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## Origin and evolution of the lowermost lava successions at Santorini volcano (Greece): insights from major and trace element composition of rocks from the submarine caldera wall

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Santorini volcano in the central sector of the South Aegean volcanic arc is one of the most active and potentially dangerous magmatic systems in Europe having had twelve Plinian eruptions over the last 350 ka of which at least four eruptions were accompanied by caldera collapses. The well-known Late Bronze Age eruption (~3.6 ka<sup>A</sup>) for example is considered to rank as one of the largest eruptions since the Late Miocene.

The main focus of research thus far has been on the comparatively young and subaerial deposits, whereas older stages of volcanism have been poorly studied. Our study comprises samples from the submarine caldera flanks and gives new insights into the early evolutionary stages of Santorini volcano, contributing to a better understanding of its eruptive history and potential risks. The submarine lava successions were sampled along the inner caldera wall by a remotely operated vehicle (ROV) during R/V POSEIDON cruise 511 in 2017.

The investigated lavas can be divided into two magmatic series: a low-K basaltic series overlain by medium- to high-K series, including basaltic andesites, andesites and occasional dacites. First results of <sup>40</sup>Ar/<sup>39</sup>Ar dating reveal ages of ~250 ka for the andesites. For the presumably older basalts, no reliable age data could be obtained.

Major and trace element compositions and mineral zoning patterns suggest that fractional crystallization was the dominant process controlling magma evolution. In addition, repeated magma mixing played an important role as indicated by characteristic zonation patterns within plagioclase and clinopyroxene ante- and phenocrysts. Comparison of the major and trace element compositions with published data from subaerial deposits show a strong similarity between our lavas and the ~528-308 ka<sup>A</sup> old deposits of Peristeria volcano, a composite stratocone in the north of the volcanic field and whose subaerial deposits are found on northern Thera only<sup>B</sup>. This similarity is also supported by the Sr-Nd-Pb isotopic compositions of our lavas. Our results indicate both an extended age range of Peristeria activity and a much wider geographic distribution of its lava flows than previously recognized.

<sup>A</sup> T. H. Druitt et al. (1999), Santorini Volcano, Geological Society of London Memoir

<sup>B</sup> T. H. Druitt et al. (2015): Field guide to Santorini Volcano