Isotopic characteristics of silicon translocation in granite-derived soils and its tracing in the typical subtropical ecosystems

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To understand the Si biogeochemical behavior and its implication on soil evolution, three typical watersheds in the subtropical granite area, Southern Anhui province, subtropical China were selected to monitor the Si cycling. The Si contents and δ^{30}Si value were determined in the rock, soil, plant and water.

The dominant soil types are Inceptisols and Entisols belonging young soil with rich primary silicate minerals. The bulk soil δ^{30}Si value is higher than mature soil from basalt in the tropical area [1]. It was related to soil degree of evolution and trended to more negative with the increase of clay, active iron and free aluminous.

There are significant Si isotopic fractionation among rock, soil, plant and water. The δ^{30}Si value of plant is more negative than rock. However, the dissolved δ^{30}Si value was positive in the stream water, which resulted in more negative soil δ^{30}Si value because of mass dissolved Si loss with stream. Therefore, under rich primary mineral, soil with strong desilification had big δ^{30}Si value fractionation between soil and stream water.

The positive high δ^{30}Si value in the stream water indicated that Si in the stream mainly origin from primary silicate mineral weathering. This result is different strongly weathering tropical area [2]. Secondary clay mineral with much negative δ^{30}Si value indicated that the synthesizing process dominated the formation of clay and only a little directly came from weathering. This is a different mechanism from traditional clay formation.

Si isotope reflected Si translocation path and soil formation. This study can extend the application of Si translocation in soil genesis studies.

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[1] Ziegler *et al*. (2005) *Geochim Cosmochim Ac*, **69**, 4597-4610. [2] Alexandre *et al*. (1997) *Geochim Cosmochim Ac*, **61**, 677-682.