



## GMPE-1: Paleoclima y reconstrucciones paleoambientales

### Hydroclimate variability of northern Patagonia during the last 20 kyr inferred from the bulk organic geochemistry of Lago Castor sediments (Chile, 45°S)

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Lago Castor (45°S; 72°W) is located on the leeside of the Patagonian Andes, near the forest-steppe ecotone. It contains a continuous sediment record of the last 20 kyr, which was recently interpreted in terms of past changes in westerly wind strength, based on sediment physical properties and seismic data (Van Daele et al., QSR 2016). Here, we use the bulk elemental and isotopic composition of the organic matter preserved in Lago Castor sediments to reconstruct changes in the supply of organic matter of terrestrial and aquatic origin to the lake through time. To constrain the sources, we analyzed samples of present-day terrestrial vegetation, soils, river sediments, lake and river suspended particulate matter, aquatic macrophytes, and surface lake sediments. Results demonstrate that the lake sedimentary organic matter is composed of variable proportions of lake plankton, C3 terrestrial plants, and aquatic macrophytes. The proportions of each component were estimated using a three end-member mixing model that takes into account the alteration of the isotopic values during incorporation of plant material in soils prior to transport by rivers. Results show that before 17.8 cal kyr BP, aquatic macrophytes were abundant, likely due to the low but rising postglacial lake level. After 17.8 cal kyr BP, accumulation rates of organic matter of terrestrial origin increased, while those of aquatic macrophytes were negligible, which is interpreted as the postglacial development of the terrestrial vegetation. From 9.3 cal kyr BP onwards, accumulation rates of both aquatic macrophytes and C3 plants increased and peaked between 7.5 and 2.0 cal kyr BP. The latter is interpreted as a period of increased wind strength, and consequently higher precipitation, and is in excellent agreement with the grain-size results previously obtained on the same sediment core. All proxies show a secondary increase during the last millennium, in agreement with regional high-resolution records of the last 2000 years. These results, which are broadly compatible with regional pollen records during the Holocene, confirm that, at 45°S, the southern westerlies reached their maximum intensity between 7.5–2.0 cal kyr BP and increased again during the last millennium.