

**Arid Soil Development on Alluvial Fans  
Derived from Oman Mountains Ophiolite**

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Here, we report on the chemistry and mineralogy of the soils formed on alluvium of Oman ophiolite, and their changes with increasing landform age. A key question to be considered is evidence of chemical weathering, and the origin of carbonates in this hot and dry environment.

Silicate clay and pedogenic iron content, indicative of mineral weathering, show little trend with increasing soil age. In contrast, the silt content steadily increases from a ~2 % in the young soils, to over 30% in the oldest relict soils. In the youngest soil, carbonate content is highest at the surface and decreases with depth, a trend suggestive of aeolian sources. As soils age, carbonate accumulation steadily increases, with the oldest soil having nearly 50% carbonate in the <2-mm fraction of the soil. The older soils show some subsurface accumulations, but the soil surface is also highly enriched.

The systematic accumulation of silt is indicative of continuous aeolian deposition over time. The simultaneous accumulation of carbonate, and its abundance at the immediate soil surface, is indicative of a strong aeolian source). However, observed weathering halos on, and the presence of palygorskite, suggest chemical weathering and possible release of Ca in the older soils.

The data suggest, tentatively, that much of the carbonate in the upper few meters of soils is from eolian deposition and formed in other environments. Future work might focus on the use of trace element chemistry to verify this, and identify the dust sources.