Comparing 6 years of event-based rainfall deposition of mercury, trace metals and major ions collected close to a coal-fired power plant with nearby NADP/MDN sites.

Arnout ter Schure, Jane M. Caffrey,
Nishanth Krishnamurthy and William M. Landing

Event-based (24-hour integrated) rainfall deposition of mercury (Hg), trace metals (Se, As, etc), and major ions (SO_4, NO_3) has been monitored over the last 6 years at 4 locations (3 inland locations and 1 close to the coast over the past 2 years) around coal-fired power plant (CFPP) Crist in Pensacola, FL. Over the years, emissions in the region have changed as a result of an increasing population, along with Hg emission controls at the CFPP, providing a great opportunity to evaluate the temporal and spatial patterns in atmospheric wet deposition. One goal of this project was to quantify the contribution of local emission sources –in this case the CFFP- to the total atmospheric deposition flux of mercury and other metals to the Pensacola Bay Watershed. There were no significant differences in the rainfall Hg flux between the three inland sites or between nearby MDN monitoring sites along the Gulf Coast. Mercury deposition during the summer months is higher than other months due to higher concentrations in the rainfall and higher summer-time rainfall rates throughout the region. Sulfate deposition shows a consistent decline at the 3 inland sites over the years. The Hg/SO_4 and Hg/NO_3 ratios in wet deposition can be used to assess long term changes in emissions and different types of weather systems that control short term variability. The seasonal pattern in Hg/SO_4 in precipitation is in the summer and fall in recent years about twice that of the previous seasons. In addition, the Hg/SO_4 and Hg/NO_3 ratios are lower compared to that of nearby NADP/MDN sites.

Arnout ter Schure: Electric Power Research Institute, 650 855 2281, aterschu@epri.com
Jane M. Caffrey: Center for Environmental Diagnostics and Bioremediation, University of West Florida, 850 857 6089, jcaffrey@uwf.edu
Nishanth Krishnamurthy: Department of Earth, Ocean, and Atmospheric Science, Florida State University, nk08d@my.fsu.edu
William M. Landing: Department of Earth, Ocean, and Atmospheric Science, Florida State University, 850 644 6037, wlanding@fsu.edu