Freeze coring closed basin lakes in Patagonia

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We are requesting funds from the LDEO Climate Center to cover the travel expenses for one of us (MQF) to take part in a field program in Patagonia, Argentina. The first phase of the NSF-funded Patagonian Lake Drilling Project (PATO) will collect sediment cores from three closed-basin lakes in extra-Andean Argentina. The principal investigators are V. Markgraf, K. Kelts, J.P. Bradbury, and S. Stine from the USA, D. Ariztegui from Switzerland, F. Schaebitz from Germany, and A. Amos and M.A. Gonzalez from Argentina. The goal of the initial phase of the project is to collect samples from the three lakes and their surroundings, including seismic surveys, sediment coring, and water sampling, to determine the potential for reconstructing the paleoclimate of Patagonia. Assuming that the initial phase of the project yields promising results, longer cores, spanning several glacial/interglacial cycles would be collected in the second phase of the project. Our participation in the initial phase of the project would allow us to collect freeze cores from two of these lakes; Lago Cardiel (49°S, 71°W, 267 masl) and Lago Cari Laufquen Grande (41° 10’°S, 69° 20’W, 800 masl). The cores would be brought back to Lamont, frozen, for processing (photography and x-rays) and ^{210}Pb fallout isotope analyses. The measurements would be used to construct a chronology for the most recent 100-150 years of sediment accumulation. Recent publications[1-6] coauthored by one of us (RFA), have shown how such chronologies provide a useful framework for understanding recent climatological and hydrological changes in closed basin lakes. Using historical records of changing lake levels, temperature, and precipitation, in association with temperature and salinity indicators, such as stable isotopes and metal/Ca ratios, one can validate the use of these tracers for paleo-temperature and salinity reconstructions.