
Equilibration of Clays in Natural and Simulated Bottom-Sediment Environments

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Abstract: To identify mineral alterations which might occur in stream environments, predominantly illitic soil clays were equilibrated in bottom sediment environments under natural and laboratory conditions for 217 and 98 days, respectively. Changes occurring after 217 days on the bottom of the Auglaize River, Ohio, consisted of a reduction in carbonate content, a decrease in particle size, and a slight loss of Al and Si; however, no significant changes in basal spacings were observed.

Clays equilibrated in river water under laboratory conditions at 4° and 25° C in CO₂, N₂, or air atmospheres showed only an increase in oxalate-extractable iron. The concentrations of Al, Si, Fe, Mn, K, and Ca in solution above the clays varied with the atmosphere and temperature. The concentrations of Fe, Al, and Si in solution may have been influenced by the dissolution of amorphous Al-Fe-Si compounds. Therefore, the mineralogical differences between soils in the watershed and sediments in the drainage system can not be attributed to mineralogical transformations during residence in the drainage system.

Key Words: Alteration • Bottom sediments • Dissolution • Illite • Vermiculite

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