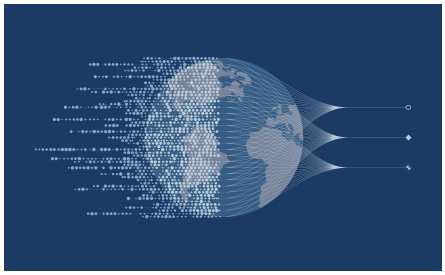

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analysis of recent and historic low-frequency acoustic propagation from the island of Kauai to hydrophones at Wake Island: implications for accurate localization of impulsive signals

A low frequency sound source, deployed in the mid-1990s off the North Coast of Kauai at deep sound channel axis, provides a critical tool for measuring the deep ocean temperature across North Pacific Basin. This temperature measurement is enabled by precisely timed transmissions from a cabled sound source and their reception on distant cabled hydrophones. We focus on hydrophone receptions at Wake Island, specifically HA11N and HA11S of the International Monitoring System (IMS) and WK30 and WK31 stations from the Prototype International Data Center (PIDC). These historic and ongoing transmissions have built up a 30-year record of travel-time, revealing a trend of quickening propagation and thus warming of the deep ocean sound channel in the subtropical mid-Pacific Ocean. Models of acoustic propagation generate a sensitivity kernel to infer deep ocean temperature from travel-time measurements. These acoustically derived measurements, compared to ocean state estimates informed by non-acoustic satellite measurements and drifting profilers, highlight the uncertainty in deep ocean temperature and the implication on impulsive source localization.

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