



## **Carbon and nitrogen isotope composition of core catcher samples from the ICDP deep drilling at Laguna Potrok Aike (Patagonia, Argentina)**

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The ICDP project PASADO aims to develop a detailed paleoclimatic record for the southern part of the South American continent from sediments of Laguna Potrok Aike (51°58'S, 70°23'W), situated in the Patagonian steppe east of the Andean cordillera and north of the Street of Magellan. The precursor project SALSA recovered the Holocene and Late Glacial sediment infill of Laguna Potrok Aike and developed the environmental history of the semi-arid Patagonian steppe by a consequent interdisciplinary multi-proxy approach (e.g. Haberzettl et al., 2007). From September to November 2008 the ICDP deep drilling took place and successfully recovered in total 510 m of sediments from two sites resulting in a composite depth of 106 m for the selected main study Site 2. A preliminary age model places the record within the last 50,000 years. During the drilling campaign, the core catcher content of each drilled core run (3 m) was taken as separate sample to be shared and distributed between involved laboratories long before the main sampling party. A total of 70 core catcher samples describe the sediments of Site 2 and will form the base for more detailed investigations on the palaeoclimatic history of Patagonia.

We here report on the organic carbon and nitrogen isotope composition of bulk sediment and plant debris of the core catcher samples. Similar investigations were performed for Holocene and Late Glacial sediments of Laguna Potrok Aike revealing insights into the organic matter dynamics of the lake and its catchment as well as into climatically induced hydrological variations with related lake level fluctuations (Mayr et al., 2009). The carbon and nitrogen content of the core catcher fine sediment fraction (<200  $\mu\text{m}$ ) is low to very low (around 1 % and 0.1 %, respectively) and requires particular attention in isotope analysis. The carbon isotope composition shows comparably little variation around a value of -26.0 per mil. The positive values of the Holocene and the Late Glacial (up to 22.0 per mil) are only sporadically reached down core. Compared to this, separated moss debris is remarkably  $^{13}\text{C}$  depleted with a minimum at 31.5 per mil. The nitrogen isotope ratios of glacial Laguna Potrok Aike sediments are lower (2.5 per mil) than those of the younger part of the record. The core catcher samples indicate several oscillations between 0.5 and 3.5 per mil. Data suggest a correlation between nitrogen isotopes and C/N ratios, but no linear relation between carbon isotopes and carbon content and an only weak relationship between carbon and nitrogen isotopes. Increasing nitrogen isotope values from 8000 cm downwards could probably be related to changed environmental conditions of Marine Isotope Stage 3 (MIS 3) compared to Marine Isotope Stage 2 (MIS 2). This will be further evaluated with higher resolution from the composite profile including a detailed study of discrete plant debris layers.

### References

- Haberzettl, T. et al. (2007). Lateglacial and Holocene wet-dry cycles in southern Patagonia: chronology, sedimentology and geochemistry of a lacustrine record from Laguna Potrok Aike, Argentina. *The Holocene*, 17: 297-310.
- Mayr, C. et al. (2009). Isotopic and geochemical fingerprints of environmental changes during the last 16,000 years on lacustrine organic matter from Laguna Potrok Aike (southern Patagonia, Argentina). *Journal of Paleolimnology*, 42: 81-102.