



Contribution ID: 61 Contribution code: ACI-6

Type: Oral Presentation

Meteoric ^{10}Be analysis of a deeply weathered dolomite soil profile in the central Guizhou Plateau, SW China

Wednesday, 23 October 2024 11:20 (20 minutes)

The Guizhou Plateau is a typical subtropical mountainous karst area where carbonate rocks contain very few insoluble residues causing the slow soil production rate. Moreover, serious soil erosion leads to karst rocky desertification and land degradation in this area. Quantification of soil formation age and rate thus is vital for understanding carbonate weathering and scientifically evaluating the sustainability of soil resources. Meteoric ^{10}Be and element geochemical analysis were applied in a regolith profile with a thickness of ~3 meters on the early Triassic dolomite bedrock at Pingba, Guizhou, SW China. Unlike the regular “bulge” or “decline” type, the concentrations of meteoric ^{10}Be increase with soil depth and enrich at the soil-rock interface. We suggest that this trend is controlled by soil pH that averages with value of 5 in soil and it abruptly increases to more than 8 at the soil-rock interface. This geochemical barrier results in Be isotopes and some other elements precipitating in the alkaline region. Correcting for potential losses of meteoric ^{10}Be based on ^9Be mass losses in the regolith profile, the minimum soil residence age was estimated to be 0.53 Ma. The related maximum soil production rate of 5.37 m/Ma was evaluated for the Pingba profile, which is faster but does not conflict with a previous estimation of 1.27 m/Ma from acid-insoluble residue contents. This work is the first attempt of meteoric ^{10}Be employed on the carbonate regolith, not only providing a choice for the soil study in the karst area but also expanding the knowledge of meteoric ^{10}Be geochemical behaviors in different soil types.

Student Submission

No

Primary authors: Prof. WANG, Shijie (Institute of Geochemistry, Chinese Academy of Sciences); Ms SONG, Wanwan (Institute of Geochemistry, Chinese Academy of Sciences); Prof. LUO, Weijun (Institute of Geochemistry, Chinese Academy of Sciences); Mr WENG, Xu (Institute of Geochemistry, Chinese Academy of Sciences); LIU, Yu (Institute of Geochemistry, CAS)

Presenter: LIU, Yu (Institute of Geochemistry, CAS)

Session Classification: Applications of Cosmogenic Isotopes

Track Classification: Applications of Cosmogenic Isotopes