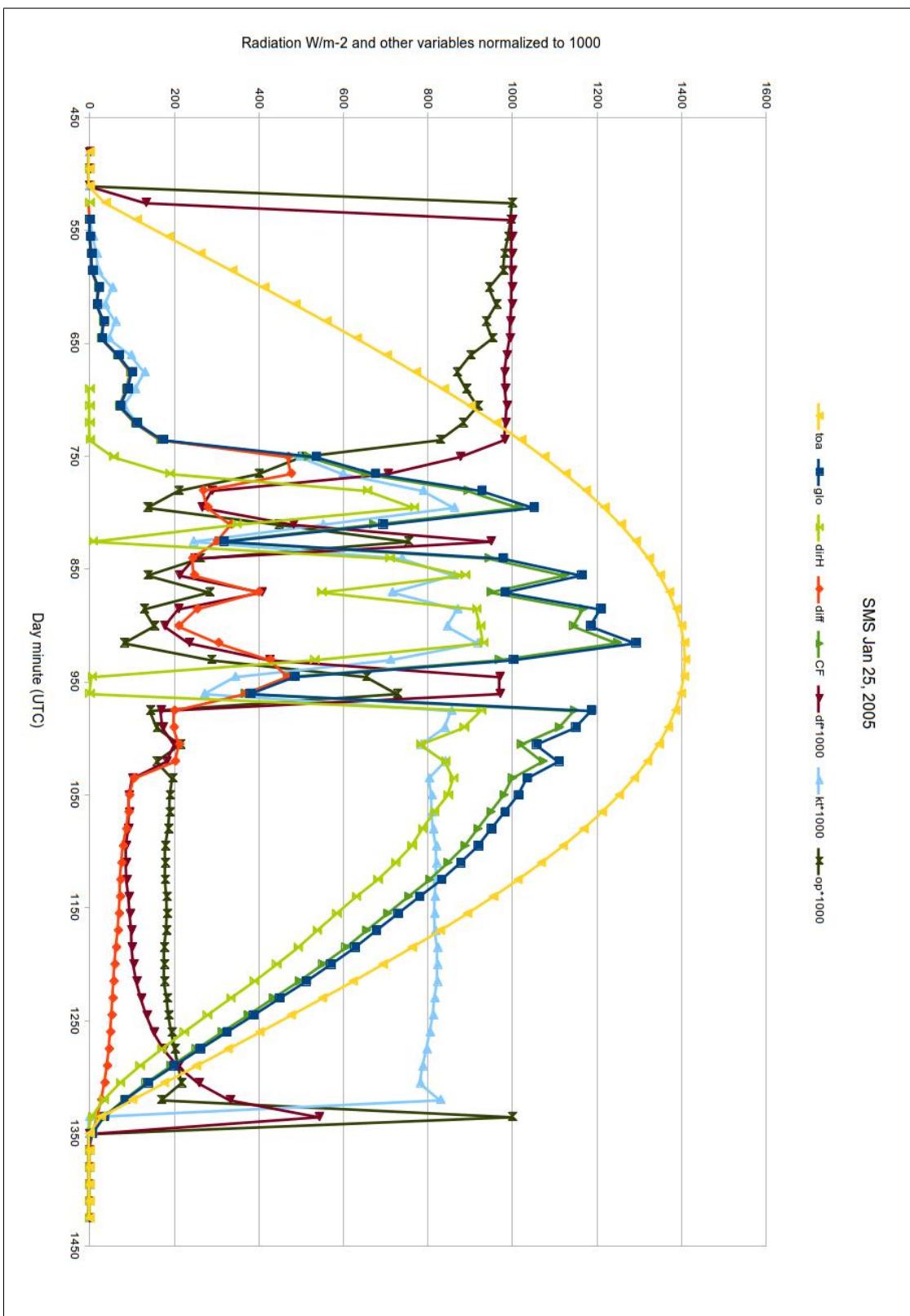


Figure C.25 - Graphic illustrating data measured and calculated on SMS January 25th 2005.

Table C.26 - Solar radiation and derived data for SMS jan 26th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-2.20	0.00	-1.45	-2.12	0.000	0.000	0.000	-0.126
495	0.00	-2.52	0.00	-1.11	-2.43	0.000	0.000	0.000	-0.076
510	0.00	-2.20	0.00	-1.47	-2.12	0.000	0.000	0.000	-0.025
525	37.85	-1.57	-0.48	-0.60	-1.51	0.386	-0.041	1.000	0.027
540	112.30	3.55	-0.63	4.30	3.43	1.000	0.032	0.968	0.079
555	187.37	26.62	148.25	14.66	25.72	0.551	0.142	0.858	0.133
570	262.74	70.40	159.32	24.70	68.02	0.351	0.268	0.732	0.186
585	338.09	123.80	152.89	32.73	119.61	0.264	0.366	0.634	0.239
600	413.09	182.00	142.52	38.75	175.84	0.213	0.441	0.559	0.292
615	487.42	243.30	132.92	44.12	235.07	0.181	0.499	0.501	0.345
630	560.77	303.70	126.43	49.48	293.42	0.163	0.542	0.458	0.397
645	632.82	365.50	118.12	52.65	353.13	0.144	0.578	0.422	0.448
660	703.26	426.90	111.27	55.95	412.46	0.131	0.607	0.393	0.497
675	771.79	488.20	105.77	59.08	471.68	0.121	0.633	0.367	0.546
690	838.11	549.70	98.61	60.16	531.10	0.109	0.656	0.344	0.593
705	901.95	607.30	95.96	63.69	586.75	0.105	0.673	0.327	0.638
720	963.03	661.20	90.35	64.58	638.83	0.098	0.687	0.313	0.681
735	1021.09	721.00	84.15	63.80	696.61	0.088	0.706	0.294	0.722
750	1075.88	772.00	82.73	66.67	745.88	0.086	0.718	0.282	0.761
765	1127.16	821.00	79.20	67.38	793.22	0.082	0.728	0.272	0.797
780	1174.72	868.00	76.25	67.74	838.63	0.078	0.739	0.261	0.831
795	1218.35	910.00	74.64	69.38	879.21	0.076	0.747	0.253	0.862
810	1257.86	952.00	72.59	69.80	919.79	0.073	0.757	0.243	0.890
825	1293.09	984.00	72.01	71.50	950.71	0.073	0.761	0.239	0.915
840	1323.89	1020.00	69.31	70.70	985.49	0.069	0.770	0.230	0.936
855	1350.12	1049.00	67.23	69.96	1013.51	0.067	0.777	0.223	0.955
870	1371.66	1076.00	65.48	69.62	1039.59	0.065	0.784	0.216	0.970
885	1388.44	1096.00	64.91	70.30	1058.92	0.064	0.789	0.211	0.982
900	1400.37	1109.00	64.48	70.80	1071.48	0.064	0.792	0.208	0.990
915	1407.41	1118.00	64.95	71.90	1080.17	0.064	0.794	0.206	0.995
930	1409.52	1126.00	63.93	71.20	1087.90	0.063	0.799	0.201	0.997
945	1406.70	1129.00	64.18	71.60	1090.80	0.063	0.803	0.197	0.995
960	1398.96	1129.00	63.14	70.30	1090.80	0.062	0.807	0.193	0.989
975	1386.33	1120.00	63.84	71.00	1082.10	0.063	0.808	0.192	0.981
990	1368.86	1109.00	64.81	71.30	1071.48	0.064	0.810	0.190	0.968
1005	1346.63	1090.00	66.37	72.20	1053.12	0.066	0.809	0.191	0.952
1020	1319.74	1073.00	65.61	70.40	1036.70	0.066	0.813	0.187	0.933
1035	1288.30	1049.00	67.58	71.10	1013.51	0.068	0.814	0.186	0.911
1050	1252.45	1022.00	68.43	70.50	987.42	0.069	0.816	0.184	0.886
1065	1212.33	994.00	68.77	68.84	960.37	0.069	0.820	0.180	0.857
1080	1168.13	955.00	71.59	69.55	922.69	0.073	0.818	0.182	0.826
1095	1120.02	917.00	73.49	69.12	885.97	0.075	0.819	0.181	0.792
1110	1068.22	871.00	77.06	69.70	841.53	0.080	0.815	0.185	0.756
1125	1012.95	828.00	78.19	67.58	799.98	0.082	0.817	0.183	0.716
1140	954.44	778.00	80.36	66.09	751.68	0.085	0.815	0.185	0.675
1155	892.95	729.00	82.74	64.37	704.33	0.088	0.816	0.184	0.632
1170	828.73	672.70	86.05	62.92	649.94	0.094	0.812	0.188	0.586
1185	762.07	615.90	91.14	62.30	595.06	0.101	0.808	0.192	0.539
1200	693.25	558.80	95.36	60.28	539.89	0.108	0.806	0.194	0.490
1215	622.56	498.80	101.00	58.51	481.92	0.117	0.801	0.199	0.440
1230	550.30	439.10	108.07	56.83	424.24	0.129	0.798	0.202	0.389
1245	476.79	378.20	114.35	53.79	365.40	0.142	0.793	0.207	0.337
1260	402.34	315.90	122.92	50.76	305.21	0.161	0.785	0.215	0.285
1275	327.27	253.40	129.98	46.00	244.83	0.182	0.774	0.226	0.231
1290	251.91	193.70	138.02	40.73	187.15	0.210	0.769	0.231	0.178
1305	176.56	135.80	148.05	34.99	131.21	0.258	0.769	0.231	0.125
1320	101.56	80.70	155.93	27.97	77.97	0.347	0.795	0.205	0.072
1335	27.23	34.32	152.29	18.66	33.16	0.544	0.000	1.000	0.019
1350	0.00	5.86	0.00	7.39	5.66	0.000	0.000	0.000	-0.033
1365	0.00	-1.07	0.00	0.03	-1.03	0.000	0.000	0.000	-0.084
1380	0.00	-2.45	0.00	-1.62	-2.36	0.000	0.000	0.000	-0.133
1395	0.00	-2.67	0.00	-1.37	-2.58	0.000	0.000	0.000	-0.182
1410	0.00	-2.47	0.00	-1.29	-2.39	0.000	0.000	0.000	-0.229
1425	0.00	-2.35	0.00	-1.56	-2.27	0.000	0.000	0.000	-0.274

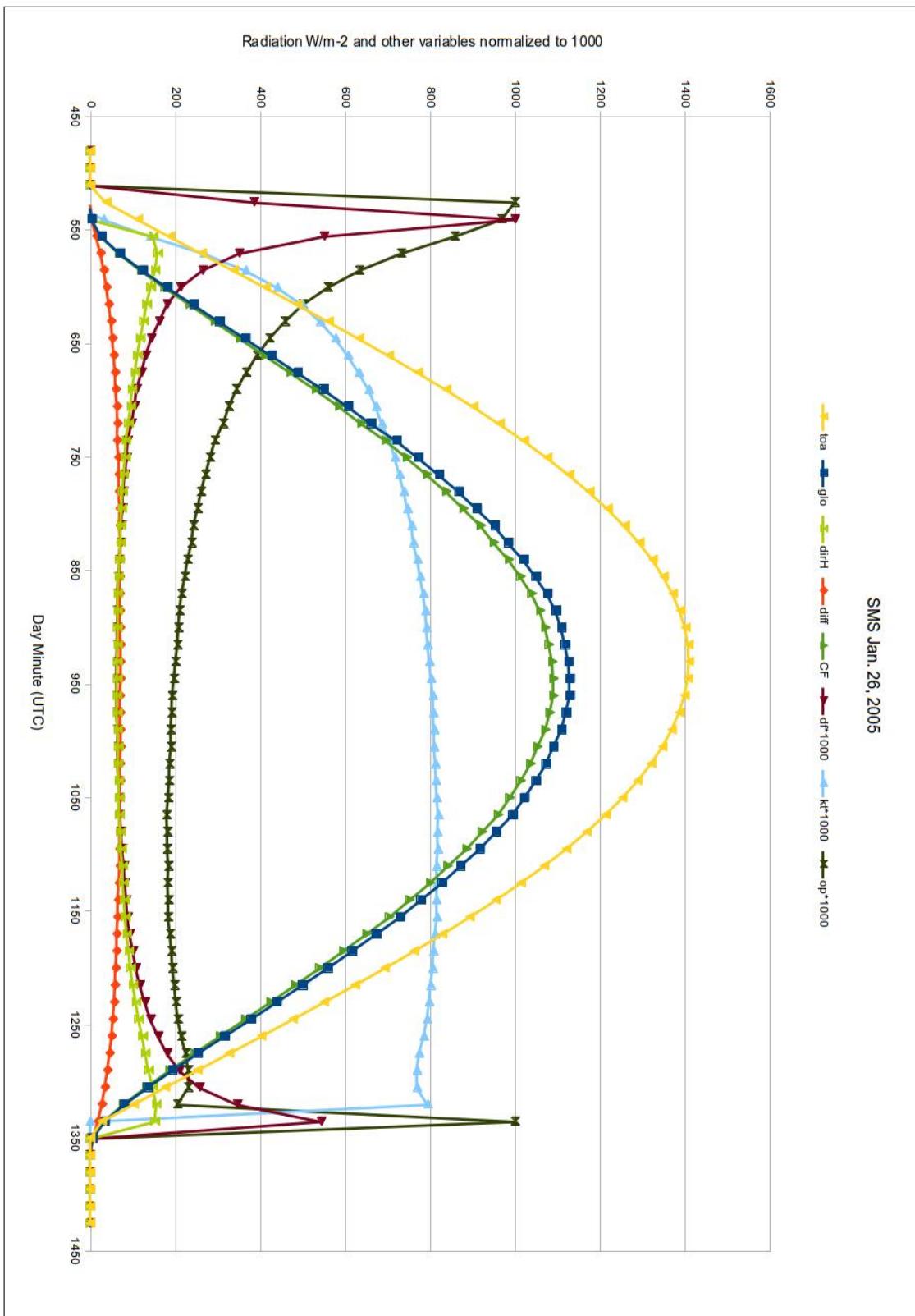


Figure C.26 - Graphic illustrating data measured and calculated on SMS January 26th 2005.

Table C.27 - Solar radiation and derived data for SMS jan 27th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-2.26	-0.04	-1.52	-2.18	0.000	0.000	0.000	-0.126
495	0.00	-2.19	-0.01	-1.47	-2.11	0.000	0.000	0.000	-0.076
510	0.00	-2.51	0.04	-1.23	-2.43	0.000	0.000	0.000	-0.025
525	37.85	-1.57	0.01	-1.05	-1.52	0.666	-0.042	1.000	0.027
540	112.30	3.12	-0.10	4.17	3.01	1.000	0.028	0.972	0.079
555	187.37	22.67	30.04	15.01	21.90	0.662	0.121	0.879	0.133
570	262.74	64.12	73.89	25.49	61.95	0.398	0.244	0.756	0.186
585	338.09	115.40	126.57	33.34	111.50	0.289	0.341	0.659	0.239
600	413.09	172.20	183.49	39.34	166.37	0.228	0.417	0.583	0.292
615	487.42	231.30	238.64	45.13	223.47	0.195	0.475	0.525	0.345
630	560.77	293.70	297.47	49.64	283.76	0.169	0.524	0.476	0.397
645	632.82	353.20	352.70	53.94	341.25	0.153	0.558	0.442	0.448
660	703.26	415.10	410.36	56.41	401.06	0.136	0.590	0.410	0.497
675	771.79	476.90	466.18	58.99	460.76	0.124	0.618	0.382	0.546
690	838.11	533.80	513.95	63.05	515.74	0.118	0.637	0.363	0.593
705	901.95	593.50	569.05	63.21	573.42	0.107	0.658	0.342	0.638
720	963.03	649.60	617.80	65.62	627.62	0.101	0.675	0.325	0.681
735	1021.09	706.00	668.77	65.89	682.11	0.093	0.691	0.309	0.722
750	1075.88	757.00	709.98	69.58	731.39	0.092	0.704	0.296	0.761
765	1127.16	804.00	744.62	73.10	776.80	0.091	0.713	0.287	0.797
780	1174.72	853.00	789.33	71.70	824.14	0.084	0.726	0.274	0.831
795	1218.35	894.00	823.82	73.60	863.75	0.082	0.734	0.266	0.862
810	1257.86	933.00	855.87	75.30	901.43	0.081	0.742	0.258	0.890
825	1293.09	968.00	884.42	75.10	935.25	0.078	0.749	0.251	0.915
840	1323.89	1002.00	912.97	76.60	968.10	0.076	0.757	0.243	0.936
855	1350.12	1028.00	931.06	77.90	993.22	0.076	0.761	0.239	0.955
870	1371.66	1056.00	953.68	76.80	1020.27	0.073	0.770	0.230	0.970
885	1388.44	1072.00	962.40	80.60	1035.73	0.075	0.772	0.228	0.982
900	1400.37	1083.00	965.71	81.80	1046.36	0.076	0.773	0.227	0.990
915	1407.41	1096.00	979.53	78.80	1058.92	0.072	0.779	0.221	0.995
930	1409.52	1107.00	985.98	77.60	1069.54	0.070	0.785	0.215	0.997
945	1406.70	1106.00	980.03	78.80	1068.58	0.071	0.786	0.214	0.995
960	1398.96	1096.00	960.78	82.30	1058.92	0.075	0.783	0.217	0.989
975	1386.33	1095.00	959.95	79.10	1057.95	0.072	0.790	0.210	0.981
990	1368.86	1082.00	942.05	81.70	1045.39	0.076	0.790	0.210	0.968
1005	1346.63	1072.00	928.66	79.80	1035.73	0.074	0.796	0.204	0.952
1020	1319.74	1052.00	909.18	79.00	1016.41	0.075	0.797	0.203	0.933
1035	1288.30	1028.00	881.14	79.30	993.22	0.077	0.798	0.202	0.911
1050	1252.45	1000.00	851.30	78.30	966.17	0.078	0.798	0.202	0.886
1065	1212.33	968.00	821.46	80.00	935.25	0.083	0.798	0.202	0.857
1080	1168.13	932.00	779.94	79.90	900.47	0.086	0.798	0.202	0.826
1095	1120.02	902.00	748.61	78.60	871.48	0.087	0.805	0.195	0.792
1110	1068.22	844.00	689.81	83.30	815.44	0.099	0.790	0.210	0.756
1125	1012.95	806.00	656.27	82.00	778.73	0.102	0.796	0.204	0.716
1140	954.44	751.00	600.81	82.60	725.59	0.110	0.787	0.213	0.675
1155	892.95	695.30	548.21	82.70	671.77	0.119	0.779	0.221	0.632
1170	828.73	655.10	512.30	78.80	632.93	0.120	0.790	0.210	0.586
1185	762.07	597.20	458.16	76.40	576.99	0.128	0.784	0.216	0.539
1200	693.25	541.30	408.44	73.70	522.99	0.136	0.781	0.219	0.490
1215	622.56	478.40	350.06	71.80	462.21	0.150	0.768	0.232	0.440
1230	550.30	419.70	297.76	69.07	405.50	0.165	0.763	0.237	0.389
1245	476.79	357.40	243.82	65.52	345.31	0.183	0.750	0.250	0.337
1260	402.34	295.30	191.32	61.49	285.31	0.208	0.734	0.266	0.285
1275	327.27	235.20	142.87	56.21	227.24	0.239	0.719	0.281	0.231
1290	251.91	176.40	97.05	49.45	170.43	0.280	0.700	0.300	0.178
1305	176.56	122.20	57.57	41.48	118.07	0.339	0.692	0.308	0.125
1320	101.56	73.60	25.62	32.10	71.11	0.436	0.725	0.275	0.072
1335	27.23	30.18	3.64	20.23	29.16	0.670	0.000	1.000	0.019
1350	0.00	5.72	-0.47	7.19	5.53	0.000	0.000	0.000	-0.033
1365	0.00	-1.40	0.31	-0.18	-1.35	0.000	0.000	0.000	-0.084
1380	0.00	-2.56	0.33	-1.29	-2.47	0.000	0.000	0.000	-0.133
1395	0.00	-2.67	0.47	-1.27	-2.57	0.000	0.000	0.000	-0.182
1410	0.00	-2.35	0.53	-1.29	-2.27	0.000	0.000	0.000	-0.229
1425	0.00	-2.35	0.64	-1.14	-2.27	0.000	0.000	0.000	-0.274

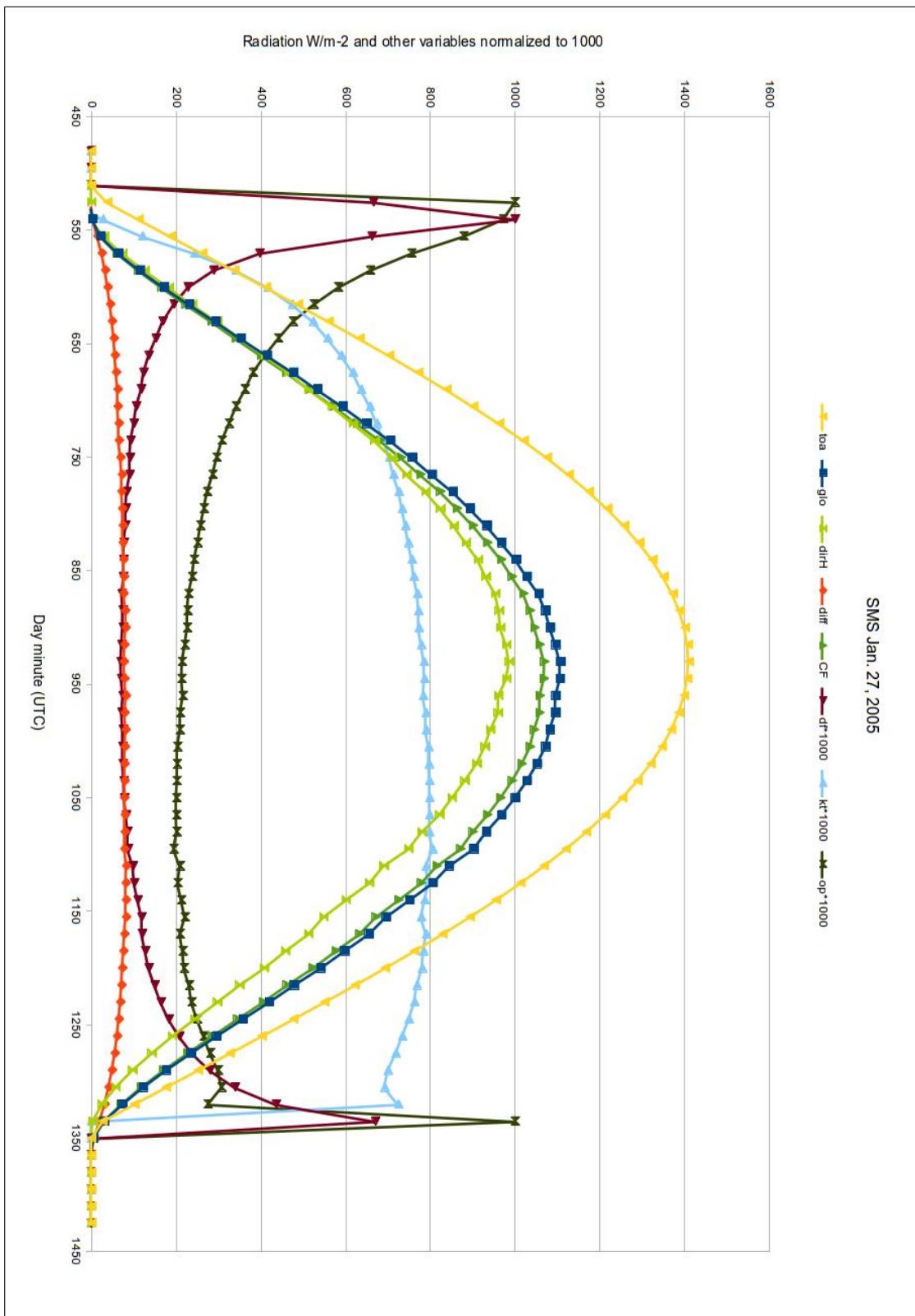


Figure C.27 - Graphic illustrating data measured and calculated on SMS January 27th 2005.

Table C.28 - Solar radiation and derived data for SMS jan 28th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-1.89	0.04	-1.13	-1.83	0.000	0.000	0.000	-0.126
495	0.00	-2.02	0.03	-1.14	-1.95	0.000	0.000	0.000	-0.076
510	0.00	-1.88	0.00	-1.18	-1.82	0.000	0.000	0.000	-0.025
525	37.85	-1.45	-0.02	-0.60	-1.40	0.409	-0.038	1.000	0.027
540	112.30	13.43	0.06	13.70	12.98	1.000	0.120	0.880	0.079
555	187.37	28.58	18.53	24.31	27.61	0.851	0.153	0.847	0.133
570	262.74	26.67	12.95	20.10	25.77	0.754	0.102	0.898	0.186
585	338.09	22.11	0.40	22.52	21.36	1.000	0.065	0.935	0.239
600	413.09	87.60	6.32	82.40	84.64	0.941	0.212	0.788	0.292
615	487.42	254.80	172.68	118.40	246.18	0.465	0.523	0.477	0.345
630	560.77	300.60	233.42	107.10	290.43	0.356	0.536	0.464	0.397
645	632.82	439.00	279.88	197.30	424.15	0.449	0.694	0.306	0.448
660	703.26	199.10	38.85	162.90	192.36	0.818	0.283	0.717	0.497
675	771.79	206.90	0.33	204.20	199.90	0.987	0.268	0.732	0.546
690	838.11	188.50	1.16	186.00	182.12	0.987	0.225	0.775	0.593
705	901.95	172.80	-0.61	170.60	166.95	0.987	0.192	0.808	0.638
720	963.03	360.00	86.17	272.40	347.82	0.757	0.374	0.626	0.681
735	1021.09	420.60	125.38	291.90	406.37	0.694	0.412	0.588	0.722
750	1075.88	932.00	575.29	362.70	900.47	0.389	0.866	0.134	0.761
765	1127.16	845.00	614.67	235.60	816.41	0.279	0.750	0.250	0.797
780	1174.72	822.00	557.10	264.30	794.19	0.322	0.700	0.300	0.831
795	1218.35	1002.00	698.00	289.30	968.10	0.289	0.822	0.178	0.862
810	1257.86	776.00	501.78	257.80	749.74	0.332	0.617	0.383	0.890
825	1293.09	960.00	795.70	145.90	927.52	0.152	0.742	0.258	0.915
840	1323.89	962.00	827.76	112.40	929.45	0.117	0.727	0.273	0.936
855	1350.12	988.00	849.89	110.00	954.57	0.111	0.732	0.268	0.955
870	1371.66	1012.00	862.48	116.90	977.76	0.116	0.738	0.262	0.970
885	1388.44	1045.00	881.87	126.70	1009.64	0.121	0.753	0.247	0.982
900	1400.37	1059.00	892.42	123.00	1023.17	0.116	0.756	0.244	0.990
915	1407.41	1096.00	901.88	146.70	1058.92	0.134	0.779	0.221	0.995
930	1409.52	1094.00	905.23	140.40	1056.98	0.128	0.776	0.224	0.997
945	1406.70	1151.00	903.42	188.20	1112.06	0.164	0.818	0.182	0.995
960	1398.96	502.80	255.78	268.10	485.79	0.533	0.359	0.641	0.989
975	1386.33	412.70	68.34	321.90	398.74	0.780	0.298	0.702	0.981
990	1368.86	1235.00	890.73	284.80	1193.21	0.231	0.902	0.098	0.968
1005	1346.63	1179.00	858.17	264.10	1139.11	0.224	0.876	0.124	0.952
1020	1319.74	1090.00	748.62	269.00	1053.12	0.247	0.826	0.174	0.933
1035	1288.30	1171.00	822.82	289.20	1131.38	0.247	0.909	0.091	0.911
1050	1252.45	552.70	221.82	307.90	534.00	0.557	0.441	0.559	0.886
1065	1212.33	286.30	-0.85	279.50	276.61	0.976	0.236	0.764	0.857
1080	1168.13	247.80	0.28	242.00	239.42	0.977	0.212	0.788	0.826
1095	1120.02	367.40	8.49	354.30	354.97	0.964	0.328	0.672	0.792
1110	1068.22	265.50	3.76	261.00	256.52	0.983	0.249	0.751	0.756
1125	1012.95	431.70	103.81	307.90	417.09	0.713	0.426	0.574	0.716
1140	954.44	835.00	537.36	233.80	806.75	0.280	0.875	0.125	0.675
1155	892.95	260.60	45.22	207.80	251.78	0.797	0.292	0.708	0.632
1170	828.73	259.90	40.19	207.20	251.11	0.797	0.314	0.686	0.586
1185	762.07	702.00	429.59	211.00	678.25	0.301	0.921	0.079	0.539
1200	693.25	563.40	369.22	138.20	544.34	0.245	0.813	0.187	0.490
1215	622.56	495.10	333.77	108.30	478.35	0.219	0.795	0.205	0.440
1230	550.30	239.20	113.07	103.20	231.11	0.431	0.435	0.565	0.389
1245	476.79	425.50	230.06	149.90	411.10	0.352	0.892	0.108	0.337
1260	402.34	360.30	179.25	139.40	348.11	0.387	0.896	0.104	0.285
1275	327.27	107.80	0.37	107.60	104.15	0.998	0.329	0.671	0.231
1290	251.91	145.20	27.72	108.30	140.29	0.746	0.576	0.424	0.178
1305	176.56	152.80	55.31	75.00	147.63	0.491	0.865	0.135	0.125
1320	101.56	69.73	22.04	35.16	67.37	0.504	0.687	0.313	0.072
1335	27.23	17.02	0.15	18.09	16.44	1.000	0.625	0.375	0.019
1350	0.00	4.98	-0.41	6.40	4.81	0.000	0.000	0.000	-0.033
1365	0.00	-1.44	0.39	-0.17	-1.39	0.000	0.000	0.000	-0.084
1380	0.00	-2.20	0.50	-1.10	-2.12	0.000	0.000	0.000	-0.133
1395	0.00	-2.04	0.50	-1.19	-1.97	0.000	0.000	0.000	-0.182
1410	0.00	-2.04	0.15	-1.32	-1.97	0.000	0.000	0.000	-0.229
1425	0.00	-2.07	0.28	-1.29	-2.00	0.000	0.000	0.000	-0.274

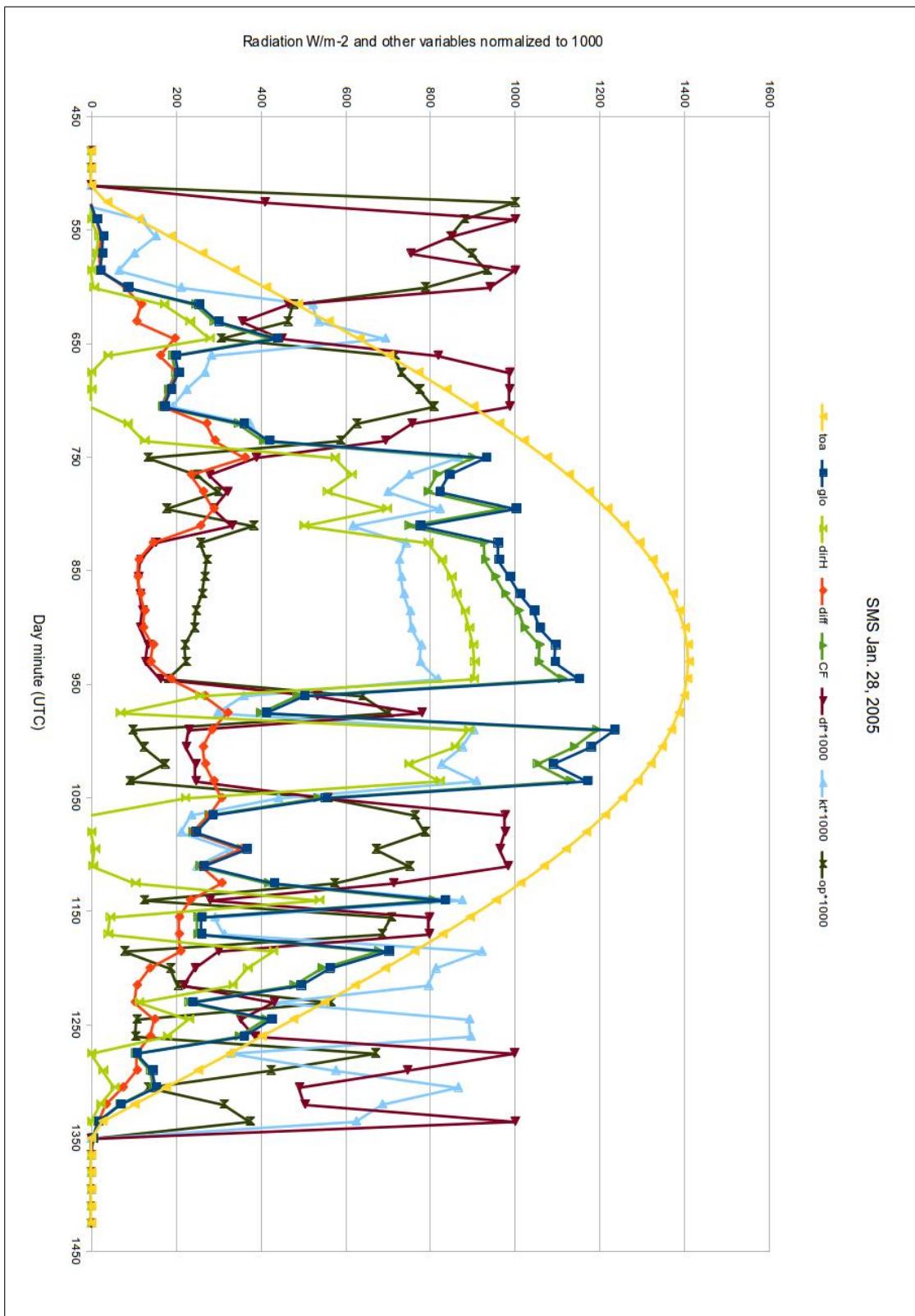


Figure C.28 - Graphic illustrating data measured and calculated on SMS January 28th 2005.

Table C.29 - Solar radiation and derived data for SMS jan 29th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-1.88	0.08	-1.10	-1.82	0.000	0.000	0.000	-0.126
495	0.00	-1.81	0.00	-1.16	-1.75	0.000	0.000	0.000	-0.076
510	0.00	-1.84	0.00	-1.10	-1.78	0.000	0.000	0.000	-0.025
525	37.85	-1.53	-0.01	-0.76	-1.48	0.494	-0.041	1.000	0.027
540	112.30	2.50	0.03	3.04	2.41	1.000	0.022	0.978	0.079
555	187.37	17.99	20.33	13.41	17.38	0.745	0.096	0.904	0.133
570	262.74	55.36	60.77	24.76	53.49	0.447	0.211	0.789	0.186
585	338.09	104.10	106.20	33.39	100.58	0.321	0.308	0.692	0.239
600	413.09	156.30	160.90	39.81	151.01	0.255	0.378	0.622	0.292
615	487.42	211.20	212.06	44.88	204.05	0.213	0.433	0.567	0.345
630	560.77	271.60	269.15	49.40	262.41	0.182	0.484	0.516	0.397
645	632.82	328.60	323.16	53.05	317.48	0.161	0.519	0.481	0.448
660	703.26	387.60	375.05	57.46	374.49	0.148	0.551	0.449	0.497
675	771.79	444.30	426.33	59.93	429.27	0.135	0.576	0.424	0.546
690	838.11	499.10	472.46	64.91	482.21	0.130	0.596	0.404	0.593
705	901.95	609.20	496.96	142.70	588.59	0.234	0.675	0.325	0.638
720	963.03	629.30	270.01	351.90	608.01	0.559	0.653	0.347	0.681
735	1021.09	631.00	180.12	456.00	609.65	0.723	0.618	0.382	0.722
750	1075.88	413.90	2.06	403.80	399.90	0.976	0.385	0.615	0.761
765	1127.16	449.30	16.34	422.30	434.10	0.940	0.399	0.601	0.797
780	1174.72	260.70	-1.36	254.90	251.88	0.978	0.222	0.778	0.831
795	1218.35	365.70	-0.05	357.40	353.33	0.977	0.300	0.700	0.862
810	1257.86	304.40	0.92	297.30	294.10	0.977	0.242	0.758	0.890
825	1293.09	146.50	-2.56	143.30	141.54	0.978	0.113	0.887	0.915
840	1323.89	87.90	-4.27	85.80	84.93	0.976	0.066	0.934	0.936
855	1350.12	199.10	0.68	193.90	192.36	0.974	0.147	0.853	0.955
870	1371.66	250.90	4.93	242.50	242.41	0.967	0.183	0.817	0.970
885	1388.44	432.40	4.91	419.60	417.77	0.970	0.311	0.689	0.982
900	1400.37	544.50	7.43	522.50	526.08	0.960	0.389	0.611	0.990
915	1407.41	430.60	3.31	415.30	416.03	0.964	0.306	0.694	0.995
930	1409.52	662.10	126.91	506.80	639.70	0.765	0.470	0.530	0.997
945	1406.70	290.50	-2.34	282.00	280.67	0.971	0.207	0.793	0.995
960	1398.96	155.90	0.63	151.80	150.63	0.974	0.111	0.889	0.989
975	1386.33	81.90	-1.03	80.40	79.13	0.982	0.059	0.941	0.981
990	1368.86	44.23	-1.42	43.78	42.73	0.990	0.032	0.968	0.968
1005	1346.63	27.42	-2.46	27.64	26.49	1.000	0.020	0.980	0.952
1020	1319.74	34.94	-9.26	35.46	33.76	1.000	0.026	0.974	0.933
1035	1288.30	88.10	-1.21	85.50	85.12	0.970	0.068	0.932	0.911
1050	1252.45	93.10	-0.08	91.20	89.95	0.980	0.074	0.926	0.886
1065	1212.33	91.40	-1.44	88.70	88.31	0.970	0.075	0.925	0.857
1080	1168.13	457.00	88.16	344.30	441.54	0.753	0.391	0.609	0.826
1095	1120.02	963.00	587.01	290.80	930.42	0.302	0.860	0.140	0.792
1110	1068.22	397.10	12.26	377.30	383.66	0.950	0.372	0.628	0.756
1125	1012.95	823.00	631.91	117.70	795.15	0.143	0.812	0.188	0.716
1140	954.44	793.00	488.75	252.80	766.17	0.319	0.831	0.169	0.675
1155	892.95	858.00	549.47	241.40	828.97	0.281	0.961	0.039	0.632
1170	828.73	300.80	110.08	168.00	290.62	0.559	0.363	0.637	0.586
1185	762.07	218.20	0.87	215.40	210.82	0.987	0.286	0.714	0.539
1200	693.25	581.40	406.97	117.80	561.73	0.203	0.839	0.161	0.490
1215	622.56	476.20	356.67	67.53	460.09	0.142	0.765	0.235	0.440
1230	550.30	409.80	305.93	55.63	395.93	0.136	0.745	0.255	0.389
1245	476.79	349.70	253.26	51.97	337.87	0.149	0.733	0.267	0.337
1260	402.34	290.20	203.19	47.48	280.38	0.164	0.721	0.279	0.285
1275	327.27	232.50	154.95	43.21	224.63	0.186	0.710	0.290	0.231
1290	251.91	175.10	107.17	38.65	169.18	0.221	0.695	0.305	0.178
1305	176.56	118.90	63.38	32.83	114.88	0.276	0.673	0.327	0.125
1320	101.56	68.59	27.55	25.64	66.27	0.374	0.675	0.325	0.072
1335	27.23	28.26	4.46	16.38	27.30	0.580	0.000	1.000	0.019
1350	0.00	5.20	-1.42	6.42	5.02	0.000	0.000	0.000	-0.033
1365	0.00	-1.05	0.15	-0.04	-1.01	0.000	0.000	0.000	-0.084
1380	0.00	-2.04	0.31	-0.92	-1.97	0.000	0.000	0.000	-0.133
1395	0.00	-1.92	0.27	-1.02	-1.85	0.000	0.000	0.000	-0.182
1410	0.00	-1.73	0.24	-1.03	-1.67	0.000	0.000	0.000	-0.229
1425	0.00	-1.89	0.29	-1.04	-1.82	0.000	0.000	0.000	-0.274

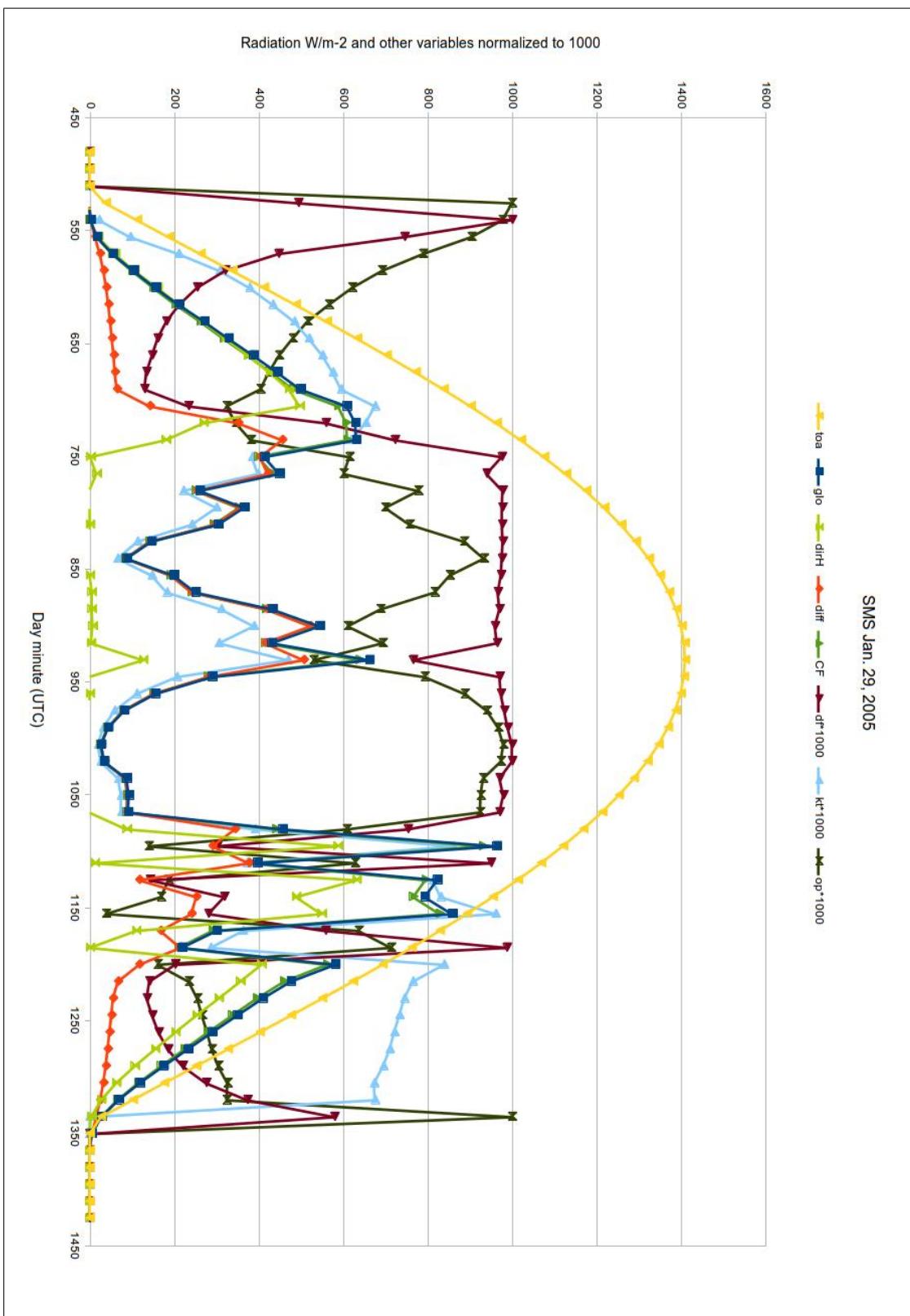


Figure C.29 - Graphic illustrating data measured and calculated on SMS January 29th 2005.

Table C.30 - Solar radiation and derived data for SMS jan 30th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-1.74	0.03	-1.10	-1.68	0.000	0.000	0.000	-0.126
495	0.00	-1.73	0.00	-1.10	-1.67	0.000	0.000	0.000	-0.076
510	0.00	-1.73	0.01	-1.10	-1.67	0.000	0.000	0.000	-0.025
525	37.85	-1.47	-0.01	-0.74	-1.42	0.503	-0.039	1.000	0.027
540	112.30	2.67	0.00	3.27	2.58	1.000	0.024	0.976	0.079
555	187.37	17.17	3.47	16.62	16.59	0.968	0.092	0.908	0.133
570	262.74	49.32	15.91	41.86	47.65	0.849	0.188	0.812	0.186
585	338.09	151.10	106.48	85.90	145.99	0.568	0.447	0.553	0.239
600	413.09	197.70	118.36	115.10	191.01	0.582	0.479	0.521	0.292
615	487.42	138.90	10.19	130.30	134.20	0.938	0.285	0.715	0.345
630	560.77	136.50	20.37	119.10	131.88	0.873	0.243	0.757	0.397
645	632.82	258.10	205.31	87.20	249.37	0.338	0.408	0.592	0.448
660	703.26	388.40	360.62	81.00	375.26	0.209	0.552	0.448	0.497
675	771.79	481.20	423.60	109.70	464.92	0.228	0.623	0.377	0.546
690	838.11	526.30	378.85	184.30	508.49	0.350	0.628	0.372	0.593
705	901.95	497.80	193.81	314.60	480.96	0.632	0.552	0.448	0.638
720	963.03	539.40	195.97	349.90	521.15	0.649	0.560	0.440	0.681
735	1021.09	466.20	118.37	347.90	450.43	0.746	0.457	0.543	0.722
750	1075.88	517.60	133.32	382.00	500.09	0.738	0.481	0.519	0.761
765	1127.16	606.20	174.52	427.20	585.69	0.705	0.538	0.462	0.797
780	1174.72	624.20	151.30	466.10	603.08	0.747	0.531	0.469	0.831
795	1218.35	412.60	12.54	390.20	398.64	0.946	0.339	0.661	0.862
810	1257.86	386.50	2.76	373.60	373.42	0.967	0.307	0.693	0.890
825	1293.09	538.60	91.19	436.50	520.38	0.810	0.417	0.583	0.915
840	1323.89	780.00	292.06	473.80	753.61	0.607	0.589	0.411	0.936
855	1350.12	687.30	179.91	489.20	664.05	0.712	0.509	0.491	0.955
870	1371.66	656.80	125.54	518.80	634.58	0.790	0.479	0.521	0.970
885	1388.44	517.10	16.68	485.70	499.60	0.939	0.372	0.628	0.982
900	1400.37	1022.00	429.87	565.00	987.42	0.553	0.730	0.270	0.990
915	1407.41	656.50	109.10	525.10	634.29	0.800	0.466	0.534	0.995
930	1409.52	678.60	108.57	550.00	655.64	0.810	0.481	0.519	0.997
945	1406.70	927.00	309.63	583.50	895.64	0.629	0.659	0.341	0.995
960	1398.96	718.00	147.93	547.10	693.71	0.762	0.513	0.487	0.989
975	1386.33	793.00	226.60	538.90	766.17	0.680	0.572	0.428	0.981
990	1368.86	951.00	377.69	539.60	918.82	0.567	0.695	0.305	0.968
1005	1346.63	666.50	131.73	511.10	643.95	0.767	0.495	0.505	0.952
1020	1319.74	938.00	355.46	545.00	906.26	0.581	0.711	0.289	0.933
1035	1288.30	661.00	103.42	535.80	638.64	0.811	0.513	0.487	0.911
1050	1252.45	836.00	298.80	502.50	807.71	0.601	0.667	0.333	0.886
1065	1212.33	667.90	162.23	479.80	645.30	0.718	0.551	0.449	0.857
1080	1168.13	918.00	382.87	492.00	886.94	0.536	0.786	0.214	0.826
1095	1120.02	534.60	61.95	454.80	516.51	0.851	0.477	0.523	0.792
1110	1068.22	550.60	81.52	450.50	531.97	0.818	0.515	0.485	0.756
1125	1012.95	674.20	197.24	446.50	651.39	0.662	0.666	0.334	0.716
1140	954.44	619.50	174.84	416.20	598.54	0.672	0.649	0.351	0.675
1155	892.95	599.60	186.82	382.80	579.31	0.638	0.671	0.329	0.632
1170	828.73	354.70	25.61	319.40	342.70	0.900	0.428	0.572	0.586
1185	762.07	290.80	3.82	280.90	280.96	0.966	0.382	0.618	0.539
1200	693.25	271.10	3.59	262.40	261.93	0.968	0.391	0.609	0.490
1215	622.56	246.70	2.77	239.60	238.35	0.971	0.396	0.604	0.440
1230	550.30	213.40	3.48	206.30	206.18	0.967	0.388	0.612	0.389
1245	476.79	190.70	6.81	180.10	184.25	0.944	0.400	0.600	0.337
1260	402.34	147.10	1.83	143.20	142.12	0.973	0.366	0.634	0.285
1275	327.27	109.10	1.08	106.80	105.41	0.979	0.333	0.667	0.231
1290	251.91	77.30	0.08	76.60	74.68	0.991	0.307	0.693	0.178
1305	176.56	52.77	-0.03	52.70	50.98	0.999	0.299	0.701	0.125
1320	101.56	29.67	-0.05	30.02	28.67	1.000	0.292	0.708	0.072
1335	27.23	10.87	-0.01	11.48	10.50	1.000	0.399	0.601	0.019
1350	0.00	0.93	-0.01	1.63	0.90	0.000	0.000	0.000	-0.033
1365	0.00	-1.57	0.15	-0.58	-1.51	0.000	0.000	0.000	-0.084
1380	0.00	-2.04	0.26	-0.95	-1.97	0.000	0.000	0.000	-0.133
1395	0.00	-1.81	0.11	-1.16	-1.74	0.000	0.000	0.000	-0.182
1410	0.00	-1.59	-0.08	-1.29	-1.53	0.000	0.000	0.000	-0.229
1425	0.00	-1.88	0.17	-1.06	-1.82	0.000	0.000	0.000	-0.274

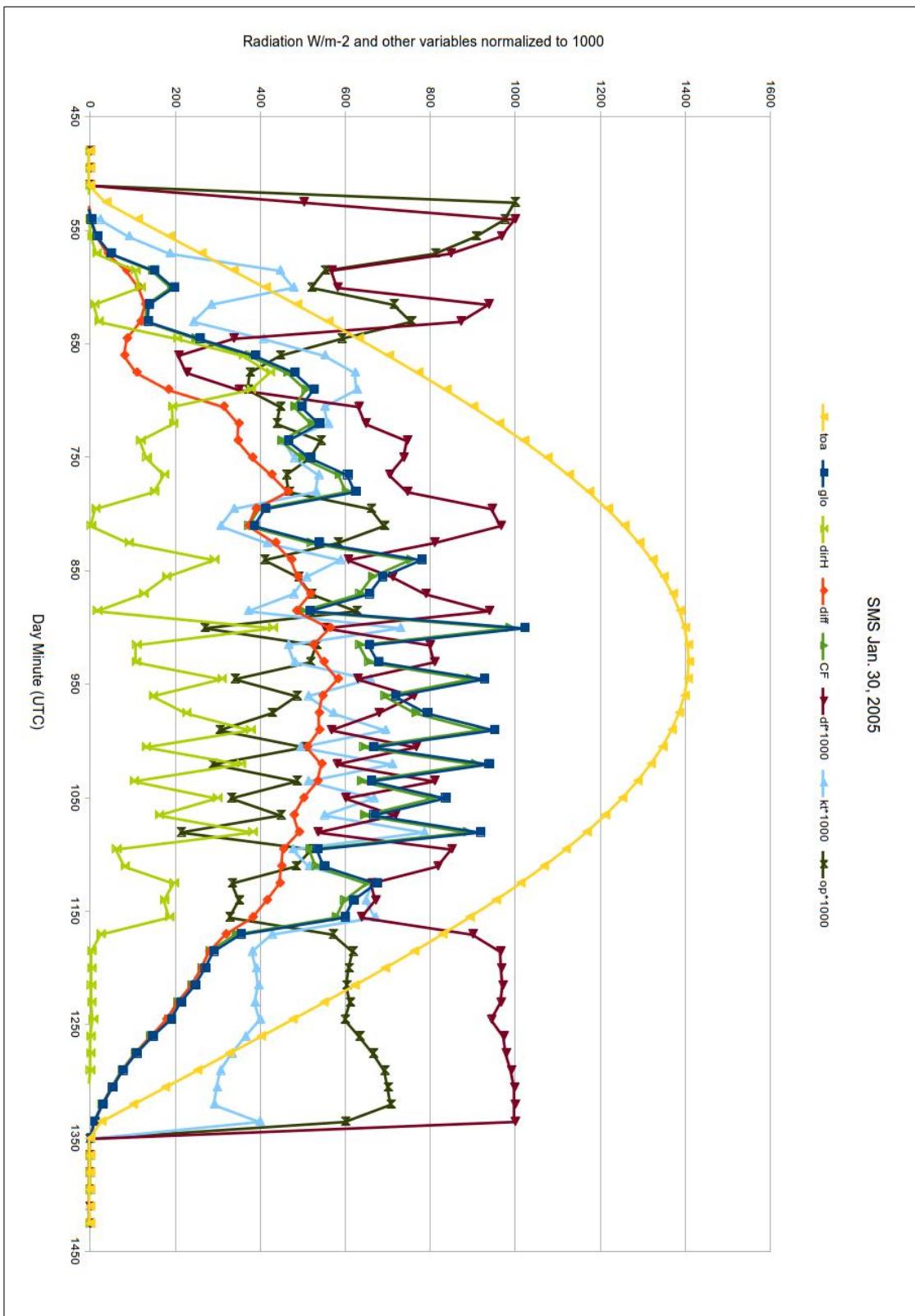


Figure C.30 - Graphic illustrating data measured and calculated on SMS January 30th 2005.

Table C.31 - Solar radiation and derived data for SMS jan 31th 2005.

min	toa	glo	dirH	diff	CF	df	kt	op	cos
480	0.00	-1.90	0.10	-1.10	-1.84	0.000	0.000	0.000	-0.126
495	0.00	-1.88	0.08	-1.10	-1.82	0.000	0.000	0.000	-0.076
510	0.00	-1.72	0.00	-1.12	-1.66	0.000	0.000	0.000	-0.025
525	37.85	-1.39	0.00	-0.82	-1.34	0.591	-0.037	1.000	0.027
540	112.30	1.65	0.00	2.32	1.60	1.000	0.015	0.985	0.079
555	187.37	14.15	2.91	13.96	13.67	0.987	0.076	0.924	0.133
570	262.74	75.80	60.41	48.43	73.24	0.639	0.288	0.712	0.186
585	338.09	120.10	72.10	76.60	116.04	0.638	0.355	0.645	0.239
600	413.09	144.70	48.50	110.60	139.80	0.764	0.350	0.650	0.292
615	487.42	172.60	48.61	135.10	166.76	0.783	0.354	0.646	0.345
630	560.77	160.90	16.17	146.90	155.46	0.913	0.287	0.713	0.397
645	632.82	168.90	2.12	165.80	163.19	0.982	0.267	0.733	0.448
660	703.26	202.70	8.44	193.70	195.84	0.956	0.288	0.712	0.497
675	771.79	237.00	2.14	232.60	228.98	0.981	0.307	0.693	0.546
690	838.11	288.40	22.12	264.90	278.64	0.919	0.344	0.656	0.593
705	901.95	327.60	53.14	274.90	316.52	0.839	0.363	0.637	0.638
720	963.03	399.70	109.80	292.40	386.18	0.732	0.415	0.585	0.681
735	1021.09	432.40	84.79	345.40	417.77	0.799	0.423	0.577	0.722
750	1075.88	449.40	58.44	385.20	434.19	0.857	0.418	0.582	0.761
765	1127.16	449.50	57.16	384.90	434.29	0.856	0.399	0.601	0.797
780	1174.72	478.10	70.04	401.60	461.92	0.840	0.407	0.593	0.831
795	1218.35	560.40	94.96	455.20	541.44	0.812	0.460	0.540	0.862
810	1257.86	637.30	151.87	474.90	615.74	0.745	0.507	0.493	0.890
825	1293.09	491.40	7.89	469.70	474.77	0.956	0.380	0.620	0.915
840	1323.89	430.30	10.67	408.20	415.74	0.949	0.325	0.675	0.936
855	1350.12	356.70	-1.14	347.90	344.63	0.975	0.264	0.736	0.955
870	1371.66	485.20	7.35	463.80	468.78	0.956	0.354	0.646	0.970
885	1388.44	425.50	0.39	411.40	411.10	0.967	0.306	0.694	0.982
900	1400.37	440.30	2.93	425.10	425.40	0.965	0.314	0.686	0.990
915	1407.41	544.00	10.62	517.00	525.59	0.950	0.387	0.613	0.995
930	1409.52	470.10	5.70	450.90	454.19	0.959	0.334	0.666	0.997
945	1406.70	732.00	175.11	532.80	707.23	0.728	0.520	0.480	0.995
960	1398.96	801.00	172.76	599.80	773.90	0.749	0.573	0.427	0.989
975	1386.33	701.00	130.61	548.70	677.28	0.783	0.506	0.494	0.981
990	1368.86	593.30	10.40	567.00	573.23	0.956	0.433	0.567	0.968
1005	1346.63	845.00	252.59	560.70	816.41	0.664	0.627	0.373	0.952
1020	1319.74	676.30	109.21	541.40	653.42	0.801	0.512	0.488	0.933
1035	1288.30	417.00	0.76	405.20	402.89	0.972	0.324	0.676	0.911
1050	1252.45	415.40	2.06	404.50	401.34	0.974	0.332	0.668	0.886
1065	1212.33	300.80	-0.30	293.30	290.62	0.975	0.248	0.752	0.857
1080	1168.13	249.10	0.18	243.40	240.67	0.977	0.213	0.787	0.826
1095	1120.02	330.10	3.93	319.80	318.93	0.969	0.295	0.705	0.792
1110	1068.22	292.20	1.75	284.50	282.31	0.974	0.274	0.726	0.756
1125	1012.95	313.20	18.02	287.40	302.60	0.918	0.309	0.691	0.716
1140	954.44	276.70	2.61	269.20	267.34	0.973	0.290	0.710	0.675
1155	892.95	230.00	-0.06	226.10	222.22	0.983	0.258	0.742	0.632
1170	828.73	121.70	-0.86	120.20	117.58	0.988	0.147	0.853	0.586
1185	762.07	56.74	-0.80	56.37	54.82	0.993	0.074	0.926	0.539

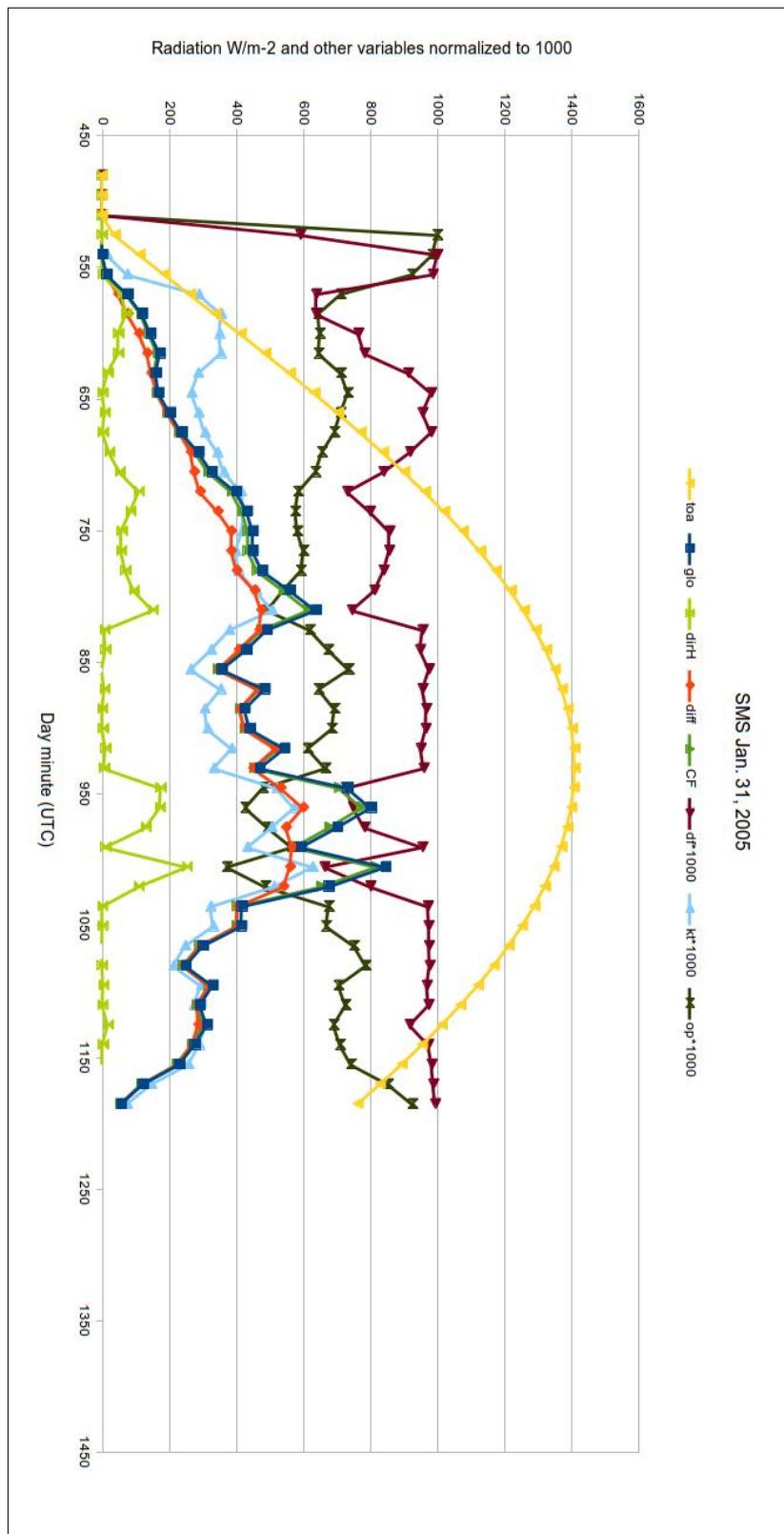


Figure C.31 - Graphic illustrating data measured and calculated on SMS January 31th 2005.