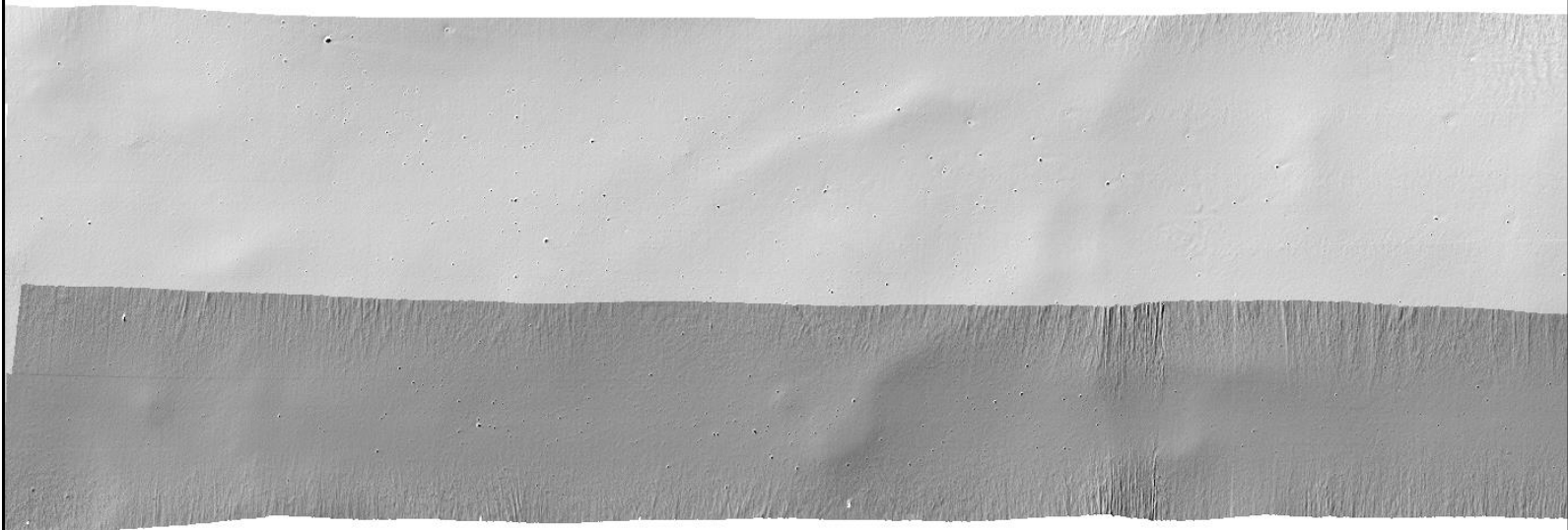
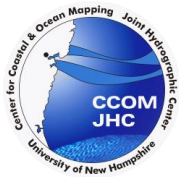


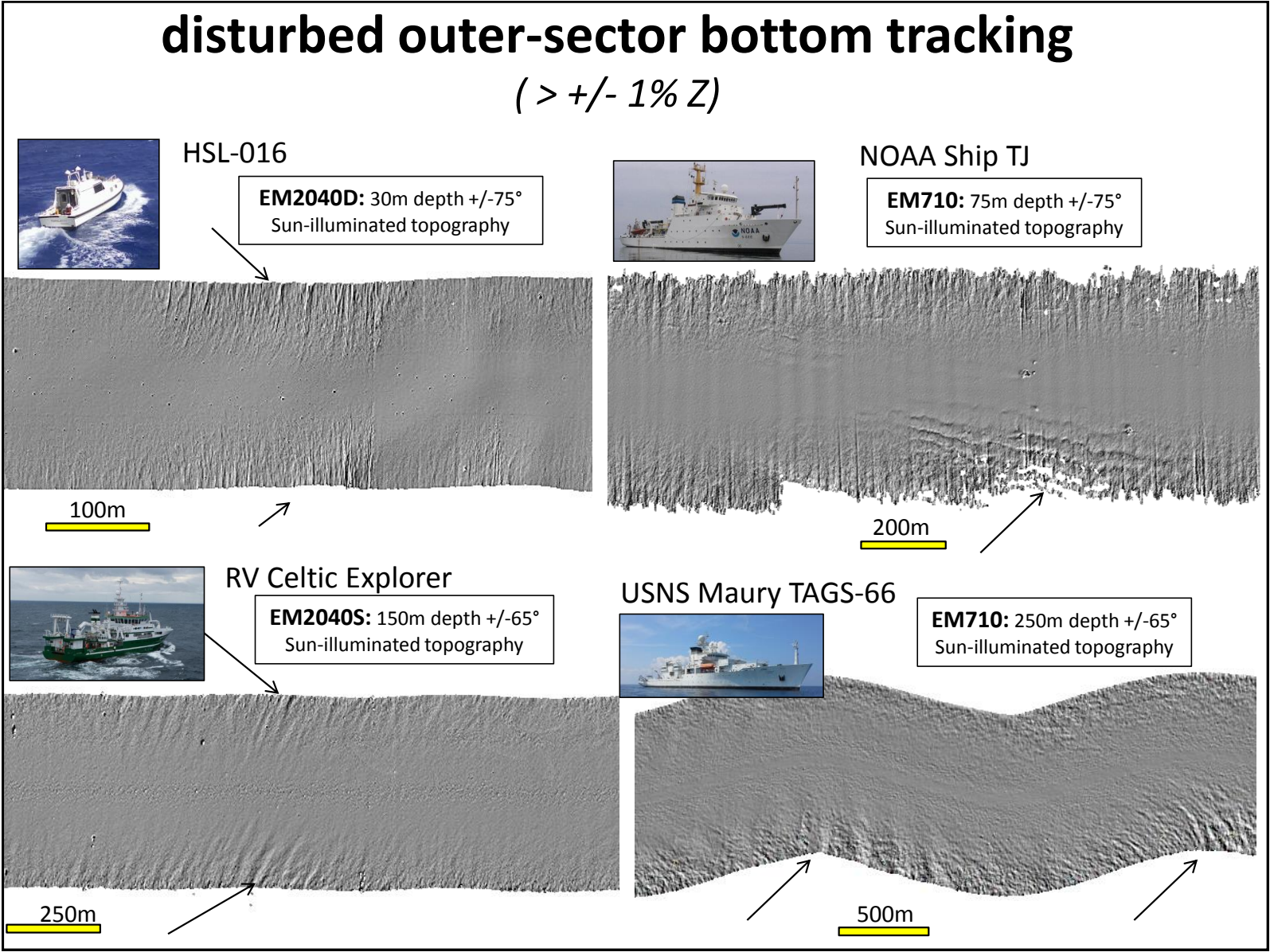
USHC 2017, Galveston, TX

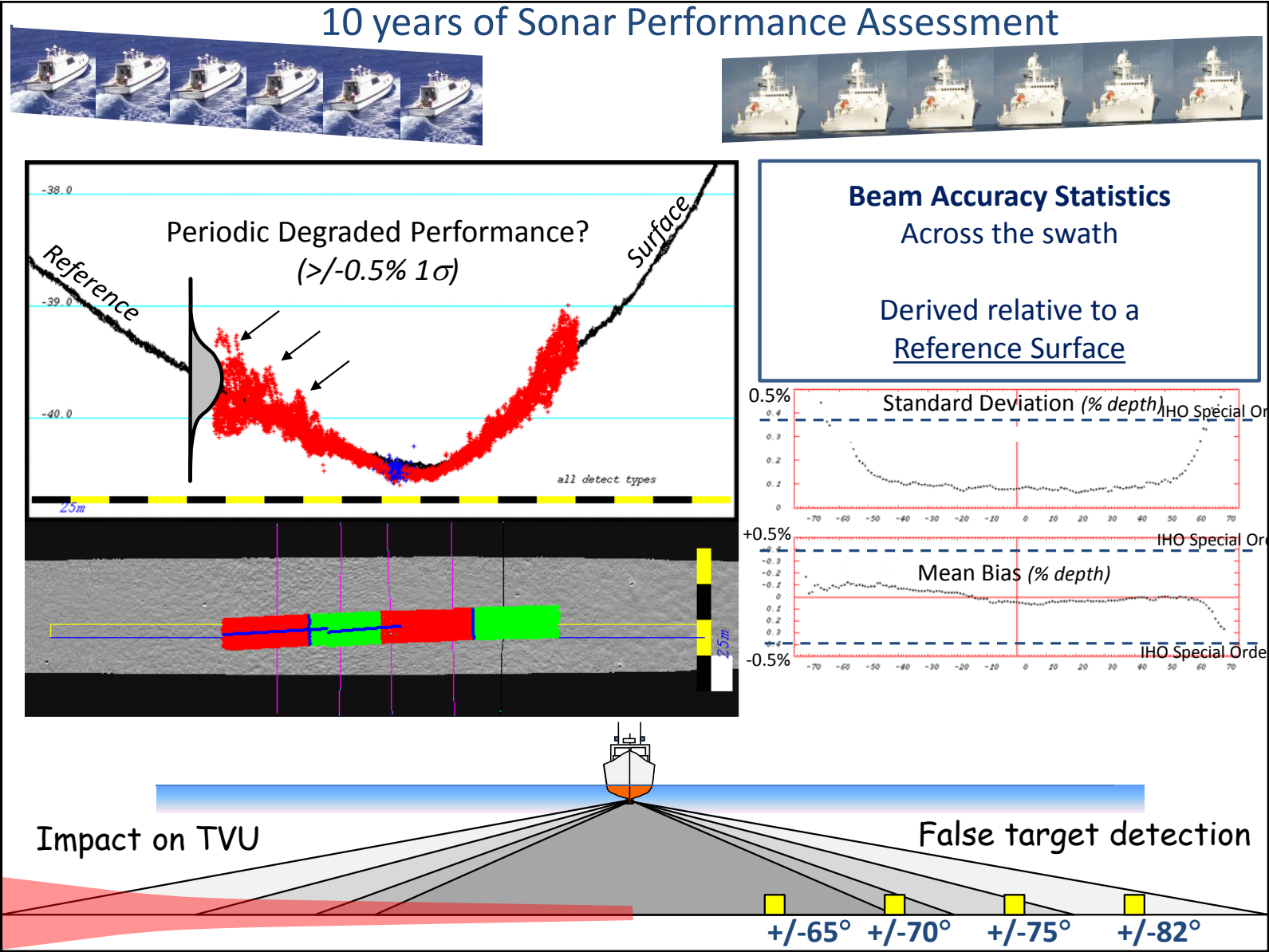
Coherent refraction “noise” in multibeam data due to oceanographic turbulence

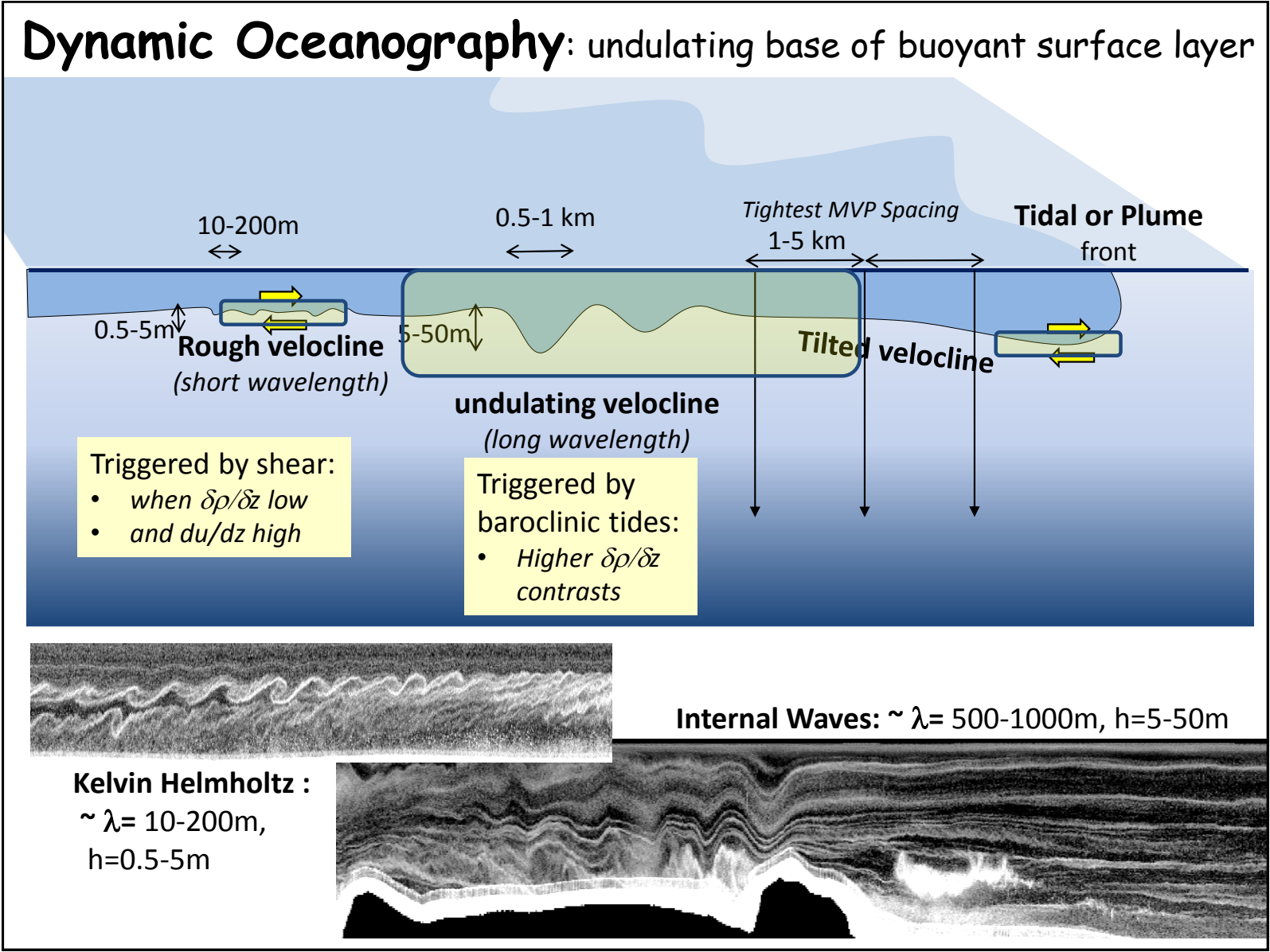


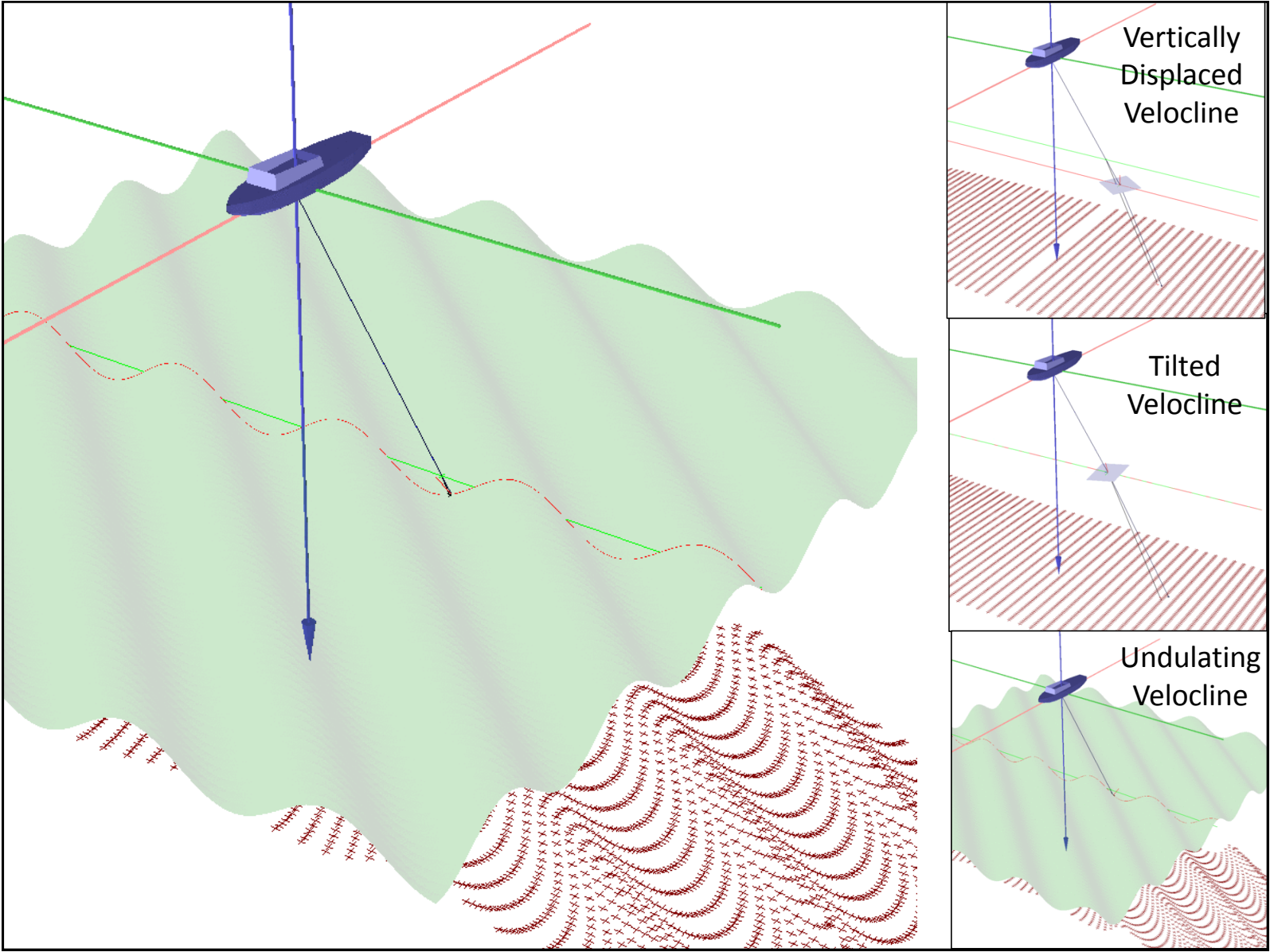
John E. Hughes Clarke
Center for Coastal and Ocean Mapping
University of New Hampshire
USA

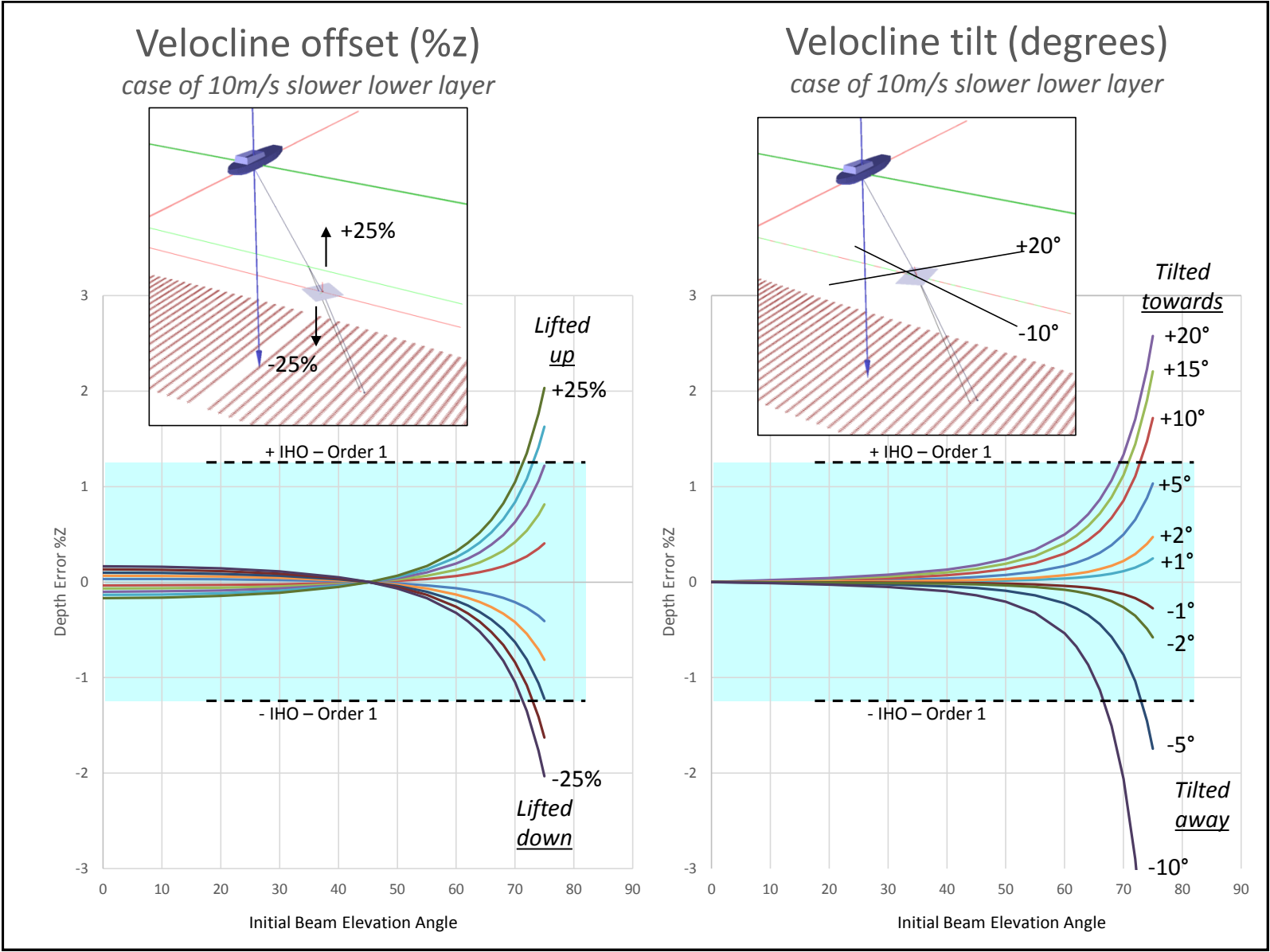


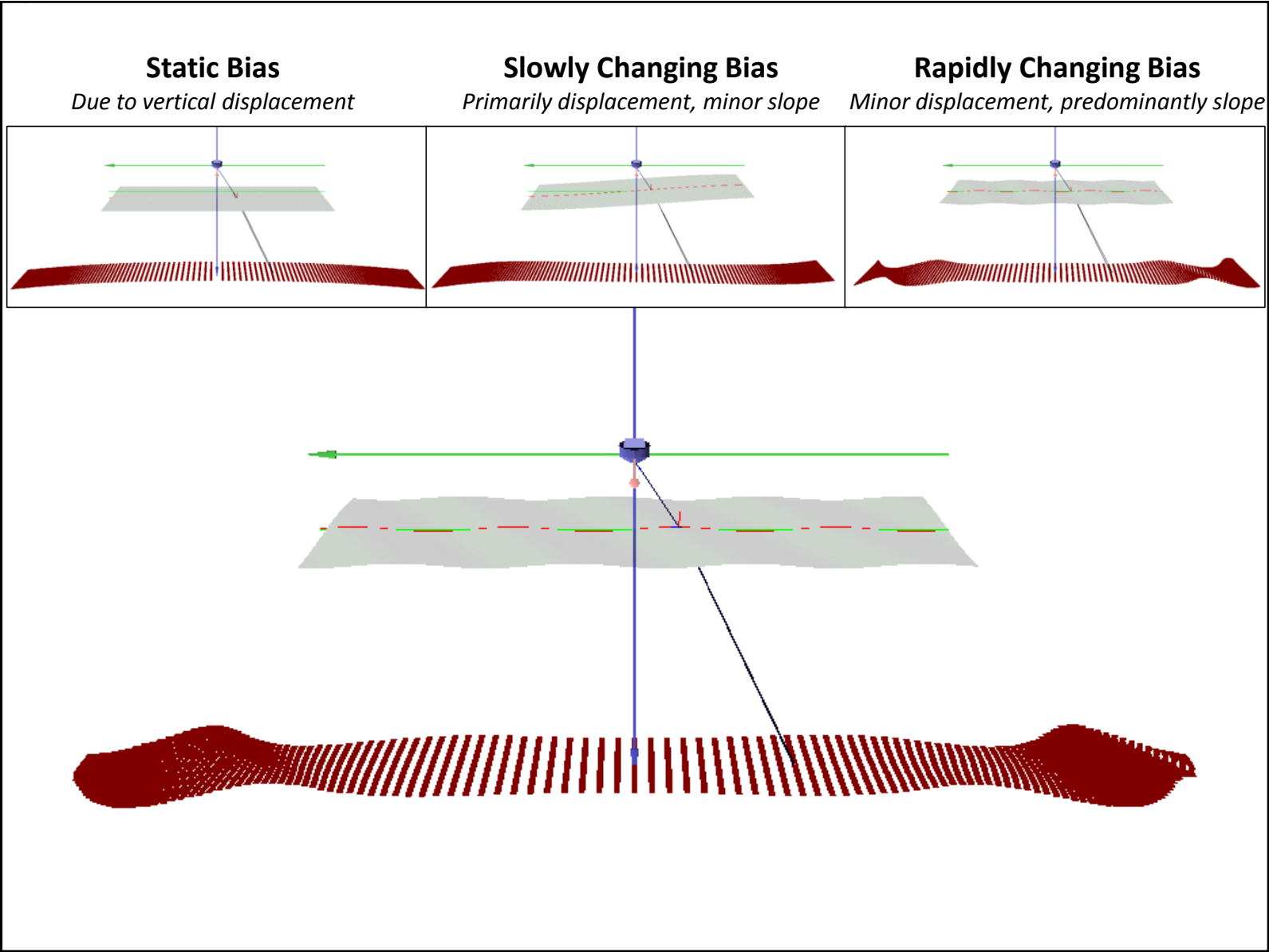


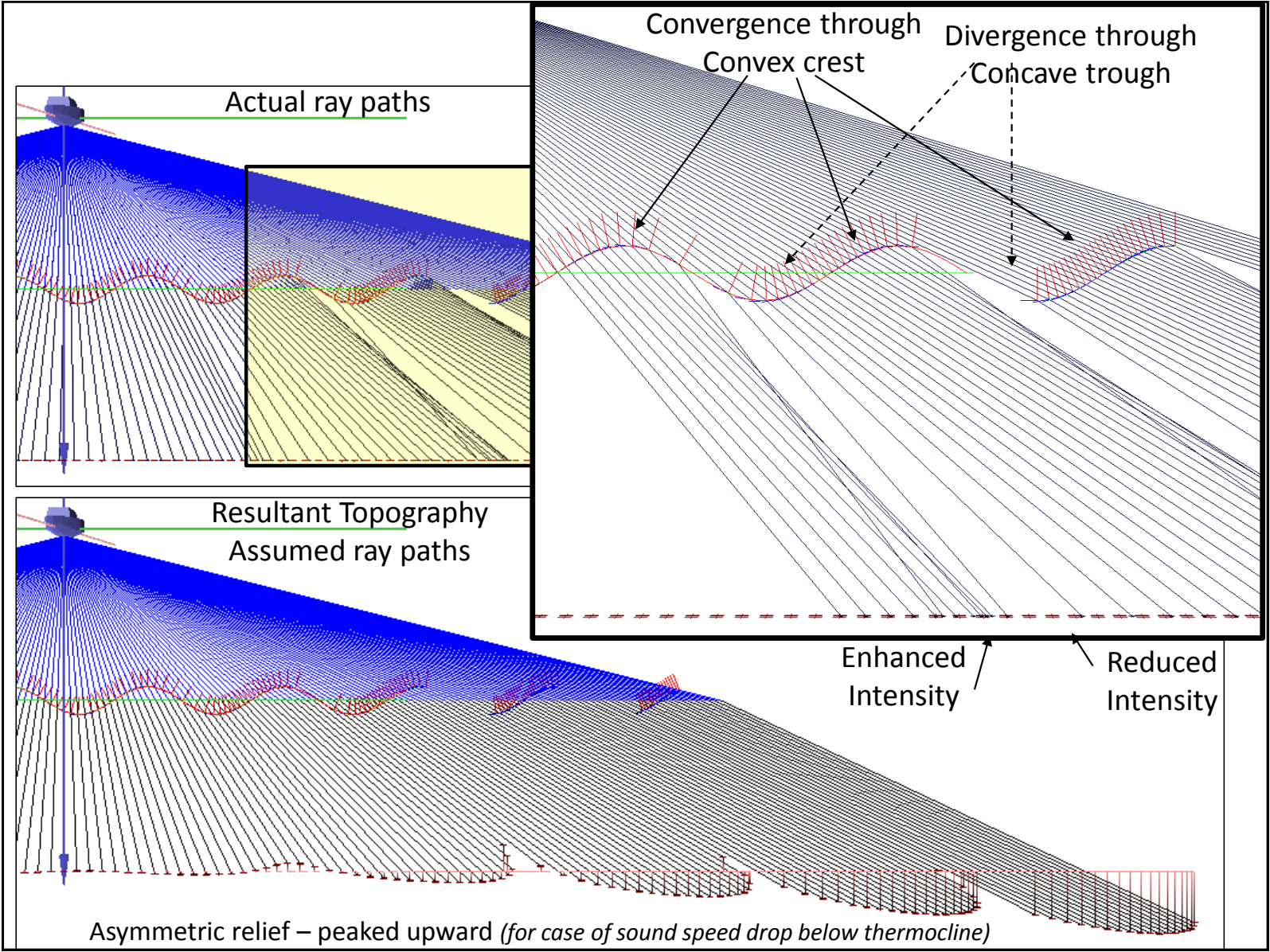


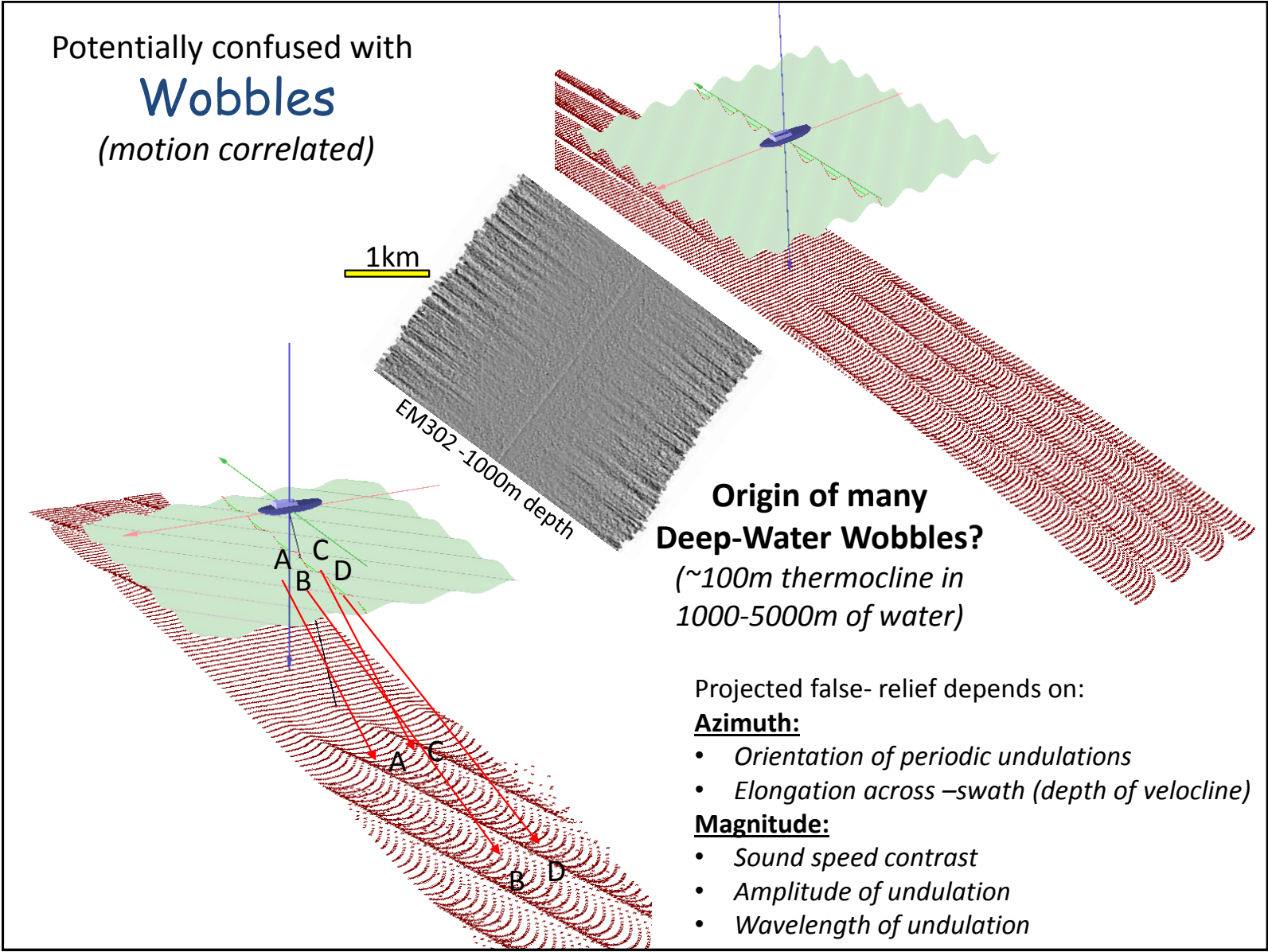


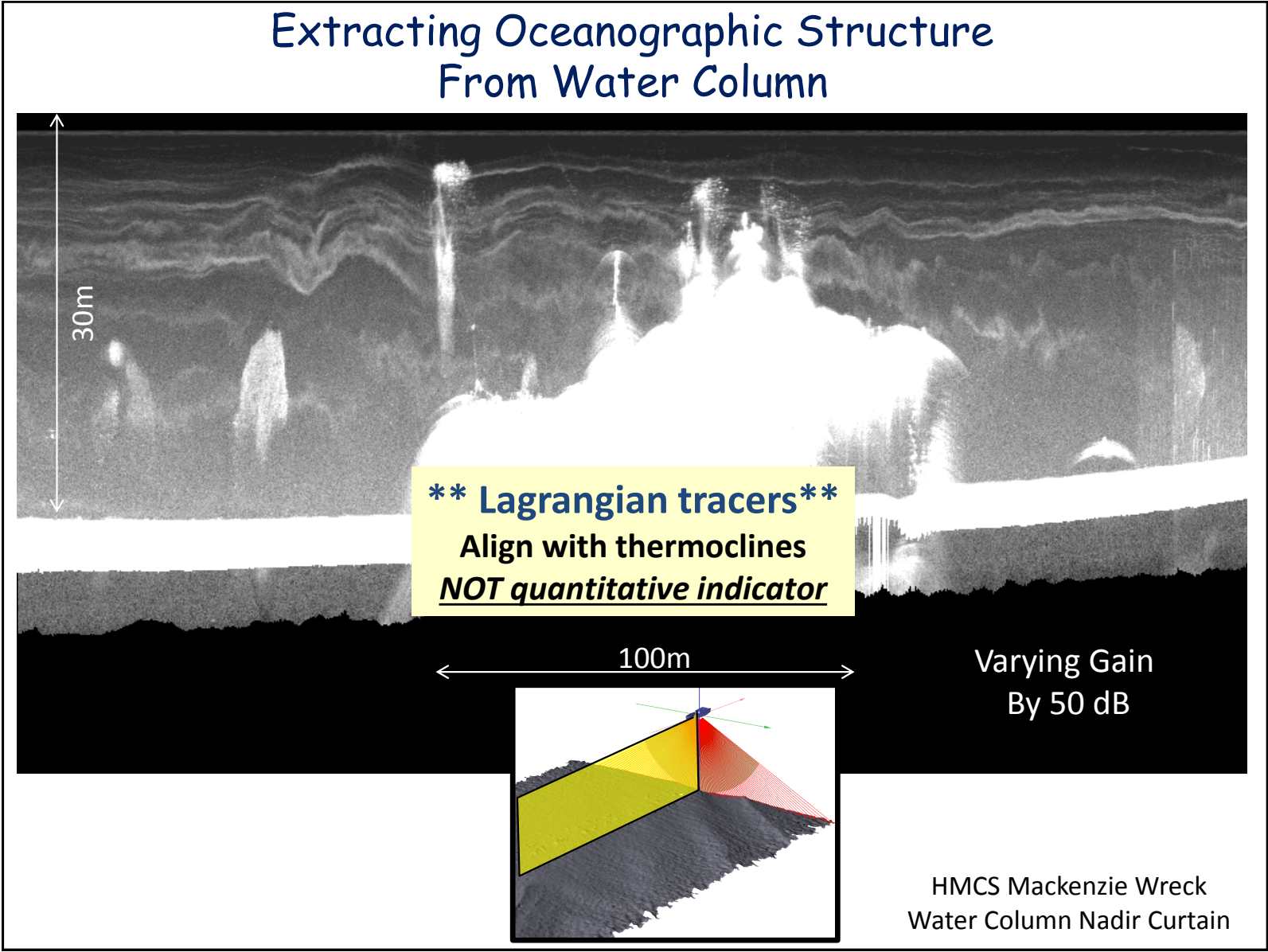


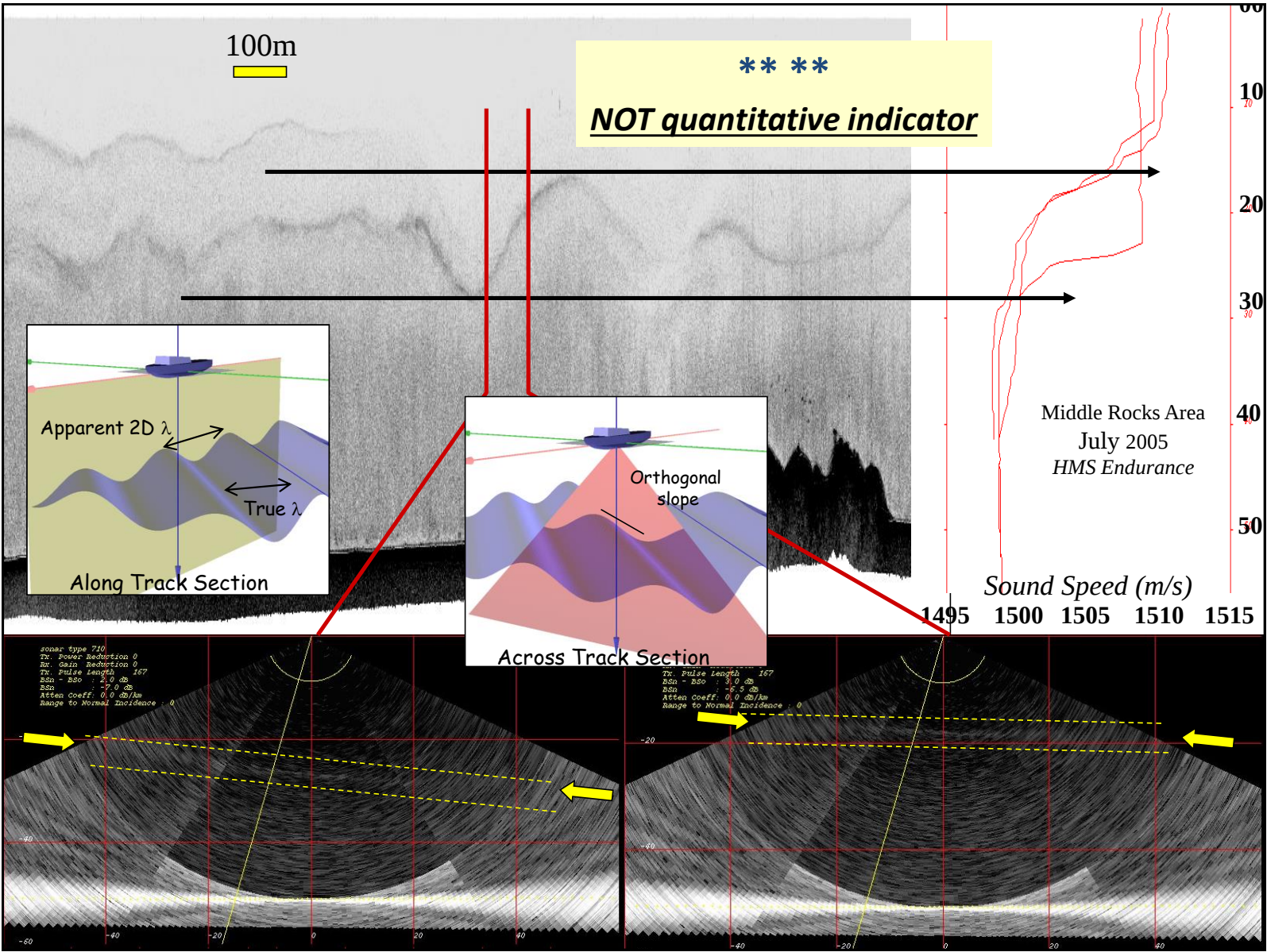


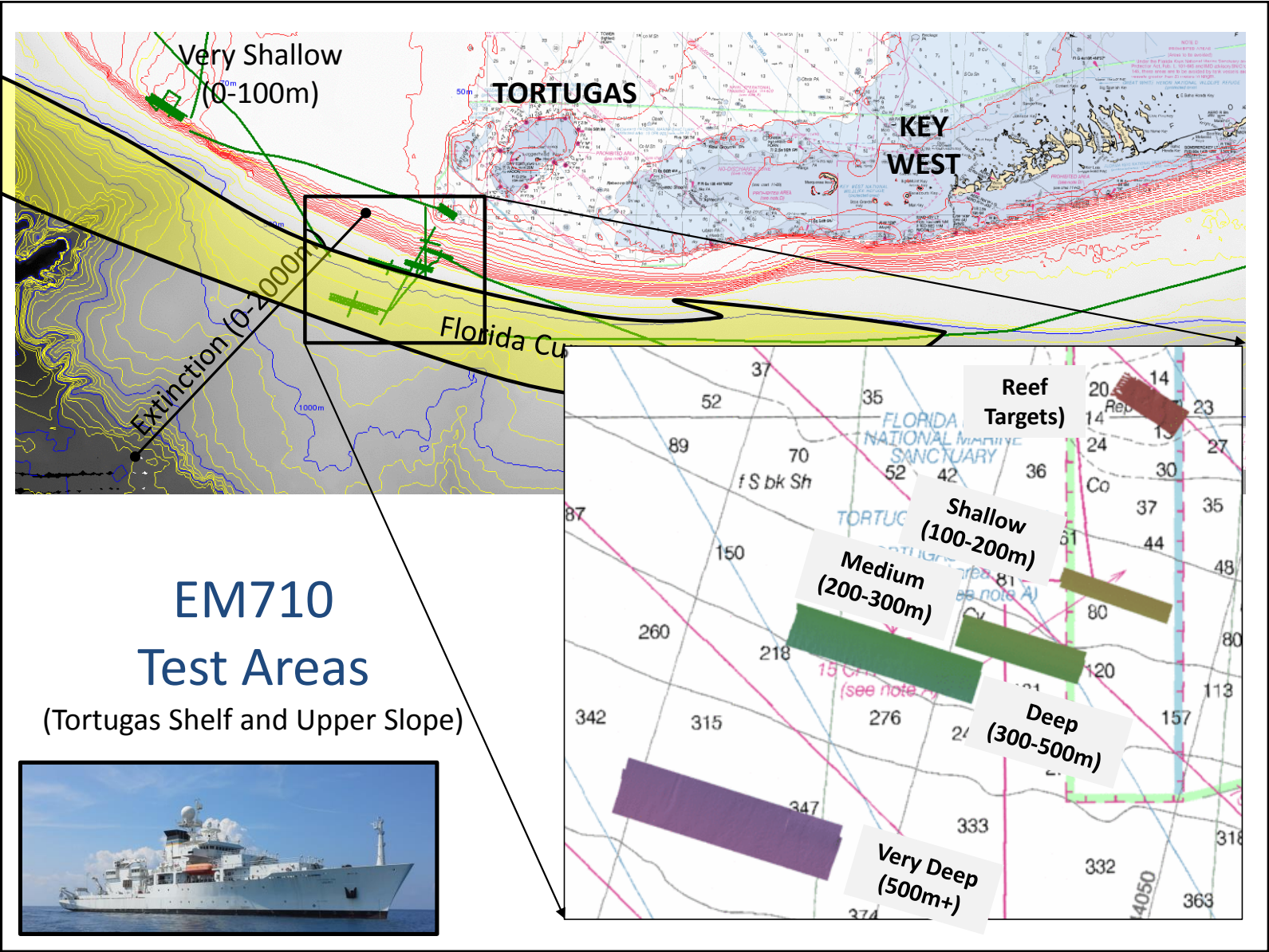


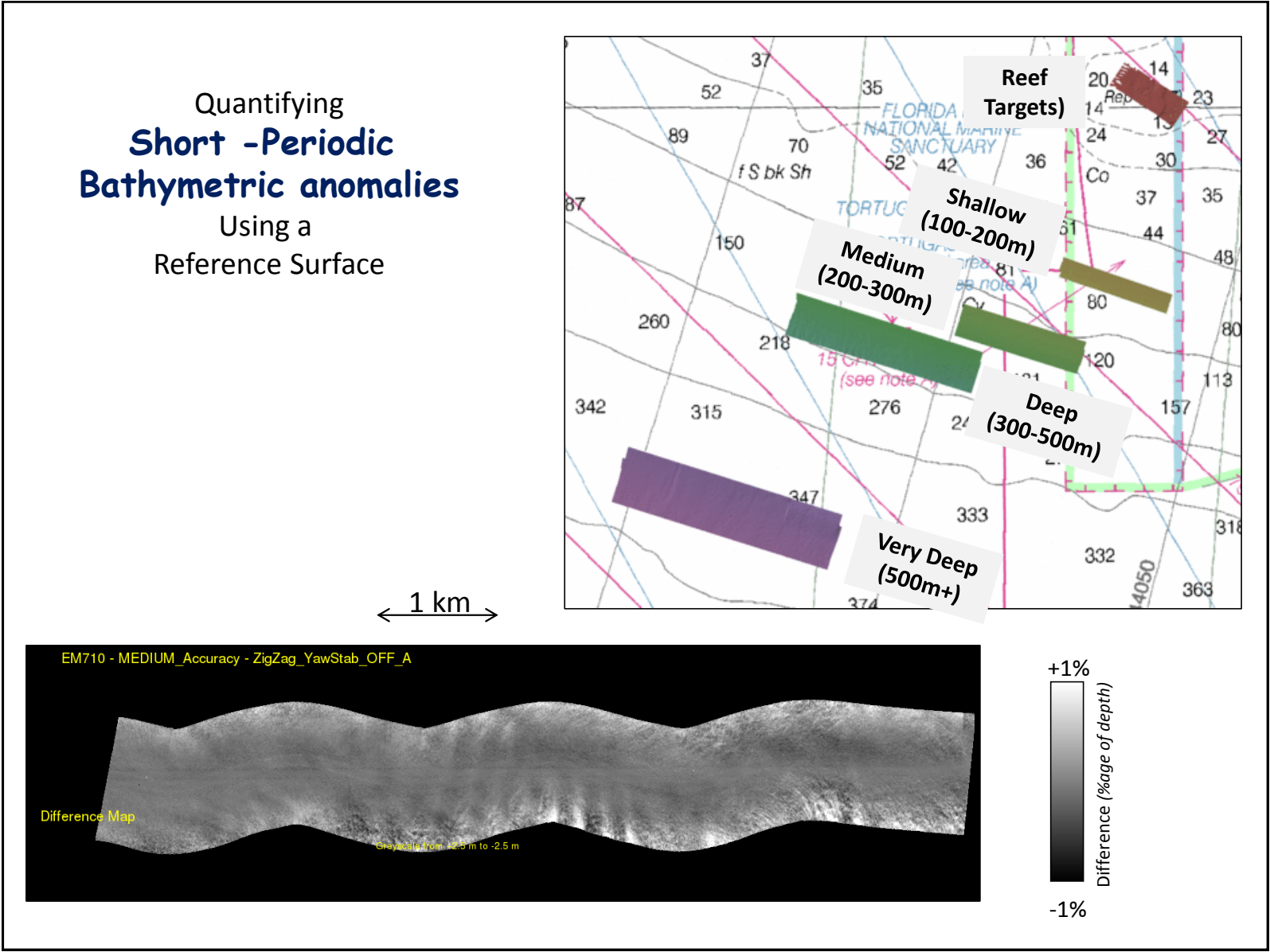


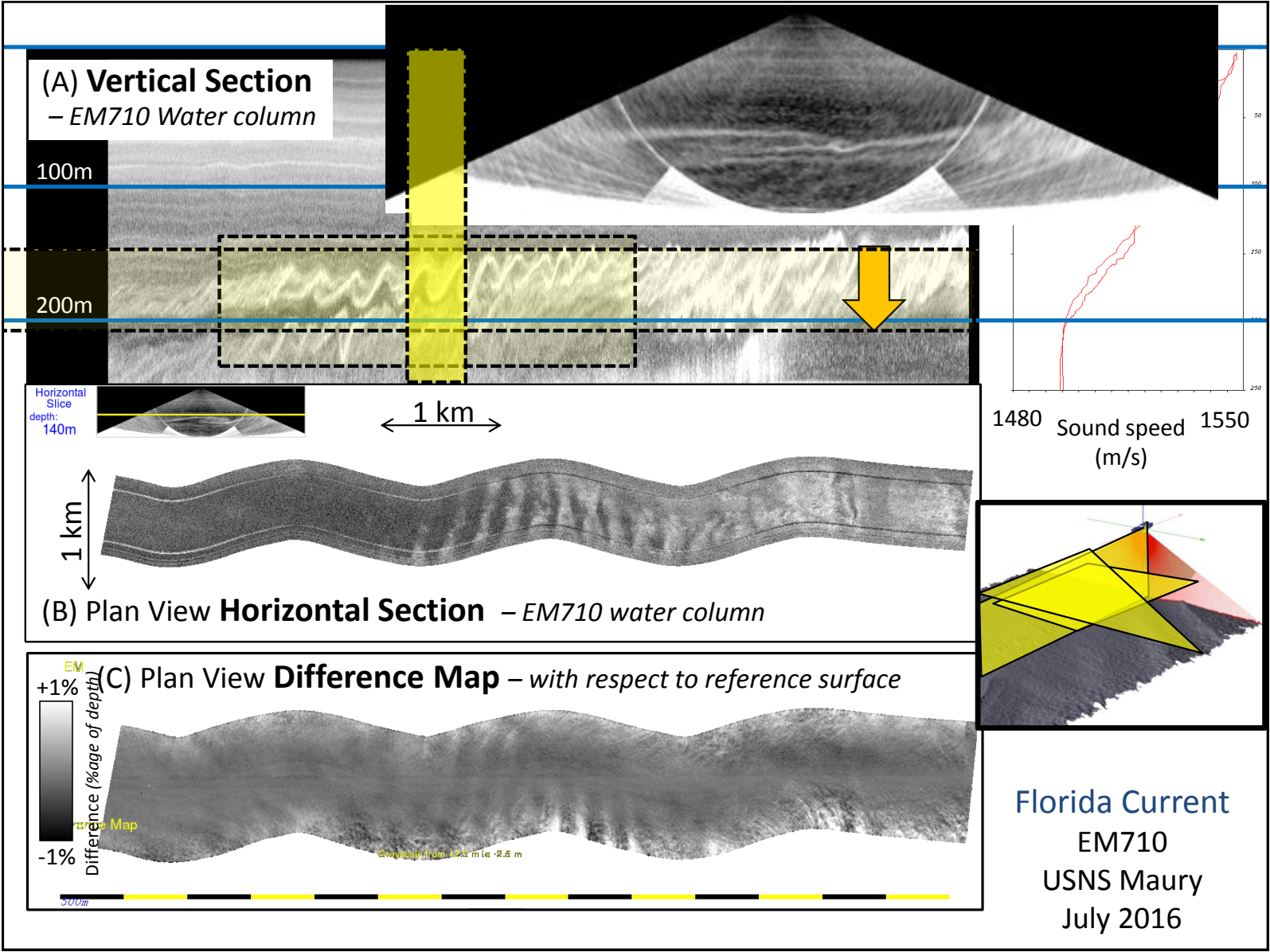


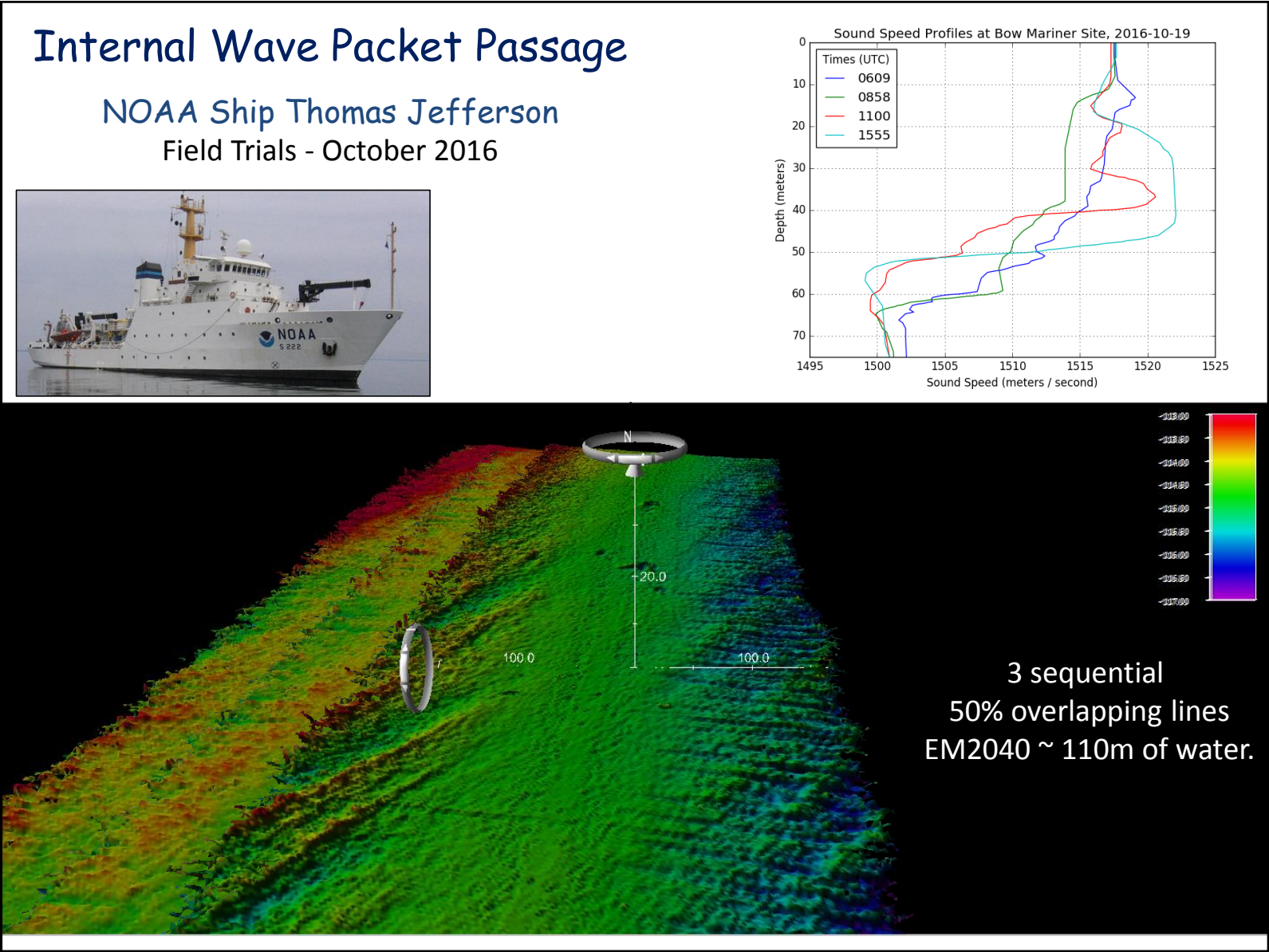


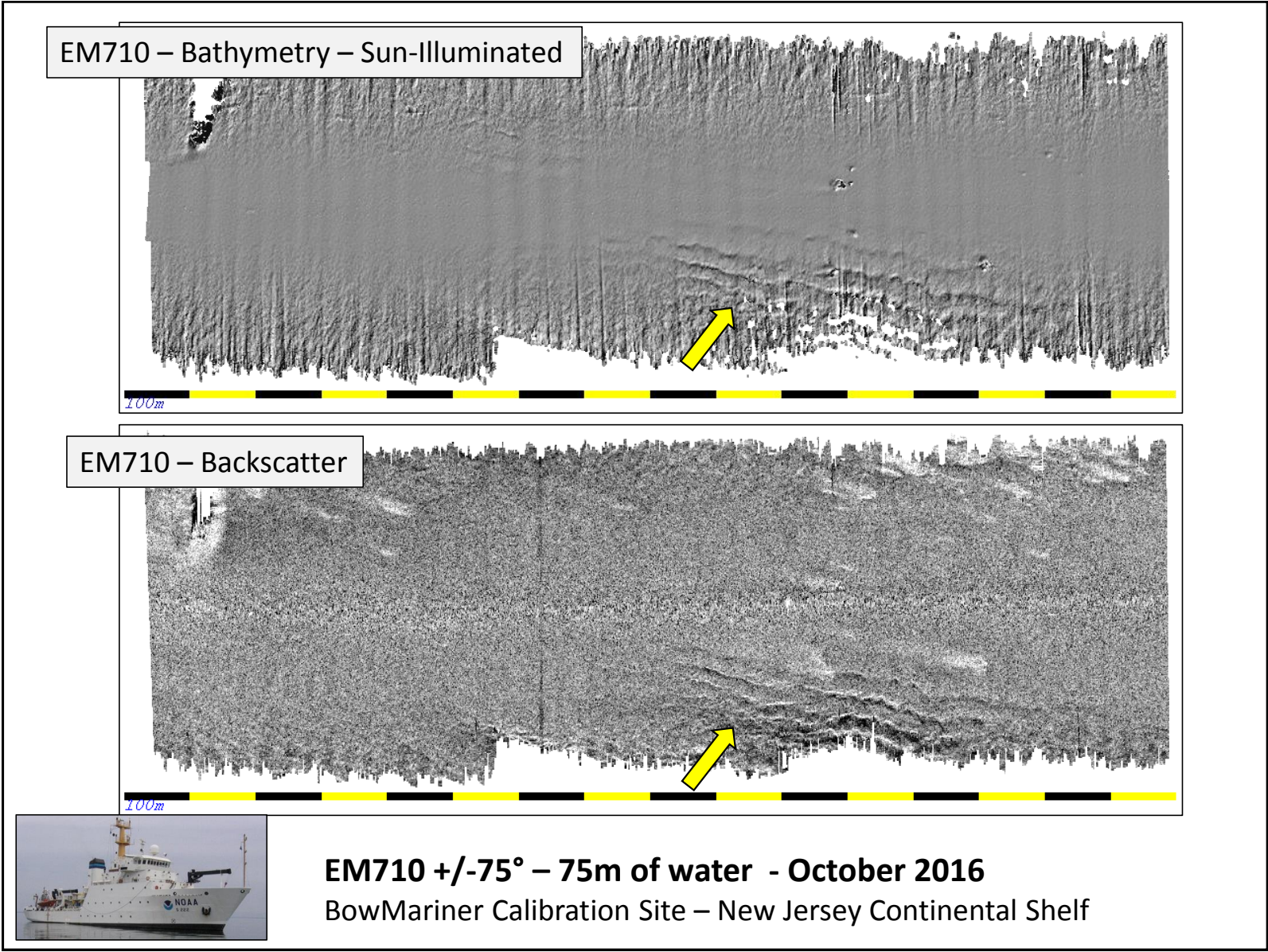


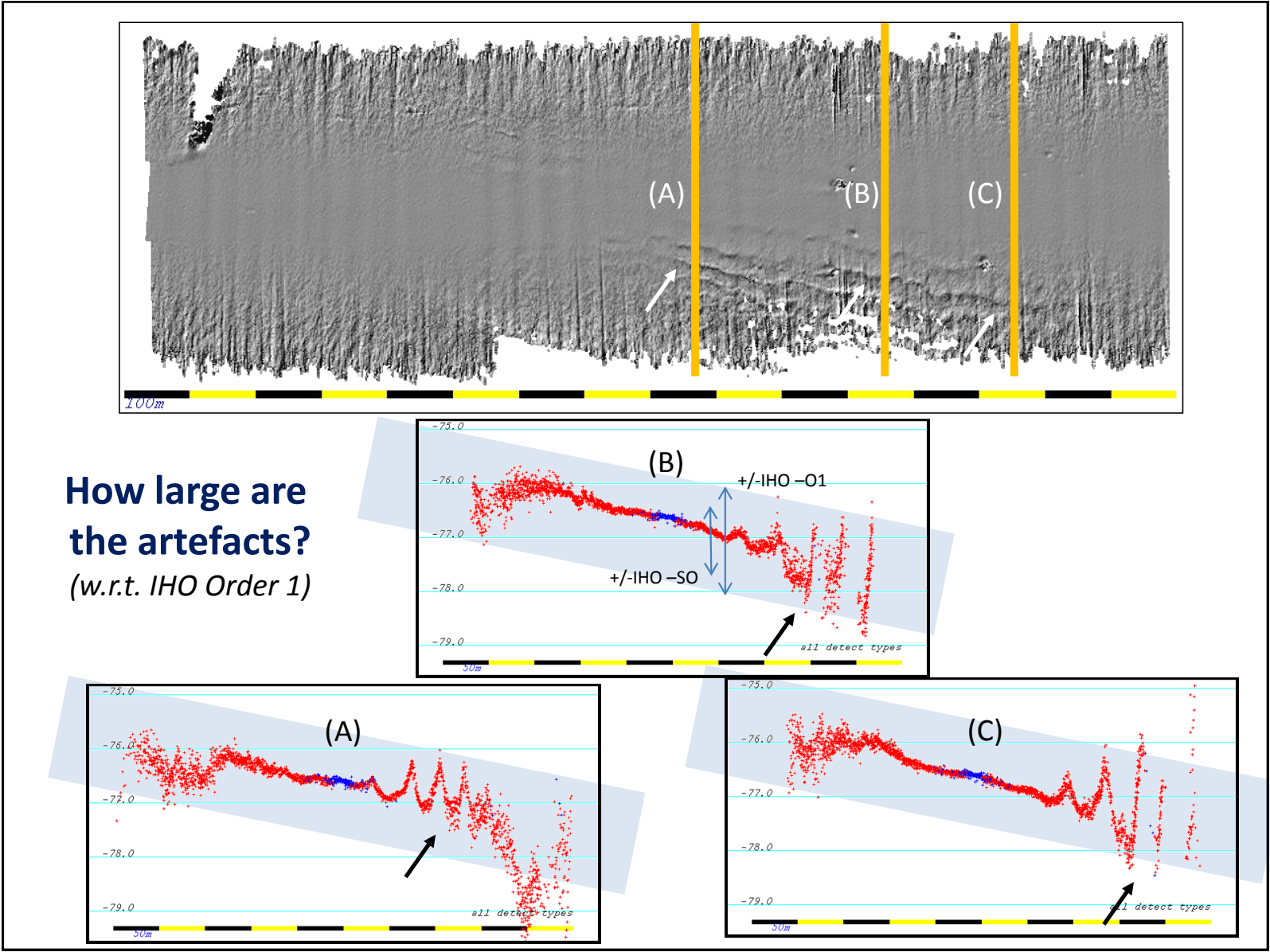


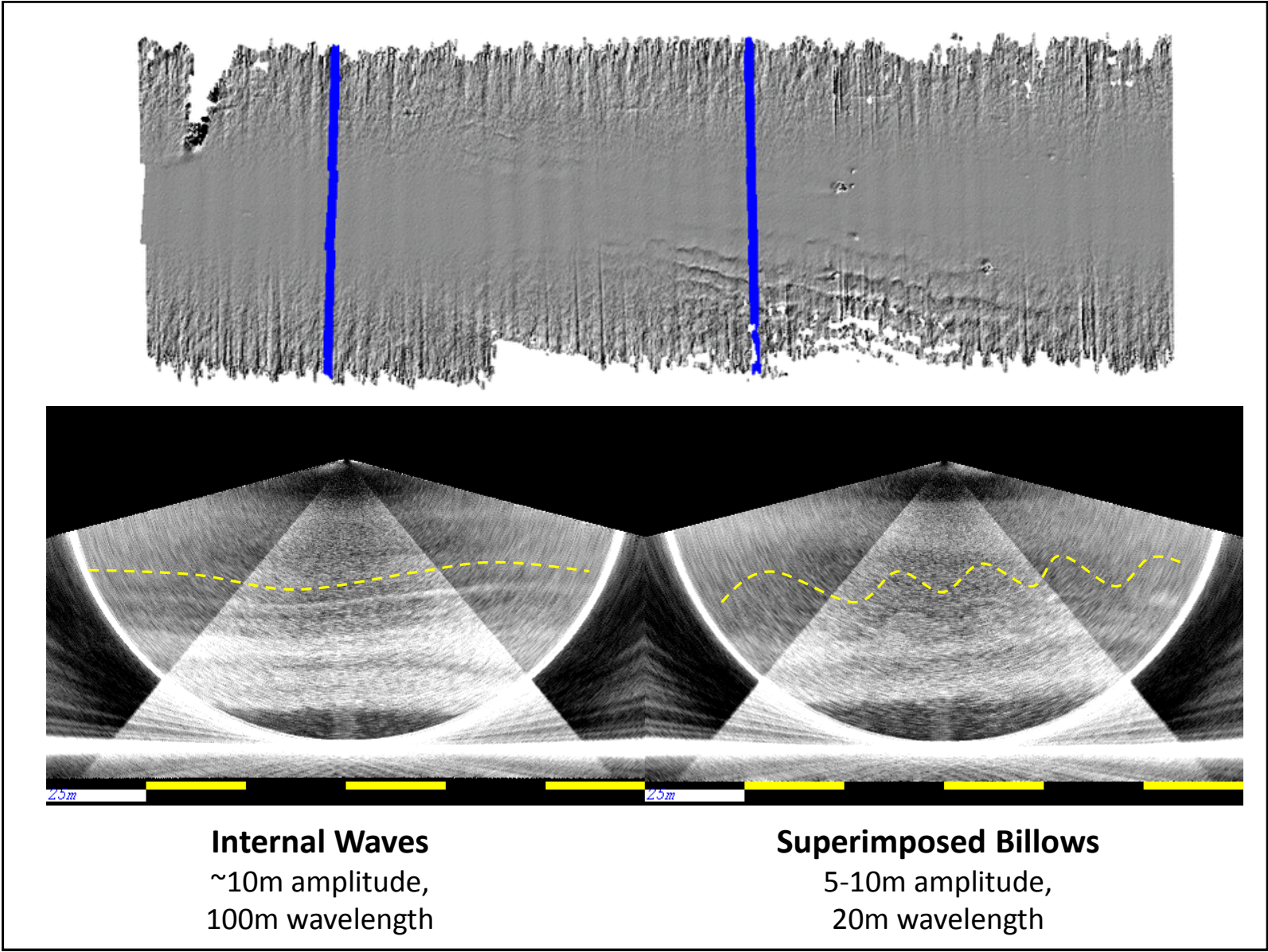






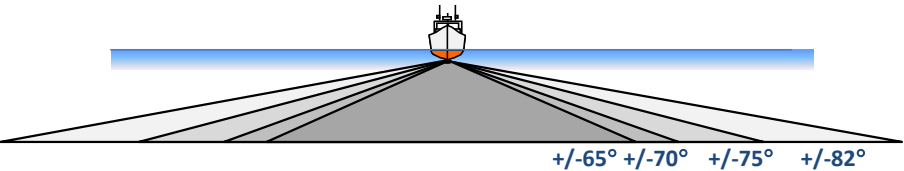






In Conclusion:

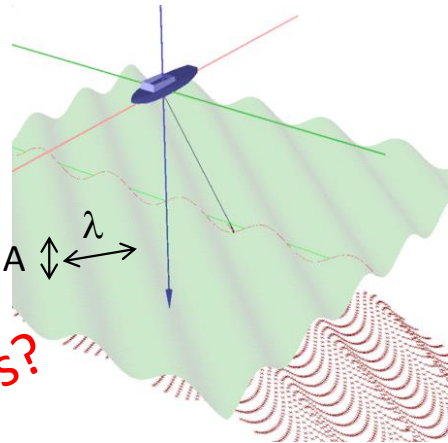
As we improve our system integration, Dynamic Oceanographic is responsible for an increasing %age of our residuals,



- **Velocline Undulations.**

Vertical perturbations and interface slopes.

1. **Internal Waves** – strong pycnoclines
(100-1000m wavelength 5-50m amplitude)
2. **Kelvin Helmholtz Waves** –weak pycnoclines
(shear induced)



- **Requires Operator Awareness**

Watermass Stability?
Interface “Roughness”

- **MVP – inadequate**
- **Need better Streaming real-time water column tools.**

