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-Performance Computing Optimization of Broadband Range-Dependent Sound Propagation Simulations

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The range-dependent Acoustic Model (RAM) is a prevalent underwater acoustics modelling program, which employs a 2-D parabolic equation method. Parabolic equation is known as an accurate and reliable method, and it has been extensively used in the underwater acoustic community. Even though the parabolic equation method requires less computation resources than many other methods, an efficient computational framework is still needed especially for broadband simulations. These broadband parabolic equation simulations essentially implement the Fourier synthesis method to compute waveform time series from frequency spectra. Therefore, it requires simulating a single environmental model with thousands of frequencies of a sound source. The first option to tackle this is the "embarrassingly parallel" methodology that distributes small instances over many processors. However, the latest processing units, such as SIMD and GPGPU, may not necessarily suit the embarrassingly parallel methodology for RAM-broadband. In the present study, we will implement several methods to accelerate RAM-broadband simulation on the latest processing units and discuss the performances.

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Promotional text

An accurate underwater acoustics modelling is accelerated using the latest computing units to support detailed analysis.

Oral preference format

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