

Origin of the Lake Natron Footprint tuff, northern Tanzania

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Here we present the results of a multidisciplinary study in order to constrain the provenance and the age of the Footprint tuff at Lake Natron in northern Tanzania. We combine geochemistry, mineral chemistry and sedimentology with geophysics in order to ensure a correct interpretation of the environment that has a significant anthropological interest as it preserves multiple tracks of people (Homonids) and animals (Bovids) of disputed age.

Based on the geochemical, mineralogical and magnetic data we collected from this site, we can deduce that the nephelinitic footprint-bearing horizon was deposited during one big eruption originating from the Oldoinyo Lengai volcano. The footprint-bearing horizon has been slightly reworked by water (ephemeral streams and/or fluctuations in the lake level) as indicated by the Anisotropy of Magnetic Susceptibility in the volcanoclastic sediments. The material that comprises the upper horizon, which covers the footprints, was deposited as windblown sediments from the Lake Natron – Engaruka Monogenetic Volcanic Field (i.e., melilititic in composition). Based on the petrology/mineral chemistry in combination with field observations and a compilation of climatological data from the region we further conclude that the age of the Footprint tuff is most likely less than 11 ka old.