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Phase I (2007 - 2009)

Phase II (2009 - 2011)

Comparison of climate and carbon cycle dynamics during late Quaternary interglacials using a spectrum of climate system models, ice-core and terrestrial archives

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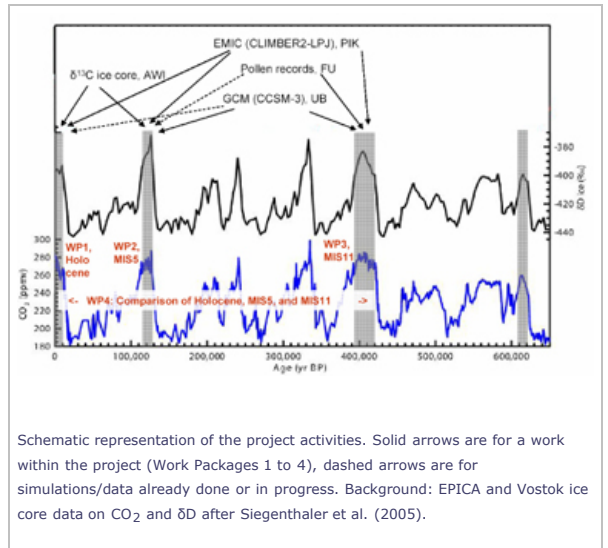
Late Quaternary interglacials were characterized by varying amplitudes and different patterns of changes in climate, vegetation cover, and atmospheric CO₂. Within this project, we will provide quantitative reconstructions of the previous interglacials using a hierarchy of Earth System models and compare model results with already available and newly delivered ice core and terrestrial archives. A main goal of the COIN project is to analyze differences between Late Quaternary interglacials using an integrated data-model approach focusing on understanding of mechanisms behind those differences. The importance of feedbacks between land cover and climate will be addressed with multi-millennial simulations of a coarse-resolution EMIC, CLIMBER2-LPJ, and with time-slice simulations of the high-resolution state-of-the-art model, CCSM 3.0. These simulations will be compared with reconstructions of interglacial vegetation dynamics based on long-term pollen proxy records, for instance, from Lake Baikal. To analyze a role of land cover changes in the atmospheric CO₂ dynamics, we will exploit data on Holocene and Eemian atmospheric $\delta^{13}\text{C}$ as derived from Antarctic ice cores within the project. Quantitative assessment of a role of different climatic mechanisms and feedbacks during the previous interglacials will be utilized later to better constrain the Earth system models used for future climate projections.

Methods

Climate modelling, Carbon cycle and isotope modelling, Ice core analysis, Quantitative paleo-climate reconstructions, Feedback Analysis

Archives

Ice core records, Lake records



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