Constraint on the last interglacial ice volume from the GIA modelling and far-field sea levels

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To accurately predict future polar ice sheet melt and resulting sea level rise attributed to global warming, it is imperative to comprehend the historical fluctuations of ice sheets during previous warm periods. During the Last Interglacial (LIG), approximately 125,000 years ago, when temperatures were slightly warmer than preindustrial levels, sea levels stood 6-9 meters higher than their present-day levels, and both the Greenland and Antarctic ice sheets were considerably smaller than their current sizes. Quantifying ice volume changes based on relative sea level (RSL) observations relies on local geographic and geological data. Nevertheless, isolating precise information regarding ice sheet volume variations proves challenging due to the concurrent effects of solid Earth deformation. Solid Earth deformation is a consequence of Glacial Isostatic Adjustment (GIA) brought about by the redistribution of ice and ocean water loads. Consequently, scenarios depicting changes in ice volume within a warmer Earth context can be significantly influenced by variations in isostatic estimates.

This study endeavors to construct a highly accurate numerical model aimed at estimating the impact of GIA during the Last Interglacial period and obtaining fundamental insights into the alterations in both polar ice sheet volumes during this epoch through comparisons with RSL data from regions distant from former ice sheets. In this presentation, we will elucidate the theoretical characteristics of RSL variations during the Last Interglacial period as inferred from our GIA numerical modeling. Furthermore, we will engage in a discussion concerning the melting volume of the Antarctic ice sheet and its temporal evolution.