

**Probing Ancient Ice Sheet Stability Using a Sea Level Lens:
A Geodynamic Perspective**

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Geological records of sea level high stands provide an important lens on the stability of polar ice sheets during periods of relative ice age warmth. But geodynamic processes, namely glacial isostatic adjustment (GIA) and dynamic topography, DT (i.e., vertical deflections of the Earth's crust in response to mantle convective flow, the driving force for plate tectonics), introduce a geographically variable signal that distorts the lens and greatly complicates efforts to estimate ancient ice volumes (or, equivalently, eustatic sea level) using local sea level markers. I will highlight the results of several recent geophysical modeling studies that have revisited and revised previous bounds on peak eustatic sea level during well-studied ice age intervals. More importantly, I will review the uncertainties inherent to state-of-the-art models of GIA and DT, and the limits these ongoing uncertainties currently place on the precision of these bounds.

Keywords: sea level, glacial isostatic adjustment, dynamic topography, ice sheet stability