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Reassessing the Contribution of West Antarctica to Last Interglacial Sea Level in Light of 3D Mantle Viscosity Structure

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Studies of peak global mean sea level (GMSL) during the Last Interglacial (LIG; 130-116 ka) commonly cite values ranging from ~2-5 m for the maximum contribution from grounded, marine-based sectors of the West Antarctic Ice Sheet (WAIS). However, this estimate neglects viscoelastic crustal uplift and the associated meltwater flux out of marine sectors as they are exposed, a contribution considered to be small and slowly-accumulating. This assumption should be revisited, as a range of evidence indicates that West Antarctica is underlain by shallow mantle of anomalously low viscosity. By incorporating this complex structure into a gravitationally self-consistent sea-level calculation, we find that GMSL differs substantially from previous estimates. Our results indicate that these estimates thus require a reassessment of the contribution to GMSL rise from WAIS collapse, as will ice sheet models that do not account for the uplift mechanism. This conclusion has important implications for the sea level budget not only during the LIG, but also for all previous interglacials and projections of GMSL change in the future warming world.