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Glacial to Holocene climate changes in Easter Island (SE Pacific, 27ºS)

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Sedimentary architecture and paleoclimate for the last 34 000 cal years BP and human activity during the last 850 years have been reconstructed from the Raraku Lake sediments in Easter Island (SE Pacific, 27ºS) using a high-resolution multiproxy study of 8 cores, 36 AMS radiocarbon dates and correlation with previous core studies. The Last Glacial period was characterized by cold and relatively humid conditions between 34 to 28 cal kyr BP. High lake levels and clastic input dominated sedimentation in Raraku Lake and a relatively open forest developed at that time. Between 28 and 17.3 cal kyr BP, including LGM period, colder conditions contributed to a reduction of the tree coverage in the island. The end of Glacial Period occurred at 17.3 cal kyr BP and was characterized by a sharp decrease in lake level conducive to the development of major floods due to the erosion of littoral sediments. The Deglaciation Period (Termination 1) occurred between 17.3 and 12.5 cal kyr BP, characterized by an increase in lake productivity, a decrease in the terrigenous input and a rapid lake level recovery inaugurating a period of intermediate lake levels. During this period, the dominance of algal lamination is interpreted as a warmer climate. The timing and duration of this warming trend in Easter Island broadly agrees with other mid- and low latitude circum South Pacific terrestrial records. The early Holocene was characterized by low lake levels. The lake level dropped during the early Holocene (ca. 9.5 cal kyr BP) and peatbog and shallow lake conditions dominated till mid Holocene, partially caused by the colmatation of the lacustrine basin. During the mid Holocene an intense drought occurred that led to a persistent low water table period, subaerial exposure and erosion of some of the sediments, generating a sedimentary gap in the Raraku sequence, from 4.2 to 0.8 cal kyr BP. The palm deforestation of the Easter Island, attributed to the human colonization at about 850 cal yr BP, could have started earlier, during the 4.2 to 0.8 cal kyr BP sedimentary gap. The colonization of the island coincides with a new humid episode that started 800 yrs ago. From the second half of the 20th century to present-day, the water table has risen flooding the peatbog, allowing the development of the present shallow lake. Since then the lake has suffered an eutrophization process due to the recent intensive cattle exploitation in the island.