Weathering of continent-scale volcanic ash deposit: Geochemical and climatic implications

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Continental weathering of silicate rocks is an essential component of global geochemical cycles. Previous studies have shown that weathering of basaltic rocks emplaced during Large Igneous Provinces events accounts for a significant portion of the total continental silicate weathering flux and atmospheric CO_2 withdrawal. In contrast, little is known about the short- and long-term influence on weathering flux and CO_2 consumption of extensive continental ash deposits, blanketing areas of up to several millions of km^2, which can be emplaced by Plinian volcanic supereruptions.

Here we apply the geochemical box model WITCH [1] to simulate mineral dissolution/precipitation in a modern-day continent-sized ash deposit. The model results are then used to estimate the weathering fluxes and the comsumption of atmospheric CO_2. Our case study is based on the modeled ash deposit from the 0.64 Ma eruptions of Yellowstone volcano, USA, covering much of North America. The temperature and drainage conditions required in the weathering calculations are derived from a glocal climate model. The simulations are run for one, 100 and 1000 years. The main findings of our original study will be presented.

[1] Godderis, François, Probst, Schott, Moncoulon (2006), *Geochimica et Cosmochimica Acta* **70**, 1128-1147.