

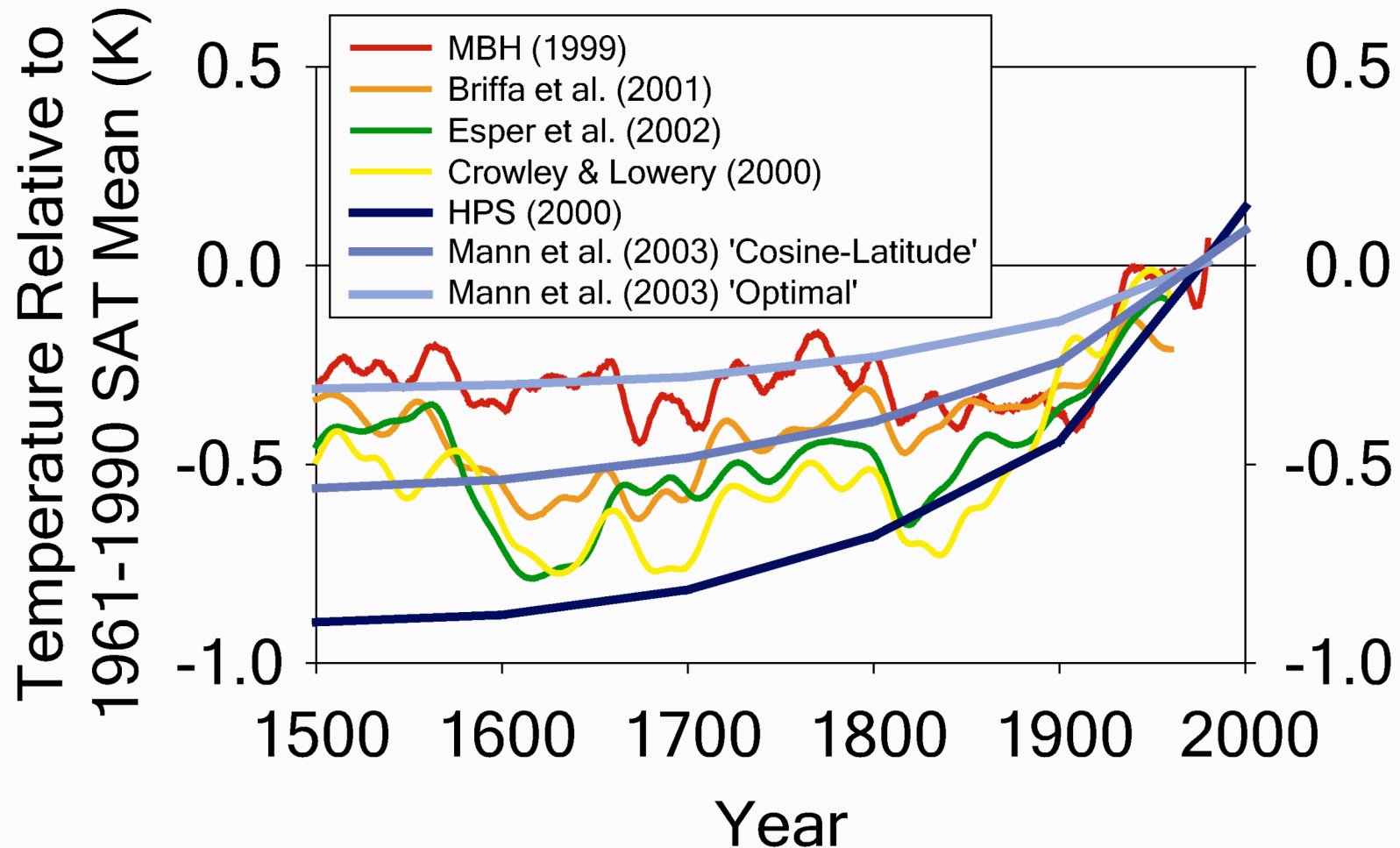
# Borehole Climate Reconstructions: Spatial Structure and Hemispheric Averages

Henry N. Pollack and Jason E. Smerdon

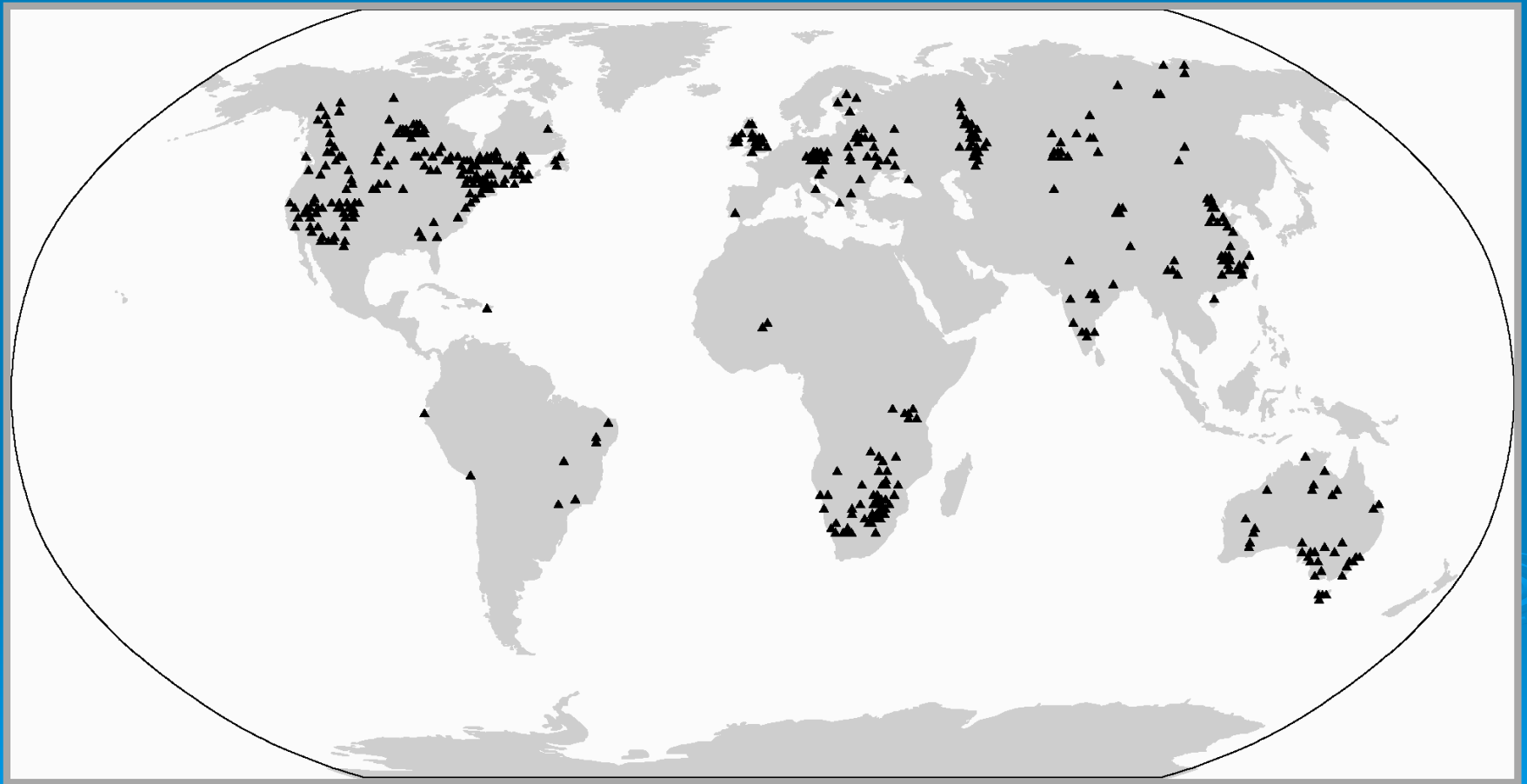
University of Michigan

2003 Fall AGU Meeting

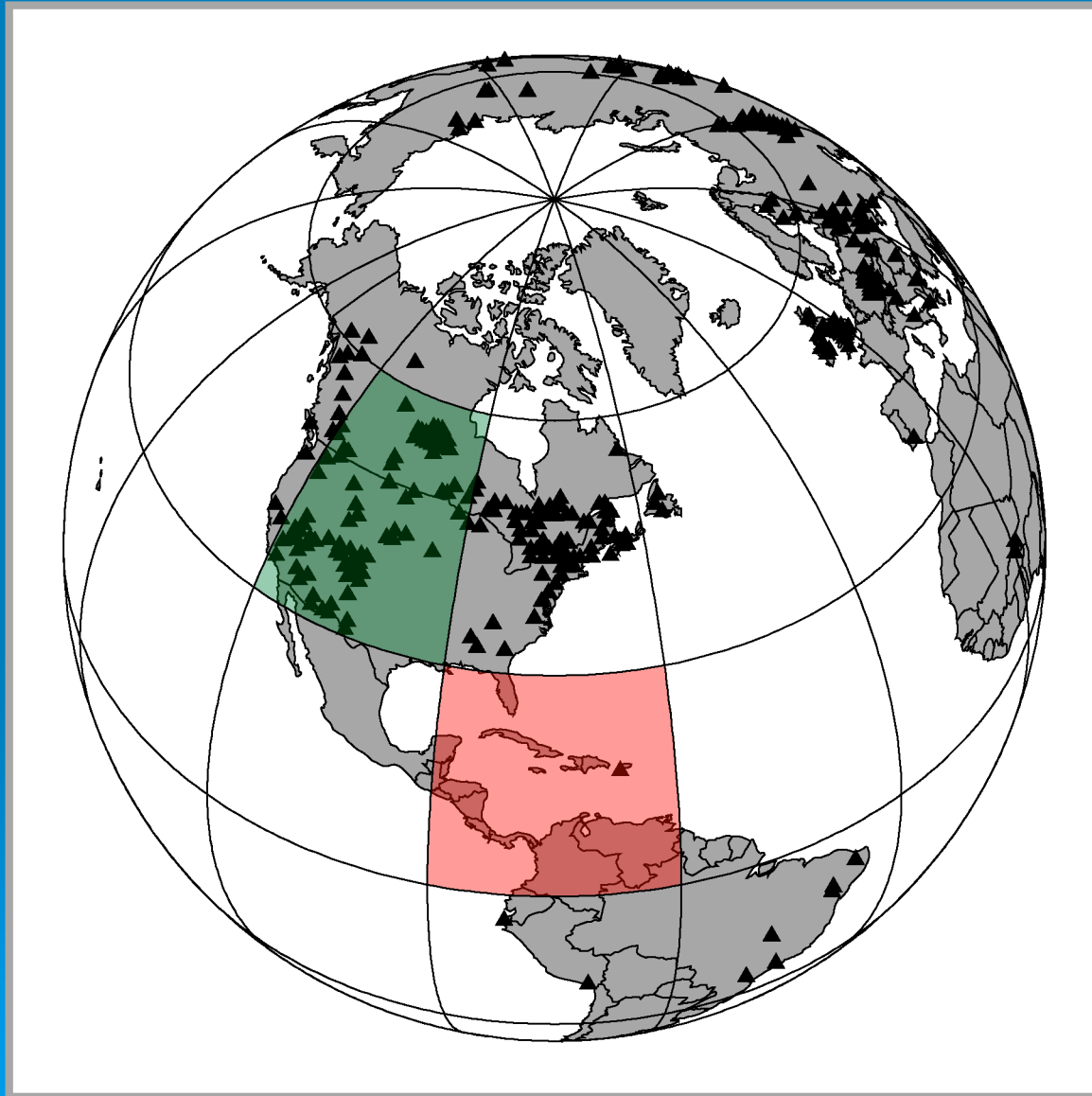
# Ensemble of Northern Hemisphere Temperature Reconstructions (after Briffa and Osborn, 2002)



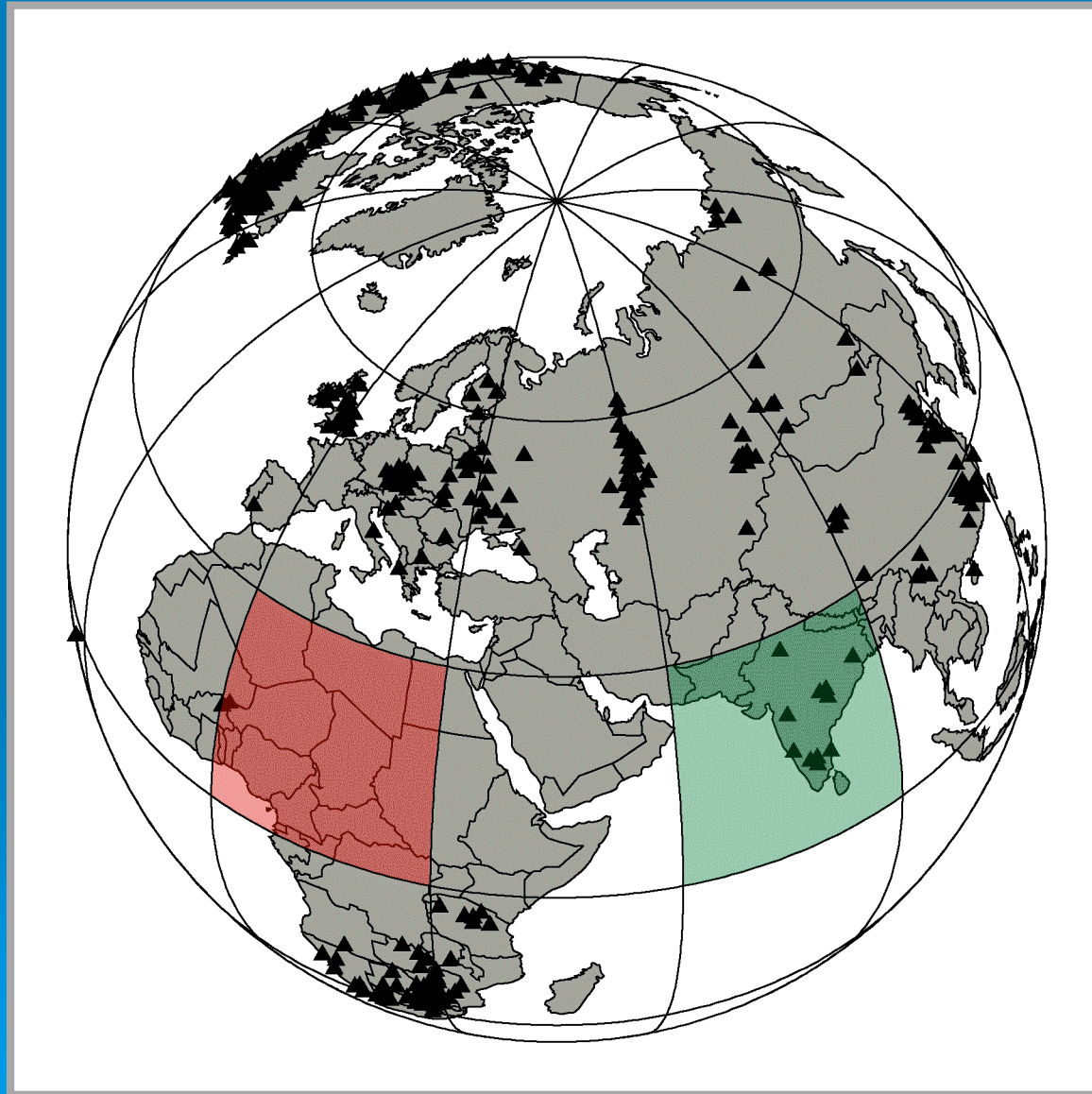
# Borehole Locations in the Global Database



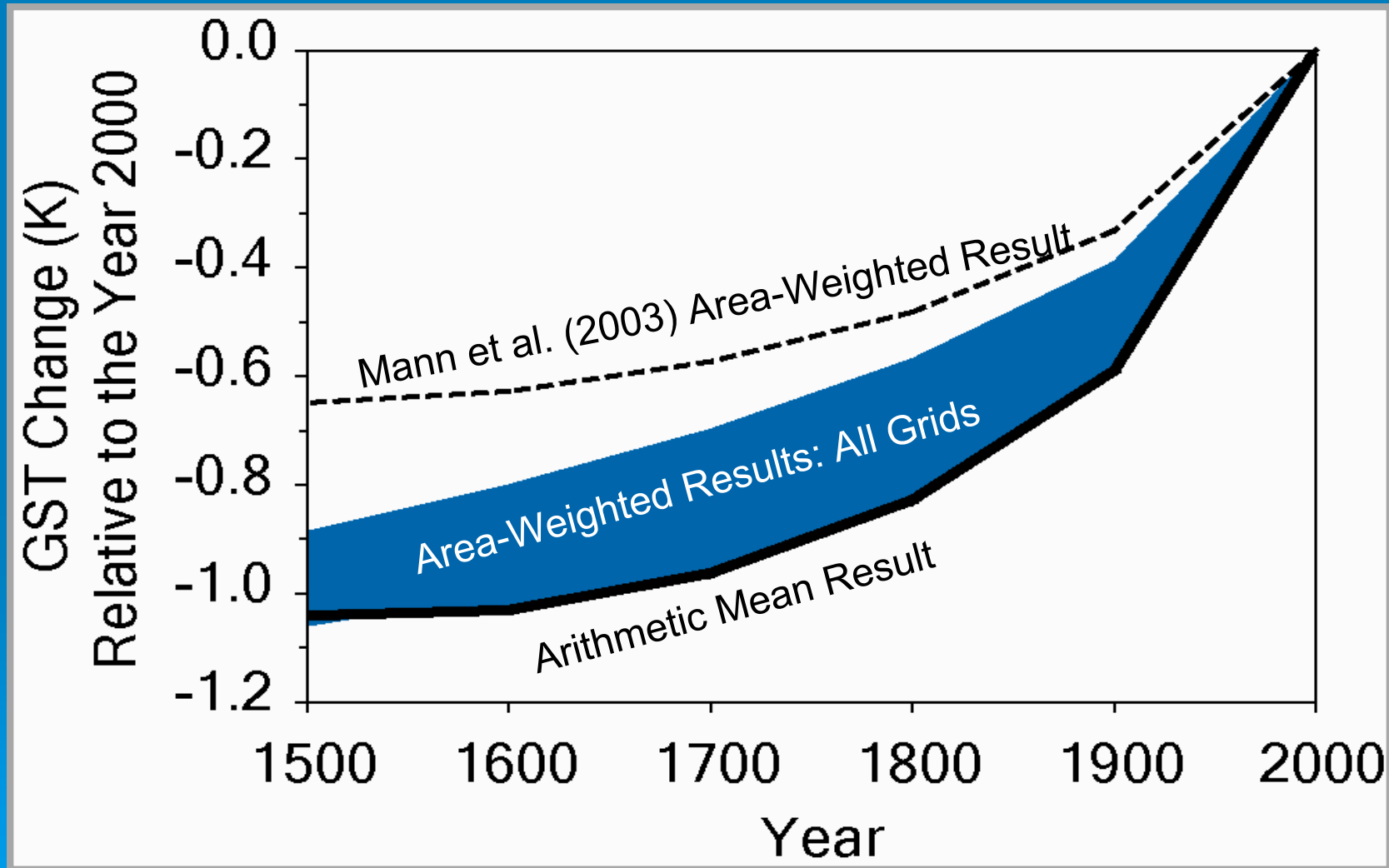
# Weighting an Irregularly Distributed Dataset on the Surface of a Sphere



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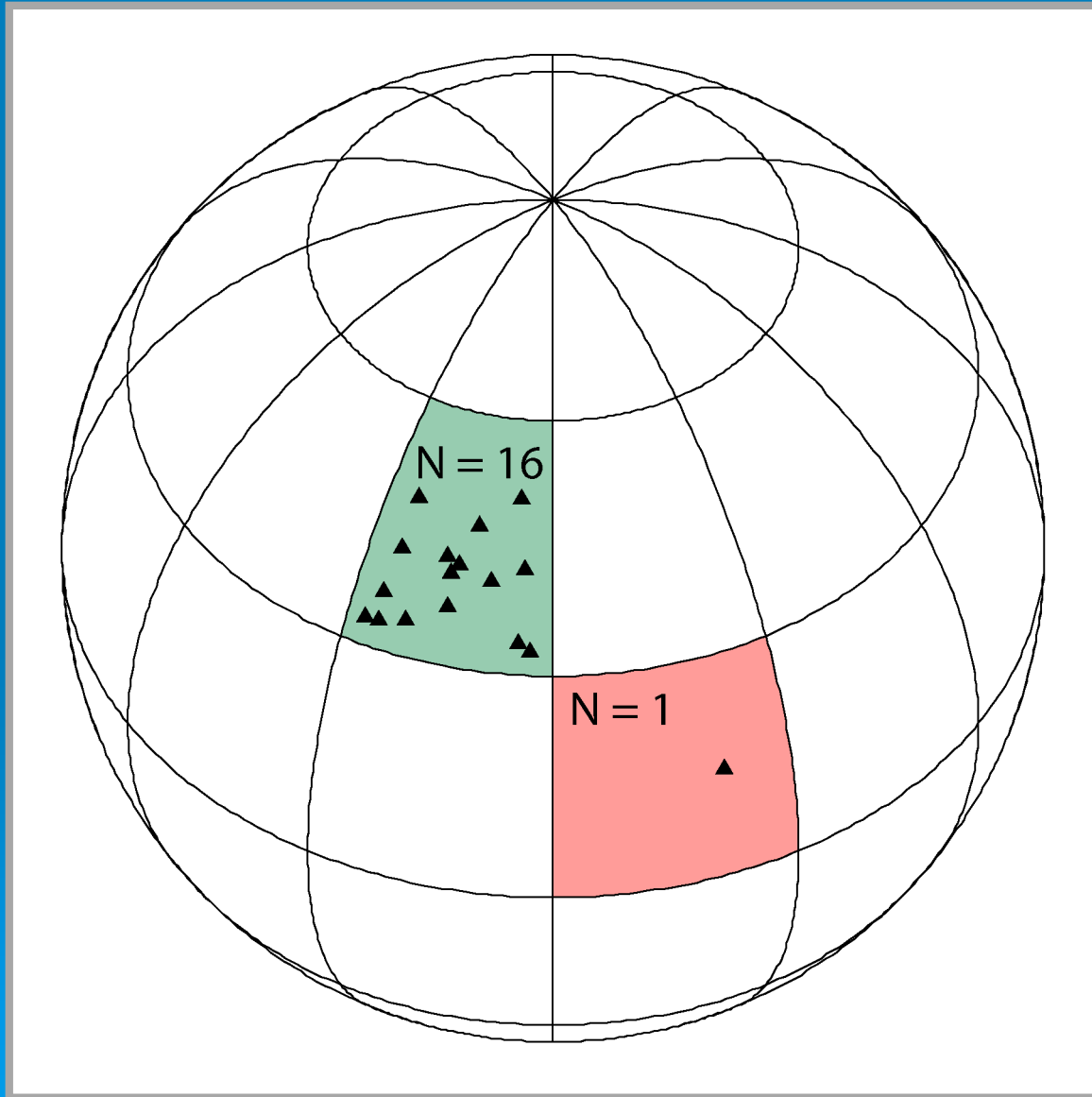


# Area Weighting of Northern Hemisphere Borehole Reconstructions

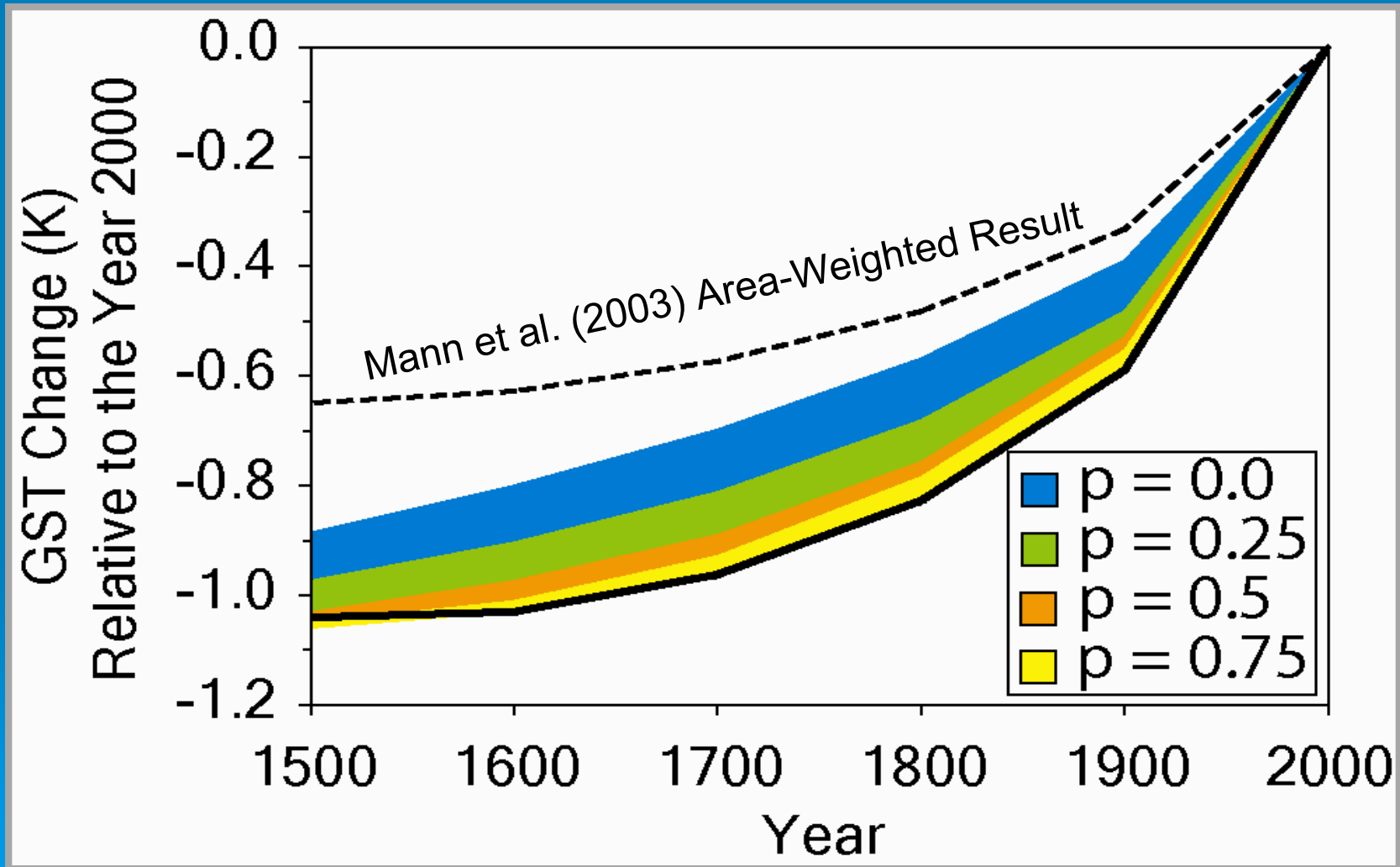


# Occupancy Weighting

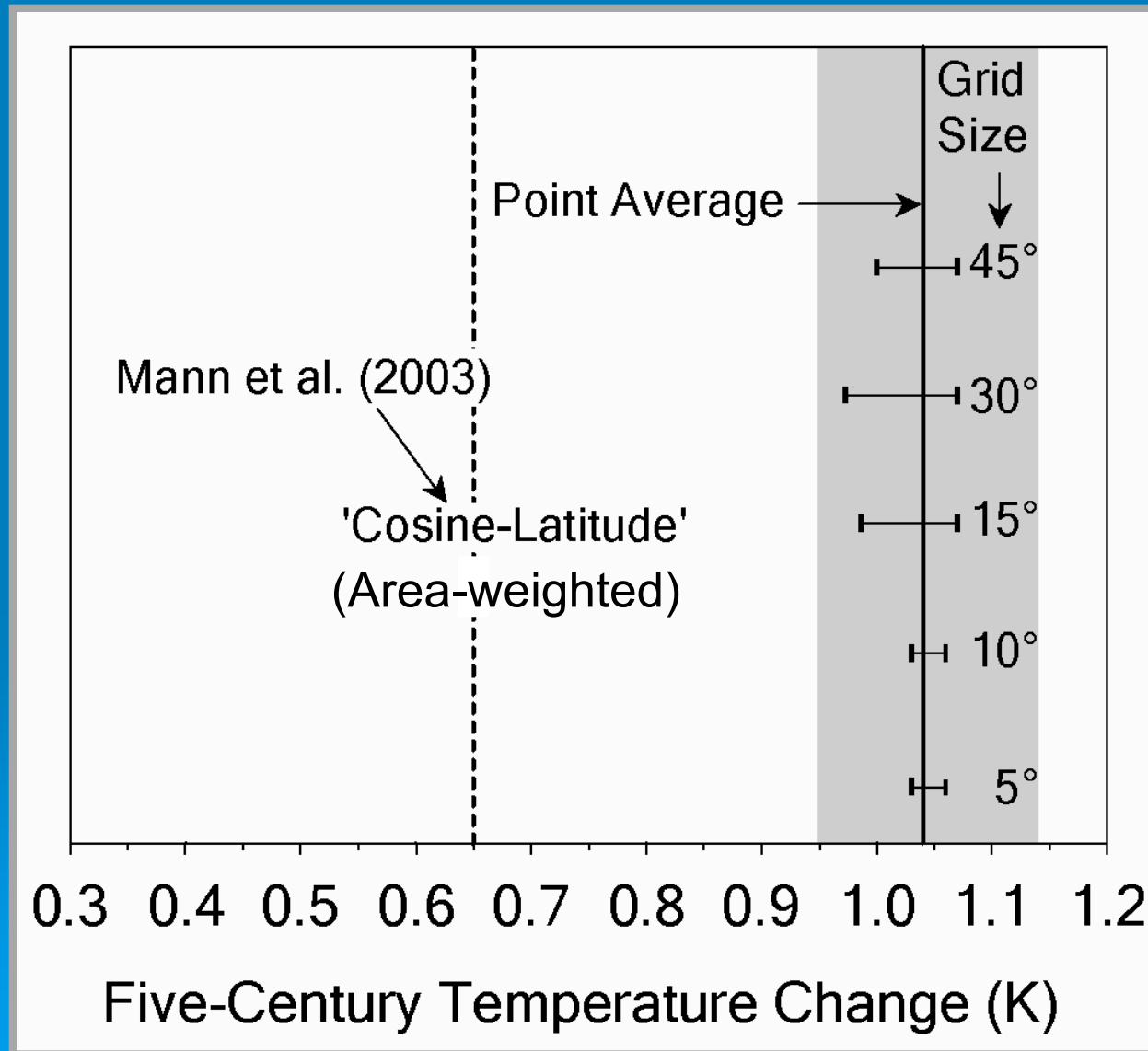
$$W = \text{Area} \times N^p \quad (p = 0, 0.25, 0.5, 0.75, 1.0)$$



# Area and Occupancy Weighting of Northern Hemisphere Borehole Reconstructions

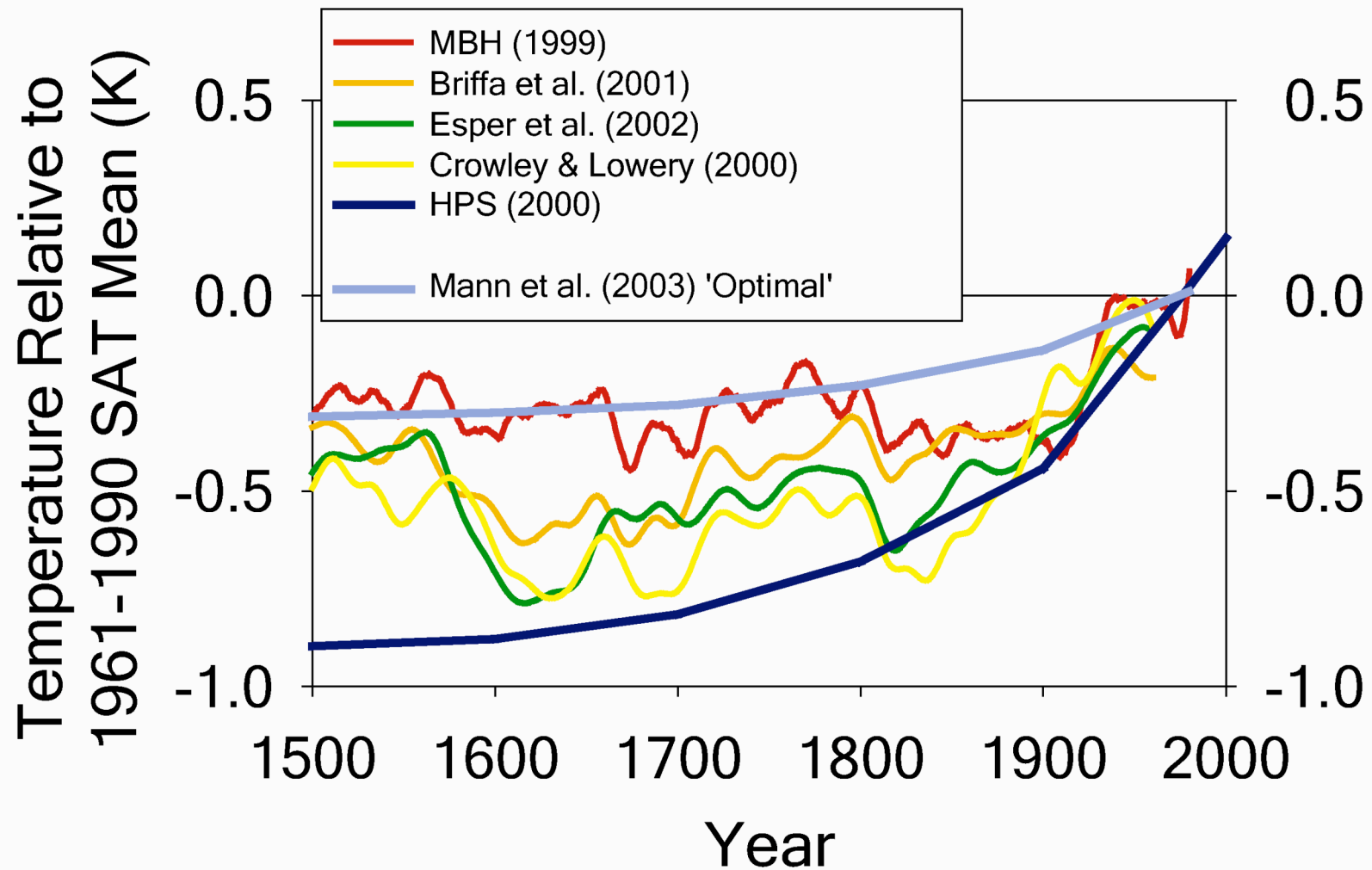


# Five-Century Hemispheric Warming Derived From Various Weighting Schemes

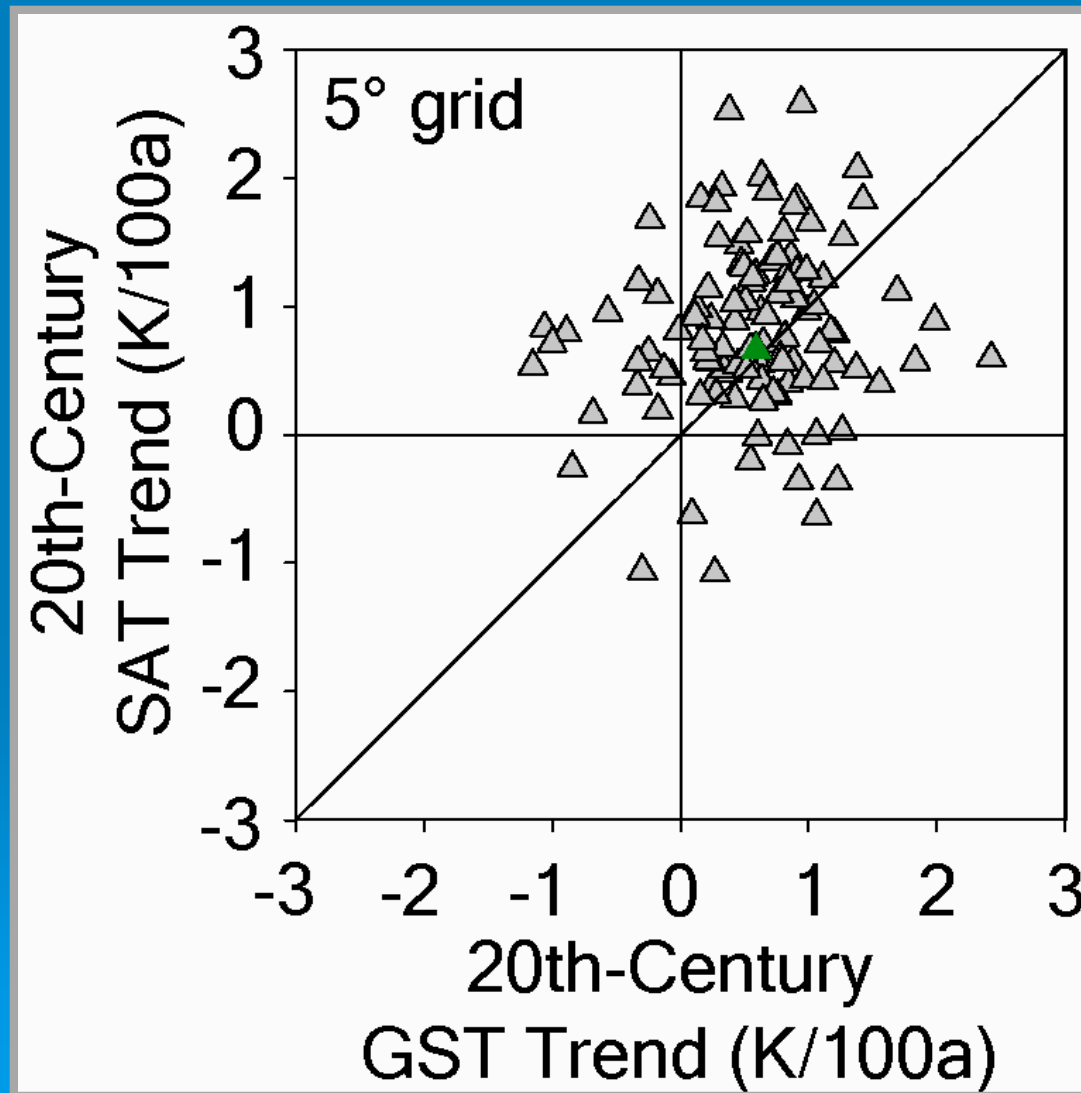


The five-century hemispheric warming of about 1 Kelvin determined from borehole temperatures remains a robust estimate under a wide range of area and occupancy weightings.

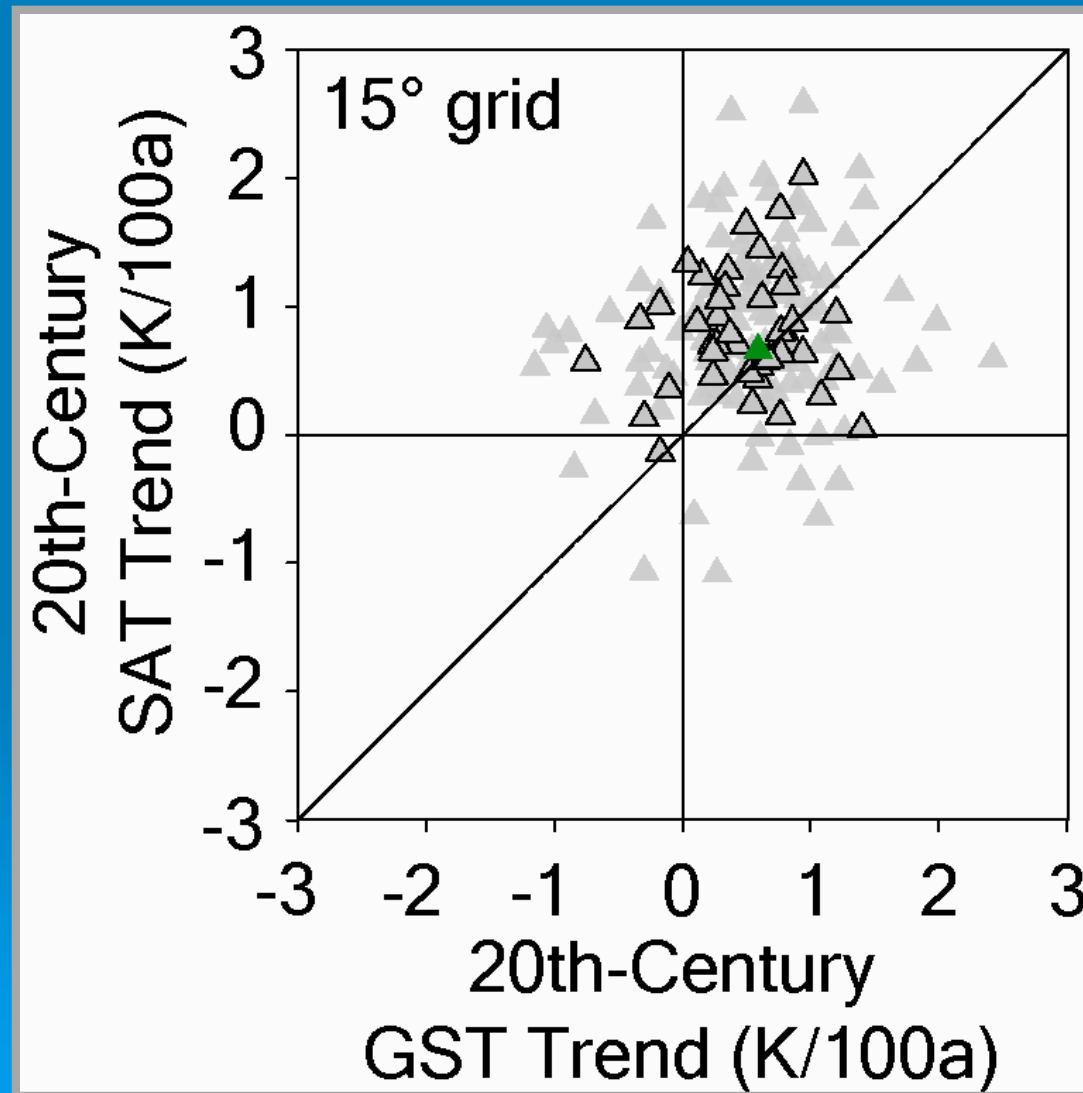
# Ensemble of Northern Hemisphere Temperature Reconstructions (after Briffa and Osborn, 2002)



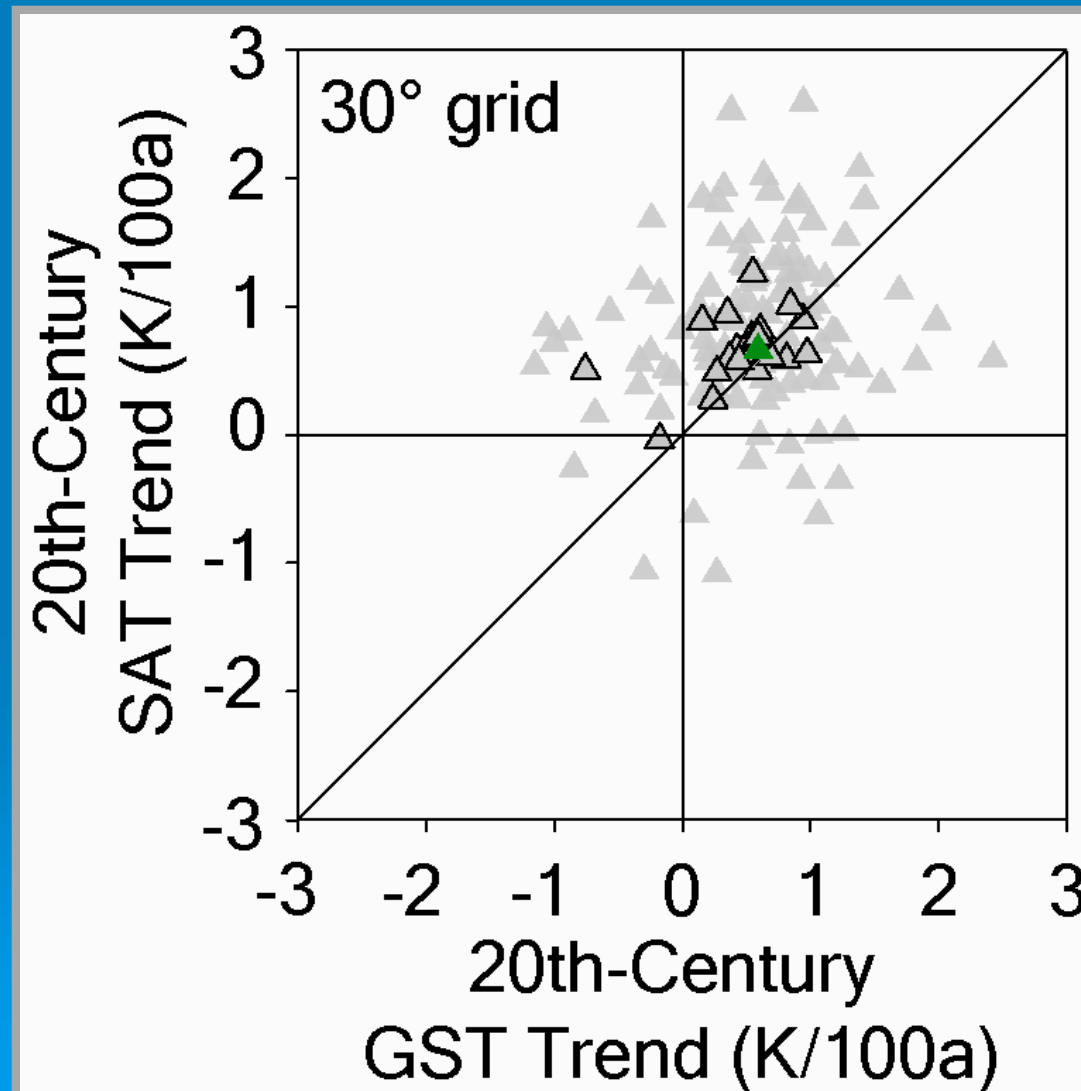
# Colocated 20<sup>th</sup>-Century SAT vs. GST Northern Hemisphere Trends in a 5°-Grid



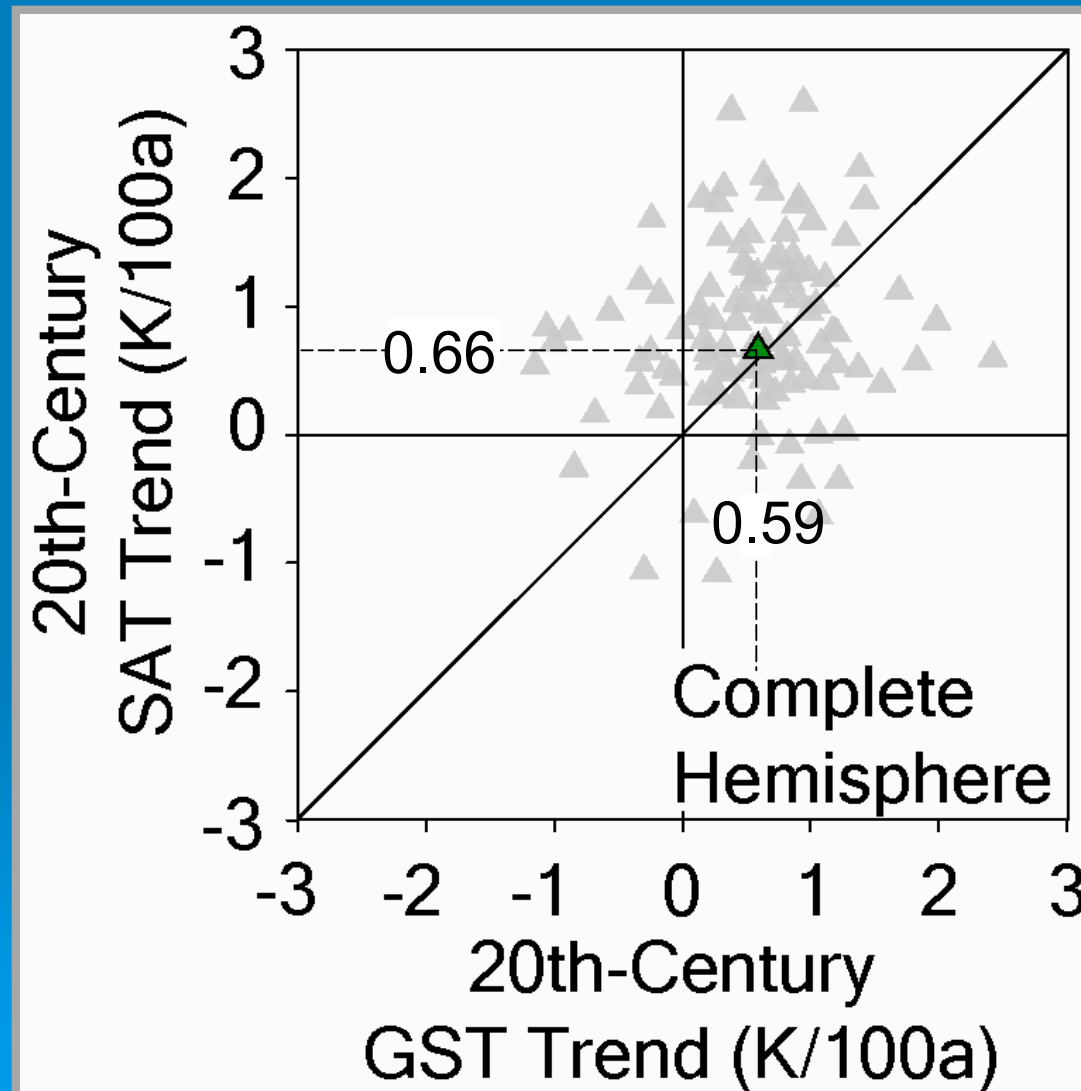
# Colocated 20<sup>th</sup>-Century SAT vs. GST Northern Hemisphere Trends in a 15°-Grid



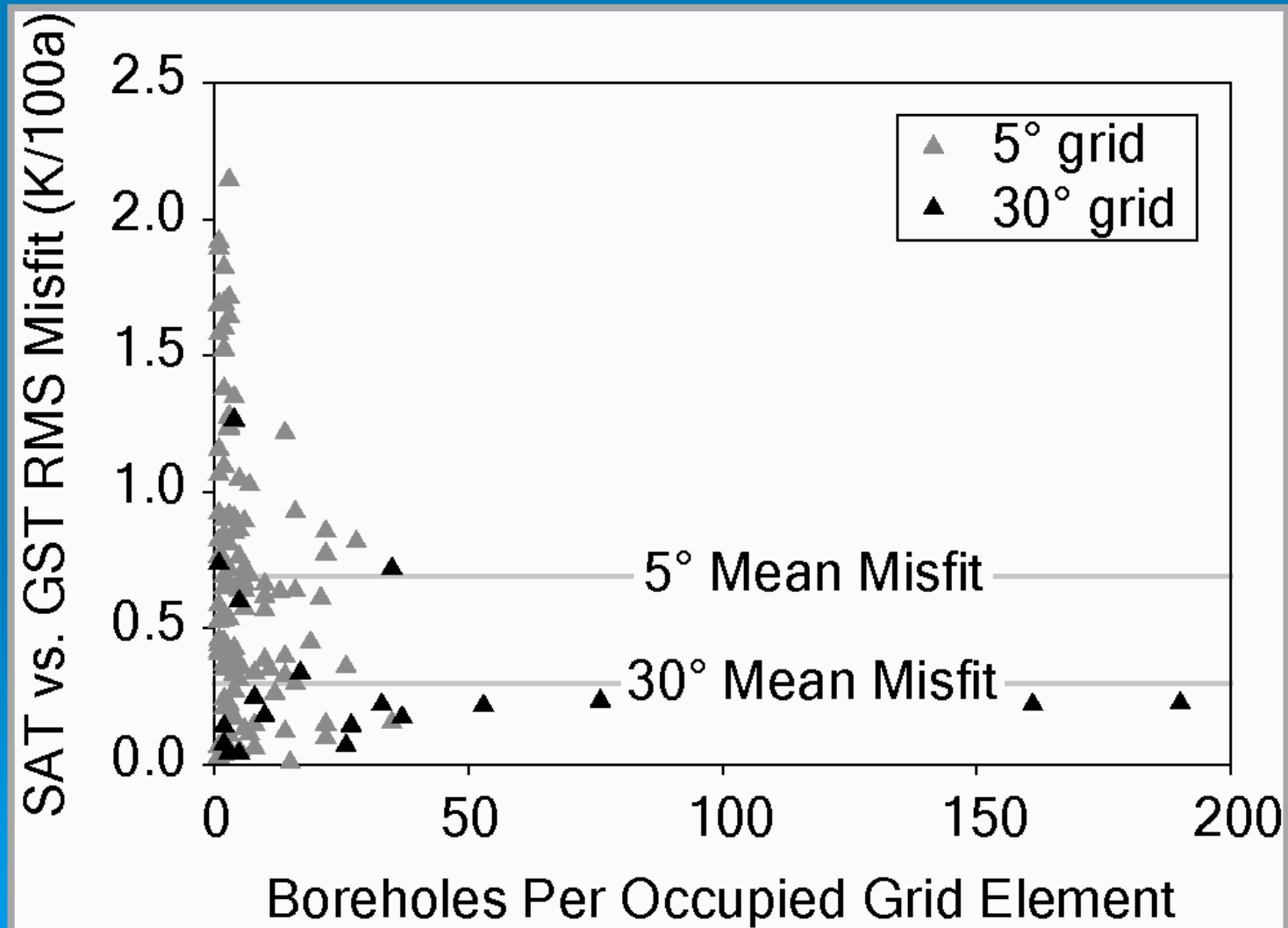
# Collocated 20<sup>th</sup>-Century SAT vs. GST Northern Hemisphere Trends in a 30°-Grid



# 20<sup>th</sup>-Century SAT vs. GST Mean Trends in the Full Hemisphere



# Occupancy Dependence of 20<sup>th</sup>-Century SAT vs. GST RMS Misfit



Spatial correlation between SAT and GST trends is increasingly apparent in larger grids where grid elements contain more boreholes and yield more reliable grid element averages.

# Ensemble of Northern Hemisphere Temperature Reconstructions (after Briffa and Osborn, 2002)

