



## **End-Pleistocene to Holocene paleoenvironmental record from piston corer samples and the challenge of stratigraphic correlation of playa sediment data with a connected alluvial apron from Damghan Basin, Iran**

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The study yields a first characterization and correlation of the end-Pleistocene to Holocene sediment archive of playa and playa lake deposits in the Damghan Basin, northern Iran. The Basin sediments are deposited since Mio- and Pliocene, which is valid for the connected alluvial fans, too. These are covering the area between the playa and mountains and while prograding from the mountain ranges they deliver gravels and fine-sediments to the basins sink. The processes on the studied alluvial apron are described and dated already and can be explained in seven morphodynamic phases, which are linked to a general lake level high-stand in north-east Iran at about 8000-9000 years ago. If and how these phases are passed on from the alluvial record down to the playa sediment record is aim of this study.

Today the salt pans margins are highly affected by salt tectonic drifting and access was suboptimal. Only here drilling could be performed through about 280 centimeters of salt-crust unfrequently intercalated with loamy layers. For yielding undisturbed playa sediment records sampling was performed with inliner-tubes deployed in a piston corer (Kullenberg type). Thus at two different drilling sites in summation seven cores could be taken, down to a maximum depth of 129 cm and 1000 cm. Back in Germany the cores had been opened and initially described, photographed and optically scanned with a core logger. Regarding future studies, the aim was a best possible comprehensive documentation of the cores. Therefore basically grain size measurements (laser diffraction), multi element analyses (XRF, ICP-OES, titrimetry) and mineralogical measurements (XRD) had been deployed on samples taken from every single previously identified layer. Continuous elemental data was secured by use of a XRF-scanning core logger.

The sedimentological description together with laboratory element analyses shows saline conditions in the first three meters coincide with general coarser grain sizes. The next three meters are made up by homogenous partly laminated deposits, rich auf clay and silt and with a decreased content of sulphur and halite. Regular Peaks of sulfate and calcium within this unit presumably indicate post-sedimentary precipitation of gypsum. The homogenous sediment unit is followed by layers clearly set up in three major phases of up-fining sediments. Higher Al and Mg contents following this sedimentation phases suggest a considerable amount of syn-sedimentary clay mineral enrichment.

The alignment of alluvial fan phases and phases recorded in the playa is challenging. As figured out before, the focused signals in the study are linked to non-local factors affecting supra-regional land surface alteration. But 0 to less than 1 % organic carbon contents decrease the chance of deriving a valid sediment dating and the possibility of chrono-stratigraphic correlation. Anyway, the clear transitional zone from halite dominated to more or less halite-free sediments can serve as a guideline to the development of further correlations.