Geophysical Research Abstracts
Vol. 14, EGU2012-4505, 2012
EGU General Assembly 2012

Sub-seasonally resolved coral records of northern Red Sea - eastern Mediterranean climate during the Holocene and the last interglacial

T. Felis (1), N. Rimbu (2), S. Al-Rousan (3), H. Kuhnert (1), G. Lohmann (2), M. Kölling (1), and J. Pätzold (1)

(1) MARUM - Center for Marine Environmental Sciences, University of Bremen, Bremen, Germany (tfelis@marum.de), (2) Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany, (3) The University of Jordan/Marine Science Station, Aqaba, Jordan

The northern Red Sea represents a unique location where ocean currents transport warm tropical waters northward, enabling coral reef growth at unusually high latitudes of up to 29 ˚N. Moreover, one of the world's northernmost complexes of uplifted Pleistocene reef terraces can be found here at Aqaba (Jordan). We present sub-seasonally resolved reconstructions of surface ocean conditions in the northern Red Sea derived from annually banded *Porites* corals. The Sr/Ca and δ^{18}O variations in the aragonitic skeletons of our modern and fossil coral colonies provide proxy records of temperature, salinity and hydrologic balance at the sea surface during the last centuries and during time windows (40 to 100 years length) of the Holocene and the last interglacial period. Previous work has shown that seasonality and interannual to decadal climate variability in the northern Red Sea as documented in our coral records is strongly coupled to climate variations in the eastern Mediterranean, Middle East and Europe, reflecting the prominent role of atmospheric teleconnections of the Arctic Oscillation (AO)/North Atlantic Oscillation (NAO) in controlling regional climate on these timescales.

New coral Sr/Ca data, in combination with δ^{18}O, reveal an abrupt regime shift toward fresher surface ocean conditions in northern Red Sea surface waters at the end of the Little Ice Age. Possible mechanisms include a reorganization of the Northern Hemisphere atmospheric circulation. Sr/Ca records from a large number of fossil corals indicate a trend of decreasing temperature seasonality over the last 6000 years toward present-day. Such a trend is expected in the higher latitudes of the Northern Hemisphere from insolation changes on orbital timescales. Coral δ^{18}O and Sr/Ca records suggest an increased seasonality in the hydrologic balance during time intervals around 4400, 4600 and 6000 years ago, which could result from both enhanced winter evaporation or increased summer precipitation, although the latter is rather unlikely in this arid region. We currently generate century-long δ^{18}O and Sr/Ca records from large fossil corals, in order to reconstruct northern Red Sea temperature, salinity and hydrologic balance at sub-seasonal resolution during time windows (up to 170 years length) of the last 2000 to 3000 years, and during shorter time windows of the last interglacial. The paleoclimatic potential of recently collected fossil corals of Holocene and last interglacial age from the northern Gulf of Aqaba will be discussed.