Clay Mineral Stability in Highly Weathered Soil Systems of Alabama. (S05-beck105313-Poster)

Authors:

- J.M.Beck* - *Auburn University*
- J.N.Shaw - *Auburn Univeristy*
- B.F.Hajek - *Auburn University*
- J.F.Adams - *Auburn University*

Abstract:

Questions exist regarding the stability relationships between hydroxy-interlayered vermiculite (HIV), kaolinite, and gibbsite in highly weathered Ultisols of the southeastern US. Quantification of both the minerals present and the ions in soil solution is necessary to understand the weathering environment of a soil system. Thermodynamic equilibria studies are often used to assess mineral weathering trends. We evaluated these relationships in three Coastal Plain and three Piedmont Udults. Decomposition of XRD and TA data coupled with elemental analyses were used to quantify minerals in the clay fraction. Soil solution samples were extracted using centrifugation. A standard free energy of formation of HIV was estimated. For all pedons, HIV quantities (ranging from 15 - 35% in the clay fraction) were highest near the surface and decreased with depth. Kaolinite quantities (ranging from 25 - 68%) increased with depth within the solum in all pedons. Gibbsite quantities (ranging from 0 - 20%) decreased with depth in Piedmont samples and were highest in the Bt horizons in the Coastal Plain samples. Mineral stability diagrams and activity products were developed to illustrate stability relationships for these highly weathered soil systems.

Corresponding Author Information:

John Beck
Auburn Univeristy
202 Funchess Hall
Auburn, AL 36849-5412

phone: 334-844-3937
fax: 334-844-3945
e-mail: jbeck@auburn.edu

Presentation Information:

Presentation Date: Monday, November 11, 2002
Presentation Time: 9:00-11:00 am
Poster Board Number: 1911

Keywords:
Stability Diagrams , Highly Weathered Soils, Clay Minerals