# Chemical Stratification and Mercury Distribution of Meromictic Glacier Lake

**Asante Holder[1], Dr. Svetoslava Todorova[1], Dr. Charles Driscoll[1], Mario Montesdeoca[1]**
**[1]Syracuse University, Department of Civil and Environmental Engineering, Syracuse, New York, USA**

Mercury (Hg) is a toxic metal, which is poisonous to humans and wildlife when found in large concentrations. Mercury is largely distributed in the environment as a result of emissions and direct releases from natural and anthropogenic sources. We study the vertical distribution of Hg species, redox, and water quality parameters in the meromictic Glacial Lake, Jamesville, NY. The lake is permanently stratified due to high salinity inputs of groundwater and does not experience outside disturbance in the lower stratum. Samples from the lake were taken in May and October 2014. The samples were analyzed for ions, organic and inorganic carbon, Hg, pH, temperature, dissolved oxygen, and additional *in-situ* parameters to depict the stratification. During spring, the lake maintained strong stratification and the transition between aerobic and anaerobic zones was abrupt, without a detectable anoxic zone. The aerobic mixolimnion had low concentrations of dissolved total Hg (0.54ng/L) and MeHg (0.09ng/L). Substantial accumulation of Hg species occurred in the anaerobic zone; dissolved total Hg concentration increased progressively to 6.98ng/L; dissolved MeHg concentrations peaked at 0.583ng/L at the uppermost part of the anaerobic monimolimnion. The accumulation of Hg species was associated with loss of dissolved oxygen, and elevated concentrations of dissolved organic carbon and sulfide. During fall, the lower layers of the mixolimnion became anoxic, with a clear zone of nitrate reduction; the monimolimnion remained anaerobic. A single strong peak of dissolved MeHg concentrations (2.59ng/L) was observed at the anoxic-anaerobic transition region, e.g. the depth below which nitrate is completely absent and sulfide is detected. This maximum is few meters below the oxic-anoxic transition zone, e.g. the depth below which dissolved oxygen is absent. During both sampling events, the peak in MeHg concentrations was associated with a deep chlorophyll maximum that ranged between 300-350µg/L.