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A ∼13,000 year history of glacial variability in the tropical Andes recorded in lake sediments from the Peruvian Andes

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Pro-glacial lake sediments from Peru contain continuous records of climatic variability spanning the Holocene. Here we present results from multiple alpine lake basins along an east-west transect through the Peruvian Andes that contain high-resolution records of clastic sediment variability for the last ∼13,000 years. Radiocarbon-dated sediment cores were measured by scanning X-ray Fluorescence, and for magnetic susceptibility, carbon content, biogenic silica and calcium carbonate concentrations. Samples of bedrock and sediments from glacial moraines in the watersheds were analyzed using ICP-MS in order to fingerprint and trace the source of glacial sediments deposited in the lakes. Preliminary results indicate that glaciers retreated after after ∼13,000 cal yr BP and remained less extensive during the remaining late Glacial Stage and early Holocene. Gradually increasing clastic sediments through most of the remaining Holocene indicate that glaciers became progressively larger, or more erosive, during the last ∼10,000 years. This overall Holocene trend of increasing glacier extent was interrupted by a pronounced decrease in clastic sediments from ∼2500 to 550 cal yr BP, and glaciers then advanced again during the Little Ice Age (∼550 to 70 cal yr BP). Periods of ice advance in the Peruvian Andes generally correspond to times of increased moisture-balance and lower temperatures that are recorded in other regional, terrestrial proxy records.