



Marine Sedimentary Record of the Gulf of Tehuantepec in the Late Quaternary: paleoceanographic and paleoclimatic implications

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The aim of this study is reconstruct the paleoceanographic and paleoclimatic conditions in the northern Gulf of Tehuantepec, through the use of geochemical and magnetic proxies. The sediment core MD02-2523 was collected using a giant piston corer during the oceanographic campaign MD126 (IMAGES VIII - MONA) in the Gulf of Tehuantepec, on June 2002 aboard the R/V "Marion Dufresne". The core was collected at 202 m depth and it has an 18.19 m length. Age control is established from AMS radiocarbon dating on four samples from the first 700 cm, which were converted to calendar years by applying a reservoir correction of 456 yr (ΔR 162±50) with the CALIB 6.1.0 radiocarbon program. This provides an initial age control for the core from 900 to 47,000 cal yr BP. A linear age model extends the record to ~120,000 cal yr BP, with a mean sedimentation rate of about 0.15 mm/yr.

Sediments in the core are composed mostly of silty clays, with some horizons containing fossil fragments presented as disarticulated bivalve shells with average sizes of 1 cm, as well as foraminifera and nannofossils. At different depths we observed cream to white ash layers, with thicknesses ranging from 2 to 10 cm.

For this study, mineral magnetic and XRF analyses were carried out along the core. For mineral magnetic analyses, standard 2.2 × 2.2 × 2.2 cm samples were taken throughout the core split. The low-field magnetic susceptibility was measured in all samples at low and high frequencies (0.465 kHz and 4.65 kHz) with the MS2 Bartington susceptibility instrument equipped with the MS2B dual-frequency sensor. For the geochemical study, samples were taken every ~2 cm and elemental chemical concentration was measured using an X-ray fluorescence analyzer (Niton XL3t GOLDD).

Magnetic susceptibility shows a cyclic pattern with peaks along the core indicating apparent increases in the amount of magnetic minerals. The peaks could be associated to (about 20 ka) precession cycles. Magnetic susceptibility correlates with terrigenous input and is related to material transported by the strong northerly winds in the gulf and isthmus region. Frequency dependence susceptibility factors indicate presence of fine-grained superparamagnetic minerals throughout the core, which could indicate that the sediment source may have relatively stable during the last 120,000 years, with variations in the amount of terrigenous input.

There is a strong correlation between Mo and V, and between Ti and Fe, which are used as proxies of oxygenation and terrigenous input, respectively. An increase in these elements is observed between ~16,000 and 15,000 cal yr BP. Also most elements showed changes in concentrations from ~30,000 to 31,000 cal yr BP.

Correlations and interpretations among other elements and magnetic susceptibility are in progress as well as additional dating with different methods to improving the age control.