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# From reflections to eruptions – reconstructing volcanic eruptions using marine seismic data from offshore Santorini

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The Christiana-Santorini-Kolumbo volcanic field (CSKVF) in the Aegean Sea represents one of Europe's most active volcanic centers. Over the past several hundred thousand years, the volcanic evolution of Santorini has encompassed a wide range of eruptive styles, ranging from catastrophic caldera-forming events (exemplified by the Minoan and Cape Riva eruptions) to explosive submarine episodes (such as the 726 CE Kameni and 1650 CE Kolumbo eruptions) and predominantly effusive activity that has characterized the Kameni islands in recent centuries. Due to this remarkable variability, Santorini represents one of the most prominent natural laboratories for volcanological research and education worldwide. However, the majority of deposits from these eruptions are preserved offshore around Santorini, making them inaccessible for direct examination and sampling. In 2019 and 2024, we acquired over 1800 km of high-resolution 2D seismic reflection profiles within and around Santorini to study the volcano-tectonic evolution of the CSKVF, complemented by drilling results from IODP Expedition 398. This unique dataset allows us to directly correlate seismic units with specific eruptions, enabling us to identify characteristic seismic signatures for various volcanic deposits and to constrain their volumes and emplacement dynamics. This integrated approach allows us to fill critical gaps in the eruptive record and develop a comprehensive catalogue linking seismic facies to volcanoclastic deposit types, which can serve as an analogue for interpreting marine seismic data from less well-documented volcanic regions.