



Drought diagnostic over Southeastern Brazil during summer 2014 and impacts over the water supply in the Cantareira reservoir

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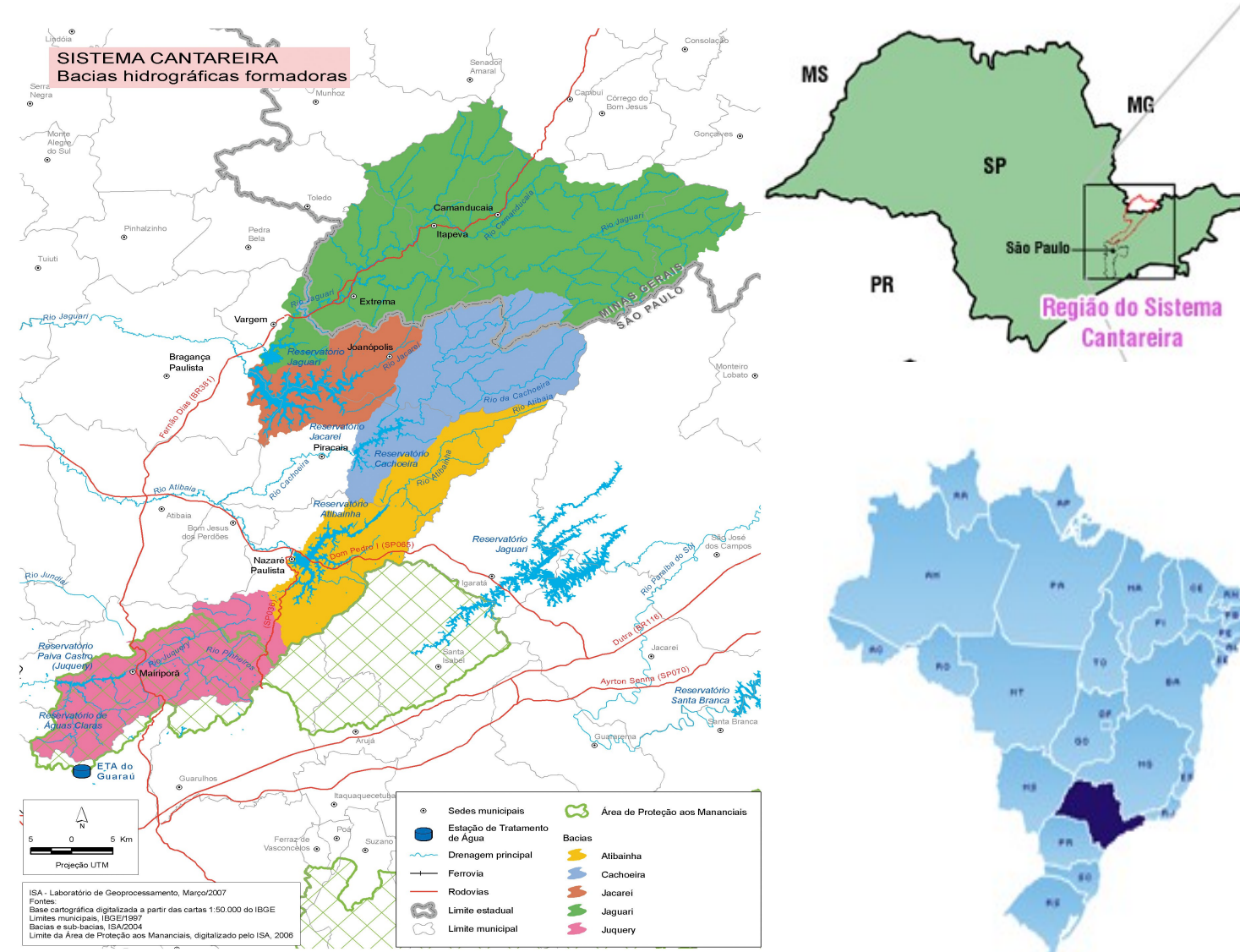
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ABSTRACT

Drought is documented in causing drawdowns of surface reservoirs and impacting water supplies all over the globe. One such documented case occurred in Southern Brazil, over the Cantareira System (CS), one of the largest in the world, as well as one used to supply 8.8 million customers, including metropolitan São Paulo city. The March 2014 prolonged drought over the region supplying the Cantareira System caused a drop in the reservoirs down to 14.0% of their usable capacity, its lowest recorded level since 1974, the year of commencement of operation. Southeastern South America has a well-defined wet austral summer monsoon, with a marked precipitation regime of more than 800 mm of accumulated precipitation over the region, which was significantly curtailed during the drought episode. The large-scale atmospheric and oceanic patterns are investigated to highlight the mechanisms associated with the drought event. Possible teleconnection influences of the Madden-Julian Oscillation (MJO) are also documented as well, due to the related negative impacts of its inactivity phase over South America during end December to early February. The Standard Precipitation Index (SPI), used to characterize the severity of precipitation deficiency, illustrates the magnitude and spatial extent of the interruption of precipitation supply. The paper concludes with an analysis of the performance of the seasonal precipitation forecast for December, January and February 2014 produced with the operational seasonal prediction system used at the Center for Weather Forecasts and Climate Studies of the National Institute for Space Research (CPTEC/INPE). This system was capable of producing 2 month in advance drought warning for the three investigated events. The ability of the seasonal system of CPTEC/INPE is important for helping the government to make decisions for reducing drought impacts in Southeastern South America.

INTRODUCTION

Cantareira reservoir



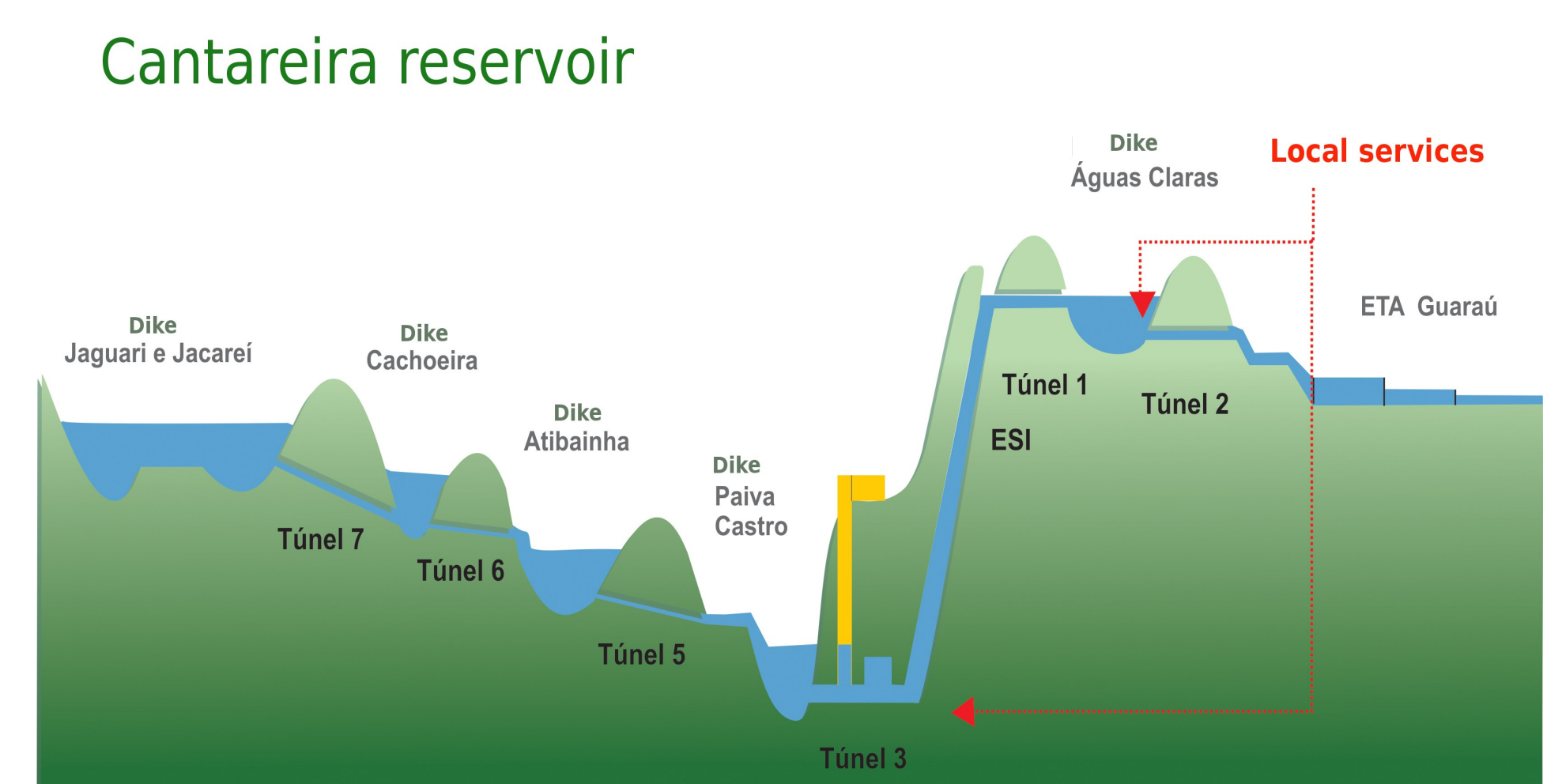
Source: <http://site.sabesp.com.br/>

Cantareira system is a water supply system in the state of São Paulo, Brazil. It is composed by five interconnected reservoirs that provide water to 9 million people in the São Paulo metropolitan area. The system is managed by Sabesp, São Paulo state water management company.

In 2014, low rainfall in the state of São Paulo led to a severe drought. Cantareira system's water level has fallen constantly, leading to water shortages in some areas of the city. Among the measures taken by Sabesp to face the problem are reducing the water pressure to the residences, bonus for customers who save water and exploring the reservoir's ground water.

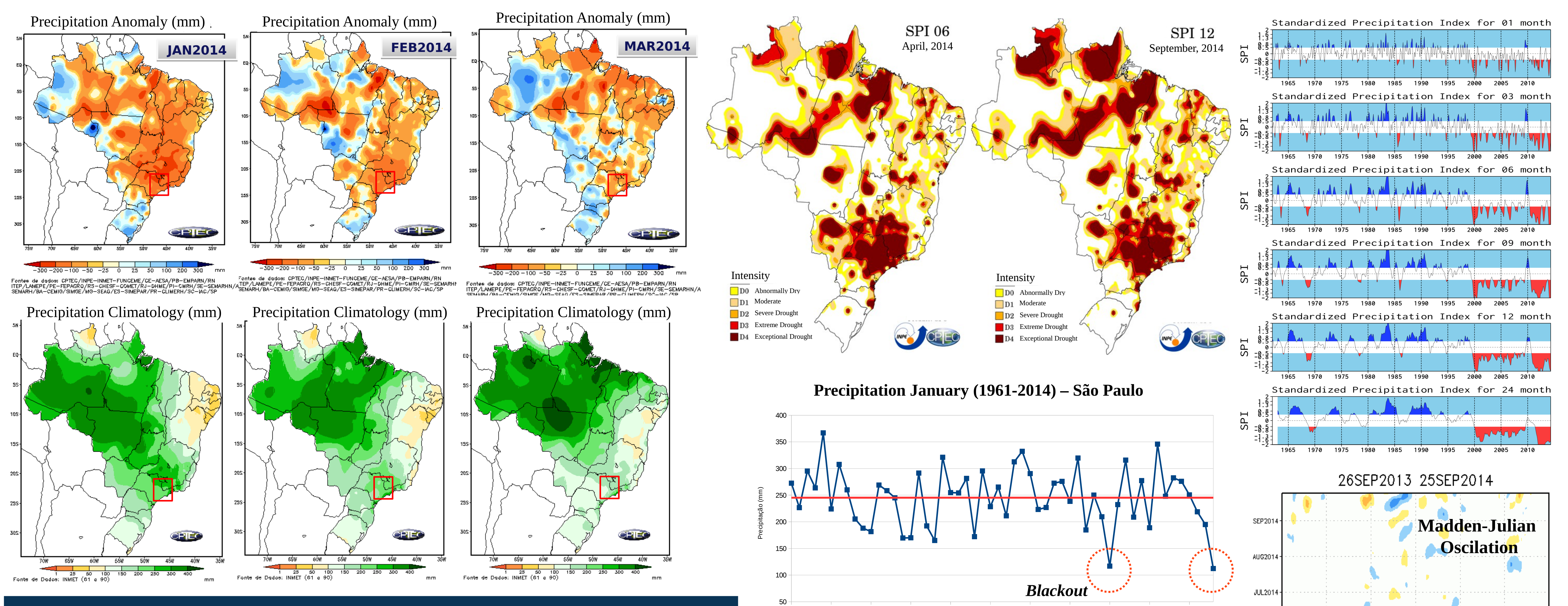
The seasonal climate forecasts and climate monitoring are tools that government can use to help decision makers for reducing drought impacts in Southeastern South America.

Equivalent system



Source: <http://site.sabesp.com.br/>

RESULTS



CONCLUSIONS

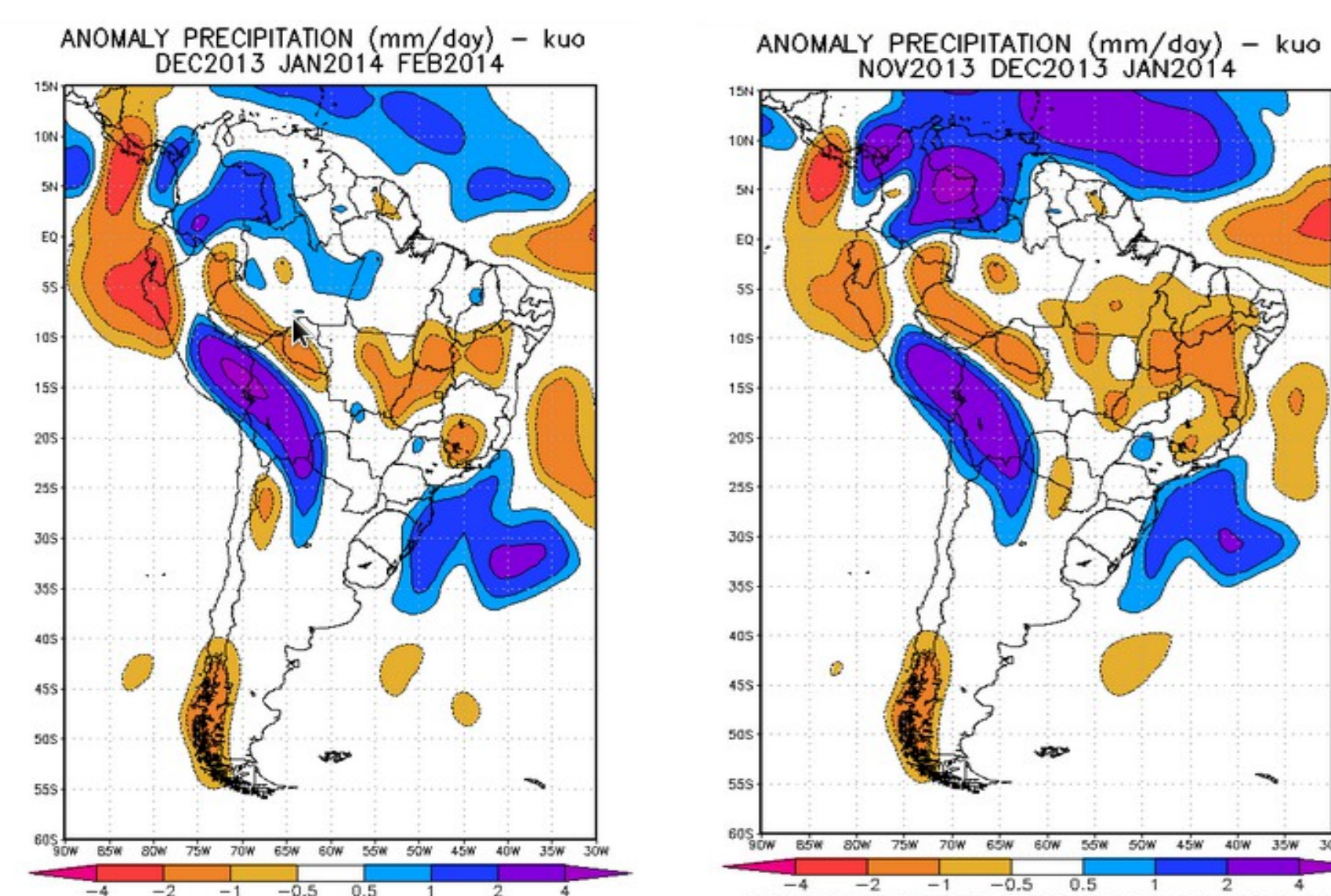
Analyses of precipitation anomalies and outgoing longwave radiation (OLR) on average between 50°W/40°W and 16°S/26°S area, indicated during January and February have been an alternation of opposite signs in the OLR anomaly (favorable and unfavorable signals), however, the behavior of the precipitation anomaly remained negative throughout the period in the region. The MJO not exerted a strong influence on the pattern of rainfall over Southeast Brazil during the summer of 2014. A large-scale pattern worked in the region during most of the period (anomalous atmospheric blocking), which strongly suppressed the regime of rainfall during the months

→ The seasonal precipitation forecast for December, January and February 2014 produced with the operational seasonal prediction system used at CPTEC/INPE was capable of producing 2 month in advance drought warning for the event.

REFERENCES

MADDEN, R. A.; JULIAN, P. R. Observations of the 40 – 50 day tropical oscillation: A review. *Monthly Weather Review*, v. 112, p. 814-837, 1994.

AGCM Forecasts



Acknowledgments

