



Middle Pleistocene volcanic activity dated by red thermoluminescence (RTL) - a case study from Lanzarote (Canary Islands)

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On Lanzarote (Canary Islands) soils were baked by Quaternary lava flows. This offers the possibility to date phases of eruptive activity by red thermoluminescence (RTL). We dated soil material baked by two different lava flows originating from the "Las Calderetas de Guatiza" volcanic chain in the northeast of the island by RTL. Furthermore, three samples of Helicidae-mollusk shells overlying one of the lava flows (site Mála) were dated using electron spin resonance (ESR). RTL datings were carried out using quartz grains 63-200 μm from baked material that were originally brought by eolian transport from the nearby Saharan desert. It appears that in spite of a baking temperature $< 550^\circ\text{C}$ the RTL-signal was sufficiently annealed and thus dating by RTL was possible. RTL ages of ca. 170 ka show good agreement with each other, however, ESR ages are up to 40 % higher than the corresponding RTL age of the lava flow in Mála. Despite this disagreement these results demonstrate that eruptive activity of the volcanic chain occurred during the Middle Pleistocene rather than during the Early Holocene/Late Pleistocene as supposed based on geomorphologic features. Furthermore, they show that ^{14}C -ages of mollusk shells originating from Mála are underestimating volcanic activity up to a factor of 10, a problem often recorded in arid areas.

These results demonstrate the value of luminescence and ESR datings on the semi arid Eastern Canary Islands. The successful dating of lava-baked soils on Lanzarote by RTL thus offers the possibility to further investigate the yet fragmentary Middle and Late Quaternary eruptive history of these islands.