

Reconstructing the glacial history of western Dronning Maud Land, Antarctica

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As a component of the discussion of human-environment interaction during the Anthropocene there is growing concern about the stability of ice sheets and associated sea-level rise due to climate forcing from human activity. To improve estimates of future change we need to better understand the past response of ice sheets to climate forcing. Numerical models of ice sheet behaviour are a central component of the work to address this challenge. Empirical geological and geomorphological data are required to test and constrain these models. An international project (MAGIC-DML) is attempting to fill critical data gaps that exist in our knowledge of the timing and pattern of ice surface elevation (thus ice sheet volume) fluctuations since the mid-Pliocene warm period on the Dronning Maud Land margin of the East Antarctic Ice Sheet. A combination of remotely sensed geomorphological mapping, field investigations, surface exposure dating and numerical modelling are being used in an iterative manner to produce a comprehensive reconstruction of the glacial history of western Dronning Maud Land. Here we present the results from the first phase of this project which involves mapping of the field area using historic and recent aerial imagery together with a range of satellite acquired data. Ice-surface features such as flow-lines, nunataks and blue-ice areas illustrate present-day ice configuration and flow dynamics. Past configurations and characteristics of the ice are interpreted from marginal moraines, surface veneer and trim-lines on nunataks. These together with ice-sheet modelling experiments are being used to target areas for upcoming field investigations.