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Acoustical Characterization of the Columbia River Estuary

Reeder, D.B.

Reeder, D.B. (2014), Acoustical Characterization of the Columbia River Estuary, Abstract OS11B-1275 presented at 2014 Fall Meeting, AGU, San Francisco, Calif., 15-19 Dec.

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Details

Meeting	2014 Fall Meeting
Section	Ocean Sciences
Session	Nearshore Processes II Poster
Identifier	OS11B-1275
Authors	Reeder, D B*, Naval Postgraduate School, Monterey, CA, United States
Index Terms	Marine sediments: processes and transport [3022] Coastal processes [4217] Nearshore processes [4546] Sediment transport [4558]

Abstract

Investigations of near-shore and in-shore environments have, rightly, focused on geological, thermodynamic and hydrodynamic parameters. A complementary acoustical characterization of the estuarine environment provides another layer of information to facilitate a more complete understanding of the physical environment. Relatively few acoustical studies have been carried out in rivers, estuaries or other energetic environments; nearly all acoustical work in such environments has been done at high acoustic frequencies—in the 10's and 100's of kHz. To this end, within the context of a larger hydrodynamic field experiment (RIVET II), a small acoustic field experiment was carried out in the Columbia River Estuary (CRE), the acoustic objective of which was to characterize the acoustic environment in the CRE in terms of ambient noise field statistics and acoustic propagation characteristics at low-to-mid-frequencies. Acoustically, the CRE salt wedge consists of two isospeed layers separated by a thin, three-dimensional high-gradient layer. Results demonstrate that (1) this stratification supports ducting of low-angle acoustic energy in the upper layer and the creation of an acoustic shadow zone in the lower layer; (2) the spatiotemporal dynamics of the salt wedge structure during the very energetic flood and ebb tides induce significant variability in the acoustic environment, as well as significant flow noise across the acoustic transducer; and (3) this flow noise correlates to current velocity and complicates acoustical observations at low frequencies.

Cite as: Author(s) (2014), Title, Abstract OS11B-1275 presented at 2014 Fall Meeting, AGU, San Francisco, Calif., 15-19 Dec.

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