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Deglaciation, ice-sheet thickness and climate change in Sør Rondane (East Antarctica) during the late Quaternary - **DELAQUA**

In order to better understand how present and future climate anomalies will affect the cryosphere and the biological communities inhabiting Antarctic ecosystems, we need regional reconstructions of past climate change based on paleoecological records and information regarding former ice-sheet dynamics. To date,
climate change studies have mainly been based on ice core records from the central Antarctic Plateau, while the coastal areas largely remained unstudied. These areas however, and especially their lakes, are true Antarctic biodiversity hotspots, hosting many endemic species. These coastal areas are in addition very sensitive to climate change, with recent evidence suggesting that some lakes are close to complete desiccation or have significantly altered foodwebs.
The current proposal aims to study the history of past changes in climate, ice sheet thickness and lacustrine biological communities in the Sør Rondane Mountains, one of the most understudied ice-free regions in Antarctica. We will adopt a multidisciplinary approach involving both geomorphological and paleolimnological analyses, in close collaboration with national and international partners. We will conduct a field campaign during the Austral summer of 2009–2010 to carry out field measurements and lake sediment coring. We will produce detailed geomorphological maps based on field measurements and the interpretation of aerial photographs. The deglaciation history of the region will be assessed using cosmogenic nuclide dating of exposed boulders in moraines, complemented with radiocarbon and optically stimulated dating of lake sediments from lakes and paleolakes. Lake sediment cores will be studied using a full range of proxies, including geochemical and sedimentological indicators (major and trace elements, magnetic susceptibility, total carbon and nitrogen content, grain size, p-wave velocity, gamma density, electrical resistivity, color imaging and gamma spectroscopy). We will apply our inference models and indices developed during previous projects to quantitatively reconstruct past climate related environmental changes (i.e. lake productivity, moisture balance). These data will be complemented with radiocarbon and optically stimulated luminescence dating of raised lacustrine shorelines to reconstruct past lake level changes. Molecular markers, biogeochemical proxies (fossil pigments) and microfossils will be used to study past changes in biological community structure in response to the reconstructed environmental changes. Our results are expected to provide important background information to study the evolutionary history, biodiversity and biogeography of Antarctic biological communities. They will allow to detect glacial refugia and to test competing ice-sheet models. In addition, the data will enable us to better predict the effect of future climate anomalies on lacustrine systems and their unique biota in east Antarctic nunataks.