Geochemical indicators of weathering and redox in laterite formation. (S05-brown162113-Poster)

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Abstract:

In this study of a laterite landscape on granitic rock in Uganda, we use Neutron Activation Analysis (NAA) to develop a suite of robust geochemical indices that can be applied at the landscape scale to study the role of weathering and oxidation-reduction (redox) processes in laterite formation. For landscape studies, with natural variability in bedrock composition and active geomorphic processes resorting materials, techniques developed for the geochemical analysis of profiles are of limited use. To capture K-feldspar weathering the K/Hf ratio serves as a good proxy for feldspar/zircon, K/Na indexes feldspar concentration to quartz. Mn-Ce-Ba nodules and concretions can be identified by characteristically high Ce values, with anomalies recorded as high as 5000ppm. We propose using the Fe/Sc ratio to ascertain the absolute (redox) vs. relative (weathering) Fe accumulation in laterite formation. The Fe/As ratio, indicative of the degree of co-precipitation of these elements, corroborates the Fe/Sc findings. The suite of indices developed in this study point to the importance of redox processes in the formation of laterite on this landscape.

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