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# Laminations, oxygenation conditions and terrigenous inputs since 120,000 yrs on the North-western American margin.

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The water masses bathing the North-Western American margin are characterized presently by low dissolved oxygen contents in the water masses between 300 and 800 m depth, defining the Eastern Pacific oxygen minimum zone (OMZ). Weak oceanic ventilation and degradation of the organic matter both contribute to the depletion in $O_2$ in the intermediate waters. In addition, the sedimentation is marked by strong seasonal input of terrigenous and biogenic components, and high accumulation rates (35 to 150 cm/ka). These conditions lead to preservation of annual laminations (millimetric to centimetric-thick) on the sea-floor. The magnetic and geochemical investigation of four sediment cores recovered on an N-S transect along the Californian and Mexican coasts allows then describing the spatio-temporal modification of water oxygenation and terrigenous input during the last glacial-interglacial cycle (0-120,000 yrs). Among all sites cored during the campaign IMAGESVIII-MONA (june 2002), three were selected: Santa Barbara Basin (35˚N), margin of Baja California (23˚N) and Gulf of Tehuantepec (15˚N).

The magnetic parameters are used to trace the concentration, nature or grain sizes changes of the magnetic fraction. Two types of ferromagnetic minerals can be detected: the terrigenous iron oxides (magnetite, hematite, goethite) and the authigenic iron sulfides (greigite, $Fe_3S_4$ and pyrrhotite, $Fe_7S_8$). The relative contents of major and trace elements, measured by X-ray fluorescence (XRF) on key interval of the

cores, help to improve the interpretations. Isotopic ratios of oxygen and carbon measured on planktonic and benthic foraminifera in the core from Gulf of Tehuantepec allowed the reconstitution of the physical and chemical characteristics and of the structure of the water column.

The sedimentary sequences, dated by correlation of magnetic susceptibility profiles, calibrated $^{14}C$ ages and identification of paleomagnetic excursions, cover the glacial-interglacial transition (0-40 ka) and one of them covers the last climatic cycle (0-120 ka).

High concentration of iron oxides in the glacial sediments in the three sites suggests strong terrigenous inputs on the NW American margin and notably strong aeolian inputs during the last glacial maximum (20-26 ka BP). Ferrimagnetic iron sulfides (certainly greigite) enrichments in Holocene sediments from Santa Barbara Basin are interpreted as diagenetic transformation of terrigenous-rich flood events, allowing to characterize the continental hydrological cycle. Thick accumulations of greigite in glacial sediments reveal dysoxic phases during abrupt cooling of North Atlantic. In the Gulf of Tehuantepec, the thermocline was shallower during the deglaciation (16-10 ka BP) than during the Holocene (10-0 ka BP) and the presence of authigenic gypsum ($CaSO_4$), formed by reoxidation of pyrite, in the sediments suggests a better oxygenation of the bottom waters during the glacial periods. Finally, the presence of lamination in the cores shows a latitudinal balance in water masses oxygenation with a better oxygenation during the Bolling-Allerod in the South and a stronger anoxy in the North. The insights on oceanic circulation and ocean-continent linkages will be discussed.