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Genesis, clay mineralogy, and micromorphology of paleosols located on Givdary alluvial fan, Rafsanjan

M. H. Farpoor*, M. Irannejad

Soil Science Department, Faculty of Agriculture, Shahid Bahonar University of Kerman

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Abstract: Paleosols provide invaluable paleoclimatic data especially in arid regions. Buried paleosols are found in central Iran. Givdary alluvial fan, south of Rafsanjan, was selected for paleosols study. Soil moisture and temperature regimes of the area are aridic and mesic, respectively. Based on paleosols' identification criteria, four paleosol layers at the depths of 15, 20, 45, and 50 m from the surface were identified in the Canyon of Givdary River. Palygorskite, illite, smectite, chlorite, and kaolinite clay minerals identified using XRD analyses. Palygorskite was not found in paleosol 4 which is attributed to higher moisture at the time of soil formation that prevented palygorskite formation, or caused transformation of palygorskite to smectite. Electrical conductivity content of 60 dS/m in paleosol 3, together with 5% gypsum content and high amount of palygorskite found during SEM observations showed that the climate at the formation time of this soil was more arid than other studied paleosols. Micromorphological observations demonstrated the role of gravel content on pore spaces percentage.

Keywords: *paleosols; Givdary alluvial fan; palygorskite; paleoclimate; Rafsanjan.*

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*Corresponding author, Tel.: (0341) 3202656, Fax: (0341) 3222043, Email: farpoor@mail.uk.ac.ir