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Different Impacts of Antarctic Last Interglacial Ice Sheet Changes on West and East Antarctic Isotope Records

Content

Global temperature during the Last Interglacial (LIG) period (116,000-130,000 years ago) was $\sim 0.8^{\circ}\text{C}$ warmer than that today. This is associated with a global mean sea level which is 6-9m higher than today. Given most of the sea level increase likely came from the Antarctic ice sheet, understanding how Antarctic ice sheet changed in this warmer scenario is very useful in constraining future global sea level predictions. Six existing East Antarctic ice cores, containing LIG ice, have previously been used to study the relationships between Antarctic Ice Sheet (AIS) changes and the LIG stable water isotopes. However, none of these studies have included records from the key West Antarctic ice sheet (WAIS) region. Roosevelt Island Climate Evolution (RICE) ice core, a new 763 m long ice core from Roosevelt Island, which offers the new possibility of a LIG West Antarctic record. Here, our research is to combine new RICE information with measurements from the other six ice cores to explore the impacts of AIS changes on the LIG stable water isotope.

We will explore the stable water isotope response to different AIS scenarios using the isotope-enabled coupled ocean-atmosphere-sea ice General Circulation Model, HadCM3. Two control simulations are used: (1) preindustrial (PI) simulation, with present orbit and greenhouse gas forcing; (2) LIG isotope maximum 127ka simulation with modern AIS configuration. A suite of simulation focused on 127 ka is then used to investigate the isotope response to different AIS elevations. We compare the model outputs with ice core records. Other variables like precipitation, sea ice concentration, sea ice extent, and surface air temperature are analyzed to help understand the impacts of AIS changes in both West and East Antarctic.

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