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The idea of dating volcanic lavas using thermoluminescence is attractive because the method potentially covers time intervals not readily accessible by the radiocarbon and potassium-argon methods. However, while TL dating works well for pottery artifacts, previous attempts to apply it to volcanic lavas have been unsuccessful because of a poorly understood failure in the ability of the samples to retain their natural TL signals.

We propose two new approaches to TL dating of these materials. (1) Recent work suggests that it is possible to quantify the instability of the natural TL signal and correct for it, so that the methods of TL dating which have proved successful in other applications can then be applied. In this case the intensity of the corrected TL for the samples is a measure of the radiation dose absorbed and by determining the dose rate at the site (by chemical and radiochemical analysis or TL dosimetry) an absolute age can be determined. (2) Recent work has also shown that TL sensitivity (the TL of a sample whose natural TL has been removed and a standard test dose administered) is strongly dependent on the extent of devitrification of rapidly cooled silicate systems, so that the measurement of the TL sensitivity of lavas might present a means of determining the extent of crystallization following solidification which, in turn, is time- dependent. We illustrate these two approaches by application to lavas from Hawaii and southern France.