Geomorphological and hydrochemical analysis of Mohammadabad playa in eastern Iran

A. MAHBOUBI*, R. MOUSSAVI-HARAMI, N. REZAVAND and M. KHANEHBAD
Department of Geology, Faculty of Science, Ferdowsi University of Mashhad, Iran
*corresponding author e-mail: amahboubi@science1.um.ac.ir

Mohammadabad playa with nearly 450 km^2 surface area is one of the most important geomorphological units in the eastern Iran. This playa mainly consists of fine grain sediments (clay, silt and fine sand) with evaporite minerals (gypsum, anhydrite and salt). This playa has been recharged by several ephemeral rivers with gravel-sand bedload and straight single channels. The most effective downstream fining factors within these ephemeral channels are mainly selective deposition, physical weathering and someabrasion. Three geomorphological subdivisions of the playa can be recognised from the margin towards the centre: 1) a wet zone with deep water, 2) a puffy zone and 3) a clay zone. Several sand dunes are present on the west margin of the playa. Hydrochemical analysis of playa brines from 10 boreholes revealed that the association of cation and anion series of Na-Ca-Mg-K-Cl-SO$_4$ are abundant while the lithium value is low. Hardness and total dissolved solid of brines are very high and pH of the water is neutral to slightly alkaline. These data show that the groundwater in this area can be classified as a secondary type of meteoric saline water. It should be noted that the chemical composition of groundwater in Mohammadabad playa is also strongly affected by volcanic and sedimentary rocks that are exposed in the area. We hope that this information could be used for mineral exploration in this an similar settings.

Keywords: Geomorphology; Playa; Hydrochemistry; Iran

★★★★★★★★★★

An investigation on desertification intensity assessment (Case study, Mahan Kerman Province, Iran)

G. ZEHTABIAN [1]* and M.R. JAVADI [2]
[1] Faculty of Natural Resources, University of Tehran, Iran, P.O. BOX: 31585-4314
[2] Combat Desertification, Faculty of Natural Resources, University of Tehran, Iran, P.O. BOX:31585-4314
*corresponding author e-mail: ghzehtab@chamran.ut.ac.ir

A vast area of the world has been influenced by desertification. Iran is located in a region sensitive to this hazard. In order to evaluate desertification intensity in Iran, Mahan region in Kerman province was selected for survey. This study area is located in latidude 57º 36' N and longitude 29º 50' E, with an area of 90,029 km². To assess the factors affecting desertification as well as quantitative and qualitative analyses, two methods were used: ICD (Iranian classification of Desertification) and F.A.O-UNEP. Benchmarks and indicesof desertification were considered in relation to the coinciding the natural situation, and a desertification map was produced. According to this method desertification intensity consists of four classes, low, moderate, severe and very severe. In order to assess desertification situation three benchmarks, wind and water erosion as well as water resource degradation, were chosen as the main criteria. Then, through the geomorphological units indices of these benchmarks were qualified. Finally according to sum of the indices, the class of desertification and degradation were identified. Results showed that in six of the total of 16 geomorphological units, located in mountainous regions, the water erosion benchmark but in the other units, the water resource degradation benchmark was the most influential factor on desertification. On the other hand among three criteria, except for agricultural lands, environmental and natural factors are more effective than human factors in desertification processes. Irrigation efficiency, high stocking rate and drought persistence, as well as geological formation, are the most effective factors in desertification progress. About 32 percent of study area (28,232 km²) is classified as moderate and 67% (60,128 km²) as severe in the desertification classification.

Keywords: Desertification; FAO, UNEP and ICD model; Wind and water erosion; Kerman; Iran