

Factors affecting palygorskite distribution and genesis in selected soils developed on Tertiary parent materials in the Isfahan Province

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Abstract: Type of clay minerals determines the stage of soil evolution. Palygorskite is a dominant clay mineral in soils of arid and semi-arid regions. This study aims to identify the distribution and genesis of palygorskite in some soils developed on Tertiary parent materials in the Isfahan Province. Six soil profiles and their Tertiary parent materials were studied, described and sampled for X-ray diffraction analysis and scanning electron microscopy examinations. Physico-chemical characteristics of both soils and parent materials were also determined. Different quantities of palygorskite were found in soils and parent materials. The highest amount of palygorskite was found in soils and parent materials where both gypsum and carbonates precipitated. Much less quantity of palygorskite was found in salic and calcic horizons. Results revealed that occurrence of palygorskite in the studied soils are mainly related to the inheritance from parent Tertiary sediments. Besides, it seems that palygorskite has partly been formed through pedogenesis processes. Using principal component analysis, the Mg/Ca ratio, pH, H_4SiO_4 and gypsum contents were identified as the most important factors affecting the distribution and genesis of palygorskite in the soils and parent materials. This may suggest that the neoformation of palygorskite by precipitation from solution can take place where the evaporation fluxes are very high.

Keywords: *Tertiary; Palygorskite; Parent Materials; Principal Component Analysis.*

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