EGU21-7111
https://doi.org/10.5194/egusphere-egu21-7111
EGU General Assembly 2021

Going with the flow: Experimental simulation of sediment turbid transport from a foraminifera perspective

Anat Ash-Mor[1], Ahuva Almogi-Labin[2], Vincent M. P. Bouchet[3], Laurent Seuront[3,4,5], Tamar Guy-Haim[6], Zvi Ben-Avraham[1,7], and Revital Bookman[1]

[1]University of Haifa, The Charney school of Marine Sciences, Geo-Marine Sciences, Israel (ash_anat@yahoo.com)
[2]Geological Survey of Israel
[3]Univ. Lille, CNRS, Univ. Littoral Côte d'Opale, UMR 8187, LOG, Laboratoire d'Océanologie et de Géosciences, France
[4]Tokyo University of Marine Science and Technology, Department of Ocean Sciences, Japan
[5]Rhodes University, Department of Zoology and Entomology, South Africa
[6]National Institute of Oceanography, Israel Oceanographic and Limnological Research, Haifa, Israel.
[7]Tel-Aviv University, Raymond and Beverly Sackler Faculty of Exact Sciences, Department of Geosciences, Israel.

Transport of continental shelf sediments to the deep ocean can be studied from displaced symbiont-bearing larger benthic foraminifera (LBF) found in turbidite deposits. The LBF habitat depth, physical characteristics and preservation serve as indicators for understanding sediment transport dynamics near the seabed and in the water column. Here, an experiment was designed to explore turbulent sediment transport in a closed flume system using simulated high current velocities. Shelf sediments from the Gulf of Eilat/Aqaba (GEA), dominated by Amphistegina papillosa and Operculina ammonoides, were subjected to 60 and 80 cm/sec current velocities while collected in a 10-cm vertical sediment trap. LBF abundance, shell physical properties and preservation state were analyzed and compared with the original bulk shelf sediments. The experiment results showed that at 80 cm/sec velocity LBF shells of all sizes and preservation states are efficiently resuspended and transported in large quantities throughout the water column, as opposed to their transport as bedload by the lower velocity current. LBF shape also has a role in the transport distances and accumulation depths. O. ammonoides shells were found more portable, compared to A. papillosa, due to their flatter discoid shape. The results suggest that a threshold velocity of ~80 cm/sec was needed to generate the thick coarse deposits found in the GEA slope sedimentary record, which were previously suggested to be triggered by large magnitude seismic events. Lower velocities probably winnowed minor amounts of LBF shells (with little or no coarser sediments) that were deposited as thin layers and may point to lower magnitude seismic triggers. In conclusion, LBF shells are transported and deposited in turbidites according to their hydrodynamic properties, resulting in assemblage differentiation along the transport pathway. This study shows the fossil biogenic composition in turbidites includes valuable information on current velocities, transport dynamics and possible triggers in the geological record.