Benthic Habitat Mapping to Meet Management Needs: A Case Study from Saipan, Commonwealth of the Northern Mariana Islands (CNMI)

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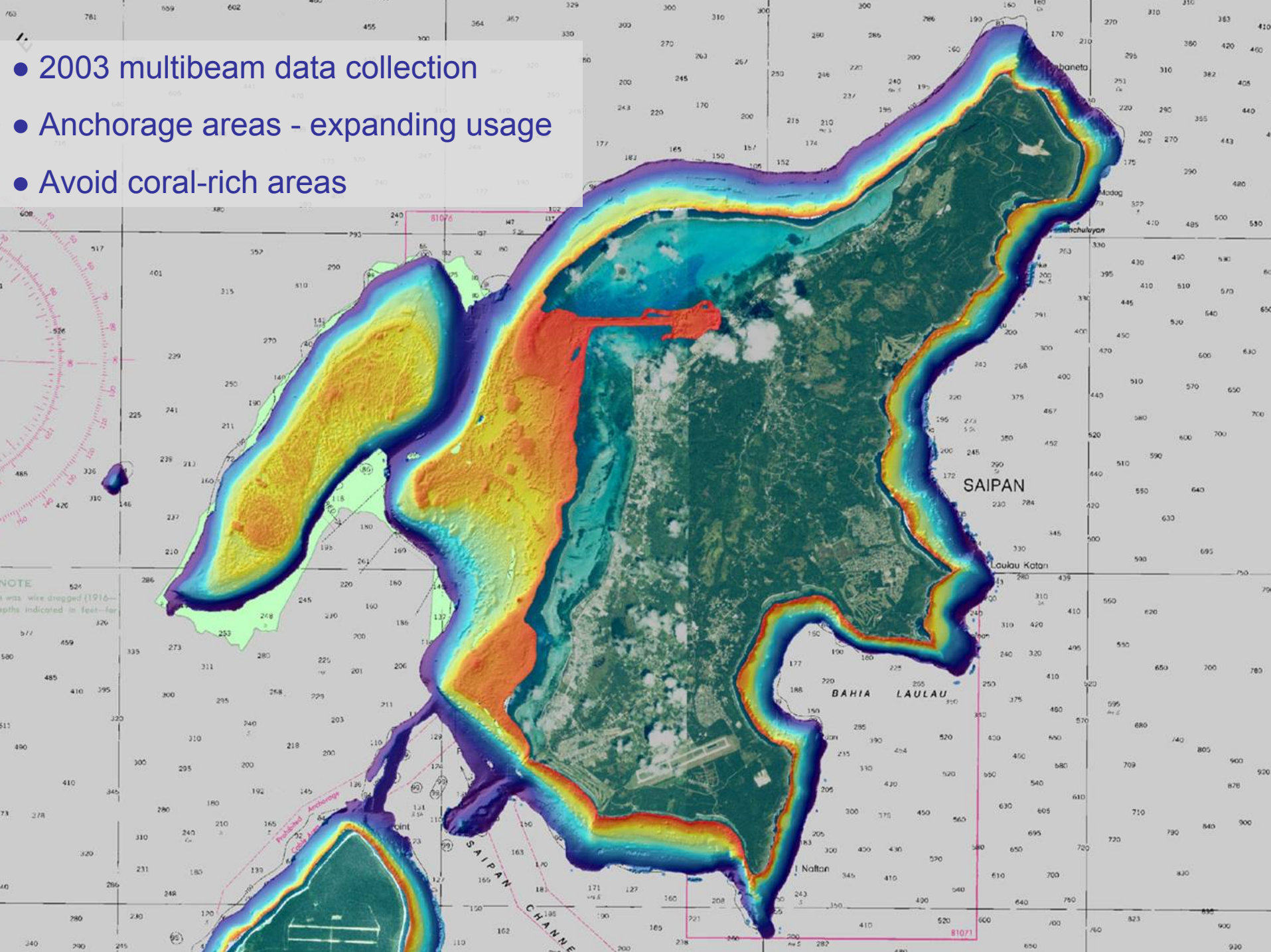
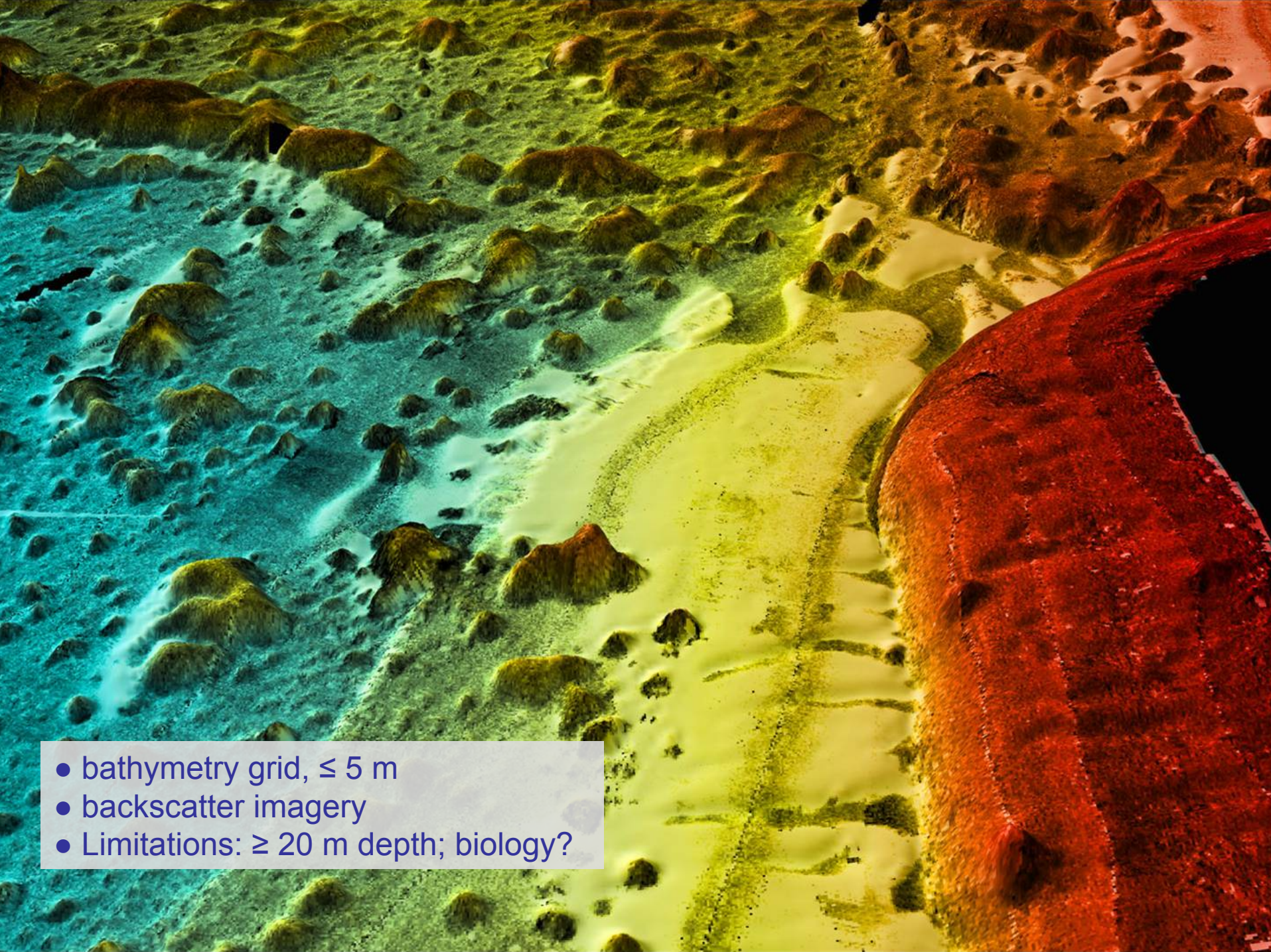
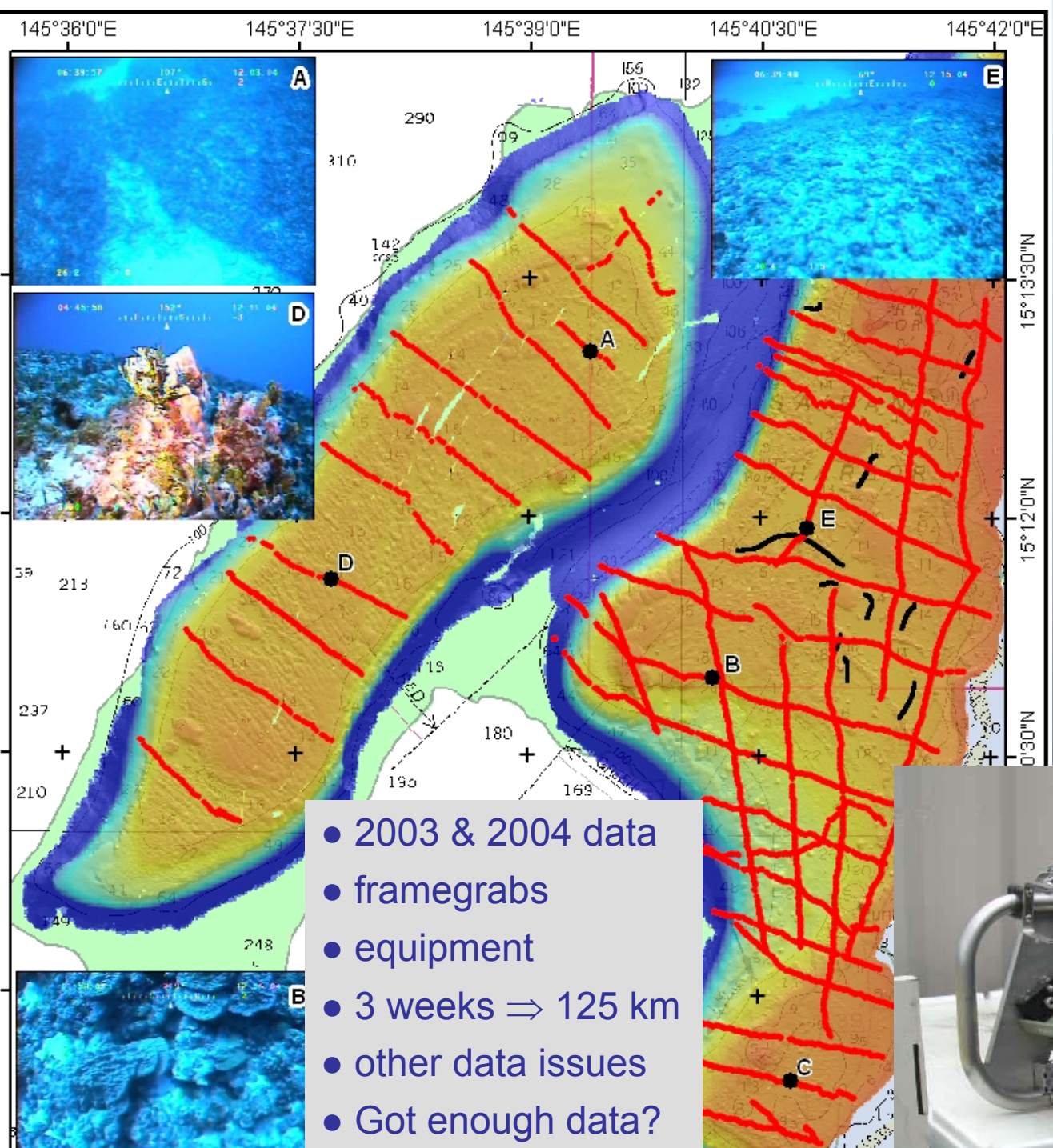
Saipan Crewboats, Inc.

- 2003 multibeam data collection
- Anchorage areas - expanding usage
- Avoid coral-rich areas





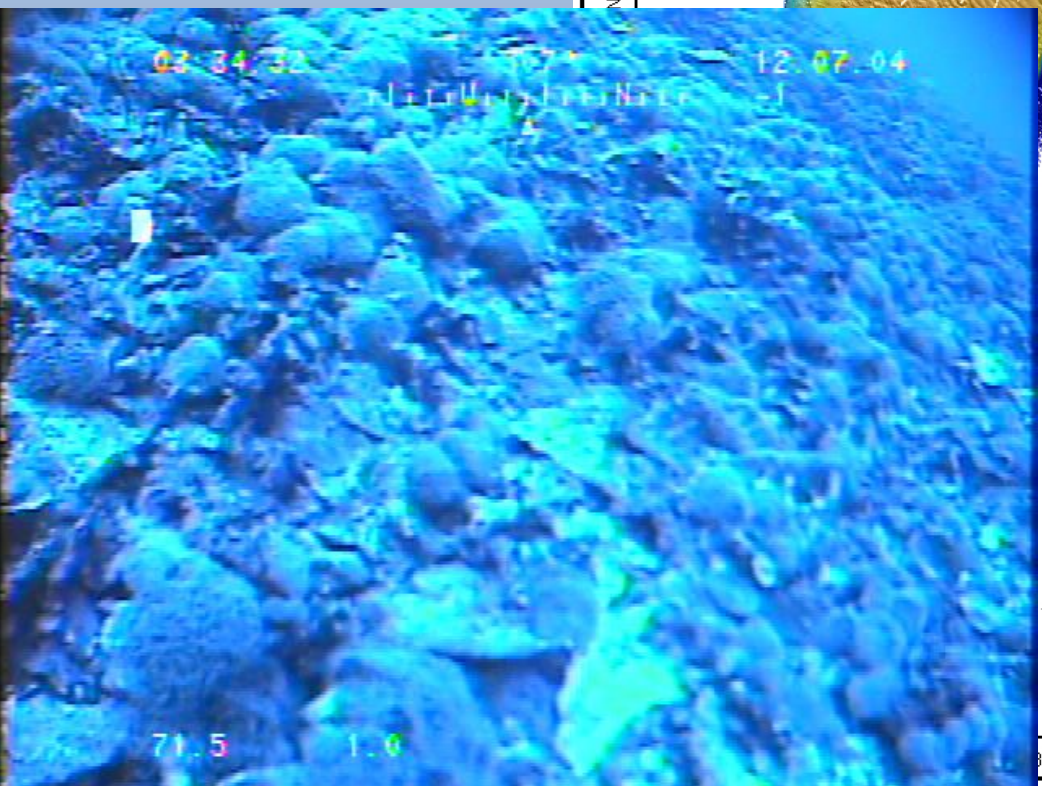
- bathymetry grid, ≤ 5 m
- backscatter imagery
- Limitations: ≥ 20 m depth; biology?

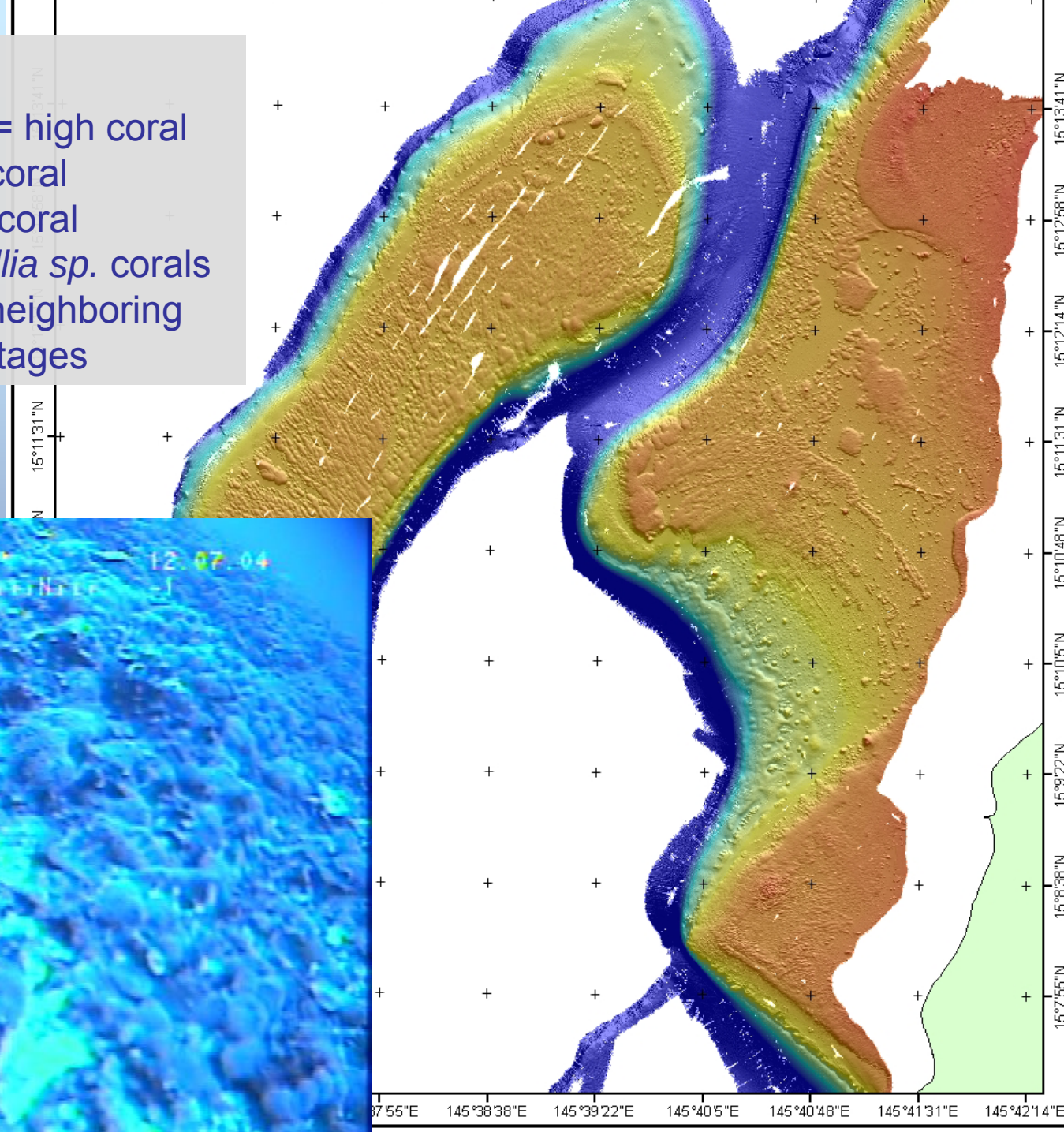


- 2003 & 2004 data
- framegrabs
- equipment
- 3 weeks ⇒ 125 km
- other data issues
- Got enough data?

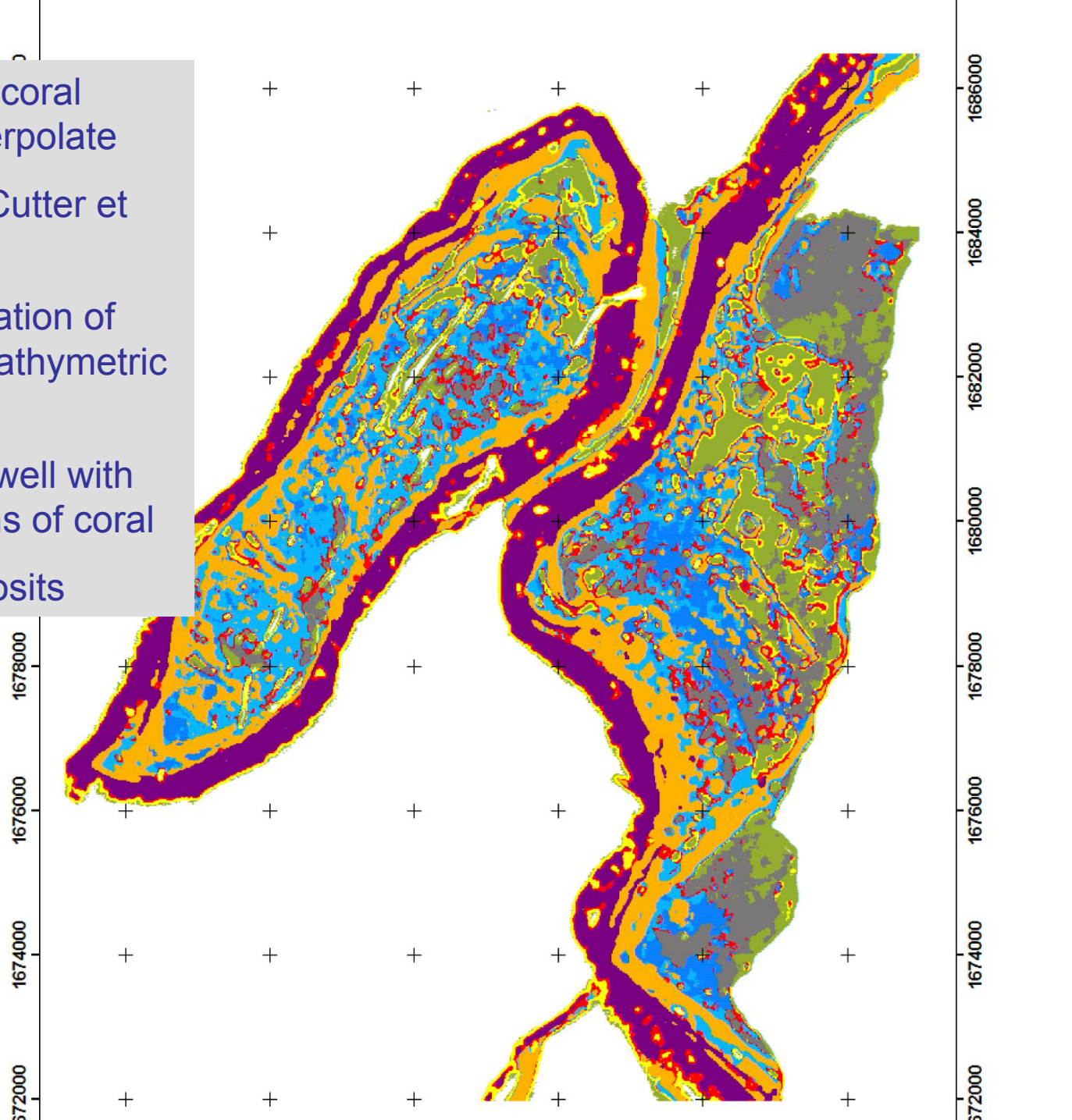
What's out there?

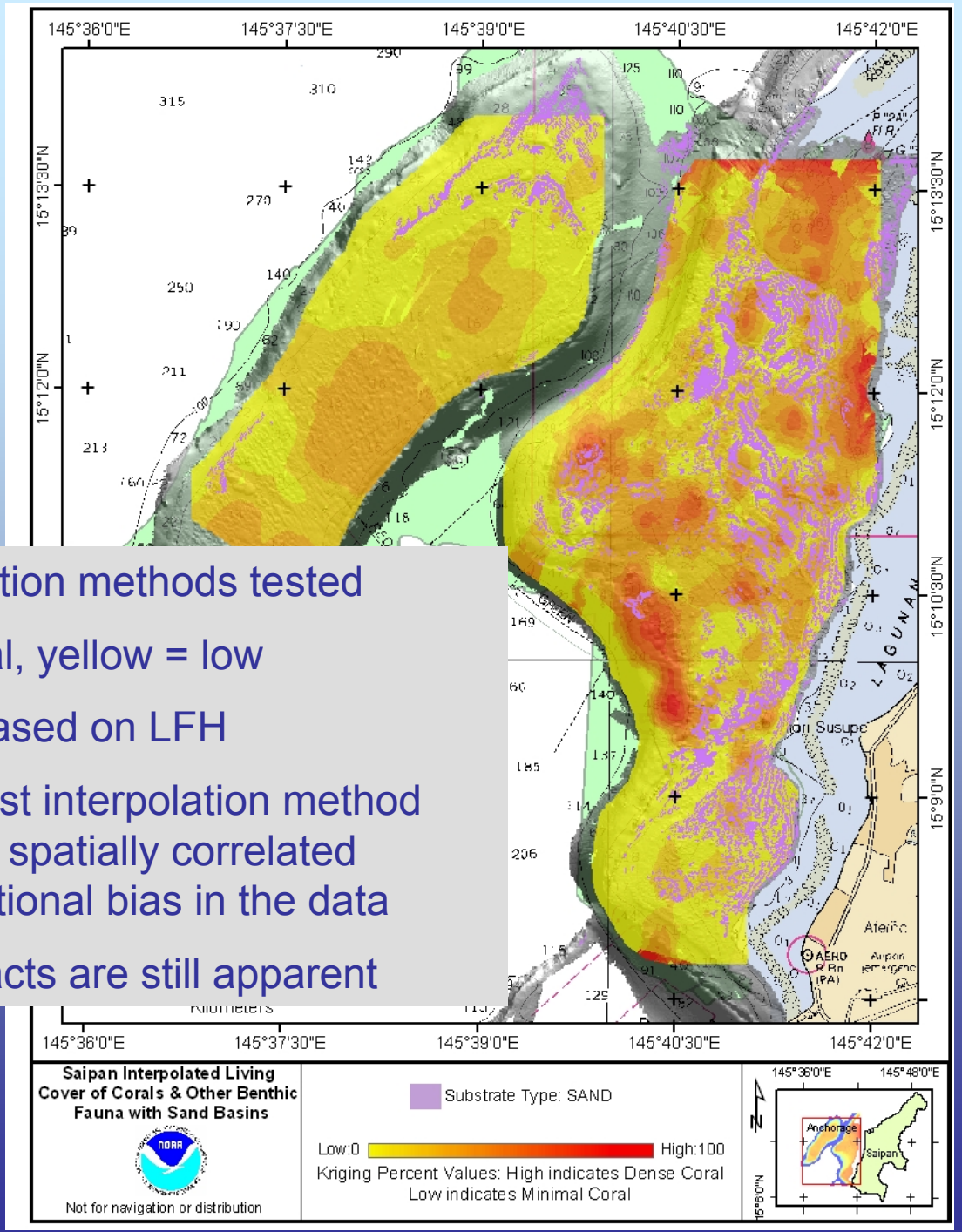
- popular anchorages = high coral
- offshore bank = low coral
- southern point = low coral
- deep (70 m+) *Eupahllia sp.* corals
- patchy distribution - neighboring transects ≠ coral percentages





- High variability of coral percentages => interpolate
- LFH Technique (Cutter et al., 2003)
- automated delineation of regions of distinct bathymetric complexity
- doesn't correlate well with optical classifications of coral
- identify sand deposits

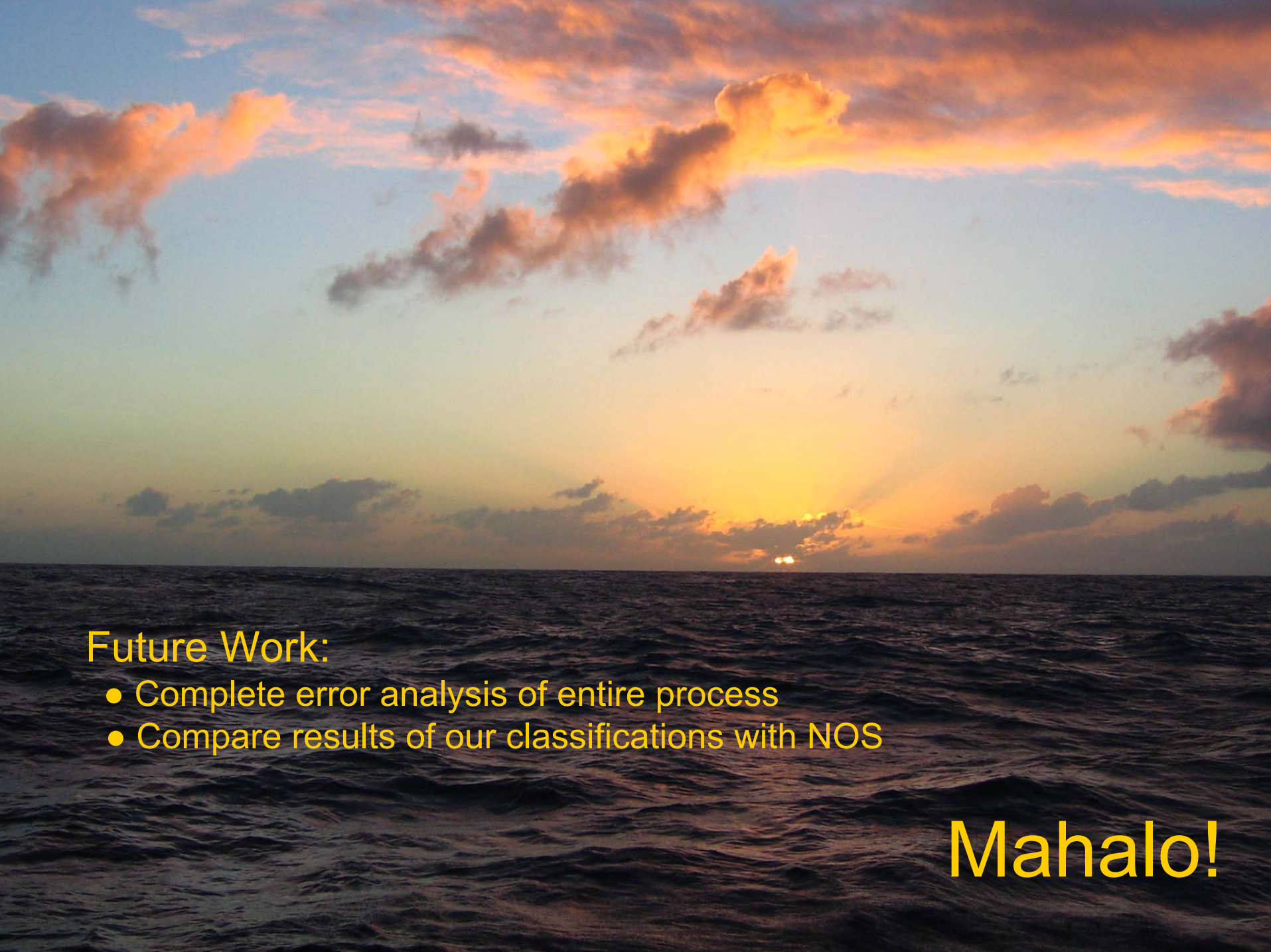




- Many interpolation methods tested
- red = high coral, yellow = low
- pink = sand- based on LFH
- Kriging- a robust interpolation method that accounts for spatially correlated distance or directional bias in the data
- Sampling artifacts are still apparent

Conclusions/Lessons Learned:

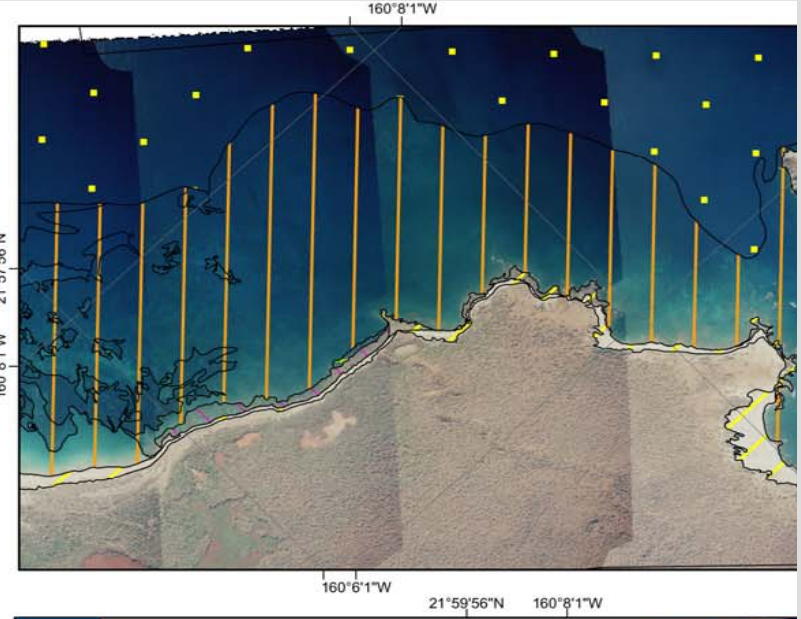
- Patchy distribution of corals makes interpolation problematic and potentially misleading
- Complete multibeam coverage and extensive optical validation are helpful but insufficient to completely overcome this problem
- Ordinary Kriging produced best results
- Towing cameras slowly and close to the seafloor, and with adequate illumination accelerates classification and increases accuracy
- Higher resolution available from digitial still cameras compared to video imagery provides the same benefits.



Future Work:

- Complete error analysis of entire process
- Compare results of our classifications with NOS

Mahalo!



Maps of benthic habitats – vital marine resource management tools:

- Magnuson-Stevens Act - overfishing and EFH
- MPAs …all habitats should be represented in MPAs (NAS, 2001)
- Mapping of coral reefs – 1st goal of CRCP

Managers and Mappers: Maps should depict what benthic characteristics? At what spatial scale(s)?

Methodological limitations