Understanding depositional processes of terrigenous sediments from flash-floods and mass-wasting events in the Dead Sea

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Continental archives such as interplate lacustrine sedimentary basins provide an excellent source of data for studying regional paleo-climate, paleo-sesmicity and paleo-environmental changes. Such is the case for the sediments that were deposited in the Dead Sea basin, a tectonically active pull-apart structure along the Dead Sea fault (DSF). This elongated basin is characterized by steep slopes and a deep and flat basin-floor, which are constantly shaped by seismicity and climate through time. The nature of the sedimentary record is the Dead Sea basin responds to changes in the controlling forces.

The aim of this study is to understand depositional processes of terrigenous material in the Dead Sea basin using core segments recovered during the December 2010 – March 2011, ICDP coring campaign in the Dead Sea. The 460 m long core at ~300 m water depth in the central part of the Dead Sea, recovered sediments that comprise of fine laminated intercalations of aragonite or calcite with detritus, evaporitic layers and thick clay-silt homogeneous layers (cm to tens of cm thick). Laminated and evaporitic sequences are believed to be deposited under stable lake conditions, however, homogeneous layers represent short-term to instantaneous sediment mass-transport events, possibly triggered by slope instability or variability in the local hydrological regime.

The homogeneous layers were catalogued into different types according to visible differences in the internal sedimentological characteristics such as grading, color change and the sediment defining the top and base of each interval. Finally six intervals from the Ze'elim formation, seven from the Lisan formation and four from Samra and Amora were sampled at 1 cm resolution. The samples were analyzed using grain size, XRD, magnetic susceptibility and TOC measurements. While grain size measurements immediately represent the

expected trend of fining upwards in these intervals, as seen in mass-transport deposits elsewhere, other measurements such as magnetic susceptibility and XRF require more attention when interpreted.

We thus suggest that comprehensive sedimentological characterization as presented in this study should be a compulsive tool in understanding sediment transport processes prior to further possible climate or tectonic interpretation.