Atmospheric dust input to the Northern Gulf of Aqaba

N. TEUTSCH[1]*, O. TIROSH[2], A. TZIPORI[2], U. DAYAN[3] AND Y. EREL[2]

[1]Geological Survey of Israel, Jerusalem, 95501 Israel (*correspondence: nadya.teutsch@gsi.gov.il)
[2]Institute of Earth Sciences, Hebrew University of Jerusalem, Israel
[3]Department of Geography, Hebrew University of Jerusalem, Israel

Atmospheric dust is considered a major source of nutrients to the open sea and major oceanic gyres. However, the contribution of airborne material to the nutrient budget of coastal marine environments was usually neglected because their supply from continental surface runoff was considered adequate. The Gulf of Aqaba situated at the north of the Red Sea is located in an extremely arid region with practically no runoff input, and therefore provides an ideal site to investigate the role of airborne dust in nutrient budget. The major objectives of this study are to quantify the role of atmospheric dust in the nutrient balance of the oligotrophic waters of the Gulf of Aqaba and to characterize the atmoshperic dust input associated with different synoptic conditions.

Suspended dust samples were continuously collected ca. every ten days for almost four years in the northwestern corner of the Gulf of Aqaba, on the pier of the Interuniversity Institute for Marine Sciences, Eilat, Israel. After collection, samples underwent sequential dissolution in order to dissolve first water-soluble salts, then carbonates and oxides, and finally Al-silicates. Dust load vary seasonally from low values in the summer to higher values in the fall, varying values in the winter and highest values in the spring. Major element chemistry points to the main phases extracted at each leaching stage and trace elements are mainly associated with the major elemental trends. Occasionally the dust samples contained elevated concentrations of anthropogenically-emitted metals (e.g. Pb, Zn, Cu) that could be attributed to changes in synoptic conditions. Elemental ratios point to seasonal and synoptic-control on the sources of the dust which in turn determine the solubility of the dust.

Tropical hydrologic cycle variability in the Florida Straits during Marine Isotope Stages 2 and 3

T.R. THEM II[1]*, M.W. SCHMIDT[1] AND J. LYNCH-STIEGLITZ[2]

[1]Department of Oceanography, Texas A&M University, College Station, TX 77843, USA (*correspondence: theo1085@tamu.edu)
[2]School of Earth and Atmospheric Sciences, Georgia Institute of Technology, Atlanta, GA, 30332, USA

Reconstructions of North Atlantic salinity variability during the last deglacial suggest that major reorganizations in the tropical hydrologic cycle are linked to North Atlantic Meridional Overturning Circulation (AMOC) and high-latitude climate change [1, 2]. However, it remains unclear if the same mechanisms are responsible for the abrupt climate oscillations during Marine Isotope Stages (MIS) 2 and 3. Here, we generate high-resolution records of sea surface temperature (SST) and $\delta^{18}O_{SEAWATER}$ ($\delta^{18}O_{SW}$, a proxy for surface salinity) from 20-39 ka ago by combining Mg/Ca paleothermometry with $\delta^{18}O$ measurements in shells from the surface-dwelling foraminifera *Globigerinoides ruber* in Florida Margin cores KNR166-2-JPC26 (24°19.61'N, 83°15.14'W; 546 m depth; 18-240 cm/kyr sed. rate) and JPC29 (24°16.93'N, 83°16.24'W; 648 m depth; 8-20 cm/kyr sed. rate). As an additional proxy of salinity variability resulting from riverine input into the Gulf of Mexico, we also measure Ba/Ca ratios in the same *G. ruber* shell material. Finally, benthic $\delta^{18}O$ values in the same cores were measured as a proxy for changes in Florida Current transport, based on the procedures outlined in [3, 4]. Our initial results show that increased Ba/Ca ratios (increased riverine influence), decreased $\delta^{18}O_{SW}$ values (fresher surface salinity) and increased benthic $\delta^{18}O$ values (suggesting increased Florida Current transport) correlate with the abrupt onset of interstadial phases in the NGRIP $\delta^{18}O_{ICE}$ record.

[1] Schmidt *et al*. (2004) *Nature* **428**, 160–163. [2] Carlson *et al.* (2008) *Geology* **36**, 991–994. [3] Lynch-Stieglitz *et al*. (2011) *Paleoceanography* **26**, PA1205. [4] Lynch-Stieglitz *et al.* (in prep)