

Holocene glacier activity on Kerguelen Island: preliminary results from a novel proglacial lake sediment record

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The Polar-regions are changing rapidly as greenhouse warming is continuing with huge impact on e.g. sea ice extent and snow cover. This change triggers teleconnections to low latitude areas challenging societies and human activity. We have, however, very little quantitative information of past climate in the Polar-regions that can be used to evaluate the potential responses and the response patterns to forcing changes and changes in boundary conditions. Whatever anthropogenic changes may occur in the future, they will be superimposed on, and interact with, natural climate variations due to all the forcing we are aware of. This means we need to better document past climate/environmental variability of the Polar-regions. Especially in the Southern Ocean there are few time series recording past climate due to few suitable land areas and the few Sub-Antarctic Islands is remote and has cumbersome logistics. Continuous terrestrial records from this region are therefore urgently needed for constraining future scenarios from earth system models. Glaciers and ice caps are still ubiquitous in the Polar-regions, although they are rapidly shrinking due to the on-going warming. The continuous sedimentary records produced by glaciers, which are stored in downstream lakes, represent supreme archives of past variability wherefrom quantitative information of key climate system components can be extracted. Kerguelen Island is located within the Antarctic Circumpolar Current and the Southern Westerly wind belt and contains several glaciers and smaller ice caps. Terrestrial archives recording past history of the glaciers at Kerguelen thus have a unique potential to record past changes in oceanic and atmospheric circulation patterns from southern mid-latitudes. Here we present preliminary results from the first distal glacier-fed lake that is sampled from Kerguelen Island. A 2.8 m long sediment core was obtained from Lac Guynemer (121masl.) located at the Peninsula Loranchet at the northern part of Kerguelen Island. The lake receives glacial meltwater from Glacier Guynemer, a small cirque glacier at the Pic Guynemer (1188masl.). The sediment core was analyzed with high-resolution core scanning X-ray fluorescence (XRF), magnetic parameters, loss-on-ignition and dry bulk density, to reconstruct past glacier variability of Glacier Guynemer. The sediment record covers the last 5000 years and show a dynamic glacier responding to the changing boundary conditions during the Neoglacial.