Ocean Exploration in Time and Space

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Why Ocean Observatories?

- Expeditionary mode has very limited ability to quantify change
- Observatories are common and valuable on continents, but thus far are rare in the oceans
- New wave of thought - Expert views in reports:
  - NRC’s Illuminating the Oceans
  - President’s Ocean Explorations Panel
  - NRC’s Ocean Exploration Panel

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Observatory Strengths

- Only way to observe abrupt changes, moderate to high frequency phenomena, and transients
- Key long-term variables often have low signal-to-noise ratios and require long-term and high frequency observations

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Changes in Atmospheric CO$_2$

Keeling and Whorf, 2000

Petit et al., 1999

D. Karl
ATMOSPHERE–OCEAN INTERACTIONS IN THE NORTH PACIFIC OCEAN

D. Karl
Processes: Sampling in Time and Space

Dickey, 2002
DEOS - Three Elements

- Plate Scale - e.g. NEPTUNE
  - Fiber optic cabled
  - Substantial seafloor power
- Coastal Observatories – LEO-15 and others
  - Fiber optic and mooring
  - Significant bandwidth/power
- Global Network - Moorings
  - Long time series
  - High bandwidth telemetry/seafloor power

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LEO Instrumentation Used for the 2000-2001 Experiment
Bermuda Testbed Mooring Time Series

Dickey et al., 1998a, 2001a
Events at the Bermuda Testbed Mooring Site

Dickey et al., 2001a; McNeil et al., 1999
Autosub: Near Bermuda Testbed Mooring Site

Griffiths, Knap, and Dickey, 2000
Dickey

Sargasso Sea Ocean Observatory
Global Thermometry Network

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Draft Map of Pilot Time Series Observatory System

Time Series Science Team, Ocean Observation Panel for Climate
Data Assimilation

Dickey, 2002
Some Challenges

- New and more sensors and systems
- More platforms of various types
- Program coordination and data synthesis
- Stable funding base
For further information, surfs up in Santa Barbara!
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