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2022 Hunga Volcano Eruption from the Multi-Technological Perspective of CTBT Monitoring

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The explosive eruption of the Hunga Volcano on 15 January 2022 provided an ideal test case for reviewing established methods to analyse source processes, especially because the key task of discriminating different kinds of explosive sources such as a nuclear test and a volcano eruption can be challenging. Standard techniques were applied to analyse critical events in the frame of the CTBT, i.e. all three waveform technologies (seismology, infrasound, and hydroacoustic) and atmospheric transport modelling of radionuclides. The potential of standard analysis methods to discriminate a source were assessed. This paper shows that the methods applied work well to identify, investigate, and discriminate a critical event. During discrimination it was not only possible to exclude a shear-source (i.e. earthquake) but also distinguish the volcanic explosion in contrast to a human-made explosion. However, some tasks remain difficult with the available methods. These tasks include the estimation of the strength of a non-shear event and thereupon a yield estimation of a possibly critical event. In addition to evaluating these methods, the results were related with specific phases of the eruption process providing a more detailed insight into what happened.

Promotional text

Multi-technology investigations of the eruption details provide a starting point for further in-depth analysis of the Hunga eruption. They underline that the huge number of IMS observations are a great opportunity to gain knowledge and enhance analysis methods.

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