

Preliminary results on quaternary studies from Bajestan Basin (Kavir-e Namak), Iran

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The increasing population and demand for developing infrastructures on the one hand, and the recent issues on water and air quality on the other hand, in addition to droughts and the shrinking of many wetlands and lakes, have encouraged Iran recently to invest more in palaeoenvironmental research - specifically on quaternary basins. Preliminary results of our study through field work, satellite imagery processing, SRTM data analysis and drilling, have created new insights on the Iranian playas and the history of the lakes. A combined geological and geomorphological approach for studying young lakes and playas of Iran has led to the identification of at least five major types of lakes and playas in different parts of Iran; for example the Bajestan basin which ranks the second biggest playa of Iran, is placed in the edge of the central Iranian microplate and Lut structural block.

The Bajestan Playa (Kavir-e Namak) is surrounded by cretaceous limestones in the south and Paleozoic formations in the north. The basin comprises several kinds of quaternary deposits including sand dunes and Aeolian deposits, fluvial sediments, alluvial fans and lake sediments.

The aeolian activity in the basin is primarily shaping landforms in the southwest and the north of the area. The major fluvial activity is considered to be driven from east and south of the playa. The integration of field observations and data derived from the analysis of SRTM digital elevation model (90m) and Landsat satellite imagery shows that the major part of the playa has flat slope.

In addition, the morphometric assessment and the hydrological modelling showed that the major current alluvial channels have SW/NE trend with the highest density and intensity of activity in south west of the basin.

The major alluvial deposits in the north and south of the playa represent a dissimilar geomorphology. While the northern part of the basin, from the rock unit outcrops to the edge of playa, is occupied by a narrow alluvial domain, the southern part is dominated by a megafan, with an approximately 3.6 times longer horizontal extension toward the wet zone of the southern rim of the playa lake. According to the satellite images and field observations, this is due to the tectonic activity and to the structural situation, which is causing different shapes of the two sides of the playa. Accordingly, the wet zone in the northern reach of the playa is weakly developed, in opposite to the southern part.

Based on cored samples from young deposits of the Bajestan basin, several salt horizons and laminated sediments have been discovered. An initial core description of the core sediments in the lab, led to a classification of salt horizons (based on size, shape and thickness) into three major groups.