



Wave - Sea Ice Interactions in E3SMv3

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Statement of Importance

Ocean waves are generally missing from earth system models.

WAVEWATCH III (WW3) is now part of E3SMv3.

The variable-resolution, unstructured meshes used in E3SM gives the DOE a unique capability to explore the role of waves in the coupled earth system, polar regions, and the Marginal Ice Zone.

Critical E3SM Developments for Wave-Sea Ice Interactions

1. Full Coupling between MPAS-SI and WW3
2. New Wave Attenuation Scheme
3. Sea Ice Floe Size Distribution (FSD) + Ice Breaking
4. E3SMv3 30km Icosahedral Mesh for WW3

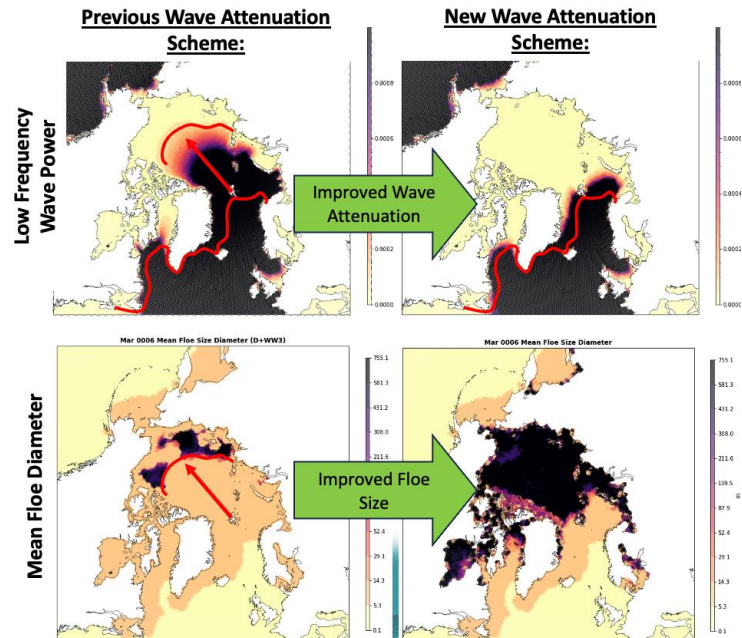
Looking Forward

Wave - Sea Ice coupling is just beginning. The DOE, LANL and E3SM are at the forefront of research simulating wave-sea ice interactions in fully coupled climate systems.

- Role of waves and wave-sea ice interactions in fully coupled climate system
- Improvements to the ice breaking mechanism and wave attenuation schemes

Key Result:

Ice breaking is sensitive to Wave attenuation
improved wave attenuation leads to more realistic ice floe sizes



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