Changes of Soil-Water Chemistry and Mineral Weathering by Elevated CO2 in Three Soils in The Piedmont of North Carolina. (S07-oh162350-Oral)

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Abstract:

Atmospheric CO2 is rapidly rising potentially changing the rate of weathering mediated by increased soil pCO2. Effects of CO2 on weathering were studied of three Piedmont soils in North Carolina using field-collected soil-water chemistry data and laboratory column experiments. The soils are highly weathered Enon, Cecil, and Tarrus series derived from diabase, granitic gneiss, and slate, respectively. Weathering of Enon soils was studied in a field experiment in which atmospheric CO2 was elevated by 200 ppmv in forested plots. In soil water at 200 cm, Ca2+, Mg2+, Si, and HCO3- were greater in elevated CO2 plots (p=0.004 to 0.08). However, insignificant interactive effects of time and CO2 treatment made the effects of CO2 on weathering equivocal requesting more controlled laboratory experiments. Column experiments were conducted with saprolite from the three soils using 1, 10, and 100% CO2. Saprolites were greatly acidified by leaching with CO2-equilibrated water. Cation exchange was the main mechanism releasing ions to solution, comprising 53 to 82% of total leached base cations. Results suggest that both cation exchange and mineral dissolution may be enhanced if soil pCO2 increases as atmospheric CO2 continues to increase.

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