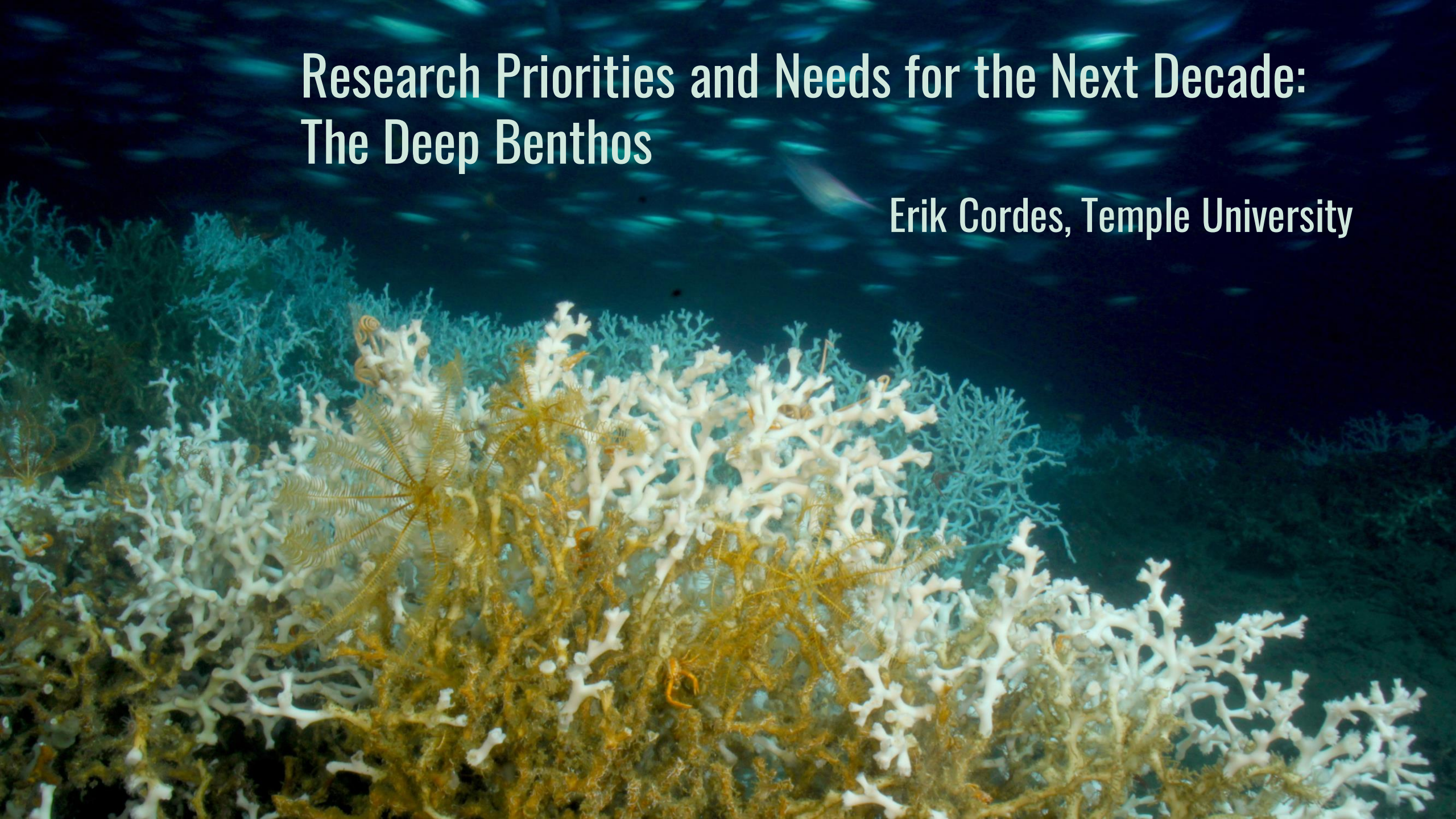
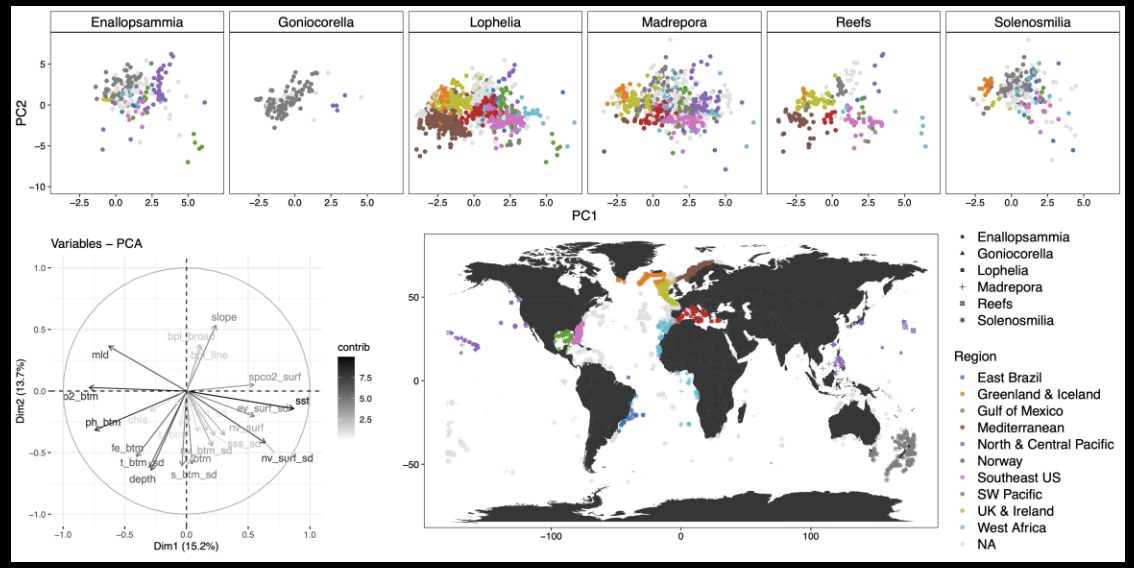
Research Priorities and Needs for the Next Decade: The Deep Benthos

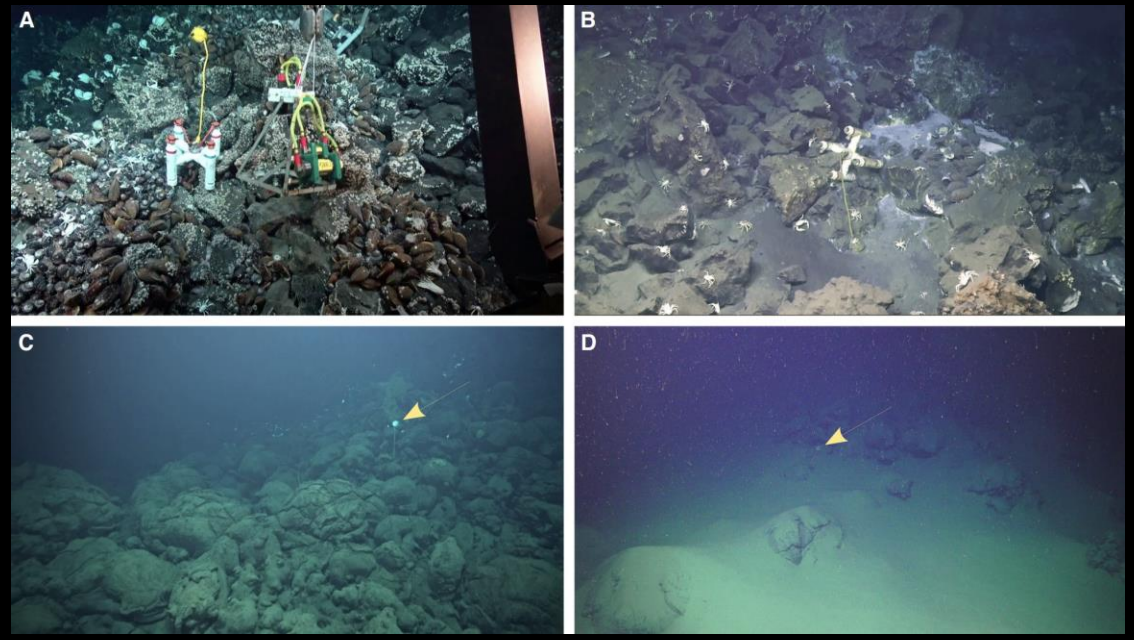
Erik Cordes, Temple University



How Did the Last Decade Go?

- Major advances in knowledge of the distribution and controls on distribution of species and habitats in the deep ocean
- Realization that the deep benthos is as diverse in habitat types as it is in species
- Increased understanding of the stability and instability of the deep benthos
- Global efforts to standardize deep ocean biological and oceanographic data
- Increase in industrial activity along with greater emphasis on proper stewardship

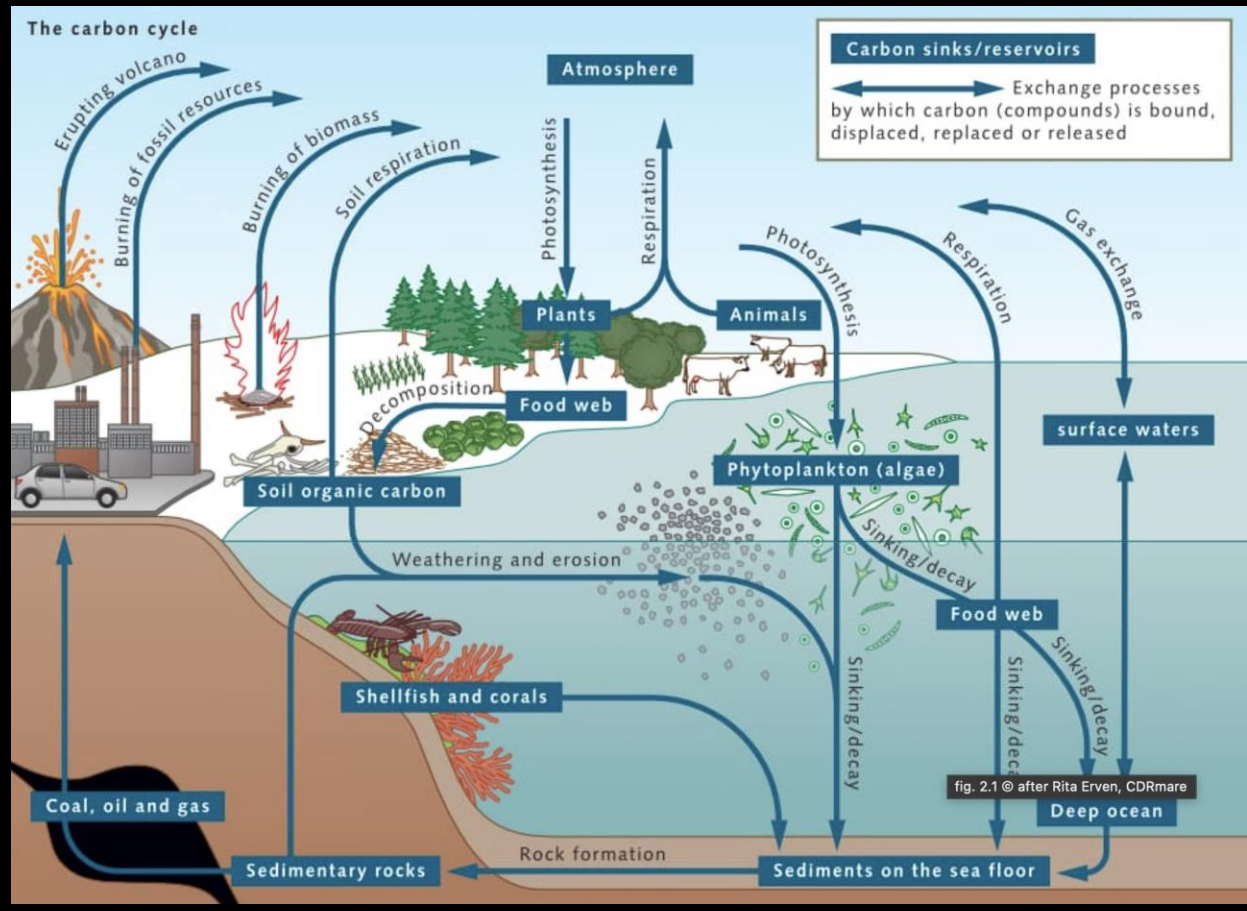




Images from Cordes et al. 2024 and Beinart et al. 2024

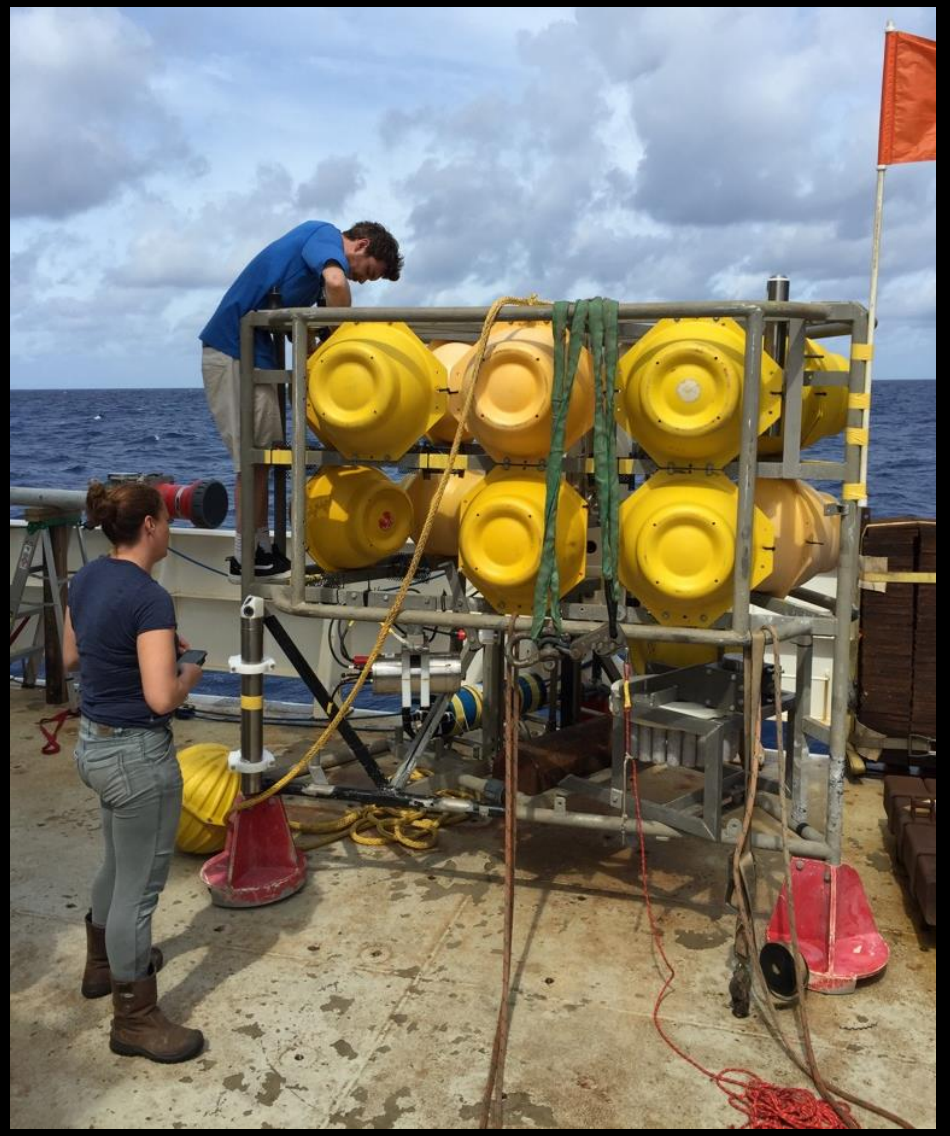
Science Priorities for the Next Decade

- What are the mechanisms underlying species' responses to the environment?
- Improved predictive capacity for species and habitat distributions, including biological interactions
- How will the deep benthos be affected by ocean change? Heat waves, acidification, deoxygenation - thresholds
- Impacts of human activity (drilling, mining, fishing, mCDR) on the deep benthos
- Interdisciplinary quantification of ecosystem services of the deep ocean



Science Needs for the Next Decade

- More integrated/interdisciplinary initiatives
  - Integrated Study Sites?
- Improved measurements of biogeochemistry and physiology on the seafloor
- Longer time series of integrated data collection for local scale environment and behavior characterization
- Connectivity among databases
- Support for data storage (video)



Suggested Actions for the Next Decade

- Cyclical relationship with industry, not just commercialization (fiber? offshore labs?)
- More mid-scale programs ($3-5M/y) to facilitate larger interdisciplinary groups
- Bigger ships with telepresence and lower emissions
- More NDSF assets
- Shared facilities (*in situ* instrumentation, NDSF tools, landers)
- More partnerships – international research (travel + stipend), private foundations, other Directorates, other agencies
- Oversight for research with industrial applications (mining, mCDR)