



Evidence from cosmic-ray exposure dating based on ^{36}Cl for the pre-Minoan caldera on Santorini, Greece

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The physiography of Santorini prior to the Minoan (Late Bronze Age) eruption (17th century BCE) is of great archaeological interest, given the importance of Santorini as a commercial centre and port in the Minoan empire. However, the paleogeography of the pre-Minoan caldera has been a point of controversy: Heiken and McCoy (1984) advocated the existence, in the southern part of the present-day caldera, of a pre-existing caldera formed during the 172 ka Lower Pumice eruption, whereas Druitt and Francaviglia (1992), based on the presence of in situ plinian pumice from the Minoan eruption adhering to the modern cliff, conceived the pre-Minoan (22 ka) caldera as having occupied much of the northern basin of the present-day caldera.

With the goal of settling the debate we performed cosmic ray exposure dating employing in situ-produced cosmogenic ^{36}Cl to date different generations of caldera cliffs at Santorini, and hence to identify those cliffs predating the Minoan eruption. Our methodology involved the determination of the in situ-produced cosmogenic ^{36}Cl in basaltic and andesitic rocks cropping out in the cliffs.

The samples returned ^{36}Cl CRE ages consistent with previously published field mapping of cliff populations based on geomorphological and stratigraphic arguments (Druitt and Francaviglia 1992), suggesting that much of the present cliff line of northern Santorini predated the Minoan eruption, or was superficially modified by landslips and rockfalls during that eruption. The ^{36}Cl CRE ages enable us to better define the paleogeography of the pre-Minoan caldera.

References

- [1] Druitt, T. H. and Francaviglia, V. 1992. Caldera formation on Santorini and the physiography of the islands in the Late Bronze Age. *Bulletin of Volcanology* 54, 484-493.
- [2] Heiken G and McCoy F (1984) Caldera development during the Minoan eruption, Thira, Cyclades, Greece. *Journal of Geophysical Research*: 89 (B10), 8841-8862.