

# **Alterations of the Lake Michigan System/Water Quality: Evidence provided by the SeaWiFS Seven-Year Time Series of Observations**

Robert Shuchman, Anton Korosov, Charles Hatt, Dmitry Pozdnyakov, Guy Meadows, Jay Means  
Altarum Institute (formerly ERIM)

charlesrayhatt@gmail.com

**ABSTRACT.** In this paper we utilize the seven years of SeaWiFS satellite data to obtain seasonal and interannual time histories of the major water color producing agents (CPAs), phytoplankton chlorophyll (chl), dissolved organic carbon (doc) and suspended minerals (sm) for Lake Michigan. We first present validation of the Great Lakes specific algorithm, followed by correlations of the CPAs with the coincident environmental observations. Special attention is paid to the observation from space of extensive episodic event of sediment resuspension and calcium carbonate precipitation out of the water. We then compare the obtained time history between the CPAs spatial and temporal distributions throughout the lake to environmental observations such as air and water temperature, wind speed and direction, significant wave height, atmospheric precipitation, river runoff, cloud and lake ice cover. Variability of the onset, duration and spatial extent of both episodic events and seasonal phenomena are documented from the SeaWiFS time series data, and high correlations with relevant environmental driving factors are established. The relationships between the CPAs retrieved from satellite data and environmental observations are then used to speculate on the future of Lake Michigan under a set of climate change scenarios.