Geophysical Research Abstracts
Vol. 20, EGU2018-12394, 2018
EGU General Assembly 2018

Assessing the Stability of the Isotopic Paleothermometer across various Interglacials of the Quaternary

Paul Gierz, Martin Werner, and Gerrit Lohmann
Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (pgierz@awi.de)

Ice cores, together with marine sediment cores, provide reconstructions of the Earth's climate throughout the Quaternary. In the face of possible future climate change, it has become vital to understand the mechanisms controlling Earth's climate, in particular during those time periods when the temperature was at or above Pre-Industrial levels. Determining temperature from ice cores requisites the assumption that the temporal relationship between temperature and δ18O or δD is identical to the spatial δ18O/T slope. However, simulation experiments have uncovered possible discrepancies between spatial and temporal δ18O/T relationships for both the Last Glacial Maximum (LGM) as well as the Last Interglacial (LIG). In the present study, we examine global circulation model simulations of various interglacials of the last 800,000 years during Quaternary in order to assess the stability of the δ18O/T both in geological time, as well as spatially, specifically over the Antarctic continent. We compare our simulations to available ice core records to determine the viability of our model. We find that although the spatial slope of the δ18O/T relationship is similar to present-day observations, the temporal slope is shallower for many of the Interglacial time periods examined.