

## Geochemical Composition of Deep and Highly Weathered Soils Leyte and Samar Islands Philippines

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**Abstract :** Geochemical composition of soils provides vital information about their origin and development. Highly weathered soils are widespread in the islands of Leyte and Samar but limited data have been published in terms of their nature, characteristics and nutrient status. This study evaluated the total elemental composition, properties and nutrient status of eight (8) deep and highly weathered soils in various parts of Leyte and Samar. Sampling was done down to 3 to 4 meters deep. Total amounts of  $\text{Al}_2\text{O}_3$ ,  $\text{As}_2\text{O}_3$ ,  $\text{CaO}$ ,  $\text{CdO}$ ,  $\text{Cr}_2\text{O}_3$ ,  $\text{CuO}$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{K}_2\text{O}$ ,  $\text{MgO}$ ,  $\text{MnO}$ ,  $\text{Na}_2\text{O}$ ,  $\text{NiO}$ ,  $\text{P}_2\text{O}_5$ ,  $\text{PbO}$ ,  $\text{SO}_3$ ,  $\text{SiO}_2$ ,  $\text{TiO}_2$ ,  $\text{ZnO}$  and  $\text{ZrO}_2$  were analyzed using an X-ray analytical microscope for eight soil profiles. Most of the deep and highly weathered soils have probably developed from homogenous parent materials based on the regular distribution with depth of  $\text{TiO}_2$  and  $\text{ZrO}_2$ . Two of the soils indicated high variability with depth of  $\text{TiO}_2$  and  $\text{ZrO}_2$  suggesting that these soils developed from heterogeneous parent material. Most soils have  $\text{K}_2\text{O}$  and  $\text{CaO}$  values below those of  $\text{MgO}$  and  $\text{Na}_2\text{O}$ . This suggests more losses of  $\text{K}_2\text{O}$  and  $\text{CaO}$  have occurred since they are more mobile in the weathering environment. Most of the soils contain low amounts of other elements such as  $\text{CuO}$ ,  $\text{ZnO}$ ,  $\text{PbO}$ ,  $\text{NiO}$ ,  $\text{CrO}$  and  $\text{SO}_2$ . Basic elements such as  $\text{K}_2\text{O}$  and  $\text{CaO}$  are more mobile in the weathering environment than  $\text{MgO}$  and  $\text{Na}_2\text{O}$  resulting in higher losses of the former than the latter. Other elements also show small amounts in all soil profile. Thus, this study is very useful for sustainable crop production and environmental conservation in the study area specifically for highly weathered soils which are widespread in the Philippines.

**Keywords :** depth function, geochemical composition, highly weathered soils, total elemental composition

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