

Modeling sea surface noise in the presence of seamounts and ocean fronts using Nx2D and 3D methods

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This study focuses on modeling the ambient noise observed along a vertical line array in the presence of distributed surface sources and extreme bathymetric and oceanographic features. The distributed surface sources considered in this study include wind-induced noise, while the extreme bathymetric and oceanographic features comprise seamounts such as Atlantis II and the ocean front caused by the Gulf Stream. Directional vertical noise levels are modeled by computing the Green's Function between the array elements and the distributed surface sources, estimating the average cross spectral density matrix, and calculating the plane wave response [1]. Green's functions are computed using the Bellhop3D ray tracing model [2] in both an Nx2D and full 3D environment, and the resulting directional noise levels are compared. The results of this study will provide insights into the accuracy and effectiveness of the modeling methods used to predict ambient noise levels in such challenging environments, with particular emphasis on the contribution of seamounts to ambient noise. The implications of these results can be significant for the design and operation of underwater acoustic systems in similar environments.

Keywords: ICTCA 2023; surface noise; 3D modeling; seamount.

References

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