**A synergistic use of 3D hydrodynamic and bio-optical models to study the phytoplankton driven forces**

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Mix and stratification processes on water column affect directly its water quality. Our purpose is to relate physical processes and phytoplankton distribution. It was analyzed by relating water column stability predictors to phytoplankton spatial distribution in Itumbiara reservoir. Two dates (winter and summer of 2009) were analyzed in order to understand the seasonal variability. A synergistic approach which combines three-dimensional hydrodynamic modeling and empirical bio-optical model from remote sensing data were used. Results showed that the riverine inflows and meteorological forcing were the most important agents driven the mix regime and phytoplankton dynamics in the Itumbiara reservoir for the two periods analyzed. However, short scale events, such as pre-frontal warming promoted the phytoplankton occurrence during the wintertime. These results suggest that meteorological events contribute to understand the phytoplankton dynamics in Itumbiara reservoir.

**Keywords:** Mix regimes, tropical reservoirs, phytoplankton, ELCOM, MODIS.