

Observing the ocean acoustically with the Kauai Beacon source

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Abstract

The 75 Hz center-frequency Kauai-Beacon Source is well-situated for observing the North Pacific Ocean acoustically, and ongoing efforts enable transmissions and analysis of broadband signals for this 18-month duration time-series. Previously, we demonstrated acoustic receiving along paths to Wake Island (~3500 km), Monterey Bay, and OOI near Oregon (~4000 km). Travel time observations to Wake Island compare well with HYCOM reanalysis data in 2023, but the model does not capture a continuous warming trend observed in 2024. The maximum travel time difference observed to date nominally is 0.5 second. Bathymetric stripping results mostly in SOFAR-channel-only propagation, limiting variability to deeper and non-seasonal energy. We hypothesize that the 2024 North Pacific Ocean El Nino contributes to a significant warming of the assumed stable SOFAR channel. We also discuss progress on sensitivity kernels, our time series repository, tidal correlations, engineering efforts to modernize its infrastructure, and collaboration opportunities.