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Responses to the 2800 years BP climatic oscillation in shallow- and deep-basin sediments from the Dead Sea

Ina Neugebauer (1), Achim Brauer (1), Markus Schwab (1), Peter Dulski (1), Ute Frank (1), Elitsa Hadzhiivanova (2), Hiroyuki Kitagawa (3), Thomas Litt (4), Vera Schiebel (4), Nimer Taha (2), and Nicolas Waldmann (2)

(1) Section 5.2 – Climate Dynamics and Landscape Evolution, GFZ German Research Centre for Geosciences Potsdam, Germany, (2) Dr. Strauss Department of Marine Geosciences, Leon H. Charney School of Marine Sciences, University of Haifa, Israel, (3) Graduate School of Environmental Studies, Nagoya University, Japan, (4) Steinmann Institute of Geology, Mineralogy and Paleontology, University of Bonn, Germany

Laminated lake sediments from the Dead Sea basin provide high-resolution records of climatic variability in the eastern Mediterranean region, which is considered being especially sensitive to changing climatic conditions. In the study presented here, we aim to reconstruct palaeoclimatic changes and their relation to the frequency of flood/erosion and dust deposition events as archived in the Dead Sea basin for the time interval from ca 3700 to 1700 years BP. A ca 4 m thick, mostly annually laminated (varved) sediment section from the western margin of the Dead Sea (shallow-water DSEn - Ein Gedi profile) was analysed and correlated to the new ICDP Dead Sea Deep Drilling Project core 5017-1 from the deep basin. To detect even single event layers, we applied a multi-proxy approach of high-resolution microscopic thin section analyses, μXRF element scanning and magnetic susceptibility measurements, supported by grain size and palynological analyses. Based on radiocarbon and varve dating two pronounced dry periods were detected at $\sim$3500-3300 yrs BP and $\sim$2900-2400 yrs BP that are characterized by a sand deposit during the older dry period and enhanced frequency of coarse detrital layers during the younger dry period in the shallow-water DSEn core, both interpreted as increased erosion processes. In the 5017-1 deep-basin core these dry periods are depicted by halite deposits. The timing of the younger dry period broadly coincides with the Homeric Minimum of solar activity at ca 2800 yrs BP. Our results suggest that during this period the Dead Sea region experienced a change in synoptic weather patterns leading to an increased occurrence of flash-flood events, overprinting the overall dry climatic conditions. Following this dry spell, a 250-yrs period of increased dust deposition is observed, coinciding with more regular aragonite precipitation during less arid climatic conditions.