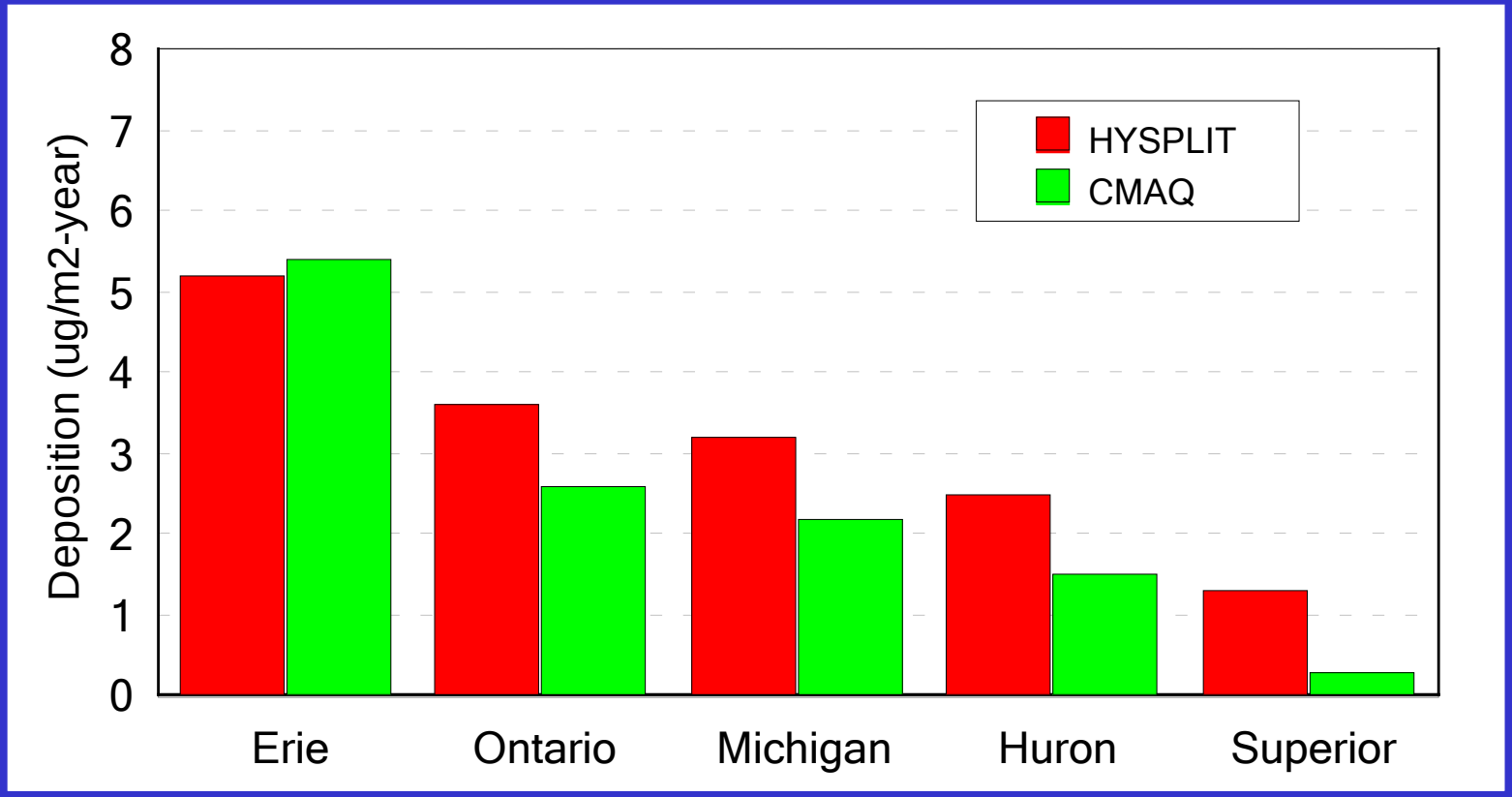
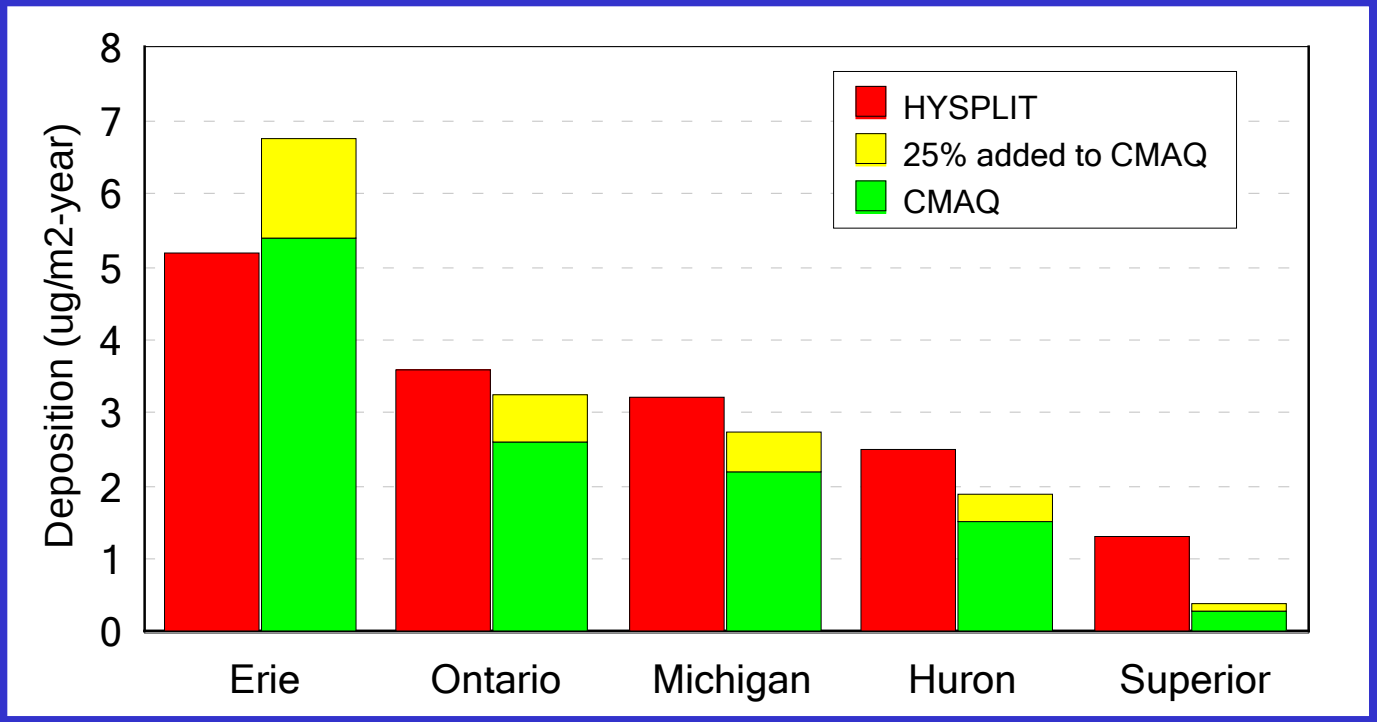
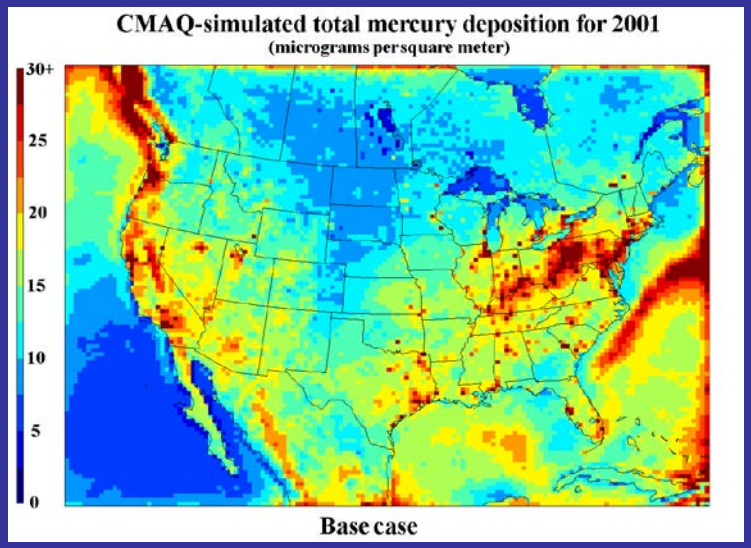


Model-estimated U.S. utility atmospheric mercury deposition contribution to the Great Lakes: HYSPLIT-Hg (1996 meteorology, 1999 emissions) vs. CMAQ-HG (2001 meteorology, 2001 emissions).

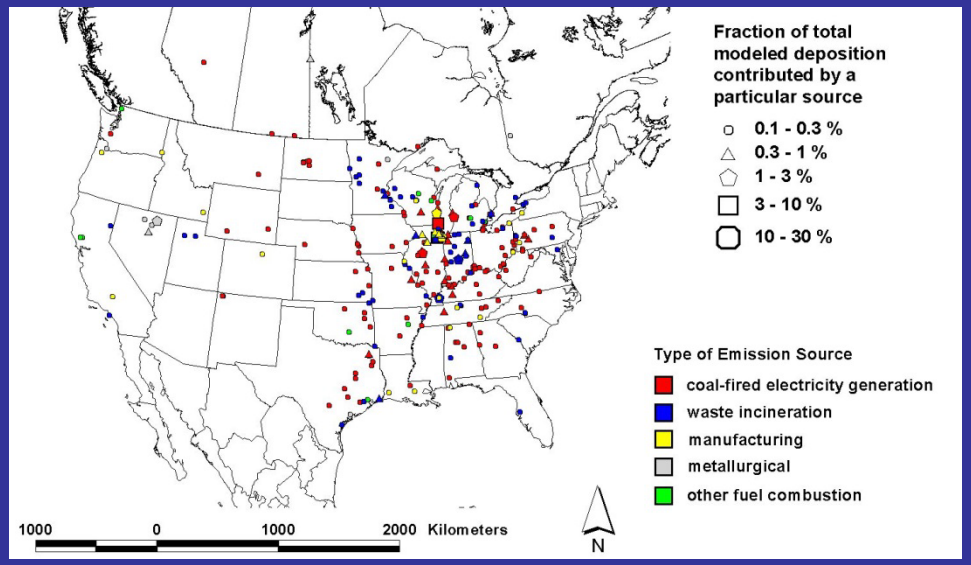


- Model-estimated U.S. utility atmospheric mercury deposition contribution to the Great Lakes: HYSPLIT-Hg (1996 meteorology, 1999 emissions) vs. CMAQ-Hg (2001 meteorology, 2001 emissions).

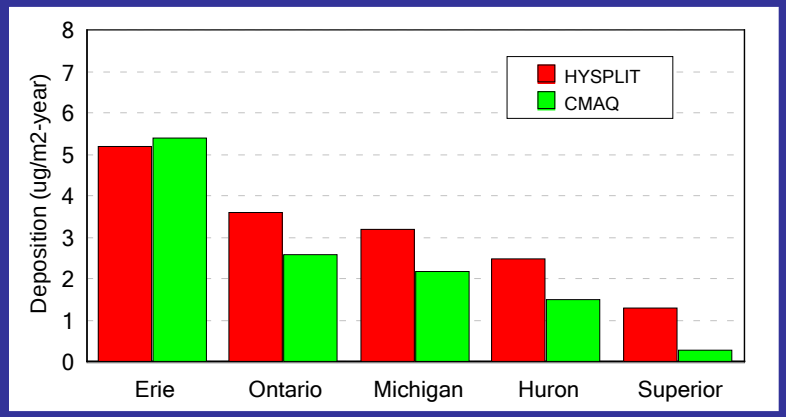
- This figure also shows an added component of the CMAQ-Hg estimates -- corresponding to ~25% of the CMAQ-Hg results – in an attempt to adjust the CMAQ-Hg results to account for the deposition under-prediction found in the CMAQ-Hg model evaluation.



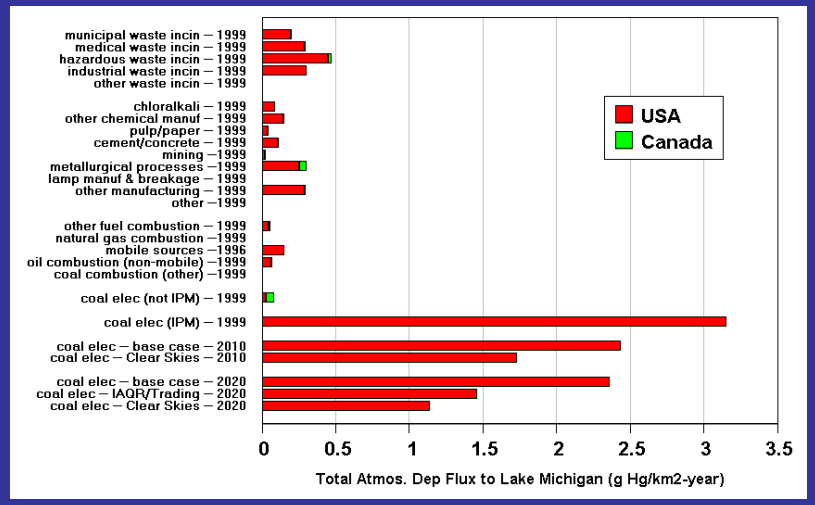
CMAQ-Hg modeling results, estimating mercury deposition in the U.S. from all sources (U.S., global, natural) used for the Clean Air Mercury Rule (CAMR), courtesy of Russ Bullock (NOAA-EPA)



Largest atmospheric deposition contributors to Lake Michigan based on 1999-2000 emissions (HYSPLIT-Hg)



Model-estimated U.S. utility atmospheric mercury deposition contribution to the Great Lakes: HYSPLIT-Hg (1996 meteorology, 1999 emissions) vs. CMAQ-HG (2001 meteorology, 2001 emissions).



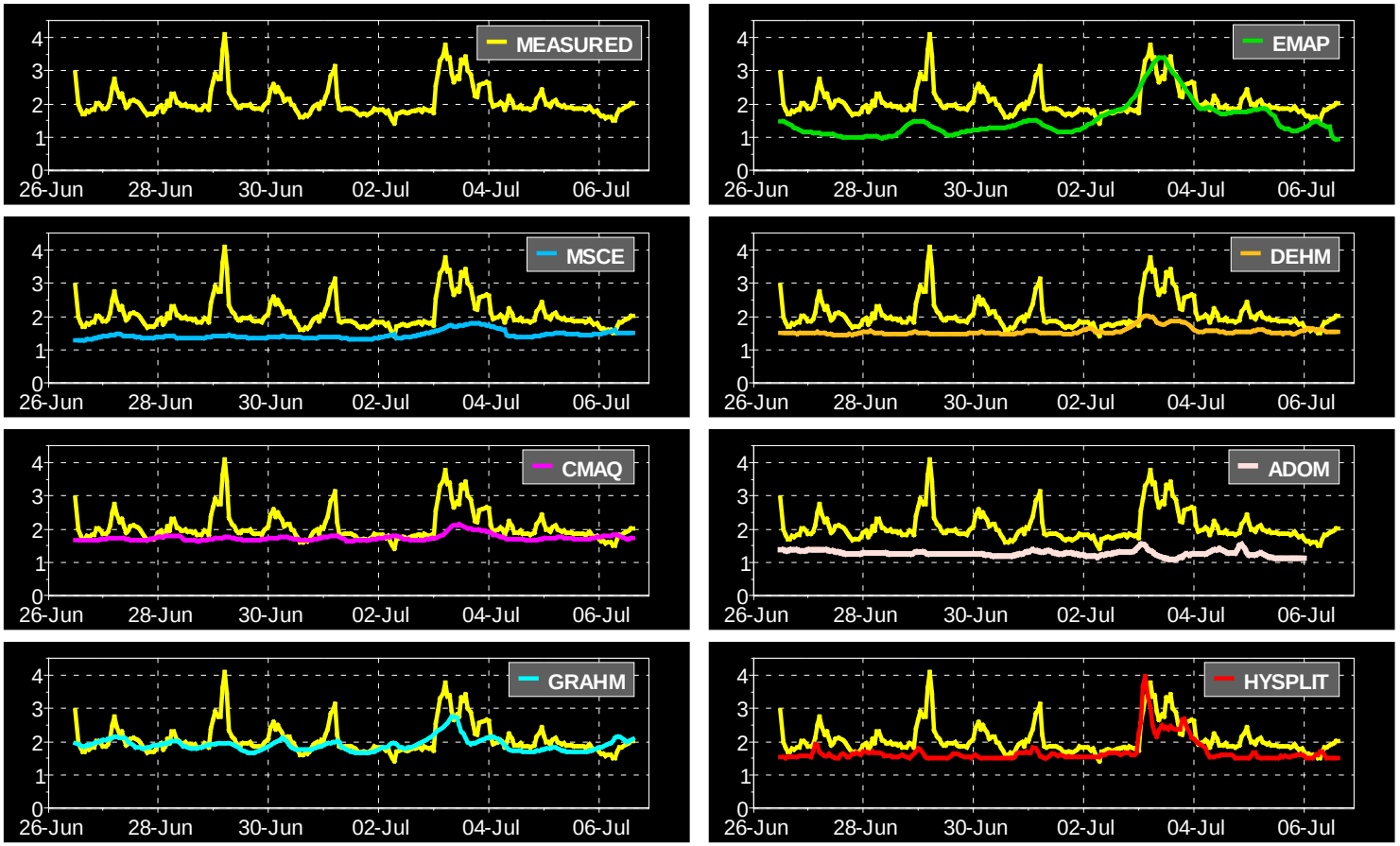
Atmospheric Deposition Flux to Lake Michigan from Anthropogenic Mercury Emissions Sources in the U.S. and Canada (HYSPLIT-Hg)

Modeling – Accomplishments

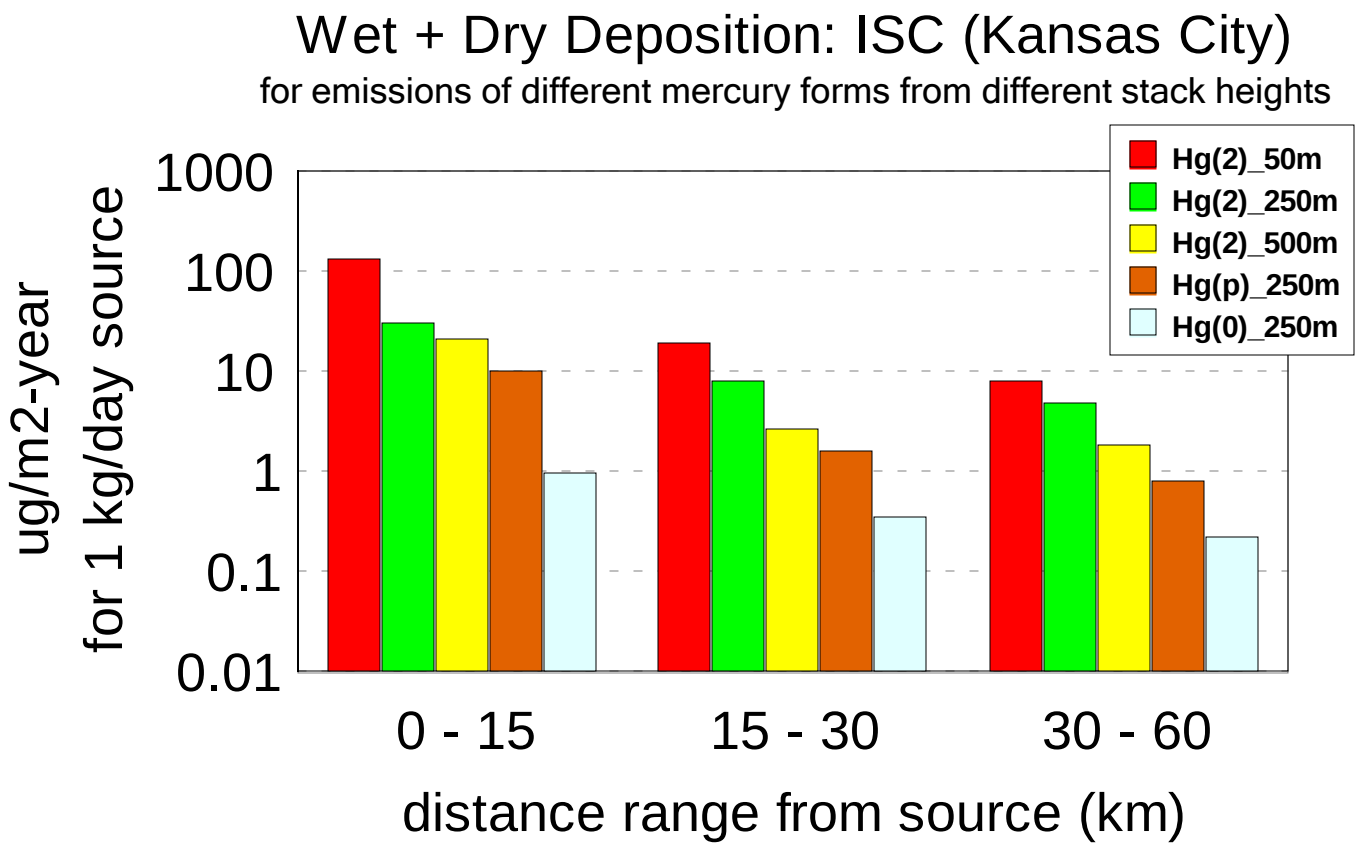
Successful performance in model evaluation and model intercomparison exercises

model inter-comparison and evaluation carried out in collaboration with numerous mercury modeling research groups around the world, under the auspices of EMEP (Europe)

Total Gaseous Mercury (ng/m^3) at Neuglobsow, Germany, June 26 – July 6, 1995.

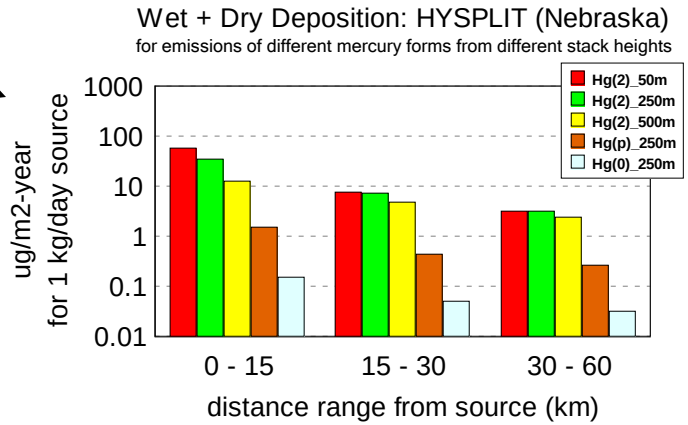


Ryaboshapko et al., **Intercomparison study of atmospheric mercury models: 1. Comparison of models with short-term measurements**. *Science of the Total Environment* **376**, 228-240, **2007**.



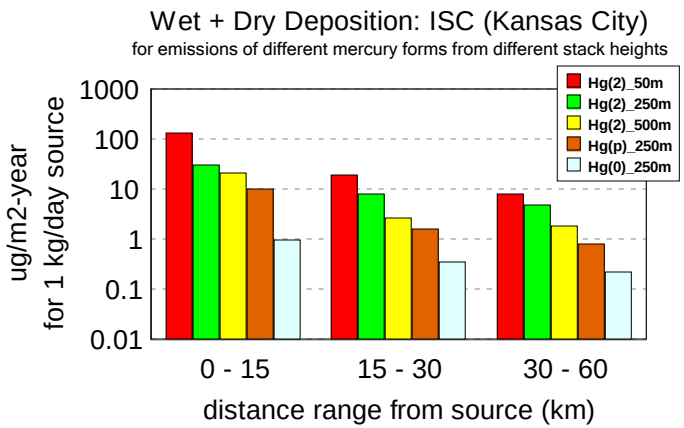
Calculated from data used to produce Appendix A of USEPA (2005): Clean Air Mercury Rule (CAMR) Technical Support Document: Methodology Used to Generate Deposition, Fish Tissue Methylmercury Concentrations, and Exposure for Determining Effectiveness of Utility Emissions Controls: Analysis of Mercury from Electricity Generating Units

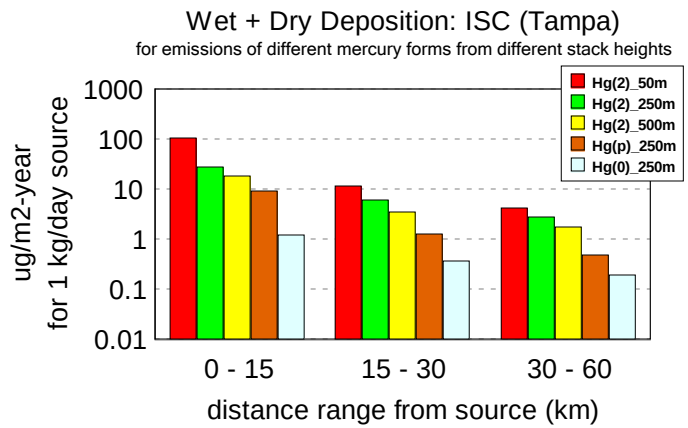
HYSPLIT 1996

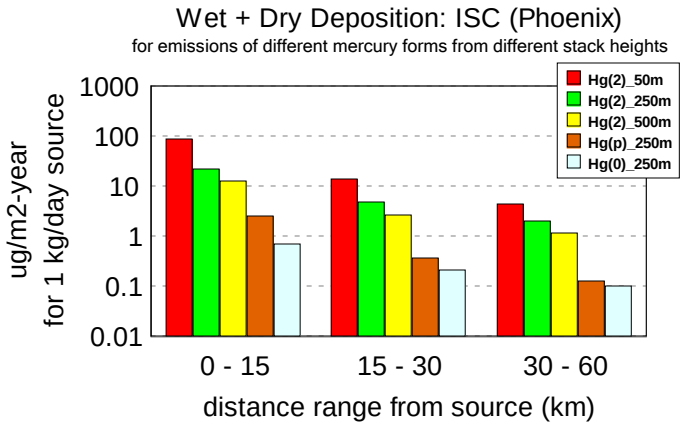


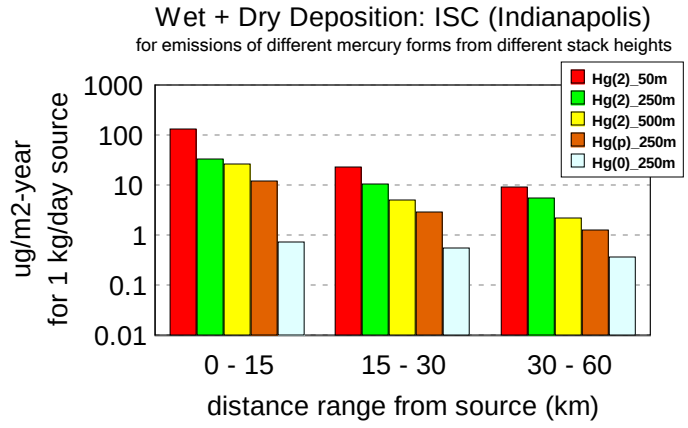
Different Time Periods and Locations, but Similar Results

ISC: 1990-1994





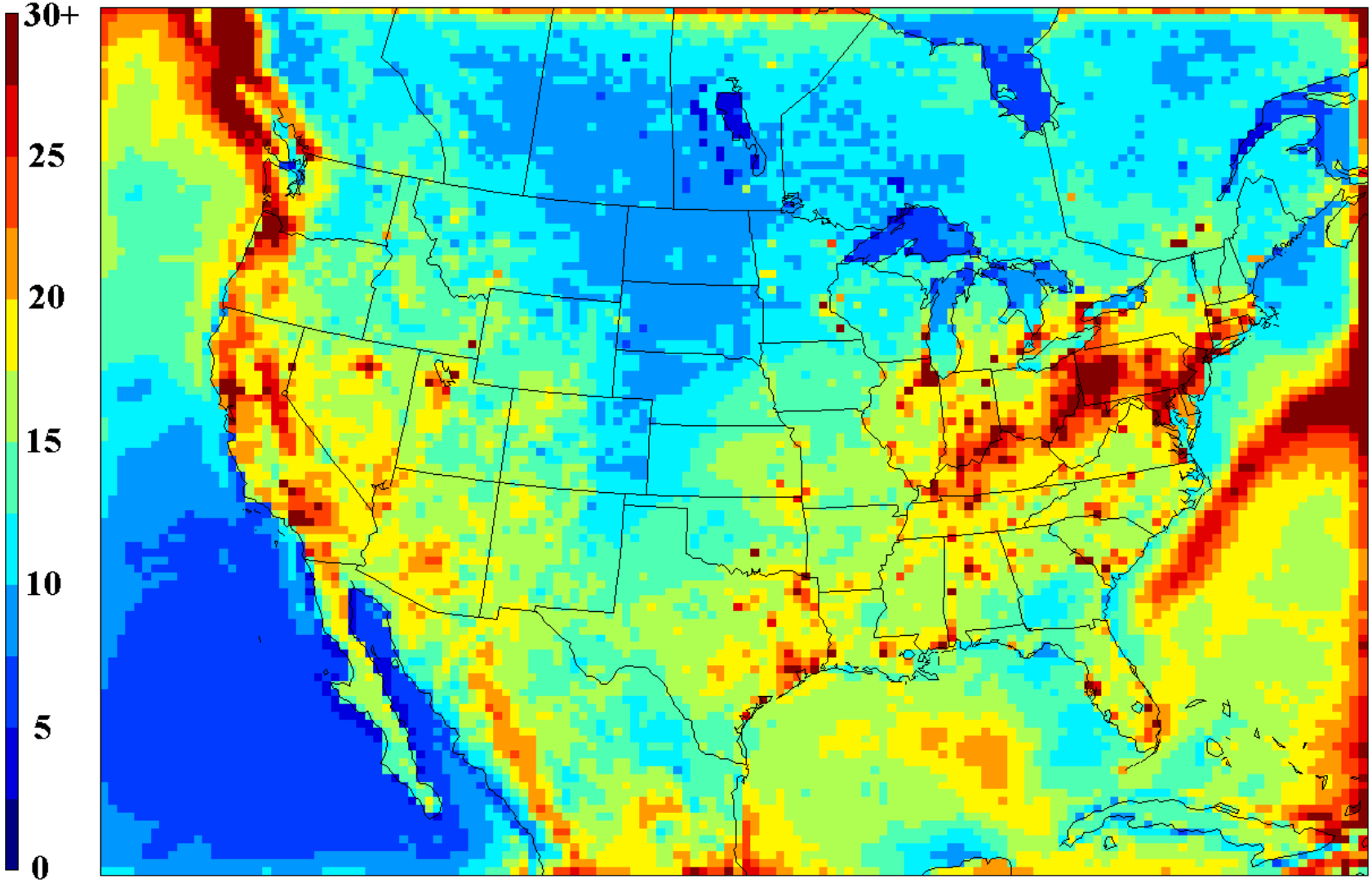




Some CMAQ results, used in the development of the CAMR rule, courtesy of Russ Bullock, EPA

CMAQ-simulated total mercury deposition for 2001

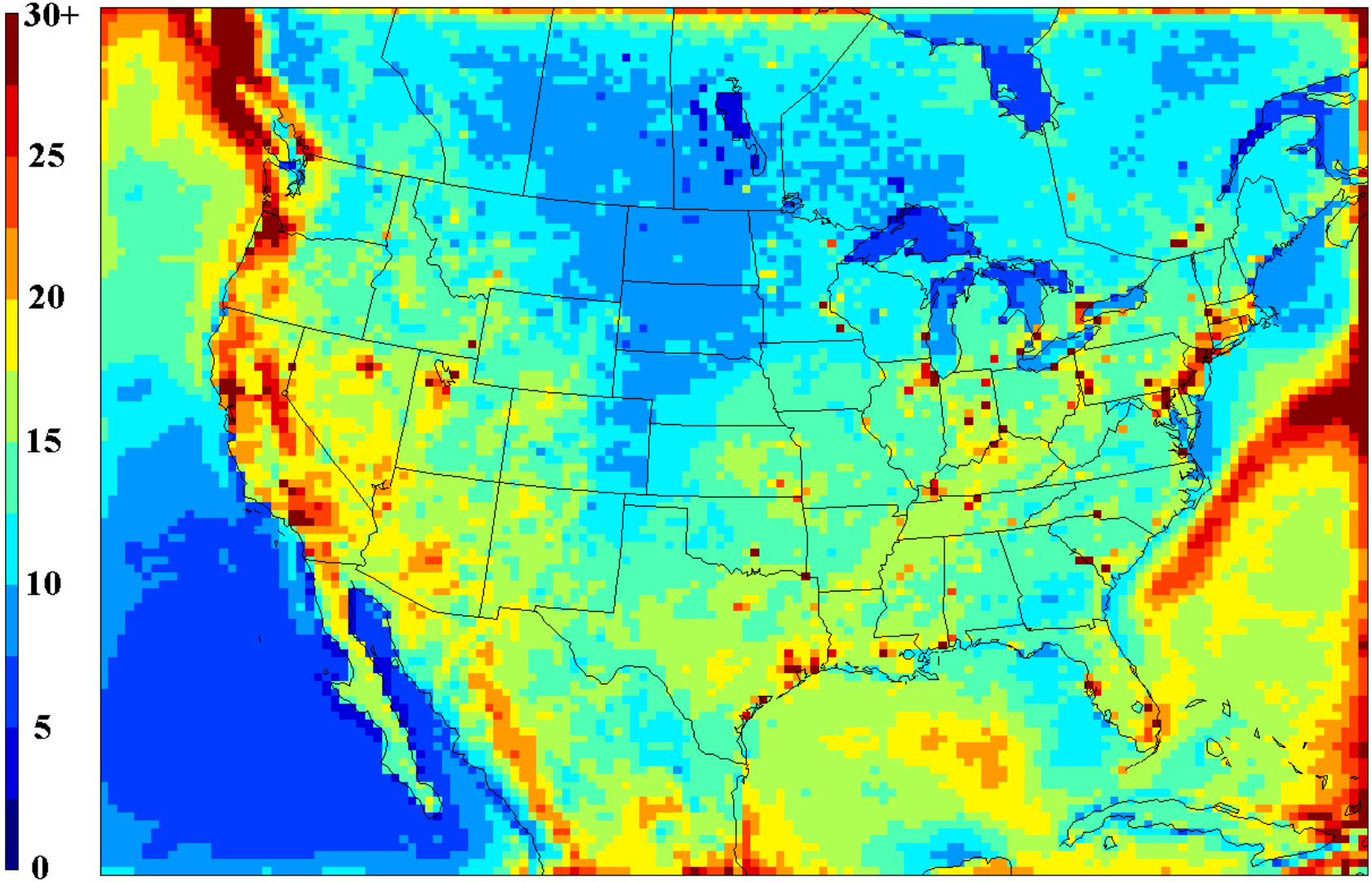
(micrograms per square meter)



Base case

CMAQ-simulated total mercury deposition for 2001

(micrograms per square meter)



Utility Zero Out