Journal of Applied Geochemistry
Vol. 17, No.1 (2015). pp. 98-108

GEOCHEMICAL CHARACTERIZATION OF SHRINK-SWELL SOILS IN YAVATMAL DISTRICT, MAHARASHTRA

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Abstract

Seven shrink-swell soils (1) on Late Palaeozoic to Mesozoic fluvial sedimentary sequence of Wardha valley [Chanoda-limestone (P1), Wani-sandstone (P2), Nagdhari-basalt (P3)] , (2) on Deccan basalt sequence of Upper Cretaceous to Palaeocene [Selodi (P3), Loni (P5)], (3) of [Dhanki under irrigation (P6)] and (4) on Archean group gneiss Kharbhi (P7) were studied for geochemical variations in genetic horizons with weathering indexes and elemental ratio's. These shrink-swell soils have mean of 23.53±2.22% Si, 8.82±1.18%Al, 6.2±1.74% Fe and 0.81±0.31%Ti with least variability of Si and Al in Ap, Bw and Cr horizonsbut moderately variable in slickensided horizons. The vertical distribution of Si showed perceptible trends in relation to parent material such as irregular in Chanoda (P1), Wani (P2) and Nagdhari (P4), gradational increase in Selodi(P3) and Dhanki (P6) and decreasing trends in Loni (P5) and Kharbhi (P6). The pedotransfer functions showed that Al is powerful predictor of clay, Ca for $CaCO_3$ and bulk density with Al, Fe and Ti whereas negative relation of COLE (coefficient of linear expansion) with molar ratio's of Fe, Ca, Si and Ti and saturated hydraulic conductivity (K sat) with molar ratio of mMg/mTi. The positive curvilinear relationship of Fine clay with CALMAG index was due to generation of exchangeable Ca and Mg from fine clay and that of Mg being an integral part of smectite. The chemical weathering patterns in soils as assessed by molar ratio's of mobile elements wit Ti showed lowering of mSi to mTi ratio in the genetic horizons of irrigated Dhanki (P6) and enrichment of carbonates in slickensided horizons of Selodi (P3), Loni (P5) and Kharbhi (P7).

Keywords: Soil geochemistry, Vertisols, Molar ratio's, Mass balance, Yavatmal.

* Orginally presented in International Symposium- 2013