

## **ABSTRACT**

The Great Lakes of East Africa are among the world's most important freshwater ecosystems. Despite their importance in providing vital resources and ecosystem services, the impact of regional and global environmental drivers on this lacustrine system remains only partially understood. We make a systematic comparison of the dynamics of the bio-optical and thermal properties of thirteen of the largest African lakes between 2002 and 2011. Lake surface temperatures had a positive trend in all Great Lakes outside the latitude of 0° to 8° south, while the dynamics of those lakes within this latitude range were highly sensitive to global inter-annual climate drivers (i.e. El Niño Southern Oscillation). Lake surface temperature dynamics in nearly all lakes were found to be sensitive to the latitudinal position of the Inter Tropical Convergence Zone. Phytoplankton dynamics varied considerably between lakes, with increasing and decreasing trends. Intra-lake differences in both surface temperature and phytoplankton dynamics occurred for many of the larger lakes. This inter-comparison of bio-optical and thermal dynamics provides new insights into the response of these ecosystems to global and regional drivers.