



Holocene sedimentary record in Lago Fagnano (Tierra del Fuego): Paleoclimate implications

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Tierra del Fuego is the world's southernmost landmass outside of Antarctica. Together with Patagonia, it represents the only terrestrial region directly influenced by the southern hemisphere westerly winds. The climate of Tierra del Fuego is controlled by the Southern Ocean circumpolar flow and the South Pacific Gyre. This region is also a tectonically active area affected by volcanic and seismic activity related to South American and Scotia-Antarctic plate boundaries. Lago Fagnano is the largest lake in Tierra del Fuego. This E-W trending lake is 100 km long and 5-15 km wide. It lies along the Magallanes-Fagnano fault system that is part of the diffuse left-lateral Scotian Sea - South American plate boundary.

Our investigations were carried out on an 8.4 m long piston core obtained at 69 m water depth in Bahía Grande (LF06-PC8), a southwestern lake sub-basin separated from the main lake by a shallow sill. Our studies are based on the integration of sediment, physical properties, pollen, and geochemical analyses. The age model for the core is based on tephrochronology and radiocarbon ages. Additionally, a 800 km long grid of high resolution seismic profiles support the sedimentary analyses and allow the correlation with other cores from within the lake basin.

Three distinct intervals are observed in the core. The uppermost interval is characterized by laminated hemipelagic sedimentation with low frequency detrital depositional events. The second interval is affected by mass transport deposits including debris flow and turbidite events. And finally, the oldest interval is characterized by very thin and fine layers associated with high frequency detrital depositional events. Pollen and geochemical analyses (C/N) integrated with the sedimentological interpretation provide reliable proxy records of past variability in the westerly wind field as well as the regional precipitation regime. These records are compared to late glacial ice retreat in the neighboring areas and with other coeval events in South America.

This core represents an important contribution to our knowledge of Southern South American Holocene paleoclimate. It was obtained in a unique site to study paleoclimate because its ideal location in a climatically sensitive and hydrologically protected site, its stratigraphic integrity, and the high temporal resolution of the isotopic record as a consequence of the short residence time of water in the lake, and the proximity to a dense network of paleoclimatic records from the region.