Geophysical Research Abstracts
Vol. 21, EGU2019-4762, 2019
EGU General Assembly 2019

Insight into the dynamics of the 1883 Krakatau eruption and associated tsunamis through deposit characterisation and interpretation

Samantha Engwell (1), Steve Carey (2), Sebastian Watt (3), Simon Day (4), and Dave Tappin (1)

(1) British Geological Survey, United Kingdom (sameng@bgs.ac.uk), (2) Graduate School of Oceanography, University of Rhode Island, Narragansett, R.I., (3) School of Geography, Earth and Environmental Sciences, University of Birmingham, Birmingham, (4) Institute for Risk & Disaster Reduction, Faculty of Maths & Physical Sciences, University College London

Much of our understanding of volcanic eruptions is based on the interpretation of deposits from, or in more recent times, observations of an eruptive event. However, volcanic eruptions are commonly multiphase, and inherently multihazardous. While an eruption itself may only impact the areas immediately surrounding the volcano, secondary processes, for example tsunamis, can impact a much larger region. However, without accurate assessment of conditions at the volcano itself, it is impossible to simulate both primary and secondary processes associated with an eruption. Here we use the 1883 eruption of Krakatau as an example of how thorough analysis of eruptive products, and application of numerical techniques can be used to both understand eruptive processes, and inform modelling of secondary processes like tsunamis, that in turn can also be used to further constrain the mechanisms of the source volcanic events.

The 1883 eruption of Krakatau was the most devastating volcanic eruption in historical times, with associated tsunamis resulting in 30,000 fatalites in the Sunda Strait. Despite the devastating consequences of this eruption, the source mechanism of the tsunamis is still poorly constrained. Here, we reanalyse pyroclastic density current deposits to characterise their physical properties, specifically the grainsize, componentry and sorting, to provide insight into the interaction of the flows with the seawater. This information is analysed alongside observations to define input parameters for numerical simulation of the pyroclastic density currents to constrain key eruptive parameters (e.g. eruptive magnitude and mass flow rate) crucial for implementing numerical simulation of the resulting tsunamis.