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Oceanographic and climatic record for the last 18 ka cal BP in marine sediments from Pescadero Basin, Gulf of California

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In this study a marine sequence is analyzed in order to reconstruct the oceanographic and climatic conditions based on geochemical and magnetic data, in centennial to multi-decadal time scales during the past 18 ka in the southern Gulf of California. The gravity core DIPAL III-T2 was recovered in the eastern part of Pescadero Basin, at 577 m depth, in the Pacific Intermediate Water (PIW) and Oxygen Minimum Zone (OMZ), aboard the R/V "El Puma" of the National University of Mexico (UNAM). The core is 262 cm long.

This core is characterized by clay sediments. It shows massive and homogeneous sediments from bottom to 200 cm, and from there to the top a well defined laminated structure. Light laminae exhibit high content of biogenic components (mainly diatoms, radiolarian and silicoflagellates remains), whereas dark laminae are formed mostly by terrigenous material. Age model is based on five AMS radiocarbon dating, calibrated applying the CALIB 6.1.0 radiocarbon program. The sedimentation rates estimated range from $\sim$0.1 mm/yr to $\sim$0.3 mm/yr (in the upper part); sedimentary sequence comprises approximately the past 18 ka cal BP. Samples were taken every cm and they were dried and grounded, and elemental chemical concentrations measured using an X-ray fluorescence analyzer (Niton XL3t GOLDD). For magnetic susceptibility, measurements were taken every 0.5 cm with a Bartington Susceptibilimeter with MS2B sensor.

A sharp difference in concentrations of Fe, Ti, K, Si, Ca y V, also observed in magnetic susceptibility measurements, marks the transition between Holocene and Pleistocene epochs, suggesting deposition under different conditions of atmospheric and oceanic circulation. In particular, low Ti, Fe and K concentrations at $\sim$ 8 ka cal BP, indicate a decrease in terrigenous input, indicating a decrease in rainfall and river discharges from mainland to the basin, suggesting dry and cold conditions. We propose that this signal correlate with the 8.2 ka cooling event, that characterized similar conditions in other regions of Northern Atlantic Ocean. Vanadium concentrations downcore show low values during Pleistocene, where sediments are massive, and high values during the Holocene, where laminated sediments are preserved. These conditions suggest a decrease in oxygen-levels in the intermediate waters during Holocene, maybe due to productivity increase in surface waters.