Geophysical Research Abstracts
Vol. 21, EGU2019-9572, 2019
EGU General Assembly 2019

Revisiting the eruptive records of Santorini volcanic field and the Kos-Yali-Nisyros volcanic complex using marine tephras from RV Poseidon cruise 513

Steffen Kutterolf (1), Armin Freundt (1), Thor Hansteen (1), Rebecca Dettbarn (1), Fabian Hampel (1), Carina Sievers (2), Cathrin Wittig (1), Timothy Druitt (3), Paraskevi Nomikou (4), Jocelyn McPhi (5), Julie C Schindlbeck-Belo (6), Kuo-Lung Wang (7,8), and Hao-Yang Lee (7)

(1) GEOMAR Helmholtz Institute for Ocean Research, Kiel, Dynamics of the Ocean Floor, Kiel, Germany (skutterolf@geomar.de), (2) University of Hamburg, (3) Laboratory Magmas-Volcanoes, Clermont Auvergne University & CNRS, France, (4) National and Kapodistrian University of Athens, Department of Geology and Geoenvironment, Athens, Greece, (5) University of Tasmania, (6) Institute of Earth Sciences, Heidelberg University, (7) Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan, (8) Department of Geosciences, National Taiwan University

The Hellenic arc hosts several active volcanic centers, of which the Santorini volcanic field and the Kos-Yali-Nisyros volcanic complex present particularly high threats due to recent unrest (2011-2012 and 1997-1998, respectively). Both volcanic centers have repeatedly produced highly explosive eruptions (VEI 4 to 7) during the last 160 kyrs and into historic times. The past record provides information on not only the number of events, but also on their magnitudes and intensities inferred from tephra dispersal characteristics, and is in turn essential to predict future volcanic hazards and risks. The past highly explosive eruptions ranged from submarine through emergent to subaerial, and the interaction with the sea increased the hazard potential (e.g., higher explosivity, tsunamis).

Here we will complement earlier work on distal east-Mediterranean sediment cores, which captured the largest eruptions, by showing first results from RV Poseidon cruise POS513, where we collected cores from distal, medial and proximal distances with respect to these two main volcanic centers, in order to record medium- to large-size eruptions.

We successfully retrieved 47 gravity cores up to 7.4 m long, and 3 box cores of the uppermost 0.5 m sediment. These cores contain more than 220 primary ash layers that we characterize compositionally by major (EMP) and trace-element (La-ICPMS) analyses of glass shards. Ongoing chemical fingerprinting suggests preliminary correlations with five eruptions from the Santorini volcanic field (Kameni, Kolumbo 1650, Minoan, Upper Scoria 2, and Middle Pumice) as well as four eruptions from the Kos-Yali-Nisyros volcanic complex (Nisyros Upper and Lower Pumice, Yali 1 and 2 pumices). We expect that ongoing correlations with known deposits on land and between the cores will provide new age constraints for presently poorly dated Aegean tephras, as well as quantify distribution characteristics in order to constrain eruption dynamics. Additionally the new data will provide important pre-site survey data for the planed Santorini IODP proposal: Volcanism and tectonics in an island arc rift environment (VolTecArc): Christiana-Santorini-Kolumbo marine volcanic field, Greece.