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International Monitoring System Observations of Infrasound and Acoustic Gravity Waves Produced by the January 2022 Volcanic Eruption of Hunga, Tonga: A Global Analysis

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The 15 January 2022 Hunga, Tonga, volcano's explosive eruption produced the most powerful blast recorded in the last century, with an estimated equivalent TNT yield of 100–200 megatons. The blast energy was propagated through the atmosphere as various wave types. The most prominent atmospheric wave was a long period (>2000 s) surface guided Lamb wave with energy comparable to that of the 1883 Krakatoa Lamb wave; both were clearly observed by pressure sensors (barometers) worldwide. Internal gravity, acoustic gravity, and infrasound waves were captured in great detail by the entire infrasound component of the International Monitoring System network with periods from ~1 h to a few Hz. Such atmospheric waves and selected barometers near the source provide insight on Earth's impulse response at planetary scales. Infrasound waves (<300 s period) were seen to circumnavigate the Earth up to eight times. Seismic, hydroacoustic and tsunami waves were also clearly captured by the seismic and hydroacoustic components of the International Monitoring System network.

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Promotional text

The 2022 Tonga Lamb explosive energy is comparable to that of the 1883 Krakatoa. The eruption is the largest event ever detected by CTBTO infrasound sensors. Coherent infrasound and acoustic-gravity waves show periods from ~1 h to a few Hz.

Oral preference format

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