
**Element mobility as a result of chemical
weathering of a Carboniferous saprolite
near Valparaiso, Chile**

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A saprolite is preserved when the erosion rate is less than the weathering rate and thus not all weathered material is removed. The partially weathered material is therefore preserved in situ and displays varying weathering intensities through a vertical profile with an increased degree of weathering closer to the surface. As the saprolite develops, the more mobile elements can be released into the environment. Some of these mobile elements, in turn, form into new minerals; others are released into water and soil systems in the vicinity. There are many factors affecting the rate of chemical weathering and thus the flux and dispersion of mobile elements through a saprolite. Factors

include lithology, pH, presence and nature of overlying soils, precipitation, humidity, possible sea water incursion, temperature and microbial action.

A Carboniferous (290 Ma) granitic saprolite profile in the Chilean Coastal Range outcrops along a recently constructed highway near Valparaiso, Chile. Overlying sediments have protected the profile from erosion since the Miocene. The area is part of a larger study examining the history of the Andes from formation through the tectonic regime to uplift and weathering of the constituent rocks. The profile was sampled at varying depths through the vertical exposure, including fresh granite at the base of the section. Preliminary results suggest that there is indeed a change in the more mobile of the major, trace, and even REEs with depth in the weathering profile. CaO, Na₂O, Ba, Sr, Nd, and the light rare earths appear to increase with depth, whereas loss on ignition (LOI) and TiO₂ decrease with depth. Analyses also show a general slight increase of boron and chlorine in the upper more weathered layers which might reflect a marine influence. This study analyses the progress of weathering with depth, as part of an attempt at deriving a mass balance of the granite and its weathered products.