



Late Pleistocene short-term changes in the eastern Gulf of Mexico sea-surface hydrography

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Planktic and benthic foraminiferal Mg/Ca and oxygen isotopes, grainsizes, organic carbon and carbonate content were analysed from IMAGES core MD02-2575 recovered from the DeSoto Canyon, eastern Gulf of Mexico (GOM). The marginal position of the core to the West Atlantic Warm Pool appears to be an ideal place to decipher the evolutionary history of the warm pool on short time scales, and to reconstruct the dynamic evolution of the Loop Current, a prominent current exporting warm tropical waters from the Caribbean through the Yucatan Channel in the GOM, and further to Florida Strait. The reconstructed SST_{Mg/Ca} record (*G. ruber*) shows a close correspondance to the $\delta^{18}\text{O}$ -record over the last 150 kyr, with an overall SST_{Mg/Ca} range from 22°C to 30°C and a deglacial SST-amplitude of 5.5°C at Termination I. Hence, the SST_{Mg/Ca} variability in the eastern GOM is much larger than in the central Caribbean with SST_{Mg/Ca} coming close to central Caribbean SST during interglacials, while glacial SST_{Mg/Ca} were significantly cooler than in the central Caribbean. SST_{Mg/Ca}, $\delta^{18}\text{O}_{\text{seawater}}$, and SSS variations calculated from the combined measurement of planktic Mg/Ca and oxygen isotopes show millennial scale changes during the last glacial, with temperate and high saline conditions during interstadials, and cool and low saline conditions during stadials. In particular, periods when the thermohaline circulation in the North Atlantic collapsed (Heinrich events) are characterized by considerable freshening in the eastern GOM. The comparison of our $\delta^{18}\text{O}_{\text{seawater}}$ data to those from Orca Basin and the central Caribbean point to generally fresher sea-surface conditions during cool periods, most likely due to a strengthened Mississippi discharge, a less established Loop Current, and reduced evaporation in combination with a southern position of the Innertropical Convergence Zone (ITCZ). Interstadial and interglacial sea-surface conditions, in turn, point to a strong, northward flowing Loop Current in line with the northward position of the

ITCZ, allowing for resembling central Caribbean and eastern GOM conditions. The continuous $SST_{Mg/Ca}$ increase during the last deglaciation being synchronous with the Byrd ice core oxygen isotope record reflecting climate change over Antarctica, and the lead of $SST_{Mg/Ca}$ over global ice volume change by 3 kyrs confirms earlier observations from low latitude $SST_{Mg/Ca}$ records and probably indicates a key role of the tropical ocean in forcing global climate change.