Geophysical Research Abstracts,
Vol. 11, EGU2009-1253, 2009
EGU General Assembly 2009

Testing recovery of ocean properties using an emulation of internal wave surfaces

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The Garreth-Munk (GM) model gives a consistent description of the internal wavefield which agrees with observations for open ocean.
To simulate the GM spectrum of oceanic internal wave displacements we created a von Karman power spectrum in the wavenumber domain applying a random phase with uniform distribution between 0 and 2*pi and transforming to the spatial domain. The statistical parameters of random medium, such as Hurst numbers and correlation lengths are chosen to make the spectrum fit the GM.
The seismic response for a set of interfaces with assigned soundspeed and density derived using the program "WAVE" to compute soundspeed realizations, gave images similar to those obtained during the GO cruise for open ocean. Picking events from the stack gives the resulting horizontal wavenumber spectrum well matching to the initial GM-like spectrum which we used as a basis of the model, as we would expect.
However, the recovery is sensitive to source frequency content and the vertical and horizontal correlation distances used for the model with the higher source frequencies giving a more robust result. The match in spectral content of the seismic data with the original GM-like spectrum is further improved by migration.