



Association between tremor activity from an undersea volcano at Ioto Island and T-phases received by IMS hydroacoustic station HA11 on Wake Island

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Hydrophone hydroacoustic stations of the Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO) International Monitoring System (IMS) comprise typically two triplets of water column hydrophones located in the axis of the Sound Fixing and Ranging (SOFAR) channel, which are deployed offshore to the North and South of an island. Triplet distances to the island vary from approximately 50 to 200 km, with each triplet connected to the on-shore receiving and communications equipment by fibre-optic submarine data cables. The systems relay underwater acoustic waveforms in the band up to 100 Hz in real time to Vienna via a shore based satellite link. One of these hydroacoustic stations, namely HA11, is on Wake Island (USA), an atoll in the western Pacific Ocean approximately 4,000 km west of Hawaii and 2,700 Km south-east of Japan.

The current study examines the association between signals received at HA11 and known underwater natural events, i.e. earthquakes and submarine volcanic eruptions, near Ioto Island, Japan, formerly known as IwoJima. The underwater signals were detected at HA11 and localized based on cross-correlation of T-phases recorded at the hydrophones of the triplets. The hydrophones of each triplet are deployed in a triangular formation with approximately 2 km horizontal separation. A clear association is shown between water-borne signals from underwater eruptions received at HA11 and volcanic tremors recorded on Ioto Island by the in-situ seismic stations operated by the Japan Meteorological Agency.