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# of T-phases from the M7.4 Kermadec Trench earthquake in 2020 at the CTBT IMS HA03 hydrophone station

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On 18 June 2020, energetic underwater acoustic T-phase signals were recorded at the Comprehensive Nuclear-Test-Ban Treaty (CTBT) International Monitoring System (IMS) hydrophone station HA03, located at the Juan Fernandez Islands, Chile. In this work, we investigate the origin of these T-phases, which were associated to an M7.4 submarine earthquake with epicenter in the Kermadec Trench located at a distance of approximately 8700 km from HA03. Analysis of the recorded T-phases was performed using the Progressive Multi-Channel Correlation algorithm (DTKGPMCC) installed on the CTBTO virtual Data Exploitation Centre (vDEC). This analysis revealed a strong signal correlation between North and South HA03 hydrophone arrays, different arrivals were identified within the duration of the earthquake, and the estimated back azimuth showed variability over time. The back azimuth results suggest that T-phases could be triggered at different locations along the Trench and far from the declared earthquake epicenter. Underwater acoustic signal travel times were estimated along different propagation paths by a Normal Mode model with realistic environmental input, and possible horizontally reflected and diffracted paths were calculated by a 3D Parabolic Equation model. Future research directions for the improvement of localization T-phase excitation from submarine earthquakes will be discussed.

Promotional text

Propagation of low-frequency underwater acoustic signals (5 to 20 Hz) from the 18 June 2020 M7.4 Kermadec Trench earthquake is investigated. This analysis will provide guidance on future improvements of underwater event localization using the CTBT IMS hydroacoustic sensor network

Primary authors: Mr OLIVEIRA, Tiago (University of Aveiro, Portugal); Mr LIN, Ying-Tsong (Woods Hole Oceanographic Institution, Massachusetts, USA); Mr JESUS, Sergio (University of Algarve, Portugal); Mr NIELSEN, Peter Louring (CTBTO Preparatory Commission, Vienna, Austria); Mr KUSHIDA, Noriyuki (CTBTO Preparatory Commission, Vienna, Austria)

Presenter: Mr OLIVEIRA, Tiago (University of Aveiro, Portugal)

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