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Expanding PlioVAR to PlioMioVAR: Updates and Future Directions

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The Pliocene (~5.3-2.6 million years ago), and increasingly the Miocene (~23-5.3 million years ago), are used by the climate community as pseudo-analogs of future climate change. Relative to today, the Plio-Miocene was globally warmer with reduced ice volume and reconstructed atmospheric carbon dioxide concentrations similar to and/or higher than present-day. The Past Global Changes (PAGES) PlioMioVAR working group expands on the previous PAGES PlioVAR working group aims to create a synthesis of marine and terrestrial data to characterise spatial and temporal reconstructions of Plio-Miocene climate. Major outputs from PlioVAR include a synthesis and evaluation of multi-proxy sea surface temperatures (SSTs) during the KM5c interglacial (~3.2 million years ago) and Pliocene-Pleistocene intensification of Northern Hemisphere Glaciation. In coordination with the Pliocene model intercomparison project Phase 3 (PlioMIP3), our Pliocene efforts are to 1) continuously update the existing mid-Pliocene database, 2) expanding our data synthesis to the early Pliocene (~4.9-4.5 million years ago) and 3) synthesise terrestrial records. In coordination with the Miocene Model Intercomparison Project (MioMIP), our Miocene efforts are to 1) synthesise surface and deep temperatures and 2) identify Miocene time slices for data-model comparison. From workshop discussions, we have identified future research directions including 1) refining site-specific chronologies to ensure robust comparison of temperature records at short (i.e. glacial-interglacial) and longer time scales, 2) constraining seawater chemistry changes, 3) comparing multi-proxies with sufficient temporal and spatial coverage, and 4) reconstructing high-latitude regions (temperature and ice margin records) to improve our ability to assess meridional temperature gradients, polar amplification, and ice sheet volume and stability. Focusing our efforts on these research directions could be community themes in the next incarnation of IODP. These databases and data-model comparisons are critical for navigating future climate change. This presentation outlines our current state of synthesis, assessment and analysis, and we welcome discussions on new data sets and approaches.