

## **UKANET: interrogating Earth rheology in Antarctica via GNSS measurements of the response to surface mass balance anomalies**

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UKANET is a NERC-funded project that seeks to quantify West Antarctic mantle viscosity via precise GNSS measurement of Earth's response to surface mass balance anomalies. We report on the work undertaken to maintain and improve the ~30-instrument UKANET GNSS network as well as preliminary findings from the analysis of surface displacement time series collected by the network.

UKANET sites are located along the Antarctic Peninsula and around the Weddell Sea Embayment. A targeted field campaign over the past five years has improved data completeness through the polar winter and data recovery via iridium during the polar summer. These significant advances have been achieved thanks to support from the British Antarctic Survey, UNAVCO and our NSF-funded project partners.

The data recovered show non-linear signals over a range of time scales, reflecting the combined elastic and viscous response to past and ongoing surface mass change. In order to make progress in constraining mantle viscosity it is first necessary to understand the elastic response to contemporary surface mass change. A significant component of the elastic signal is hypothesized to be due to interannual variations in snowfall-driven surface mass balance (SMB) anomalies. We model the elastic response to these anomalies across the southern Antarctic Peninsula and demonstrate a reduction in misfit when fitting linear trends to GNSS time series after correcting for time-dependent SMB-related elastic effects. We recommend that time-dependent (as opposed to linear) elastic effects are considered when seeking to infer mantle viscosity from the analysis of GNSS time series.