Paleolimnological records from the ice-free regions of Schirmacher Oasis and Larsemann Hills, East Antarctic

The Antarctic continental margin is marked with ice-free areas which are host to numerous freshwater lakes. These lacustrine systems are rich in sedimentary deposits which archive in them the regional and general climatic variations. These lakes respond to the seasonal variations in climate over glacial-interglacial timescales and can be inferred from biogenic and authigenic sedimentary proxies. These proxies are a good tool to decipher and understand climate changes in the cold environments of Antarctica. The use of various proxies such as sedimentary organic stable isotopes, particle size variation and diatoms as a paleoclimate indicator in lacustrine systems of Antarctic ice free areas is well documented. In this study, we report paleolimnological variations from two sediment cores retrieved from freshwater lakes viz., L-49 (Schirmacher Oasis) and Stepped Lake (SL-3: Larsemann Hills) of East Antarctica. The cores collected from different geomorphologic settings. The former is located ~80 km inland while the latter is located ~ 200 m from the coast. The L-49 core spans the last 43 kyr while the SL-3 covers mid-Holocene (4-8 kyr). We report d13C, d15N, sand-silt-clay content and diatom abundance and species variation. In the former, the transition in values (Corg, Norg, C/N ratio, 13COM, sand content) starting at 16.6 kyr BP closely following Antarctic deglaciation to reach Holocene optimum values at 11.3 kyr BP documents the influence of Antarctic climate on regional areas. While in SL-3 records, the diatom community shows similar shift with the major part of Holocene (8.3–5.5 kyr BP) dominated by sea-ice and open-ocean diatoms, the core-top sections (5.5–4.6 kyr BP) transitions to lacustrine diatoms (Stauroforma inermis). These observations confirm that the basin was marine, and later became isolated as a result of postglacial isostatic uplift after 4.7 kyr BP.