Rare Earth Element Migration in a Wisconsin Spodosol. (S05-aide132254-Poster)

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Abstract:

Spodosols are a soil order frequently exhibiting a redistribution of Al and Fe because of organic matter complexation, illuviation of these complexes, and immobilization of the Al and Fe as poorly crystalline silicates in deeper soil horizons.Little information is available concerning the organic matter complexation and migration of other elements, particularly the rare earth elements (REE). Four pedons representing a Spodosol series (coarse-loamy, mixed, superactive, frigid Alfic Haplorthods) from Wisconsin were selected to determine if selected transition metals and the REE are mobilized, illuviated and then immobilized. Non-sequential soil extractions consisting of Napyrophosphate, ammonium oxalate, ammonium oxalate-ascorbic acid, and aqua-regia partitioned elements into operationally defined chemical environments. Total element contents of the whole soil and the silt fraction were determined by instrumental neutron activation analysis. Aluminum and Fe in the Na-pyrophosphate extraction, for the majority of the pedons, were discretely more abundant in the upper Bs horizon. The light REE were largely recovered by the aqua-regia extraction; whereas, the heavy REE were insignificantly recovered, suggesting that the heavy REE reside in different chemical compartments. The Na-pyrophosphate extraction recovered only a small portion of the REE pool.

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Presentation Information:

Presentation Date: Monday, November 11, 2002 Presentation Time: 9:00-11:00 am Poster Board Number: 2021

Keywords:

rare earth elements, spodosols, selective extraction, neutron activation analysis