

104-3 - ENSO-DRIVEN PRECIPITATION EVENTS RECORDED IN LAKE SEDIMENTS AND ALLUVIAL DEPOSITS IN THE SOUTHERN ECUADORIAN ANDES



Monday, 16 October 2023



8:00 AM - 5:30 PM



Hall B (2, David L Lawrence Convention Center)

Booth No. 183

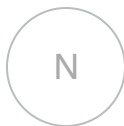
Abstract

The El Niño Southern Oscillation (ENSO) is a major source of global interannual climate variability, however our ability to predict the response of ENSO to changes in the mean state of climate is limited in part by a paucity of long-term records of ENSO. The sediment record from Laguna Pallcacocha in El Cajas National Park, southern Ecuador (4060 masl; 2°46'S; 79°14'W) records El Niño floods spanning the Holocene (Rodbell et al., 1999; Moy et al., 2002; Mark et al., 2022). The sediment record is unusual for the nearly continuous dark- and light-colored laminations (0.1-2.0 cm thick) that comprise the Holocene section. Light laminae represent deposition during periods of increased precipitation, mobilization of unvegetated sediment above the lake, and increased stream discharge, all of which generate density-driven undercurrents. Conversely, dark laminae are deposited relatively slowly by sedimentation of organic matter. To date, no other lake has yielded such a high-resolution record of rainfall events, and here we review sediment cores from the western-most lakes in the region that are most likely to also be influenced by convective driven precipitation during coastal (Pacific) El Niño events. All lakes in this region contain multiple distal tephra 0.1-1.0 cm thick that enable precise correlation among records. Cores from Laguna Pampiada, Pampiada Bog, and Laguna Narigüña are all located between 3500 and 4000 masl, all are located within steep catchments, and cores from these lakes reveal high-resolution records of clastic sediment delivery as recorded in bulk magnetic susceptibility. The stratigraphy of flood plain alluvium in the catchment of lakes studied provides an independent record of the geomorphic response to intense rainfall events. Buried soil A-horizons are clear indicators of major flooding events, and radiocarbon dates from charcoal in the uppermost sections of these A horizons can provide age estimates for large magnitude rain events and resultant floods that are comparable to the record from lake sediment cores. A 3-year record of atmospheric pressure and temperature from a data logger located at 4143 masl in El Cajas National Park provides the basis for comparing atmospheric conditions in the region of the studied lakes with those at sea level on the Ecuador coast, ~50 km to the west.

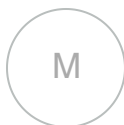
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