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A Portable Experimental Buoy for Coastal Acoustic Monitoring as a Potential Complement to the IMS Hydroacoustic Network: Applications on the Argentinian Continental Shelf

Content

Shallow-water environments, such as the Argentinian continental shelf, present challenges for monitoring underwater acoustic events due to high transmission losses (TL) at low frequencies. While the International Monitoring System (IMS) hydroacoustic network is highly proficient in detecting global low-frequency signals, its coverage in coastal zones is relatively limited due to three-dimensional propagation effects near the abrupt slope at the shelf edge. This work presents a portable passive acoustic monitoring buoy designed for deployment on the Argentinian continental shelf. This prototype represents a significant advancement in addressing the challenges of acoustic monitoring in Argentina's shallow coastal waters, providing new opportunities for scientific research. The system provides the potential to combine data from CTBTO-IMS hydroacoustic stations with local measurements to analyze transmission losses and infer oceanic properties. Simulations confirm the necessity of localized monitoring to address TL challenges at low frequencies. Potential applications include scenarios such as the ARA San Juan loss (2017) and studies near the continental slope. Simulations of plausible omnidirectional acoustic source events are conducted to evaluate whether the buoy's data can complement the data recorded by IMS hydrophone stations. This cost-effective prototype offers a practical tool for enhancing maritime monitoring and understanding coastal acoustic environments.

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