

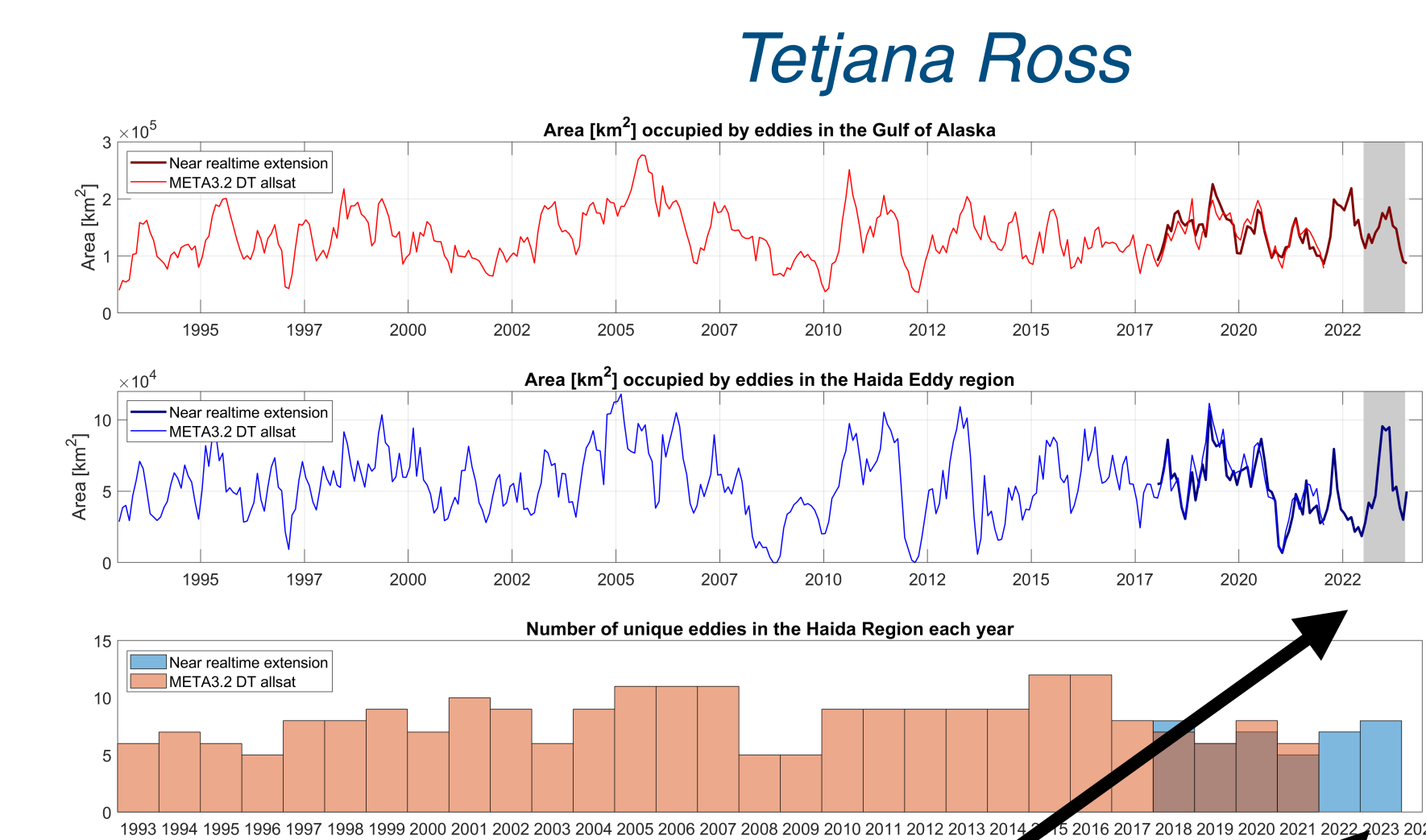
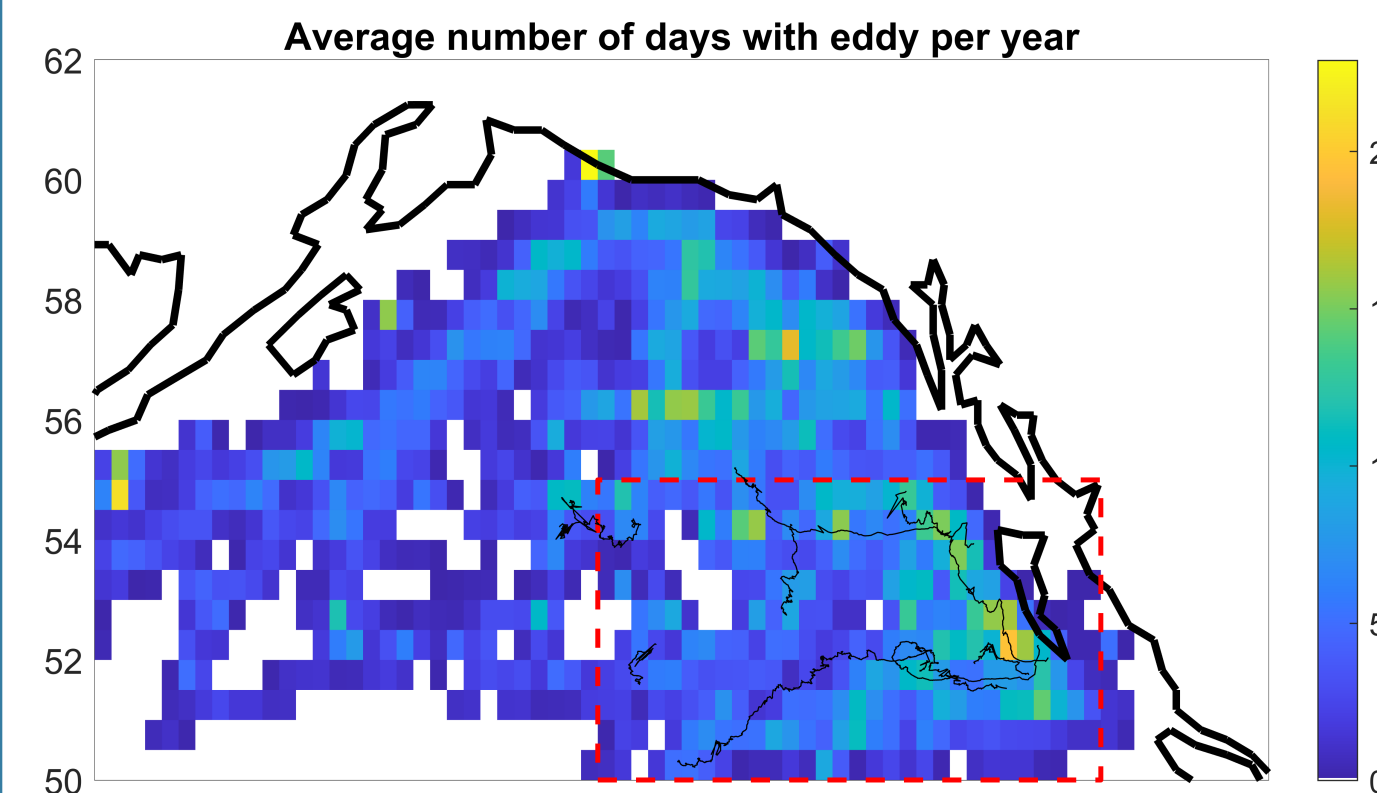
2023 State of the NEP Meso- and Submesoscales

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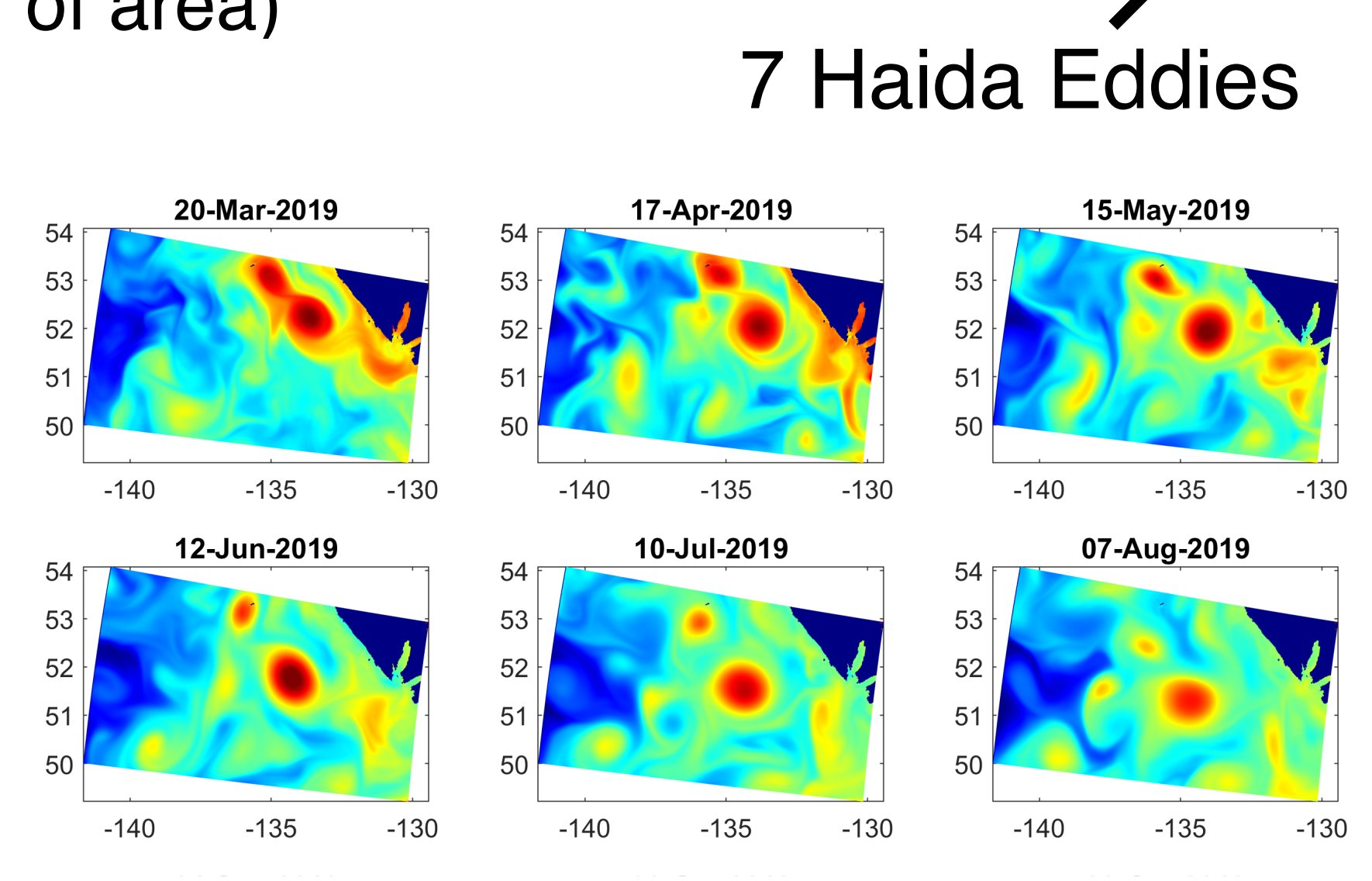
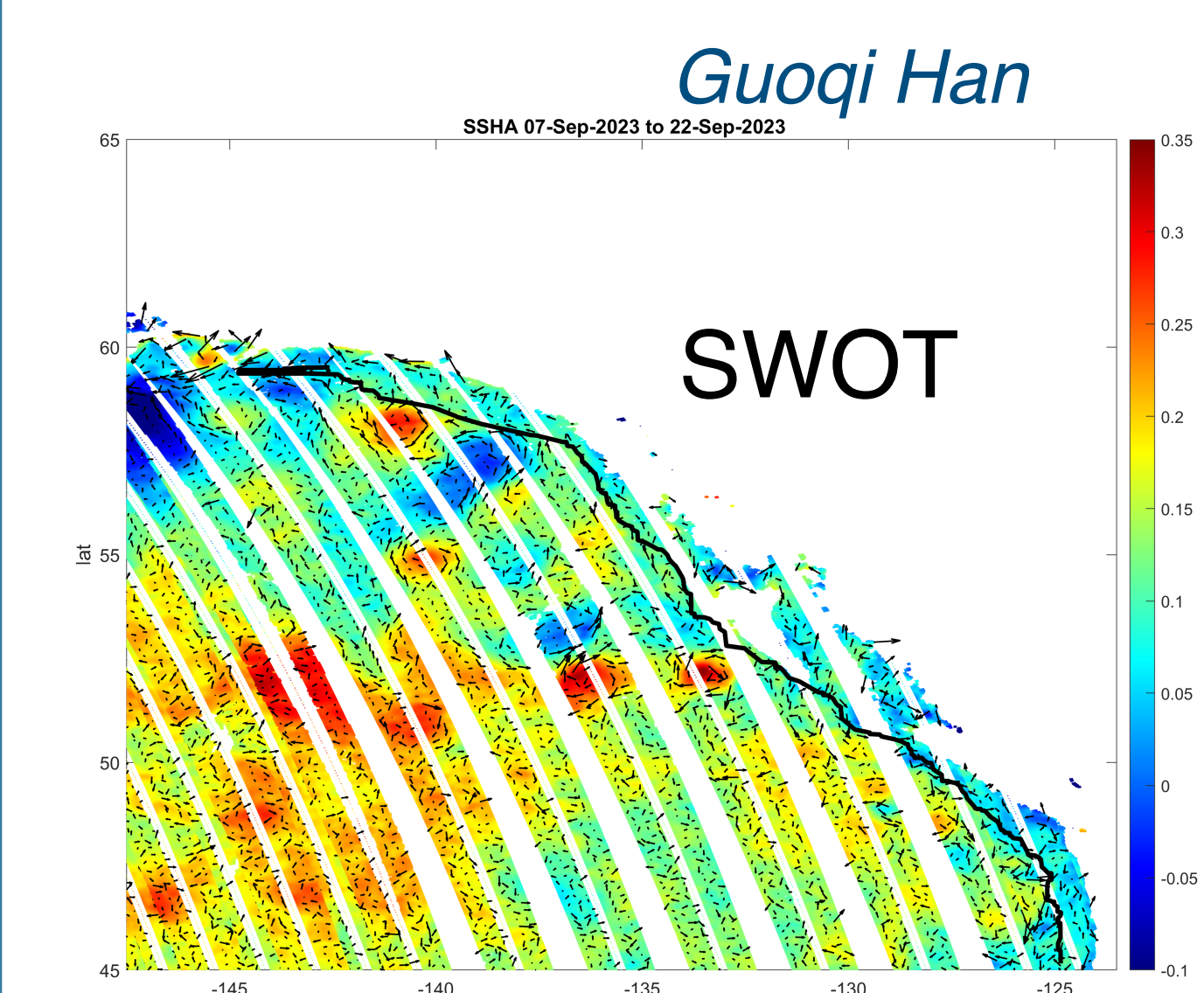
Why?

- Carry heat, nutrients, gasses from coastal to offshore
- Simulations can assimilate physics, harder to assimilate biogeochemistry
- Better understand mixing processes

Haida Eddies: Census:

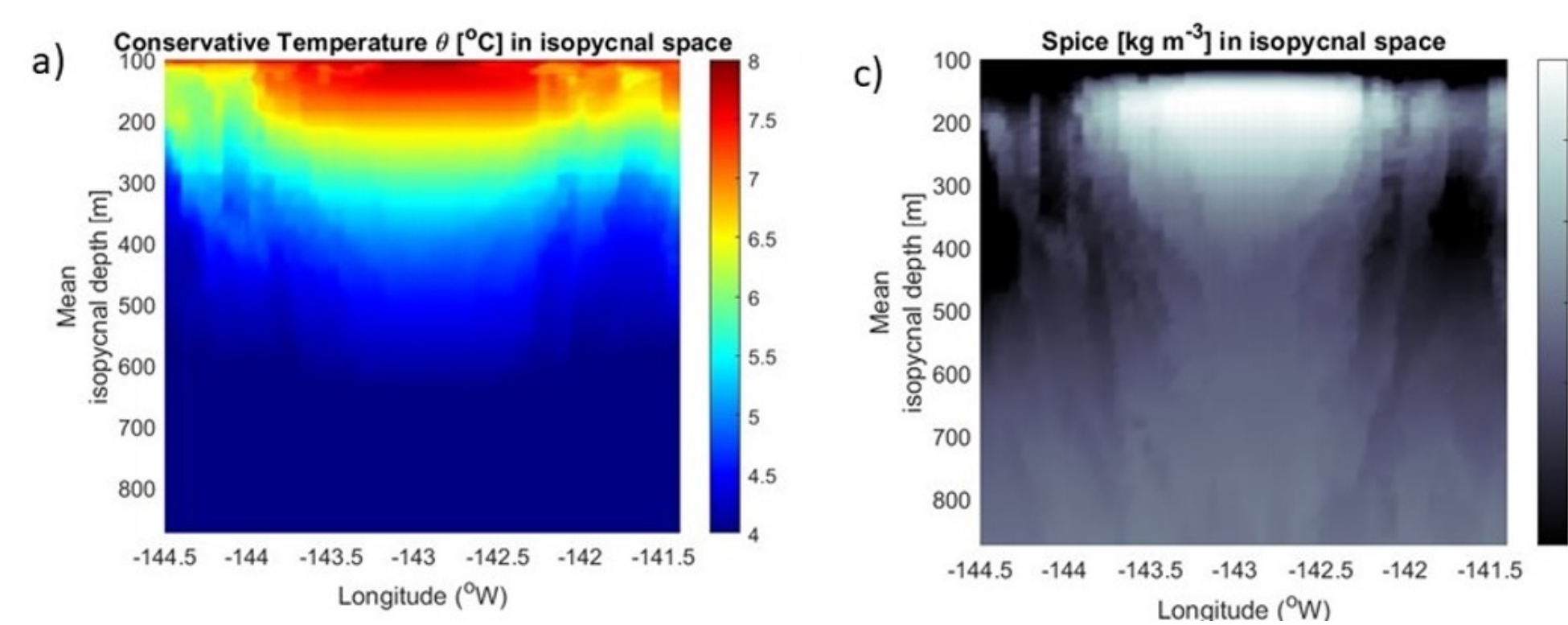


90,000 km² (about 1% of area)
7 Haida Eddies



High-resolution satellite observations to track eddies

Improved assimilation of eddies in operational simulations

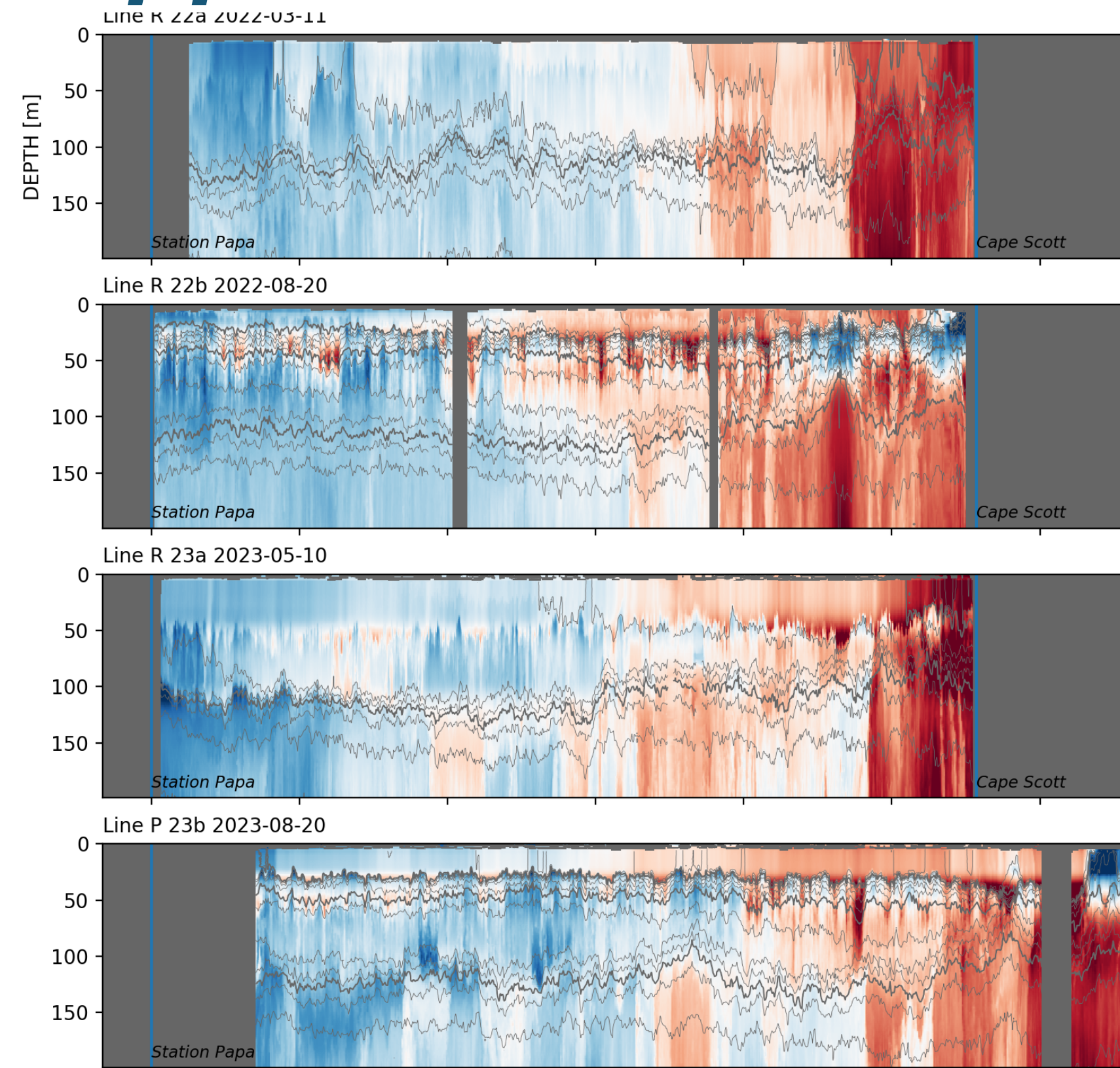


Eddy submesoscales:
- How do they decay?
- How do they mix with surrounding water?

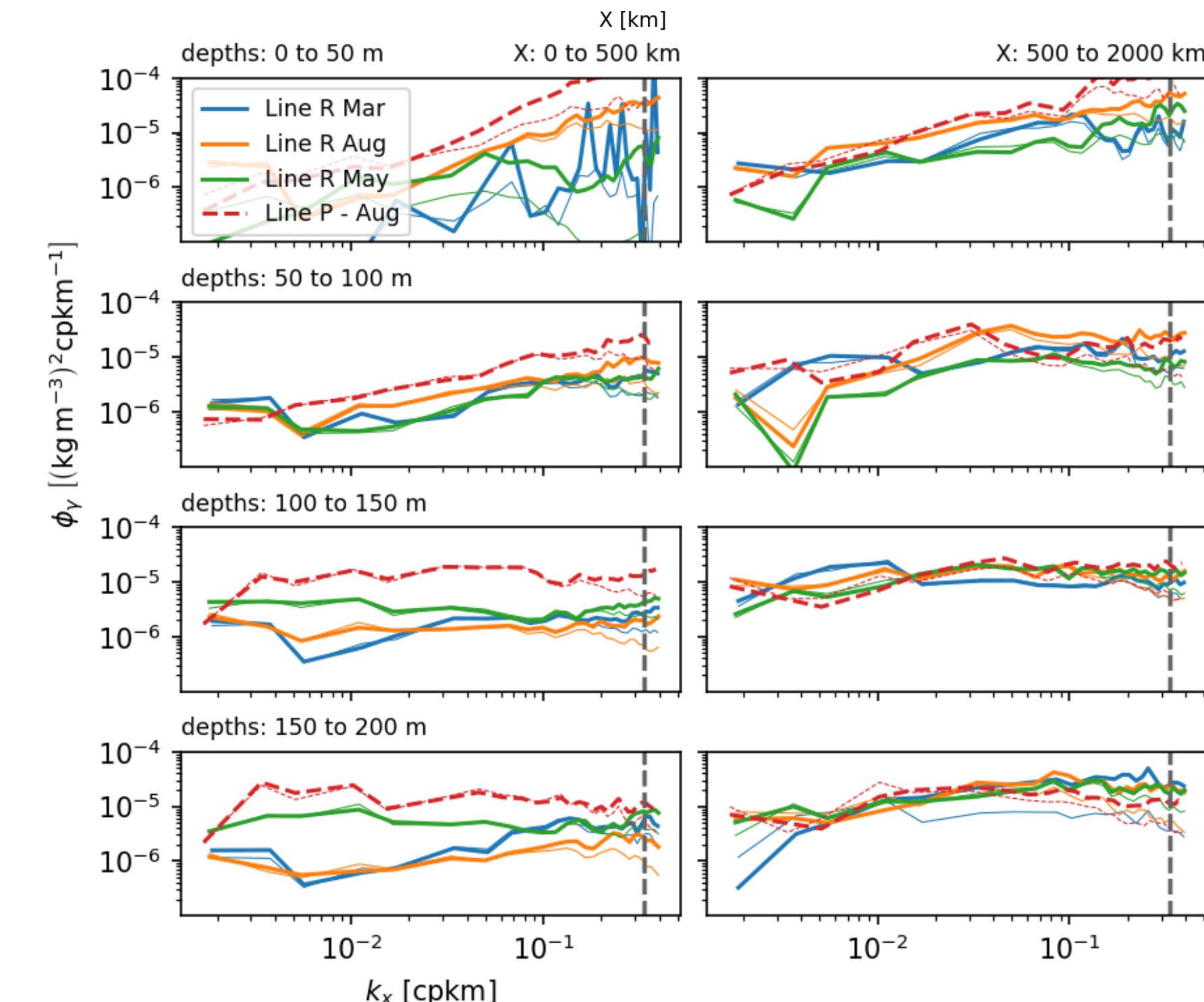
Bernard Yang



Upper-ocean submesoscale



- 4 Cruises (2022, 2023)
- Moving Vessel Profiler: dx=1.5 km



Sections:

- Strong temperature contrasts
- Clear coherent mixing in permanent thermocline
- Perhaps driven by mixed layer instability in the

Spectra:

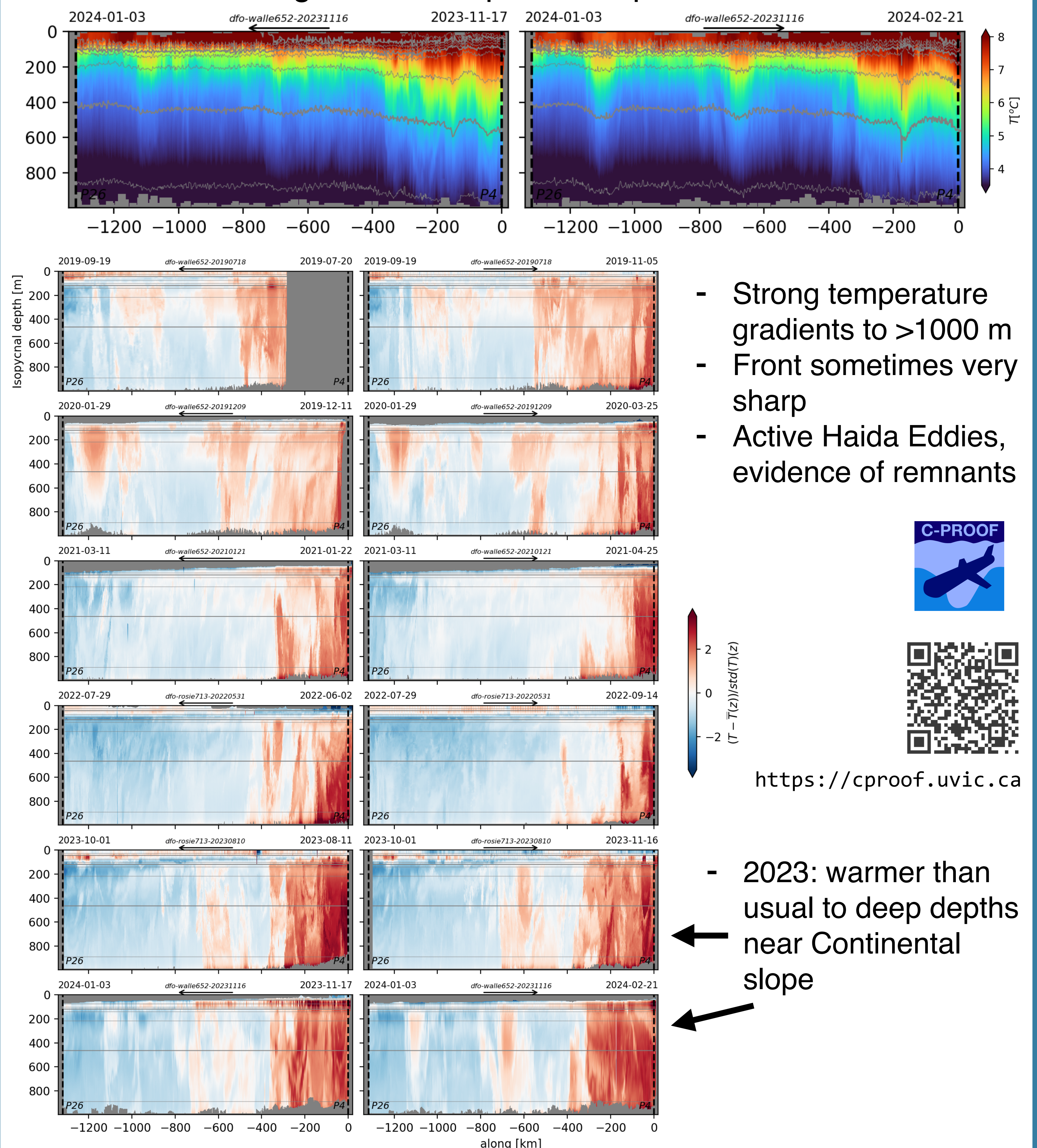
- Nearshore statistics surprisingly similar
- Offshore more variability



Deeper trends and statistics:

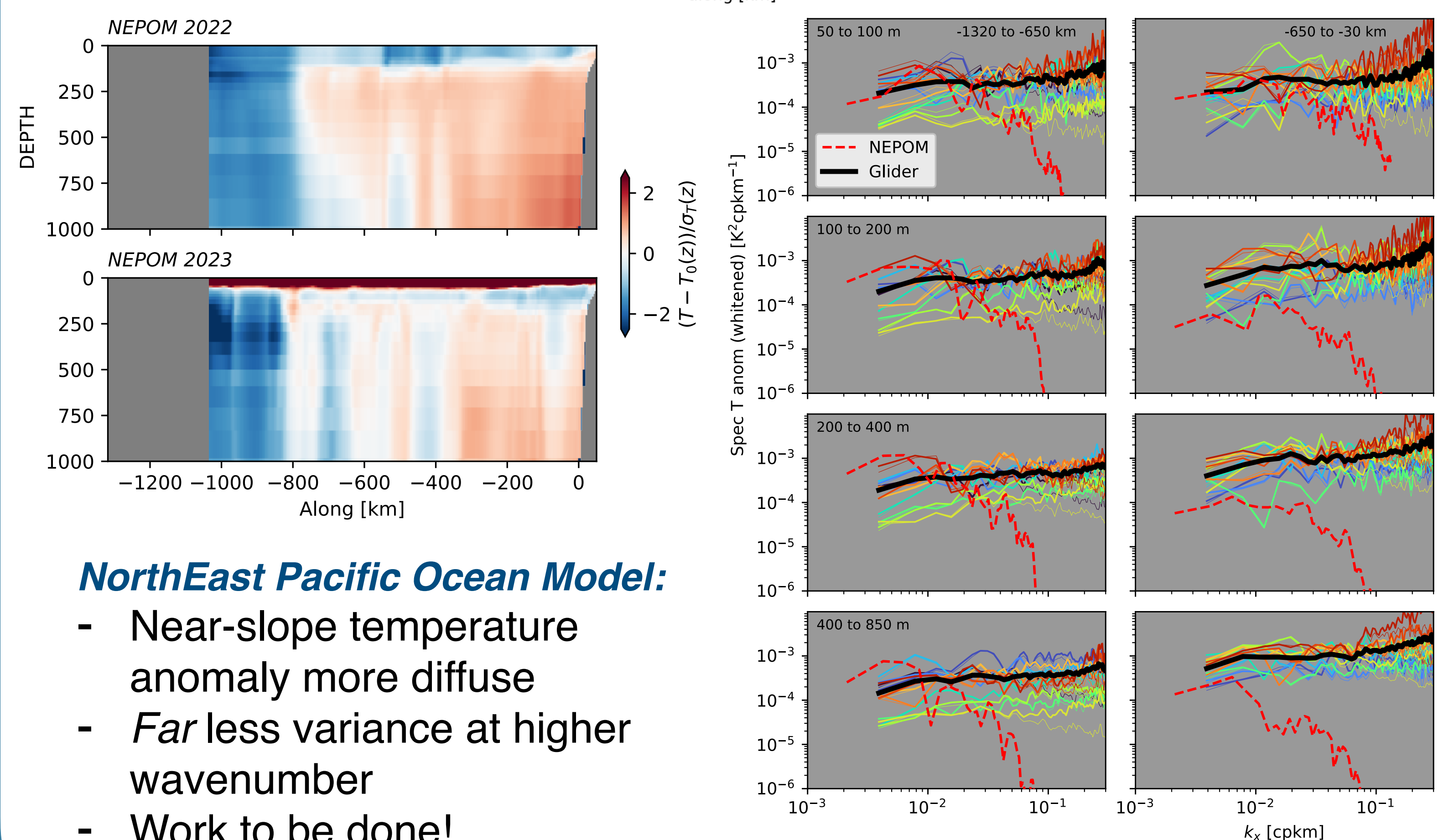
Glider data along LineP: 6 repeat occupations

Lauryn Talbot



- Strong temperature gradients to >1000 m
- Front sometimes very sharp
- Active Haida Eddies, evidence of remnants

- 2023: warmer than usual to deep depths near Continental slope



NorthEast Pacific Ocean Model:

- Near-slope temperature anomaly more diffuse
- Far less variance at higher wavenumber
- Work to be done!

Combining methods:

- Understanding and measuring mesoscales requires a variety of approaches and statistics to make progress

