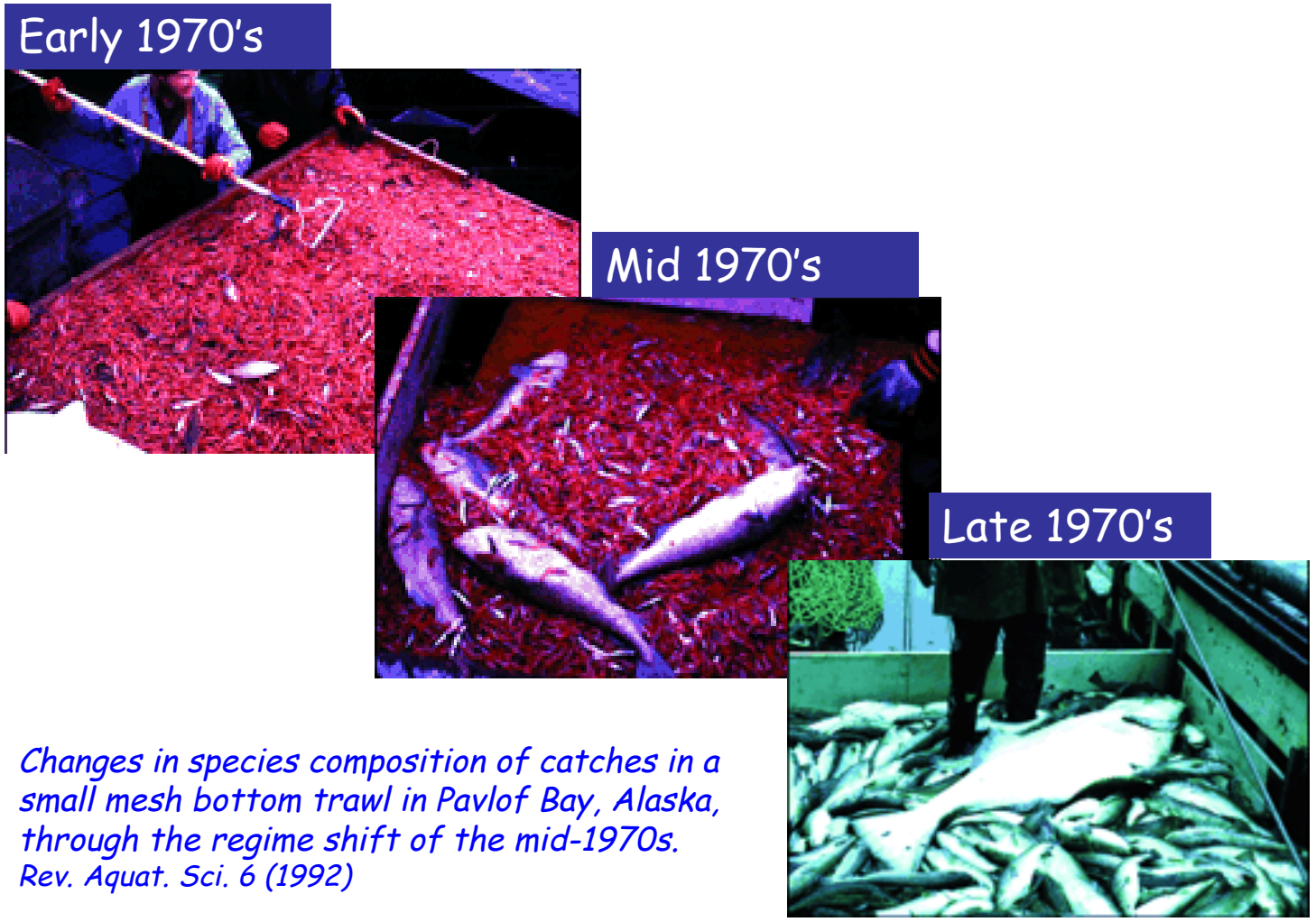
Joint PPAI/POS Panels Session

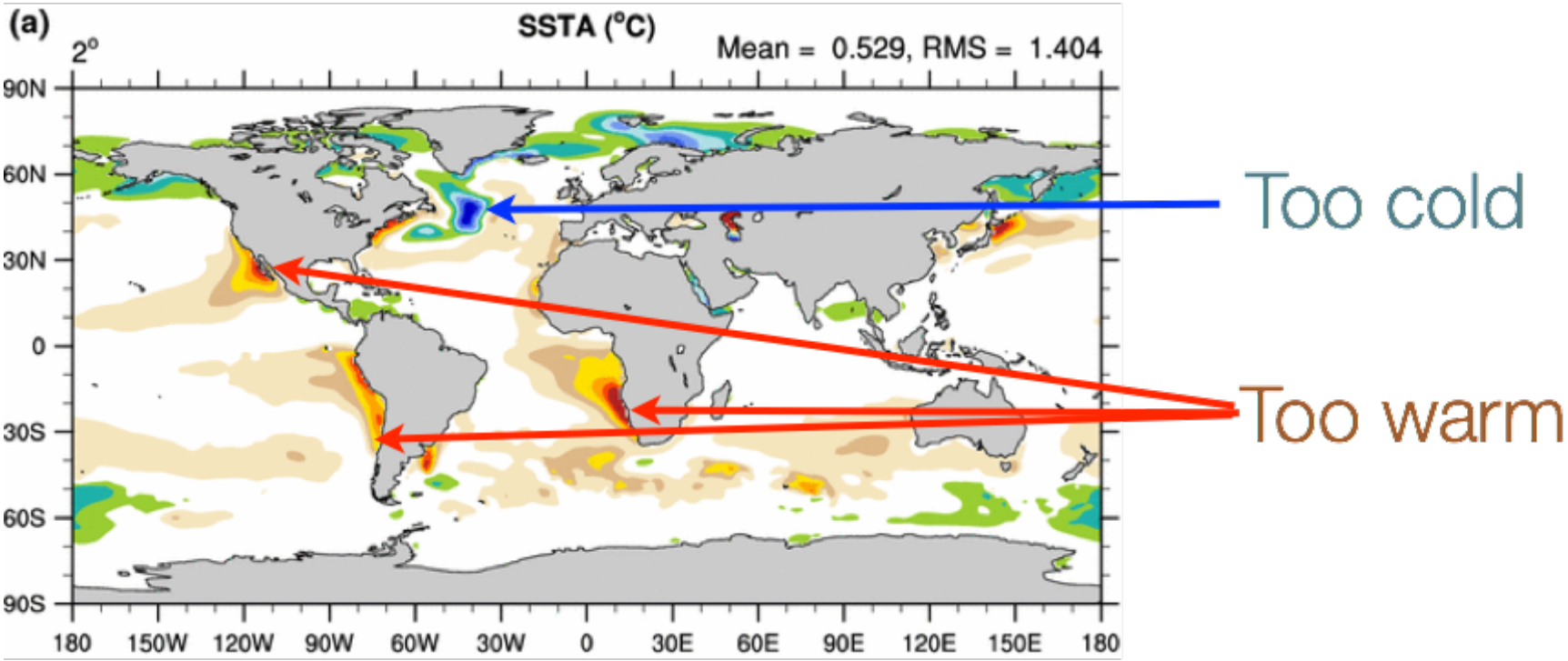
Predictability of coastal/ shelf (eco)systems

Ecosystem changes through a regime shift



Changes in species composition of catches in a small mesh bottom trawl in Pavlof Bay, Alaska, through the regime shift of the mid-1970s.
Rev. Aquat. Sci. 6 (1992)

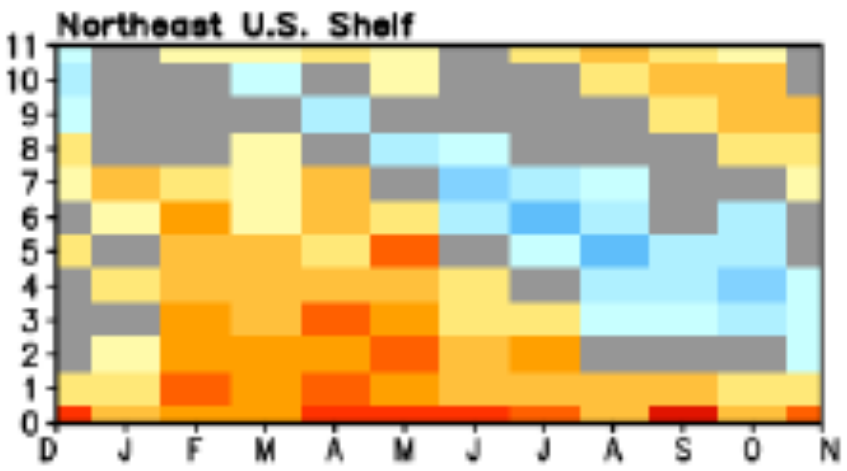
Climate model biases

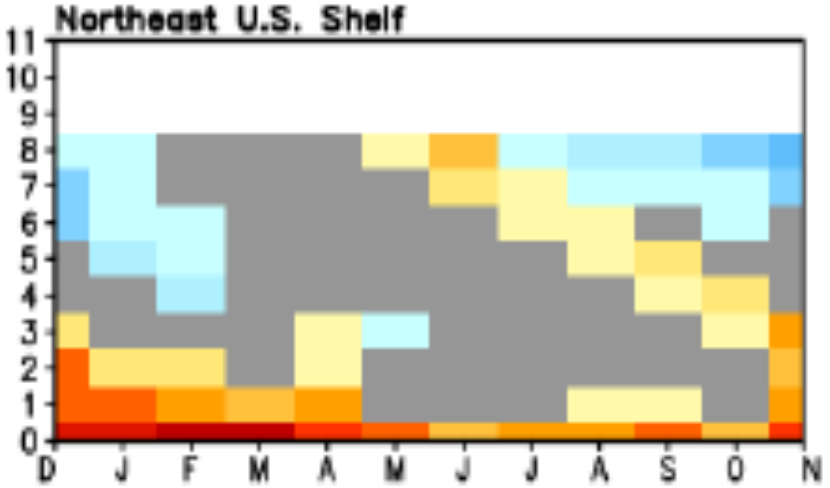


Motivation

- There is increasing concern about the impacts of climate variability and change on coastal marine ecosystems in the U.S. and other regions of the world.
- Understand how multiple stressors, some associated with climate (e.g., temperature, precipitation), can directly and indirectly affect marine ecosystem function.
- Advance the science of how the environment and marine ecosystems function in the present and how they may change under future climates.
- Advance CLIVAR's collaboration with the research and operational communities that develop and use climate information (CLIVAR Goal 4.5) and use climate science knowledge in applications, i.e., management of fisheries and marine ecosystems. Understanding the coupled physical-ecosystem environment will contribute to meeting requirements for ecosystem prediction and decision-making capabilities.

Predictability?





Anomaly correlation coefficient between the predicted and observed SST anomalies for the Northeast U.S. Large Marine Ecosystem from GFDL's CM2.1 Seasonal Forecast system (Delworth et al. 2006) and NCEP's CFSv2 (Saha et al.2014) seasonal forecast system. The x-axis corresponds to the start month of each forecast, the y-axis corresponds to the lead-time in months (figure courtesy of K. Pegion, Stock et al., in review). Note that correlations are < 0.4 for nearly all starts and leads

Possible topics

- Understand how regional and coastal eddy-scale circulation dynamics change in response to current and future climate forcing.
- Assess the role that eddy-scale circulations have in the marine ecosystem composition of the lower trophic levels on the shelf.
- Quantify how eddy-scale circulation impacts the physical and marine ecosystem connectivity between different coastal habitats and between the shelf and basin-scale.

Possible Activities

- Design numerical experiments and developing metrics for assessing the role of mesoscale circulation and eddies in the structure and productivity of the lower trophic levels of the coastal marine ecosystem.
- Design numerical experiments to explore the role of ocean eddies in the shelf-open ocean dynamics.
- Design numerical experiments to study shelf marine ecosystem variability under future climate states.
- Identify observational gaps for understanding the mechanisms of interaction between marine ecosystem and eddy-scale ocean processes.
- Identify issues with connecting climate data into ecological models
- Propose targeted observations and process studies.