Formation mechanism of halloysite-rich layer by differential weathering of tephra under a reduced condition

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Research focus
The dissolution of the primary minerals and the precipitation of secondary minerals depends on the redox conditions; just below the ground surface, shallower than 1m, an oxidizing condition dominates, while a reduced condition is preferred at deeper soil. As water is vertically percolating into soil, subsurface water behaves heterogeneously in the infiltration and drainage processes. Soil-microbial functions also affect the oxidation-reduction potential by consuming dissolved oxygen. The states and changes in the redox conditions have an impact of the ionic species of iron, that is a ferrous iron or a ferric iron, which is subsequently involved in the formation of secondary minerals.

Our aim of the study is to clarify the distribution of halloysite, which is affected by the hydrological and chemical processes in soil, addressing the dissolution of volcanic glass and the solid and solution chemistry.

Keywords: Tephra, Diffrential weathering, Halloysite, Reduced condition, Ferrous iron, Preferential flow

