

T-Phase Stations: Fifty Years of On-Land Hydroacoustic Recording in French Polynesia

Hydroacoustics constitute one of four technologies on which the International Monitoring System relies. Of the eleven stations involved, five are actually “T-phase” seismic stations located on land in the vicinity of shorelines. We present a review of this concept on the occasion of the 50th anniversary of the deployment of coastal seismometers in French Polynesia, specifically tuned for the recording of the high-frequency acoustic energy propagating in the SOFAR channel, and which can be considered as forerunners and prototypes of the now standard instrumentation of the IMS T-phase stations. In particular, we show that their performance is optimized when deployed on large atolls, and justify this result by considering (i) the processes of conversion of acoustic energy into seismic waves, critically dependent on the steepness of the receiving shore; (ii) the morphological and geological nature of the relevant island formations; and (iii) the origin of background microseismic noise. Our experience over decades of operations in French Polynesia illustrates the robustness of these stations, a combined result of their simple design, proven reliability, and ease of construction, deployment and especially maintenance, as compared to the more delicate technology of SOFAR-deployed hydrophones.

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