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Mid-Piacenzian Data-Model Comparison

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The Pliocene Research, Interpretation and Synoptic Mapping (PRISM) Project aims to accurately and comprehensively reconstruct and understand mid-Pliocene climate conditions in order to gain insight into a warmer than present world that may resemble a future climate. PRISM has demonstrated a sustained and dedicated commitment to provide the paleoclimate modeling community with a mid-Piacenzian paleoenvironmental reconstruction of important boundary conditions for use in model initialization and verification. PRISM is presently in its fourth phase as reconstructions are constantly improved, refined and updated to meet this unique goal. A summary of the development of the PRISM data set will be presented.

In this presentation we compare the PRISM3D reconstruction to the HadCM3 coupled ocean atmosphere model simulation of mid-Piacenzian climate. While there is overall agreement between data and model, several regions can be highlighted where disagreement is significant and requires further analysis. For example, high latitude warming shown by multiple proxies is not reflected to the same degree in model results. Low latitude warming shown by the model is still difficult to reconcile with faunal data, but the gap between the two results has diminished relative to previous data-model comparisons. The concept of a “permanent El Nino” while evident in mean conditions, is not reflected in further analyses of either model or data.

With the recognition that future climate conditions near the end of this century may be somewhat similar to conditions during the mid-Piacenzian, the PRISM reconstruction, coupled with independent paleoclimate proxy data, represents a unique and invaluable tool for paleoclimate and future global change research. Similarly, data-model comparisons such as this one are integral to refining both the data-based reconstructions and the climate models themselves in order to improve confidence in model simulations.