

PML

Plymouth Marine
Laboratory

Listen to the ocean

Satellite Earth Observation: making cruises obsolete(?)

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Preamble

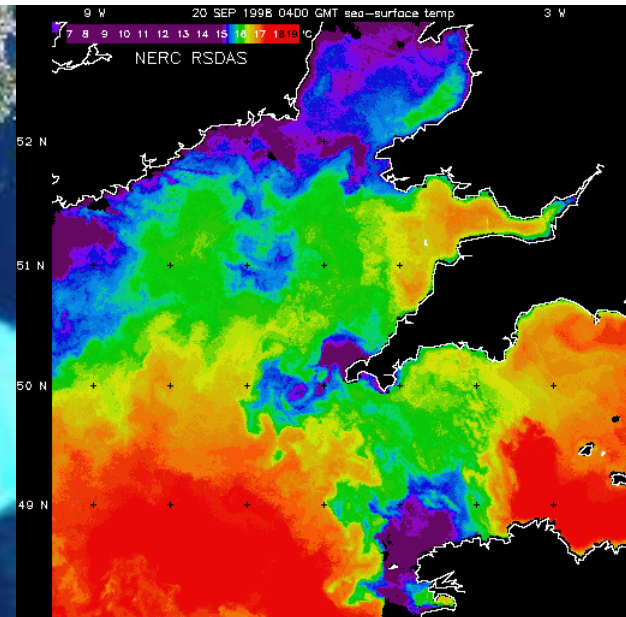
Aiken's n^{th} law:

“If you can't measure it from space it isn't important”

Case for space is beguiling ...



Earth



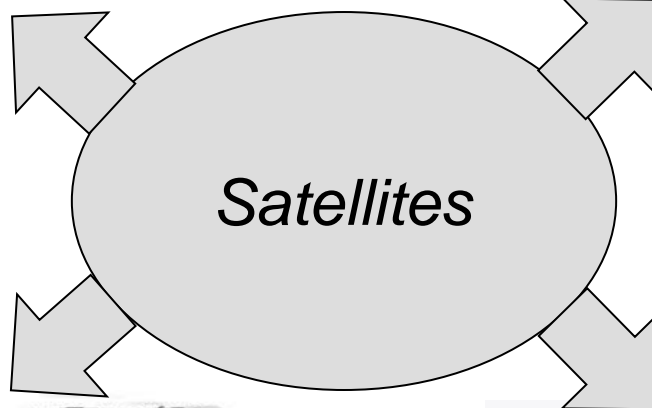
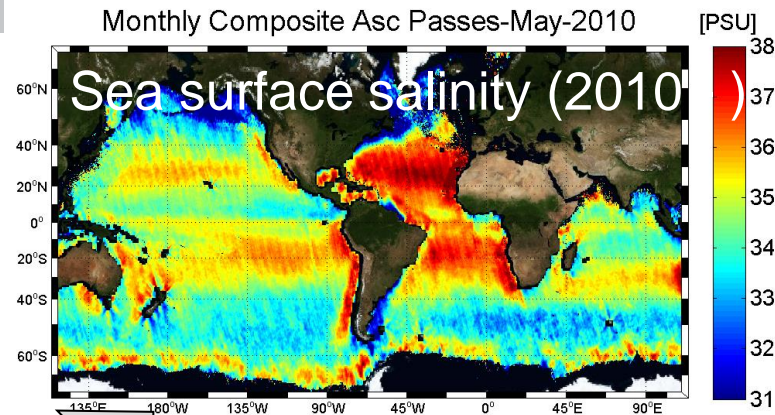
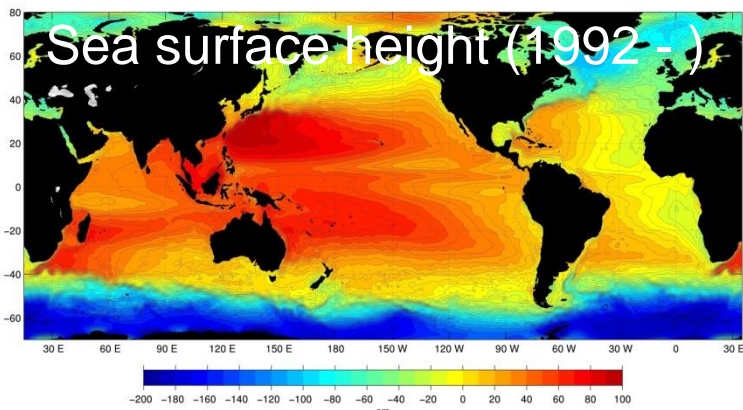
... we can start to appreciate (observe) the complexity and beauty of the oceans on an unprecedented scale.

Case for space ...

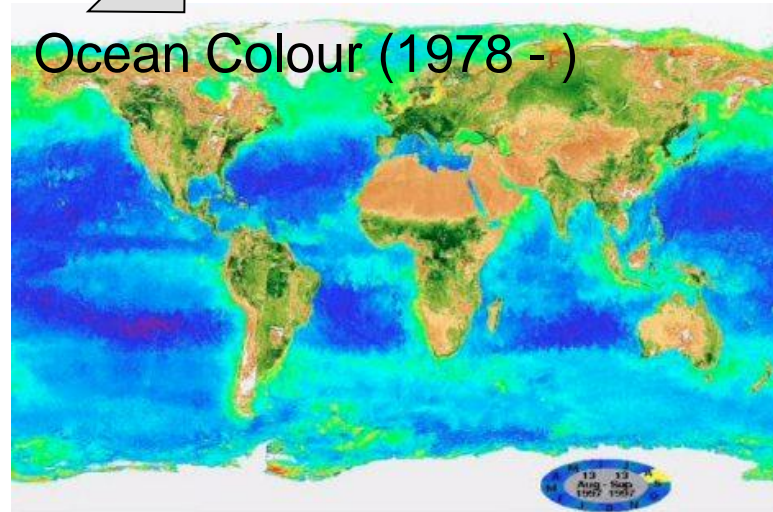
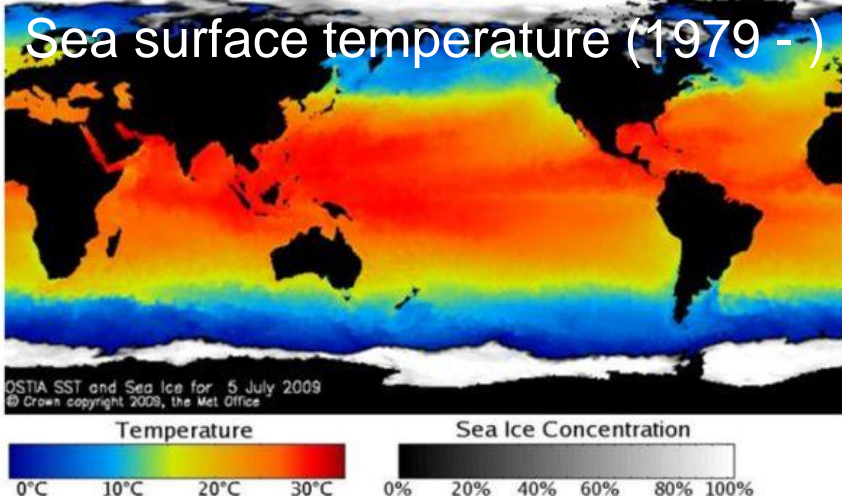
- Satellites
 - ✓ **Unparalleled coverage.** Global daily coverage at e.g. 1 km (2 billion ocean pixels – cloud reduces to around 0.5 billion);
 - ✓ SeaWiFS lifetime: 10 years – 1.7 trillion pixels
 - ✓ **Cheap:** 0.1p per pixel
- Research cruises
 - × **Limited spatial coverage**
 - × “Interesting” regions – clement weather
 - × **Expensive:** £30,000 per station
- Time-series stations
 - × **Limited spatial coverage**
 - ✓ Captures seasonality
 - ✓ Wide range of rate and state measurements
 - × **Expensive:** £1M per year

But what *actually* are we **measuring** from satellites ...

PML | Physical and Earth System Science Emerging and existing platforms and technologies



Restricted to skin or ~10 m



What do we need to invest in?

- **Operational context**

- NEODAAS providing data in **real-time for monitoring / cruise planning**
- Real-time data being **assimilated** into ocean models
 - SST (operationally mature – GHRSSST)
 - SSH (research stage)
 - OC (research stage: better physically to assimilate IOPs)
 - SSS (sensors only operational ~ 2 years: research stage)

- **Research context**

- Research cruises for **satellite product evaluation and development**
 - State variables (chlorophyll)
 - Rate terms (primary production, biogeochemical cycling)

Thank you

