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Intermediate water mass variability in the Caribbean and the Gulf of Mexico from the LGM to the late Holocene

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The role of intermediate water masses and interhemispheric water mass exchange in the Atlantic Ocean especially with respect to teleconnections via ocean tunnelling is still poorly understood. The interplay between Antarctic Intermediate Water (AAIW) and North Atlantic Deep Water (NADW) in the Caribbean during the transition from the LGM to late Holocene is the focus of our research. Periods of AAIW replacing subtropical Atlantic and N-Atlantic sourced intermediate water masses in the Florida Straits during deglacial cool periods when Atlantic Meridional Overturning Circulation (AMOC) was supposedly weak, have been hypothesised (e.g. Xie et al., 2012). Here we present new multi proxy data reflecting intermediate water mass variability in the subtropical West Atlantic, Caribbean, and the Gulf of Mexico on millennial time scales over the last 40,000 years. We reconstruct water mass properties (temperature, salinity and nutrients) using the stable isotopic ($\delta^{18}O$, $\delta^{13}C$) and elemental (Mg/Ca, Mg/Li, Cd/Ca) composition of benthic and planktonic foraminifera. These new proxy data obtained from sediment cores from 600 to 1000 metres water depth allow a detailed assessment of the role of intermediate waters in interhemispheric heat exchange, thermocline variability, surface properties, and intermediate ocean ventilation. Preliminary results from the northeastern of the Campeche Bank suggest a deglacial warming of intermediate water masses of approximately 4°C highlighting the variability of intermediate water masses and the impact on the thermal state of the ocean during deglacial climate change.