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The Pliocene Model Intercomparison Project - Phase 2

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The Pliocene Model Intercomparison Project (PlioMIP) is a coordinated international climate modelling initiative designed to understand climate and environments of the Late Pliocene, and their potential relevance in the context of future climate change. PlioMIP operates under the umbrella of the Palaeoclimate Modelling Intercomparison Project (PMIP), which examines multiple intervals in Earth history, the consistency of model predictions in simulating these intervals and their ability to reproduce climate signals preserved in geological climate archives.

PlioMIP was initiated in 2008 and is closely aligned with the U.S. Geological Survey project known as PRISM (Pliocene Research Interpretation and Synoptic Mapping). PRISM has spent more than 25 years reconstructing and understanding mid-Pliocene climate (~3.3 to 3 million years ago), as well producing boundary condition data sets suitable for use with numerical climate models.

The first phase of the PlioMIP (PlioMIP1: 2008-2014) resulted in the most complete analysis to date of the Pliocene climate. This included examination of large-scale features of global climate, detailed analyses of Pliocene ocean circulation and monsoon behaviour, and the ability of models to reproduce regional climate patterns reconstructed from both marine and terrestrial archives. The lessons learned from PlioMIP1 facilitated a revision of data and modelling approaches towards the understanding of the mid Pliocene.

PlioMIP2 has now been launched, and includes significant improvements to many of the Pliocene palaeogeographic boundary conditions used for driving climate models (new land/sea mask, topography, bathymetry and ice sheet reconstructions). Within Phase 2 modelling groups have the option of using dynamic global vegetation models to predict (rather than prescribe) land cover, and a broader portfolio of model experiments has been proposed to support efforts to better understand the Pliocene, as well as to use the Pliocene as a means to constrain future climate change and the predictive ability of climate models. Furthermore, as part of PRISM4, PlioMIP 2 will access a new set of high resolution marine proxy data sets that have been designed to optimize data/model comparison.

Here we highlight the new experimental design adopted for PlioMIP Phase 2, describe the boundary condition data sets developed and present the recently formalized timeline for the new project.