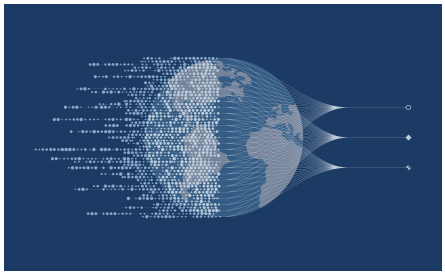

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Propagation Modelling on the Cloud

The computation of 3D acoustic models for long-range propagation in realistic oceanic environments poses significant computational challenges. Here, we present an extension of our GPU-accelerated hydroacoustic transmission loss solver in Julia. This work is built upon a model previously developed by us, enhancing its capability to run in cloud environments with large-memory GPU instances. It is based on the parabolic wave equation and the Split Step Fourier method. The extended solver can resume long computations that were interrupted, enabling it to leverage interruptible (spot) nodes thus reducing computational costs. Preliminary tests confirm that this approach indeed enables resolutions, swath widths, frequencies and propagation distances previously unattainable on our standard desktop systems, significantly reducing the need for substantial capital investments in dedicated HPC resources. We illustrate this with a case study involving a propagation distance of 10,000 km. This work is intended to lower barriers to large-scale hydroacoustic research by enabling analyses of more detailed scenarios and providing a flexible and cost-effective solution for diverse applications in underwater acoustics research, potentially aiding in aspects such as the detection and analysis of underwater acoustic events like those monitored by the IMS.

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