

Hydroacoustic signals from controlled underwater seismic survey sources in the Pacific

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The hydroacoustic stations of the International Monitoring System (IMS) monitor the world oceans for signs of underwater explosions. These stations also record signals from a variety of sources, such as, earthquakes, marine mammals, or geophysical airgun surveys. However, data from controlled underwater explosions with precise shot times, locations, and near-source signal characterization are rarely observed. In this work, data are analyzed from controlled underwater explosive sources used for seismic surveys, whose information such as origin time, location and time are known. The sounds emitted by these explosions were recorded by the CTBT IMS hydrophone stations HA11 (Wake Island, USA) and HA03 (Robinson Crusoe Island, Chile), and by ad-hoc sea bottom sensors in the Pacific. Shallow and small underwater explosions above both slope zones and flat terrains were detected at both stations. The received signal powers and arrival times fluctuate significantly even when the source depth, magnitude and propagation distances are almost the same. Observed and simulated data suggest that sea floor topography effects play a key role in the fluctuations. Observed back azimuth, source depth and magnitude will also be discussed.