

Investigating Ice Sheet – Solid Earth Feedbacks in West Antarctica: New constraints from the POLENET-ANET GPS & Seismic Network

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Deformation rates measured by GPS in the Amundsen Embayment region are some of the fastest rates ever recorded for glacial isostatic adjustment (GIA). GIA modeling indicates a very low mantle viscosity, consistent with seismic observations in this region (Barletta et al., 2018). Low mantle viscosity shortens the GIA response time scale from thousands of years, to hundreds or even tens of years. The weak Earth structure under the marine ice sheet and the very fast uplift rates set up a rapid stability feedback that can impact the evolution of the West Antarctic Ice Sheet, including the critical Thwaites and Pine Island glacial systems, at the centennial time scale. At the millennial time scale, the presence of low viscosity under West Antarctica is important for developing improved paleo- ice sheet reconstructions and assessing potential WAIS collapse scenarios. The POLENET-ANET network will be reconfigured to increase the spatial density and extend the time series of observations across this critical West Antarctic corridor, with new instruments deployed along and across the Amundsen Embayment. The new deployment will improve spatial resolution of Earth deformation patterns and deep-earth seismic imaging. Science goals are presented, with emphasis on synergies with the relevant projects of the International Thwaites Glacier Collaboration.