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Santorini Volcano's 20th Century Eruptions: A Combined Petrogenetical, Volcanological, Sociological and Environmental Study

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Santorini, the famous stratovolcano in the Aegean Sea, erupted three time periods during the 20th century (1925-1928, 1939-1941, 1950) and since then remains dormant. This study tried to combine and evaluate new and published volcanological, petrological, geochemical, environmental and sociological data of these three phases of Santorini's activity, which practically restricted to the caldera center on the Nea Kameni Islet.
After field work on the formed dacite flows, pyroclastics and domes, representative rock samples and enclaves were collected and investigated for their texture, physical parameters, mineralogy and chemical composition by polarizing light microscope, scanning electron microscope (SEM-EDS), XRD, Raman spectroscopy and ICP-MS. The petrogenetic evaluation of the data obtained suggests slight but significant changes in the solid and aerial phases produced during the three explosion stages, which can be attributed to minor variations in the magmatic differentiation and magma chamber physicochemical conditions. These variations were also expressed by decrease of duration and intensity of the eruptions, as well as in their volume of ejecta and lava. Probably, the subsequent relatively long dormant period of the volcano is also related to this tension of decrease.
The first compared results were collected from scientific literature, old photos as well as local and regional press and state documents from the different periods of volcanism, record the past hazard case scenarios and civil defense planning of the individual eruptions. As part of the disaster management a pilot survey, in which personal interviews with aged local islanders that were eye-witnesses of the events and elderly people or tourists that they indirectly experienced or have heard about them, was also conducted. This event-tracing, along with air pollution software models using volcanological data have shown the social impacts and the environmental consequences of the volcanic activities seem generally to follow the same way of reduction with time as above.
Conclusively, this integrated comparison of the three successive per decade eruption periods within the 20th century, which had followed a long dormant period of about 60 years, provide worthy hazard and risk assessment for Santorini volcano future waking up.