MERMAID Captures Sustained and Coherent Hunga Tonga-Hunga Ha'apai Eruptive Signals Propagating Across the South Pacific Ocean

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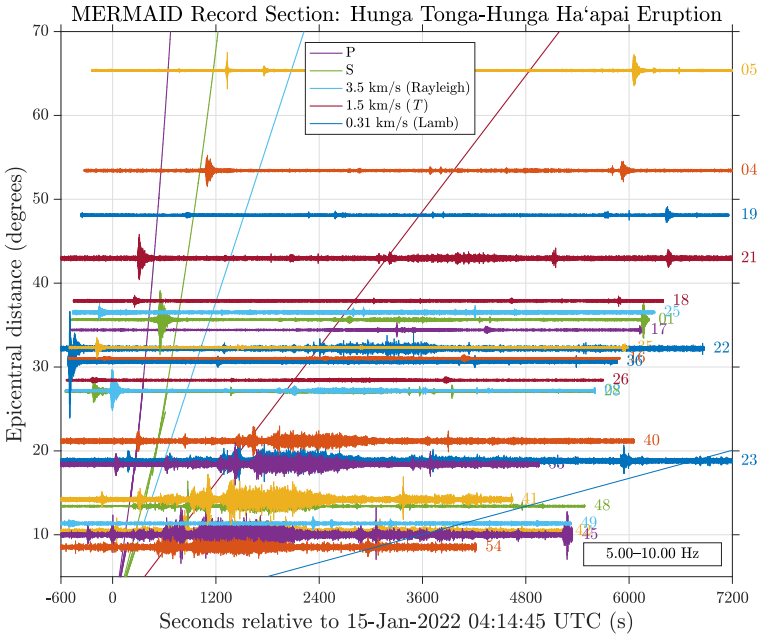
More than two dozen MERMAIDs floating in the South Pacific recorded the hydro- and seismo-acoustic signals excited by the 15 January 2022 Hunga Tonga-Hunga Ha'apai eruption. MERMAID, short for Mobile Earthquake Recording in Marine Areas by Independent Divers, is an oceanic mid-column float primarily designed to autonomously record and report high-frequency (~1 Hz) teleseismic *P* waves useful for global tomography. MERMAID is a diver: it records acoustic data streams via its hydrophone at depth and surfaces roughly once every week to transmit those data via satellite. Its algorithms prioritize the isolation of short (minutes-long) data segments containing *P* waves. However, MERMAID's data buffer remains retrievable via two-way Iridium communication for one year. We made first-of-their kind multi-hour requests to capture the eruptive process recorded across the South Pacific Plume Imaging and Modeling array. We primarily focus on the high-frequency (5+ Hz) *T*-wave signals, broadly described as a double-peaked onset followed by a sustained high-SNR "rumble'" lasting roughly 30 minutes. Many MERMAIDs across the array—at varied distances and backazimuths—exhibit high correlations of this main wave packet, however some do not. We investigate the reasons for intra-array variability in the shape and amplitude of the main wave packet, including via waveform modeling, with particular emphasis given to understanding the role of bathymetry.



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