Different Forms of Iron and Some Physico-Chemical Properties as Soil Development Parameters in a Chronosequence on Karaj River Terraces in Hassan-Abad, Southern Tehran

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Abstract

Terraces are old geomorphic surfaces that are not related to present streams and are best places to study the effect of time on soil formation (chronosequence). This research was carried out to study some physico-chemical parameters especially different forms of iron as soil development indices on terraces of Karaj River in Hassan-Abad, southern Tehran. To determine soil development indices in 4 profiles occurring on 4 terraces, some physical and chemical properties were measured and free iron(Fe_d), aluminum(Al_d), silica(Si_d) and manganese(Mn_d), amorphous Fe(Fe_o), Al(Al_o), Si(Si_o), Mn(Mn_o) and Fe, Al, Si-humus complexes were extracted. Results showed that clay, fine clay/total clay, CEC, the color redness and leaching of calcium carbonate increase toward higher terraces. Contents of Fe_d, Al_d and Si_d increases from lower terrace (T1) to the higher terrace (T4). Fe_d-Fe_o and Fe_o/Fe_d as the most important indices of soil development were enhanced and reduced from lower terrace (T1) to higher terrace (T4) soils, respectively, which indicate an increase in iron oxides crystalinity and soil profile development. Contents of Fe_d-Fe_o in the B horizons from T1 to T4 were 600, 800, 1000, and 1400 mg/kg soil, respectively. Calculation of Ferrihydrate and Fe-hydr(oxide) such as goethite and hematite showed that the amounts of these components were increased from T1 to T4 terraces confirming the variation of (Fed-Feo), (Feo/Fed) and (Feo-Fep) indices.

Keywords: Free and amorphous iron oxide, Fe-hydr(oxide), Fe_d-Fe_o, Fe_o/Fe_d.

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