

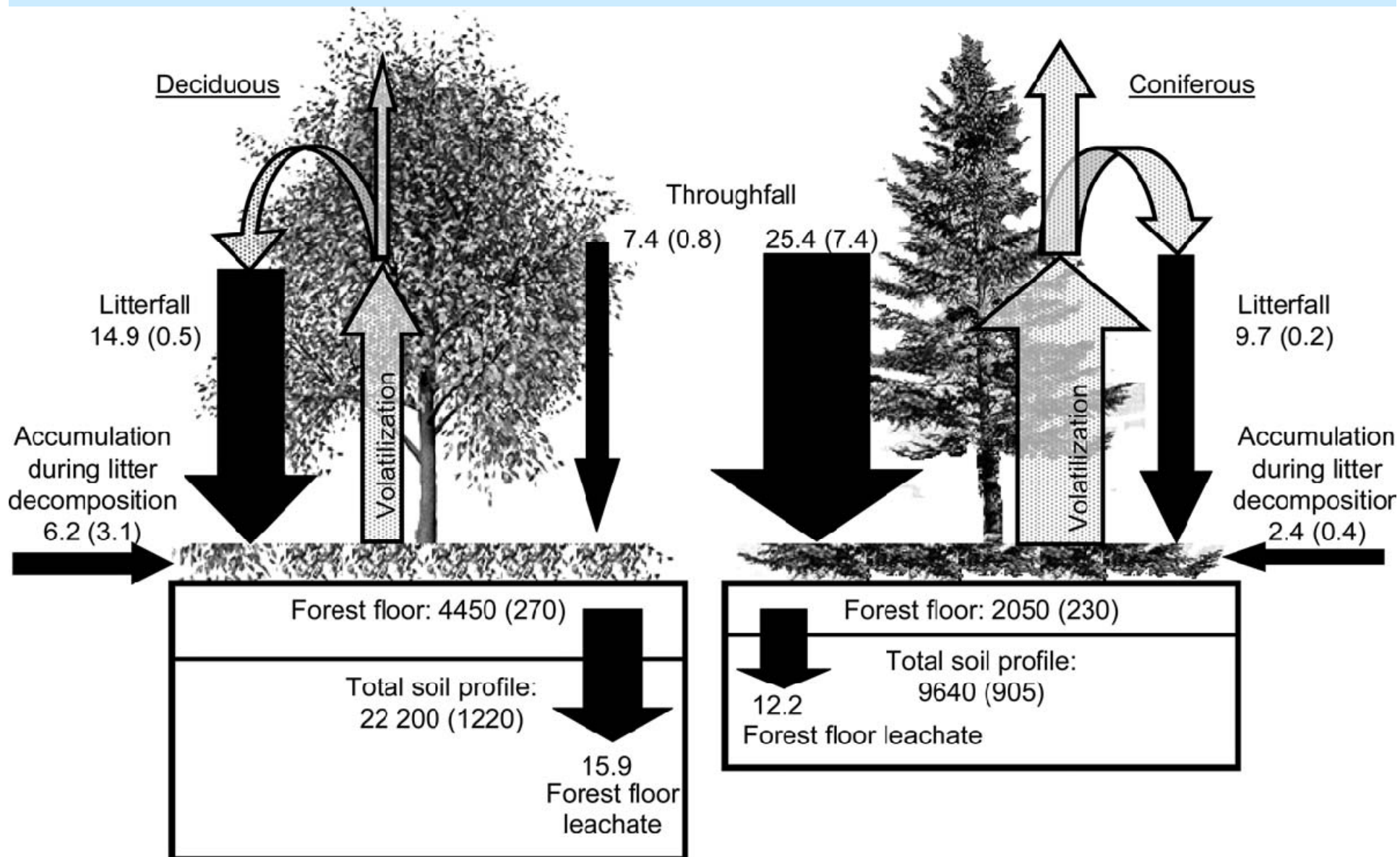
Mercury in Adirondack Soils

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Mercury in Soils

- Largest pool of Hg in most forested ecosystems
- Most studies show that inputs of Hg from atmospheric deposition exceed outputs in surface waters plus net emissions
- Hg strongly associated with soil organic matter – binds to thiol groups
- Hg in soils is new, old, and recycled

Hg Cycle in ADKs from Demers et al., 2007



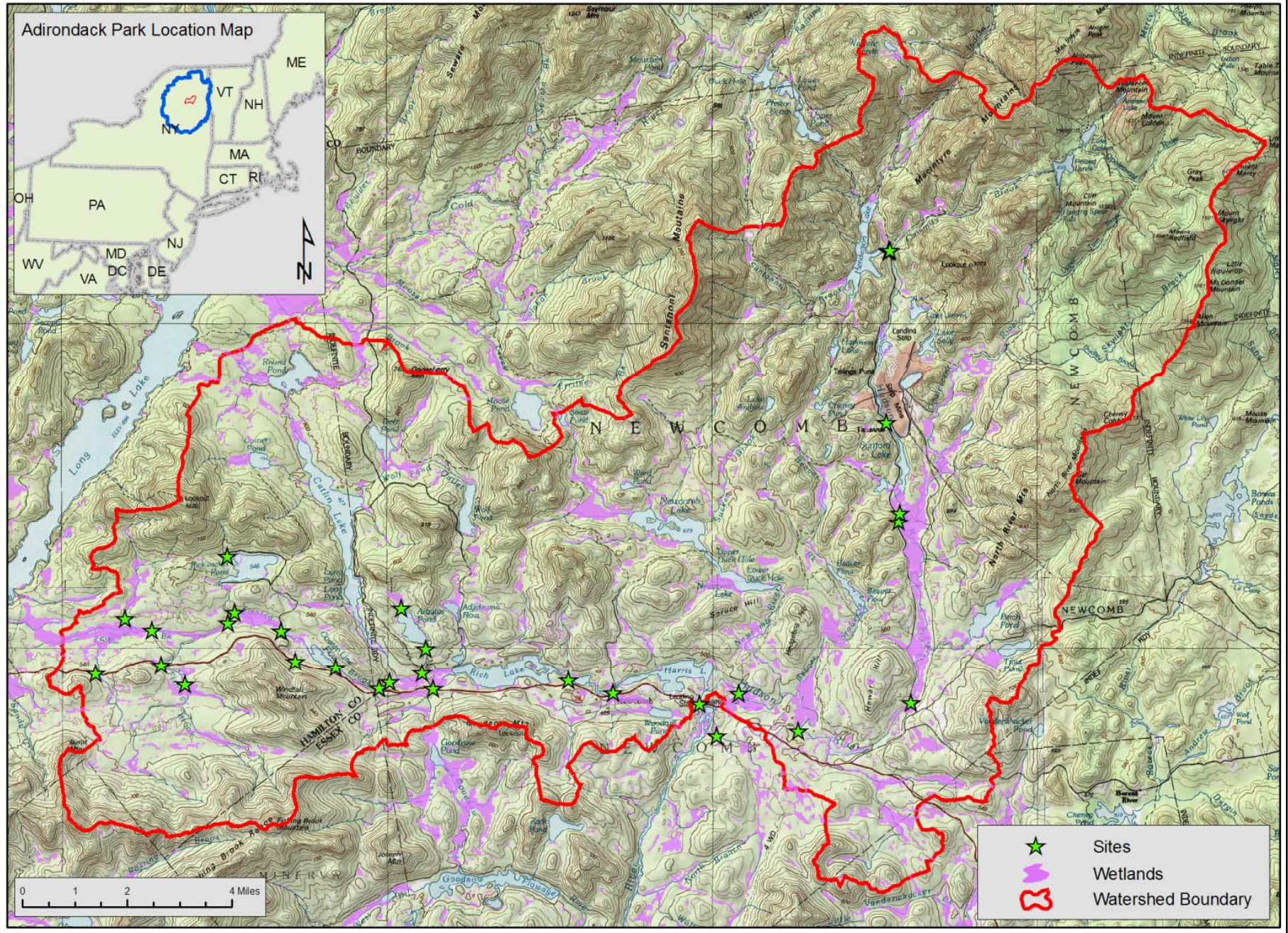
Important Questions in Hg Research that Require Soils Data

- Is Hg still showing net accumulation in ecosystems/watersheds?
- Relative roles of aquatic vs. non-aquatic methyl Hg sources
- What are the trends in Hg inputs, outputs, and stores?
- Time frame for recovery from decreasing Hg deposition

Soil Sampling in ADKs

- Collected samples in different land cover, multiple depths
- Analyzed for total Hg and methyl Hg
- Also analyzed two sets of samples from Heimburger plots near Newcomb – 1984 and 2006
- Part of effort to model Hg cycle in two watersheds: (1) Fishing Bk, NY, (2) McTier Ck, SC

Upper Hudson Basin Upstream of Newcomb, NY



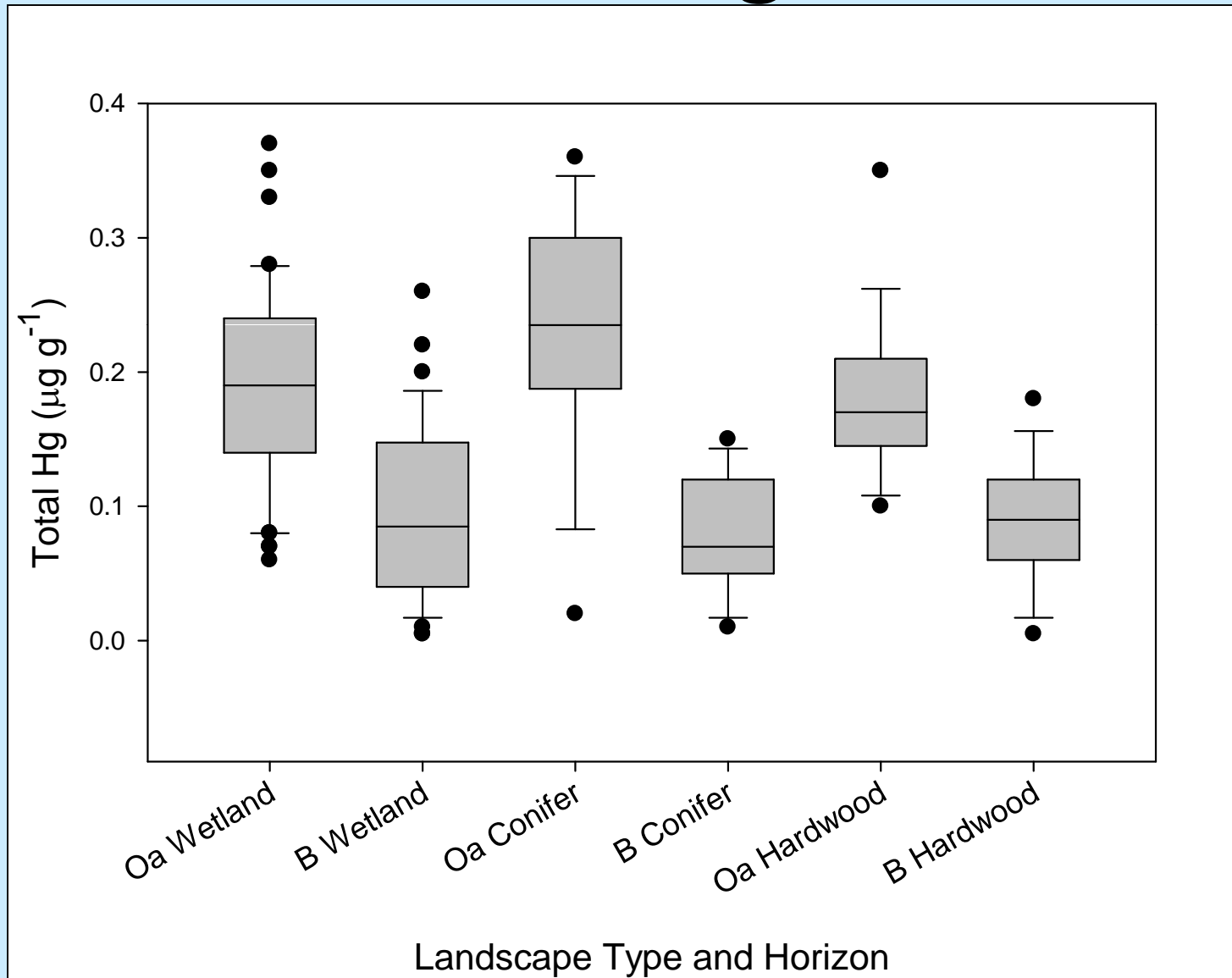
Riparian Wetlands

Riparian Conifers

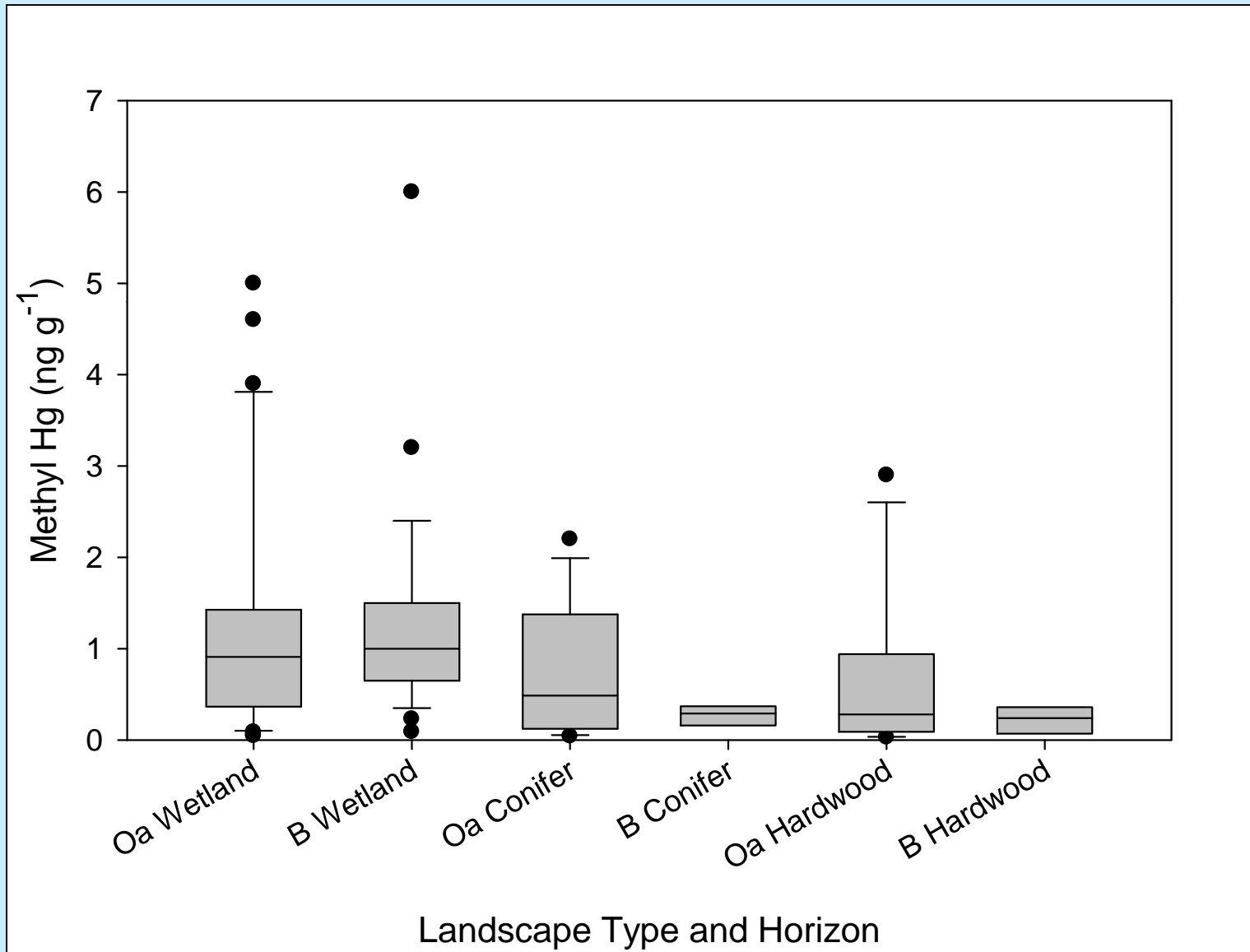
Hardwood Hillslopes



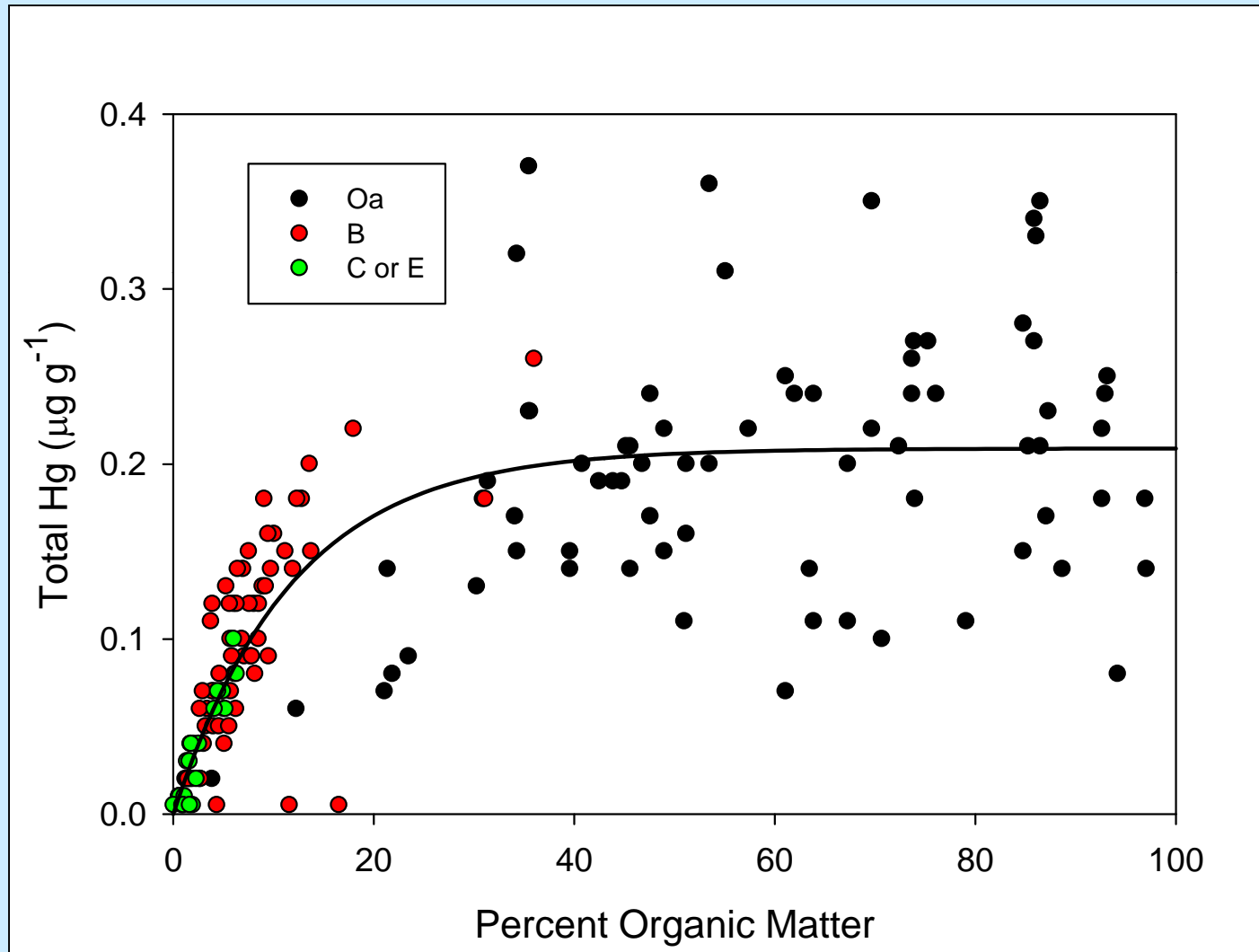
Total Hg



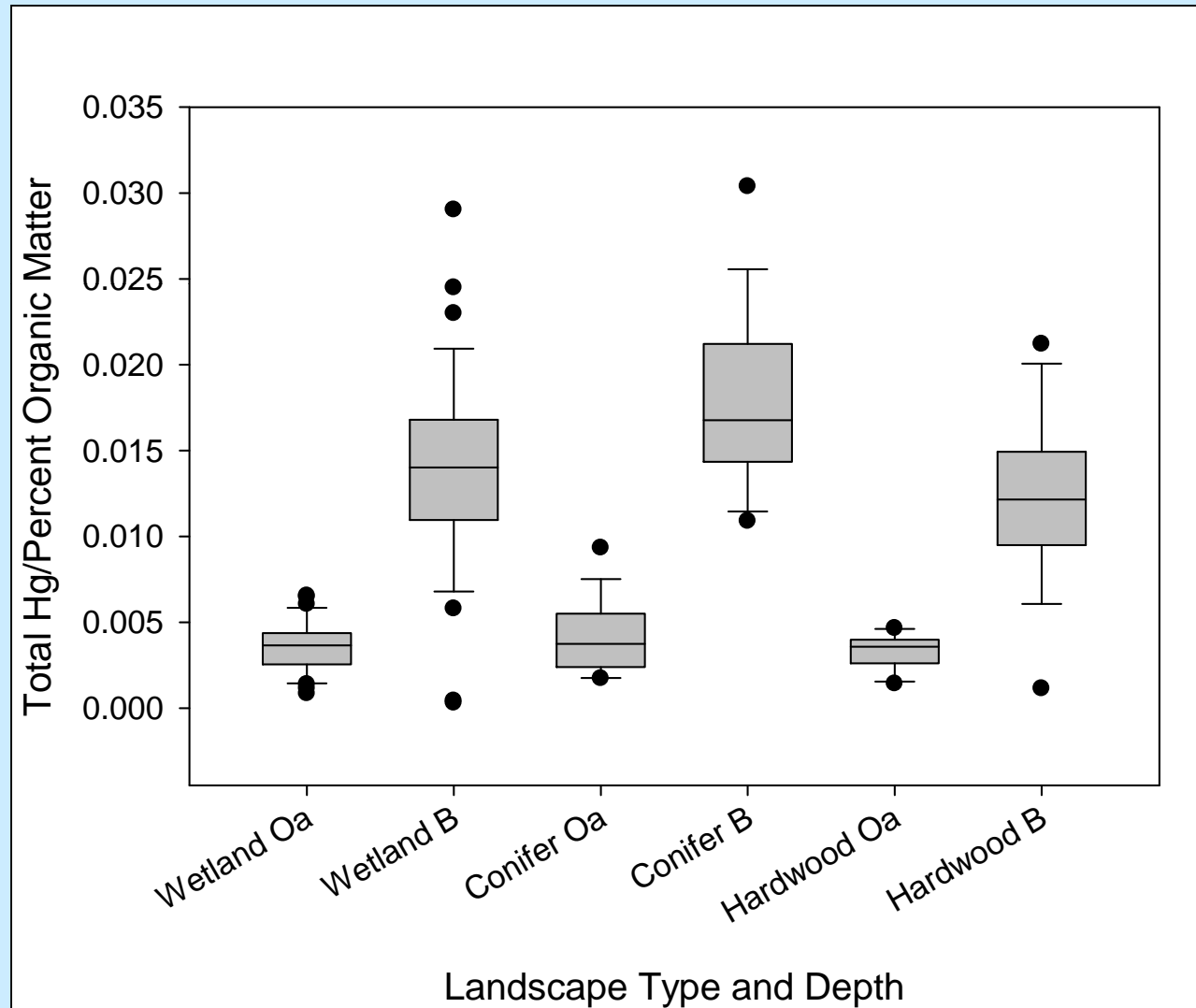
Methyl Hg



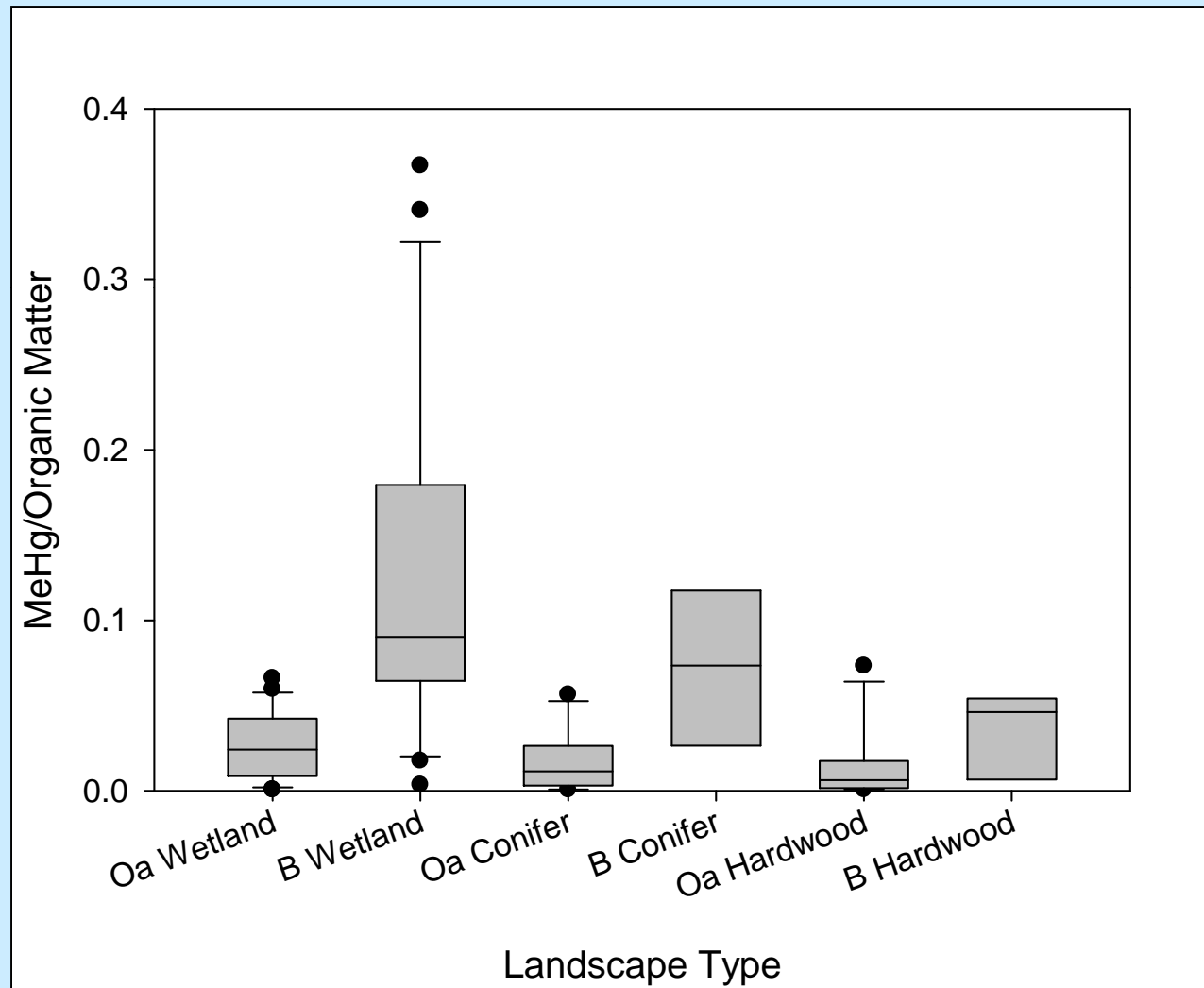
Organic Matter vs. Total Hg



Total Hg/OM Greater in B Horizon



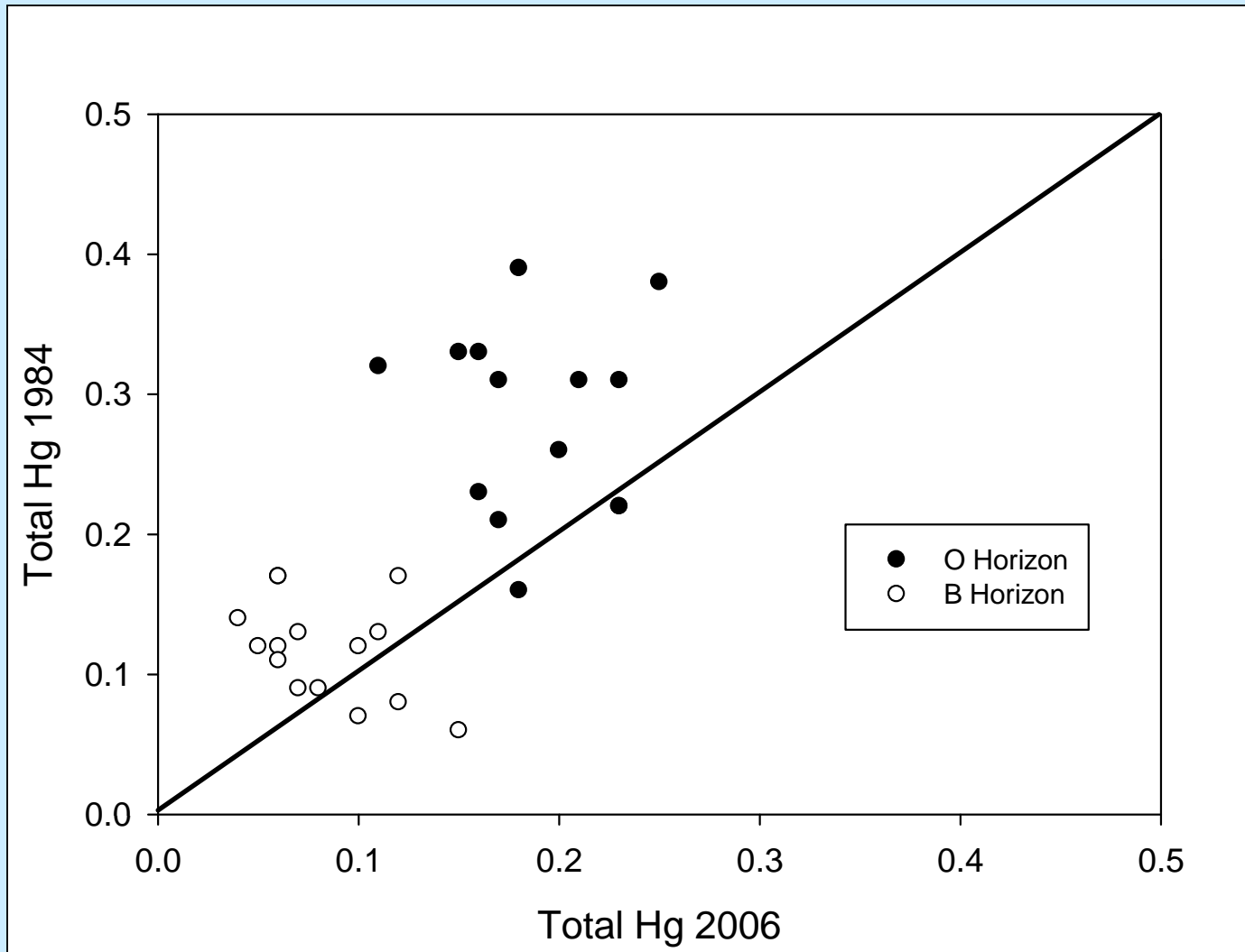
MeHg/OM Greater in B Horizon



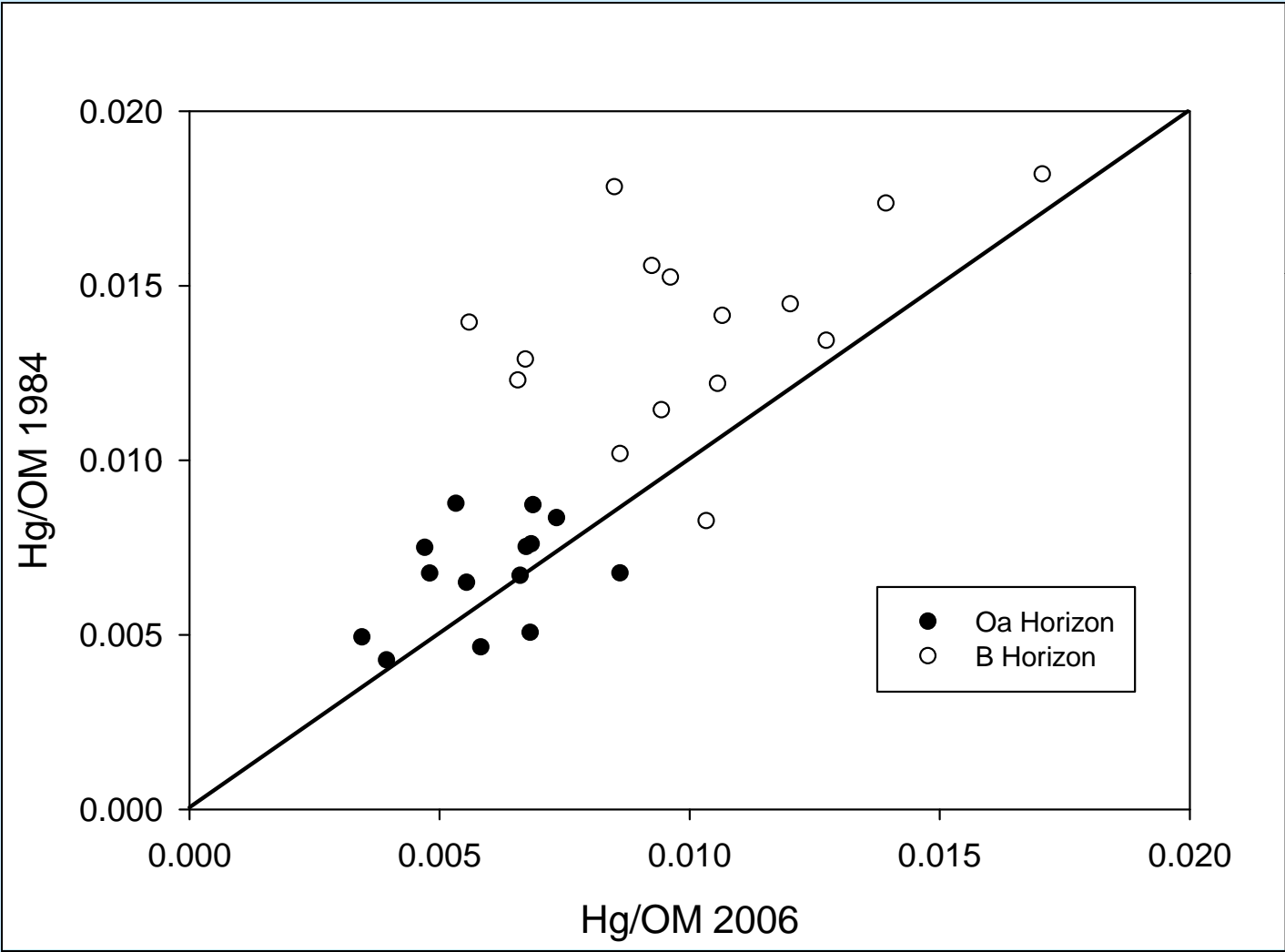
Correlations of Hg and MeHg with other Metals

- Pearson Product Moment r
- Total Hg, all with $r > 0.5$ = K -0.43, P 0.50, As 0.57, Mo 0.62, Cr 0.64, W 0.65, Sb 0.66, Bi 0.66, Se 0.70, OM 0.70, Sn 0.74, Pb 0.75, In 0.76
- Methyl Hg, all with $r > 0.45$ = S 0.46, P 0.49, Y 0.49, Sc 0.50, La 0.55
- Red font indicates Hg is more strongly correlated with element than it is correlated with organic matter content

Heimburger Newcomb Plots



Data Normalized for Organic Matter



Summary

- Total Hg concentrations in soils in the range of other studies – large pool of Hg
- Methyl Hg concentrations higher in wetland soils, but some high values found in Oa horizons in riparian conifers and hardwood hillslopes
- Total Hg concentrations are lower in 2006 than 1984 samples from Heimburger Newcomb plots – volatile losses during storage?

Acknowledgements

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