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Sedimentological implications from micro-facies data and geochemical characterization of annual laminated sediment deposits from the Holocene Dead Sea

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Here, we describe a systematic study of varves in laminated sequences. One of the aims of palaeoclimate studies is to understand the relationship between variations in seasonality and climate change. Climate change often occurs through changes in seasonal signals, but palaeoclimate records rarely reveal seasonal resolution. Recognizing the periodicity of short and long-term variability in evaporation and precipitation patterns, of length and intensity of season related variations during the Holocene are crucial for the future hydrologic balance in the highly populated Near East region. Israel and its vicinity, currently located between the global desert belt and the Mediterranean climate region, underwent significant shifts in sedimentation over the course

of the Quaternary. These shifts were reflected e.g. by major changes in the palaeo-hydrological (rain) regime, modes of fluvial erosion and clastics transport to the natural sediment traps, lacustrine sedimentation and precipitation of minerals, changes in evaporation, and in limnological conditions. The Dead Sea basin is an excellent location for the analysis of these patterns since the Dead Sea (31˚30'N, 35˚30'E, currently about 416 m below sea level (bsl) behaves as a sediment trap, thus provide a sedimentary record of the above-mentioned changes.

Our high-resolution, multi-disciplinary, palaeolimnological study investigated cores of locality Ein Feshkha *(DSF*) and an adjacent profile of mainly annual to subannual laminated sediments. Our presentation will focus on the sedimentological and geochemical results over the late Holocene. The core and profile comprise laminated fine-grained clastic sediments and authigenic aragonite and gypsum. Petrographic examination of laminae reveals that they are typically couplets of alternating very fine detritus and aragonite, or triplets of detritus, aragonite and gypsum. These successions represent annual deposition rhythmites, which reflect entering of new freshwater with bi-carbonate and sulfate to the lake during winter floods and through the Jordan River, and deposition of aragonite and gypsum during the dry season. In parts of core DSF, different types of deformed sediment sequences can be observed, e.g. slump structures and microfaults. Some of these deformed sequences seem to be generated by earthquakes, so-called "mixed layers". Major and minor elements were semi-quantitatively determined by means of Micro-X-Ray fluorescence spectrometry (μ-XRF) using the high-resolution core scanner EAGLE III BKA to characterize the different types of laminae. To investigate the characteristic composition of the Dead Sea sediment composition in core Ein Feshkha and to evaluate the measurements itself element composition in different resolution (step-sizes 50, 100, 200, and 500 μm) of the same sediments were measured by micro-XRF.

We document the presence of possible wet and dry phases or events in the *Ein Feshkha* Dead Sea record. The temporal and spatial continuity of *Ein Feshkha* sediments make them a possible archive for the reconstruction of paleo-climate and seismic activity.