



Wet mercury deposition in New York and the surrounding region: current status

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BACKGROUND

Since January 2008 the New York State Department of Environmental Conservation (NYSDEC) has been collecting wet mercury deposition at two urban MDN sites, Rochester (NY43) and New York City (NY06). The purpose of these measurements is to characterize baseline concentrations and deposition of mercury prior to planned state and national emission reduction programs. In this study we present the variation of wet mercury deposition on a seasonal basis, as well as compare deposition at these urban locations to three more rural MDN sites in New York – Huntington Wildlife (NY20), Biscuit Brook (NY68), and West Point (NY99) – and others in the surrounding region. Since several of these sites are collocated with acid deposition monitors, we also investigate any correlation and co-variation with wet SO_4^{2-} deposition at these sites.

N-CON Systems, Inc. MDN 00-125-2 Automatic Precipitation Sampler, and ETI Instrument Systems, Inc. NOAH IV Total Precipitation Measurement System at the New York City MDN site (NY06)

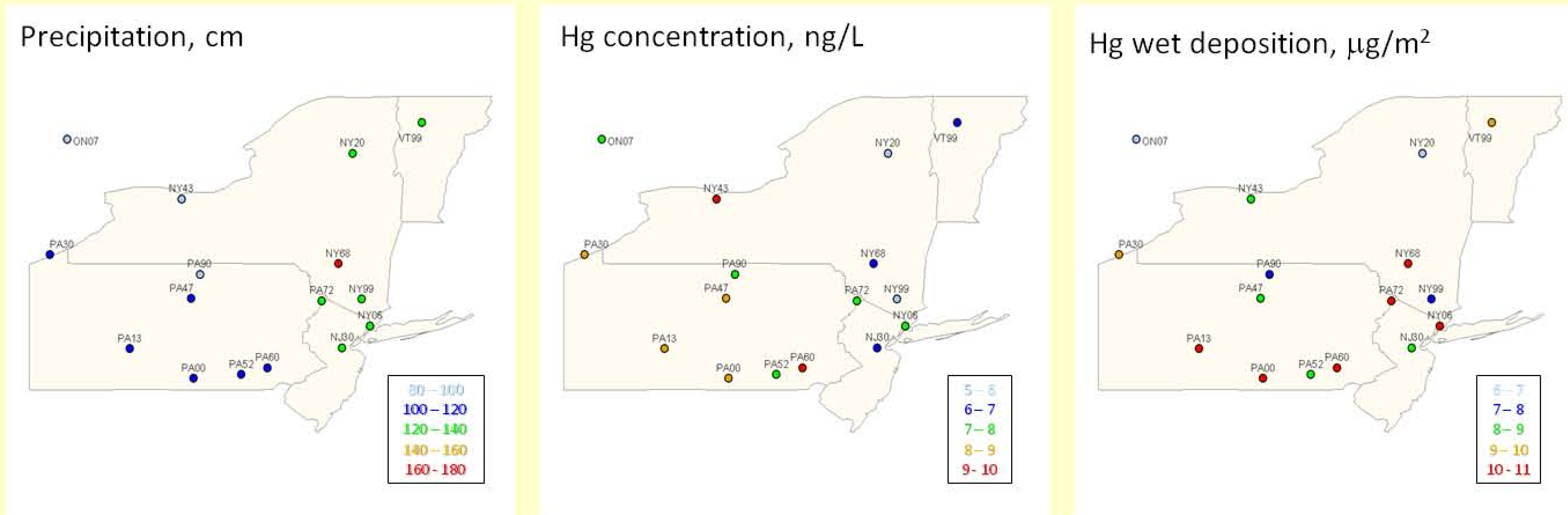


MDN sites used in this analysis

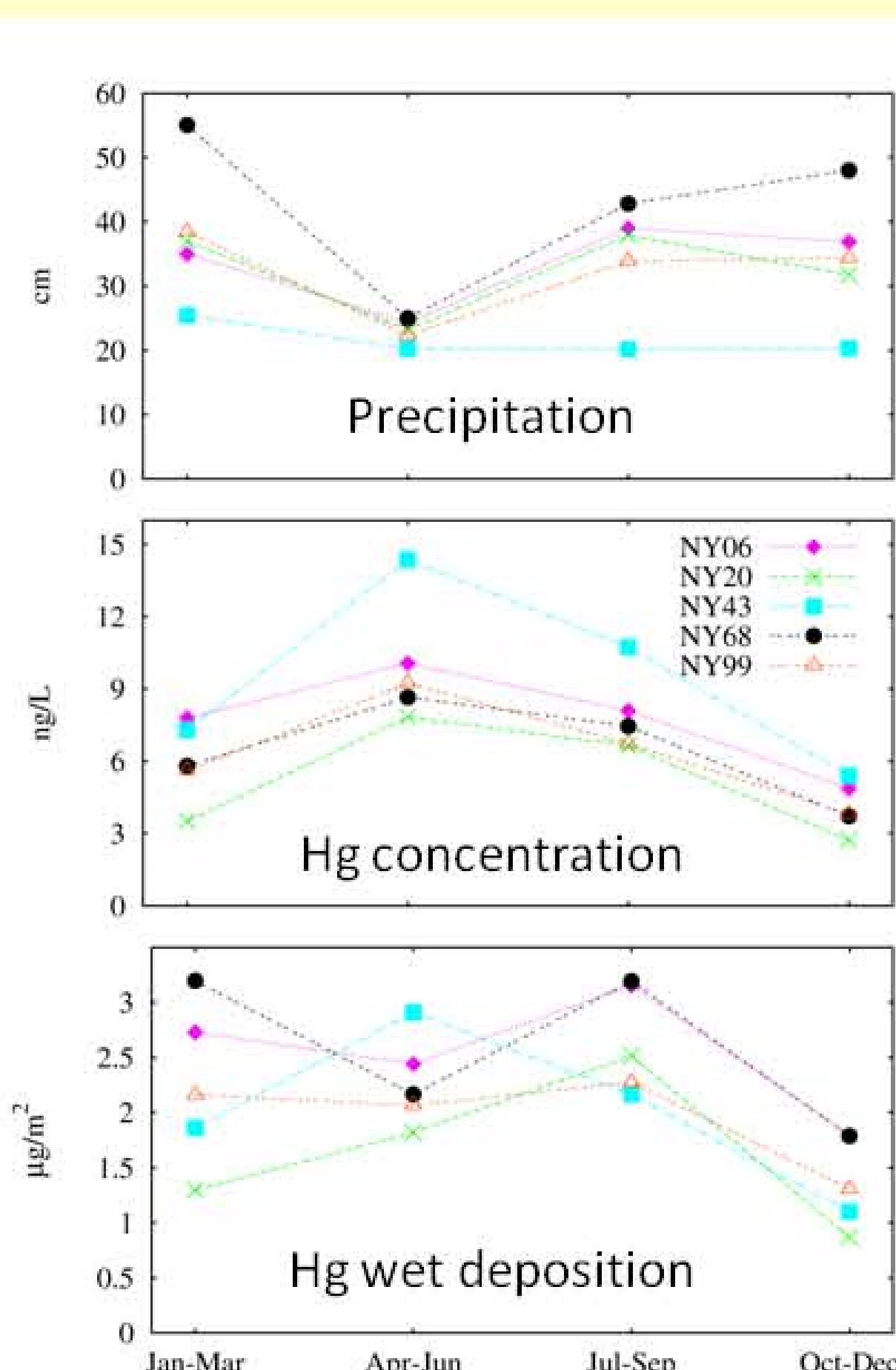
MDN ID	Site Name	Collocated with NTN?
NJ30	New Brunswick	No
NY06	New York City - Bronx	Yes*
NY20	Huntington Wildlife	Yes
NY43	Rochester	Yes*
NY68	Biscuit Brook	Yes
NY99	West Point	Yes
ON07	Egbert	No
PA00	Arendtsville	Yes
PA13	Allegheny Portage Railroad National Historic Site	No
PA30	Erie	No
PA47	Millersville	Yes
PA52	Little Pine State Park	No
PA60	Valley Forge	No
PA72	Milford	Yes
PA90	Hills Creek State Park	No
VT99	Underhill	Yes

*NYSDEC operates its own acid deposition monitors at these sites.

2008 annual precipitation, Hg concentration, and Hg wet deposition



Seasonal variations across NY



Precipitation

The highest annual precipitation in this region occurred at NY68 (171 cm). The lowest annual precipitation amounts occurred at ON07 (84 cm) and NY43 (86 cm). The passage of Hurricane Hanna through the region in early September contributed to high (~10 cm) precipitation amounts at NJ30, NY06, NY99, PA47, and PA72. In general, the lowest precipitation amounts in NY occurred during the April-June period.

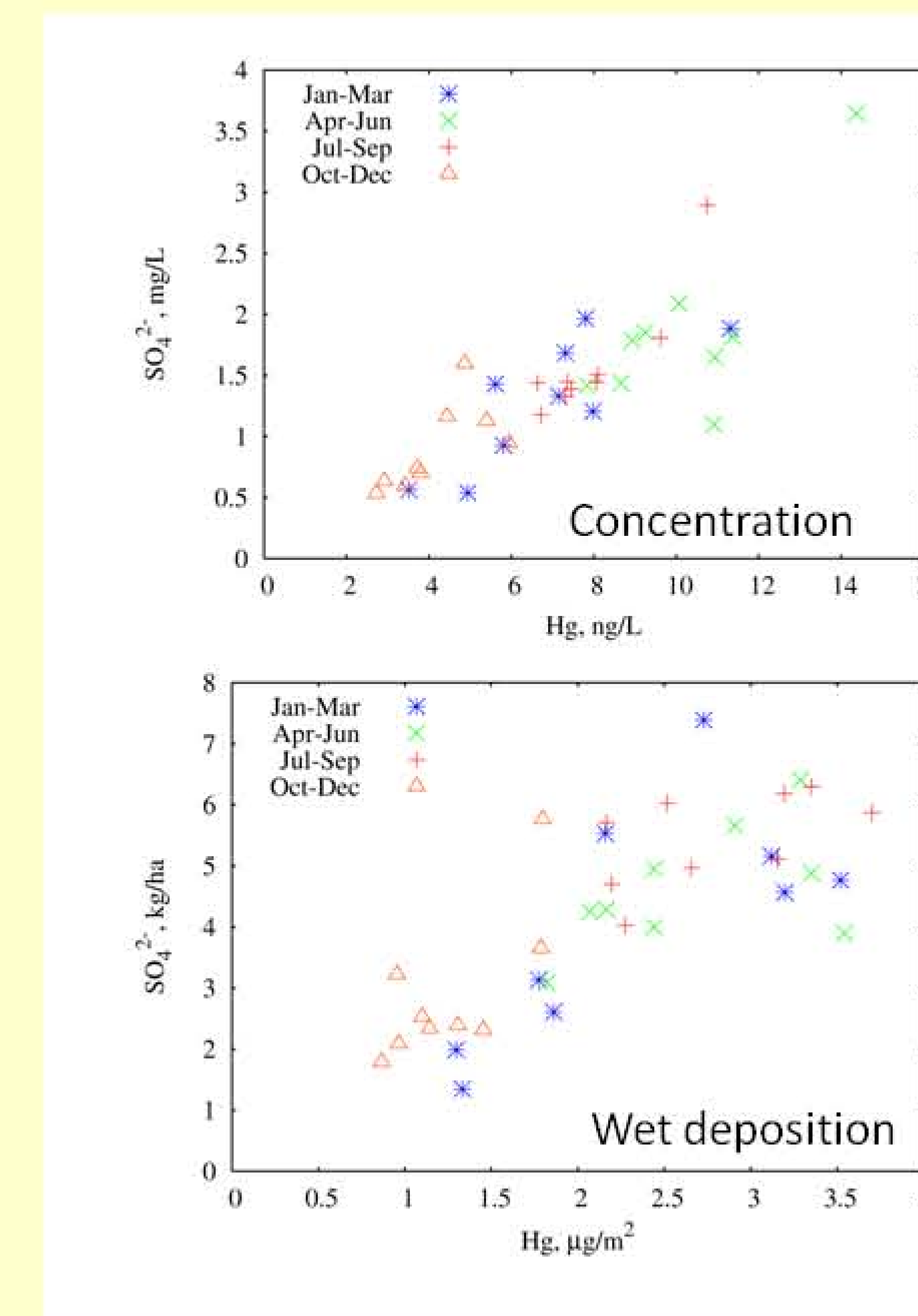
Hg concentration

Although 10 of the 12 highest weekly concentrations were observed at PA sites, the highest annual precipitation-weighted average concentration across the region was measured at NY43 (9.3 ng/L). There is a clear seasonal variation in Hg concentration across NY, with peak values during April-June.

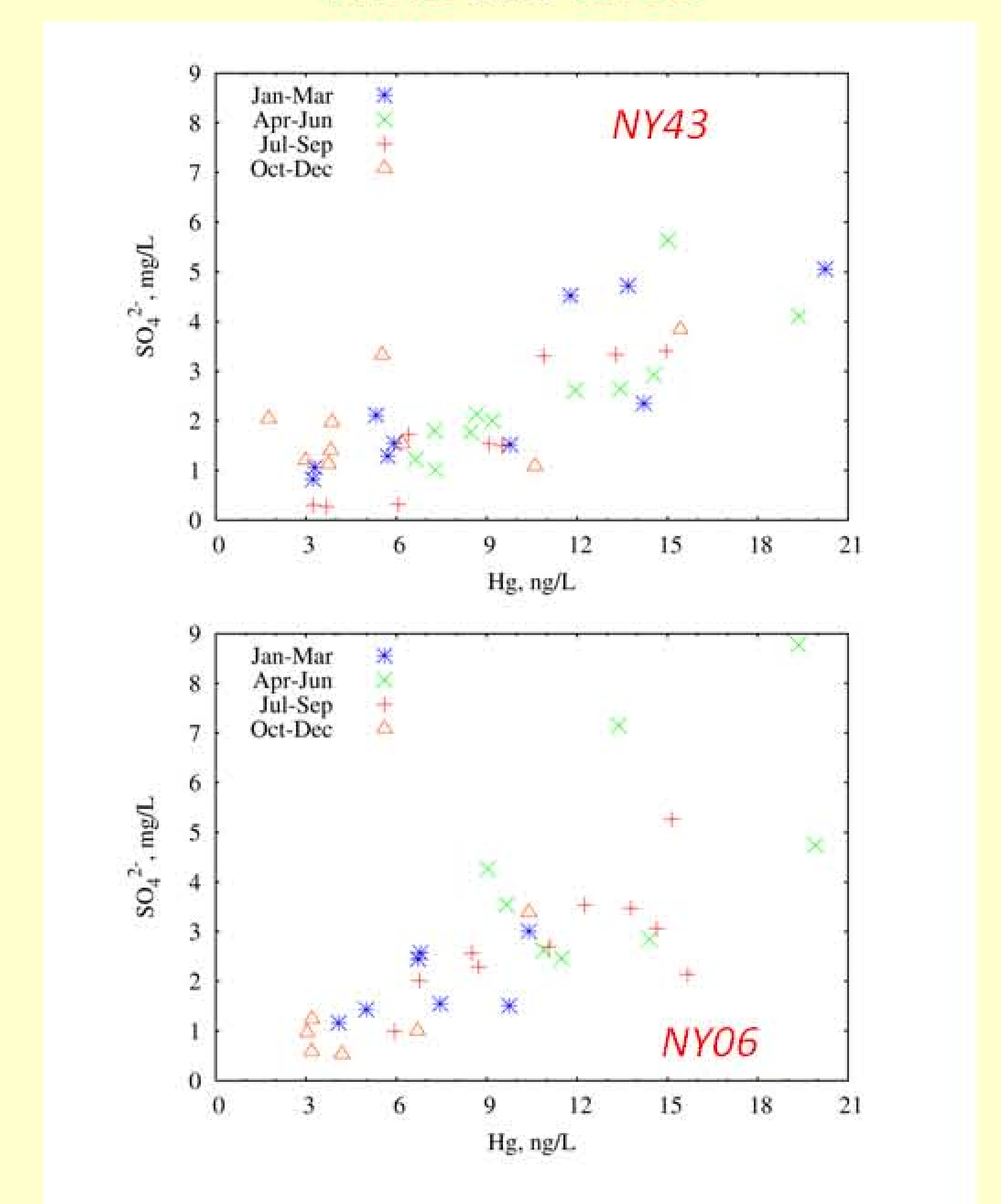
Hg wet deposition

Six of the 7 highest weekly wet Hg deposition amounts occurred at PA sites. Six of the 16 sites in this analysis had annual wet Hg deposition that exceeded $10 \mu\text{g}/\text{m}^2$ – NY06, NY68, PA00, PA13, PA60, and PA72. The seasonal patterns at sites across NY are different, although the lowest deposition amounts tended to occur during October-December.

Seasonal SO_4^{2-} vs. Hg across the region, concentrations and wet deposition



Weekly SO_4^{2-} vs. Hg concentration, NY43 and NY06



Sulfate and Hg wet concentration and deposition are correlated, on a weekly or seasonal basis. This finding is not surprising, since these two pollutants share common sources, such as coal combustion.

The NYSDEC continues to monitor Hg in ambient air and wet deposition at these two locations. Future analyses include comparison of ambient reactive gaseous mercury (RGM) levels and Hg wet deposition, as well as comparison with other ions in precipitation (e.g. Cl^-).

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