Improved Internal Wave Spectral Continuum in a Regional Ocean Model


Introduction

Problem: Regional ocean models contain poor internal wave (IW) spectrum, even with increased resolution.

Hypothesis: Forcing regional model with output from global model will help produce a fuller IW spectrum.

Importance: For models to aid in identifying and/or removing IWs from altimetry, IWs need to be simulated fully as possible!

Data & Methods

Simulations (done on Niagara Supercomputer, U. Toronto):

- LLC4320: MITgcm 1/48° global run
- One-to-One: Same resolution as LLC4320
- Finer-Δz: Increased vertical resolution by 3x
- Finer-Δx: Increased horizontal resolution by 8x
- Finer-Both: Increased both resolutions

Observations:

- 4 McLane Moored Profilers (MMPs) from IWAP program

Results

Results in Frequency Spectra:

- One-to-One: Similar to LLC4320 (validation)
- Finer-Δz: Negligible improvement
- Finer-Δx: Large improvement
- Finer-Both: Best improvement

Results in Vertical Wavenumber Spectra, 2D Spectra, Consistency Relations:


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