CONVERTED T PHASES RECORDED ON HAWAII FROM POLYNESIAN NUCLEAR TESTS

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Sponsored by U. S. Department of Defense
Defense Threat Reduction Agency
Grant No. DSWAOI-98-1-0007

ABSTRACT

We present a preliminary study of T waves from Polynesian nuclear tests at Mururoa, recorded on digital stations of the Hawaii Volcano Observatory network, following their conversion to seismic waves at the southern shore of the Island of Hawaii, and subsequent propagation to the recording stations. We show that seismograms are composed of several packets, which can be interpreted as resulting from T P and T S conversions, and which feature distinct spectral characteristics. At Station HUL, located 7 km away from the
conversion point, the P T wavetrain can be further decomposed into several arrivals corresponding to propagation through the various crustal layers. The energy of the P T wave packet is peaked at 5-7 Hz. The
S T arrival is generally of larger amplitude, but peaked at only 3 Hz. It is followed by low-frequency energy (between 2 and 4 Hz) propagating inside the island structure as a surface or guided wave.
As the station is moved inland, the relative importance of the several wave packets changes; a prominent shadow for T P is found at 8-12 km from the shore. The T P conversion re-emerges as a fast high-frequency
(6 Hz) arrival at 18 km. This pattern is generally verified at other locations along the coast of the island, but its details are affected by the local crustal structure, which reflects the three-dimensional volcanic
structure under the island. In a favorable case, propagation in deep, low-attenuation layers results in a clear record of 3- to 4-Hz energy on the Northeastern flank of Mauna Kea, 76 km from the shoreline. Finally, we verified that these results are generally robust and affected only moderately by a change of location of the source inside Mururoa Atoll.

Key Words: T waves, acoustic-to-seismic conversion, Polynesian nuclear tests