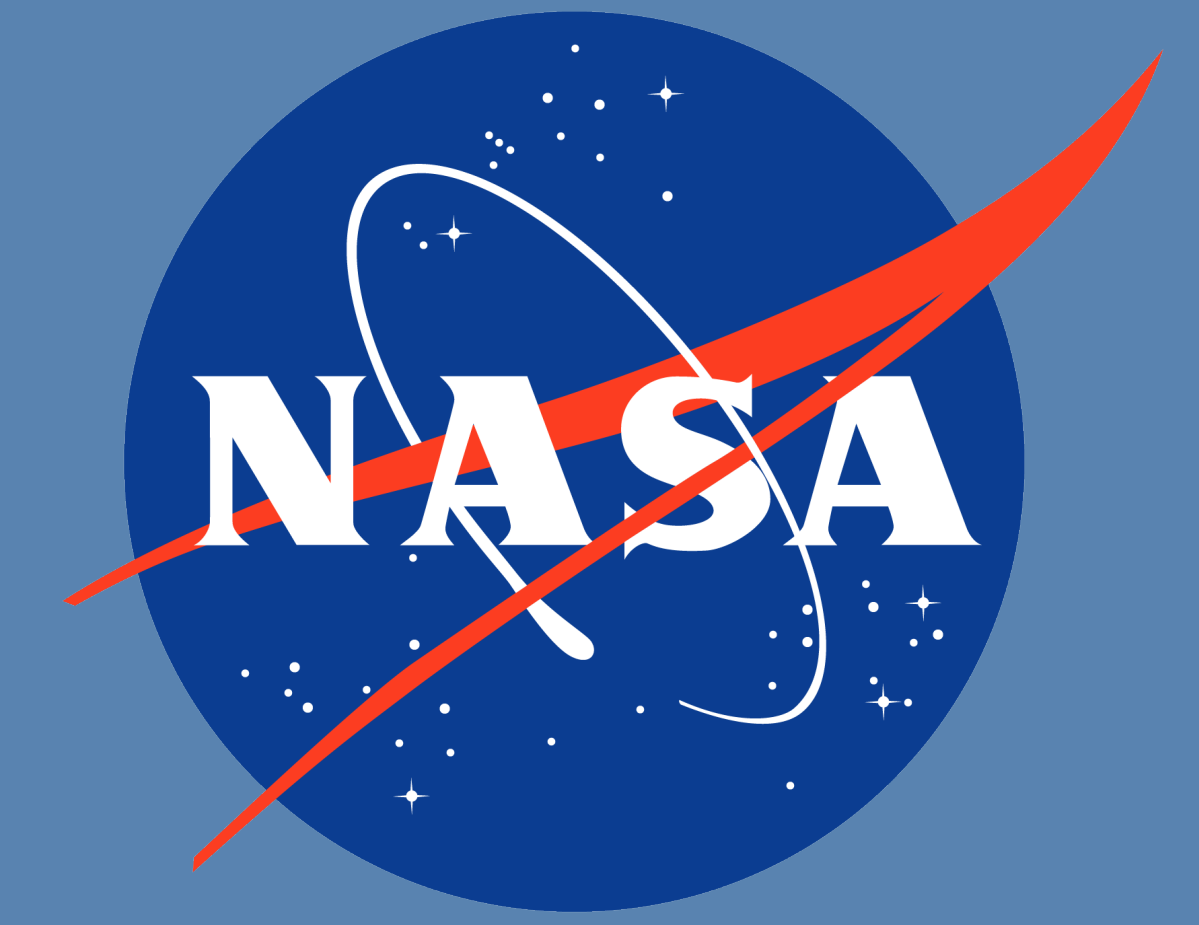




Improved Internal Wave Spectral Continuum in a Regional Ocean Model



A. D. Nelson (U. Mich.), B. K. Arbic (U. Mich.), D. Menemenlis (JPL), W. R. Peltier (U. Toronto), M. H. Alford (Scripps), N. Grisouard (U. Toronto), J. Klymak (U. Victoria)

Lead author supported by NASA Grants NNX17AH55G and NNX16AH79G

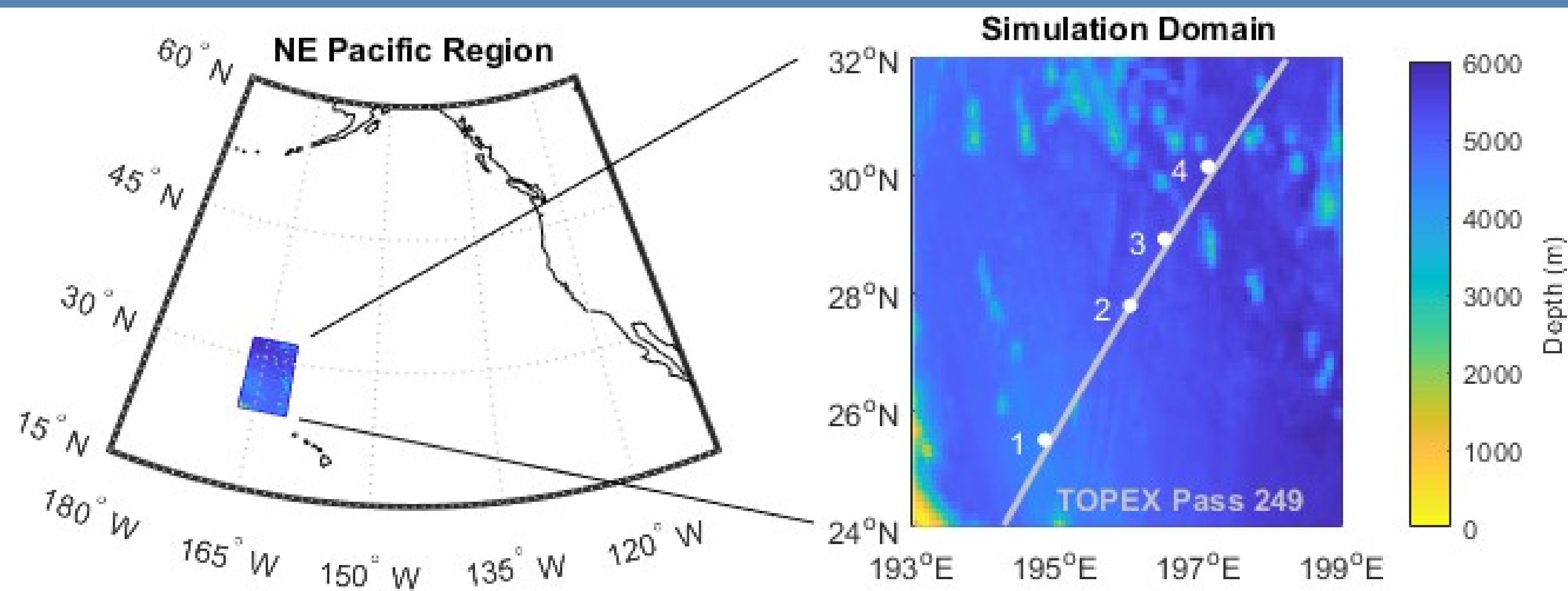
Introduction

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



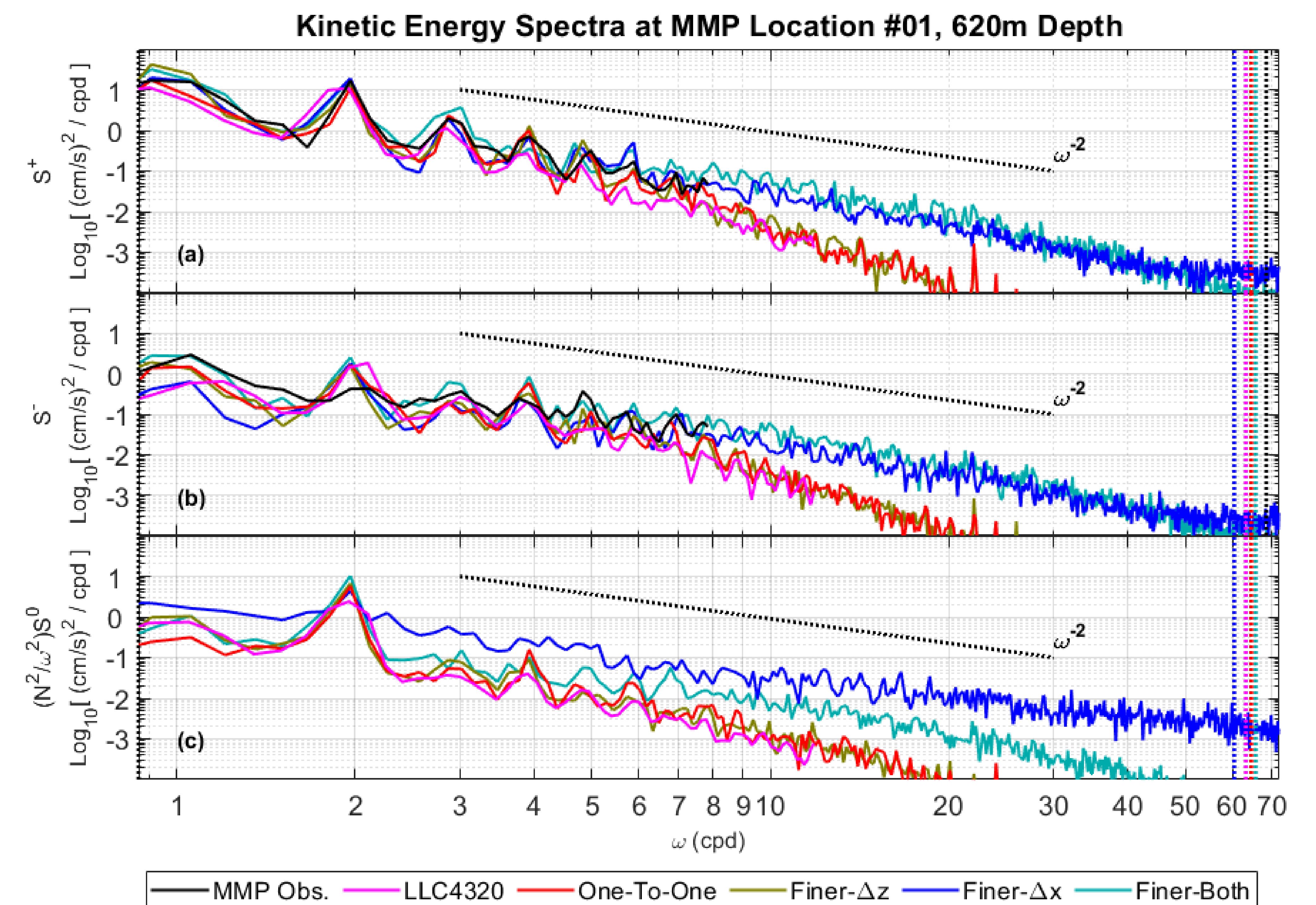
Simulations (done on Niagara Supercomputer, U. Toronto):

- 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:

See Nelson et al. (2020), Journal of Geophysical Research: Oceans, 125, e2019JC015974. DOI:10.1029/2019JC015974