

Effects of Medium Inhomogenities on Surface-Generated Ambient Noise

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摘要

Surface-generated ambient noise under the effect of inhomogenities due to small perturbations of sound speed in the medium is considered. A noise-generation model collaborated with the solution of wave propagation in a random medium is applied to a typical oceanic environment to study the characteristics of the surface-generated noise field. Based upon leading-order analysis, the effects of medium inhomogenities on the noise field, including the wavenumber spectrum, noise intensity, and spatial correlation, have been analyzed. The results have shown that the sound-speed perturbations demonstrate an equivalent effect as medium absorption so that the efficiency of waveguide propagation is degraded. In particular, the normal modes become less prominent, which in turn reduces the noise intensity in the waveguide. Furthermore, the spatial coherence of the noise field decreases with increasing degree of randomness in the medium, indicating that the coherence of noise field is partly attributable to the characteristics of the medium inhomogenities.

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