Ocean Climate Data Records from Space

Kenneth S. Casey - NOAA National Oceanographic Data Center

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(or, *Welcome to the Valley of Death*)

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What is a Climate Data Record?

A Climate Data Record (CDR) is…

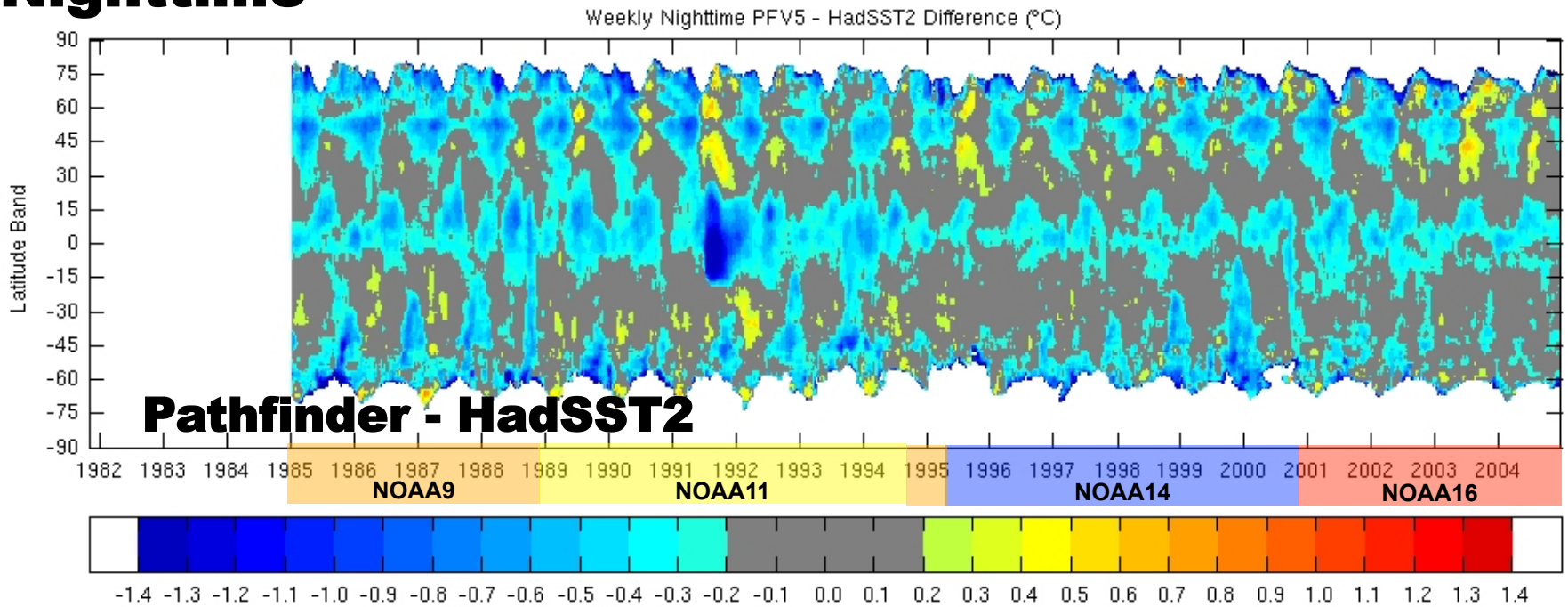
"… a time series of measurements of sufficient length, consistency, and continuity to determine climate variability and change."

Climate Data Records from Environmental Satellites, National Research Council, National Academy Press, 2004.

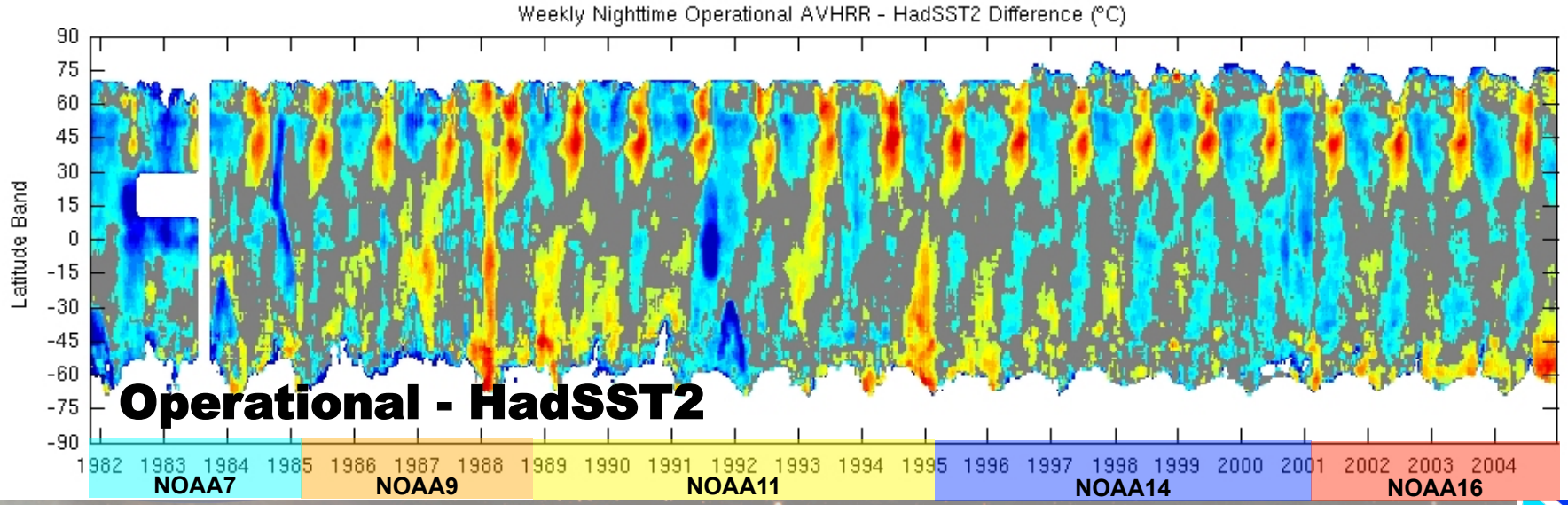
Why Do We Need CDRs?

- **Because real time satellite data are simply…**
  - Dreadful
  - Awful
  - Terrible
  - Useless
- **Ok, so they aren't that bad, however…**

Nighttime



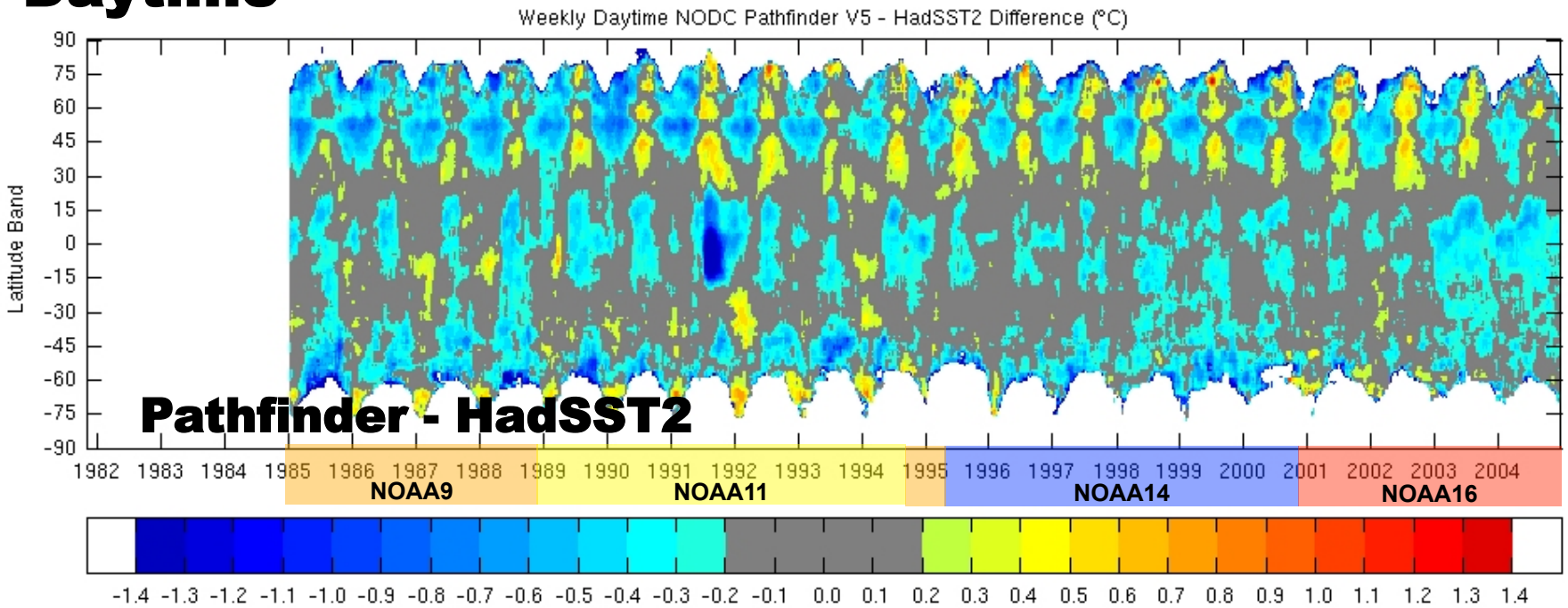
Pathfinder - HadSST2



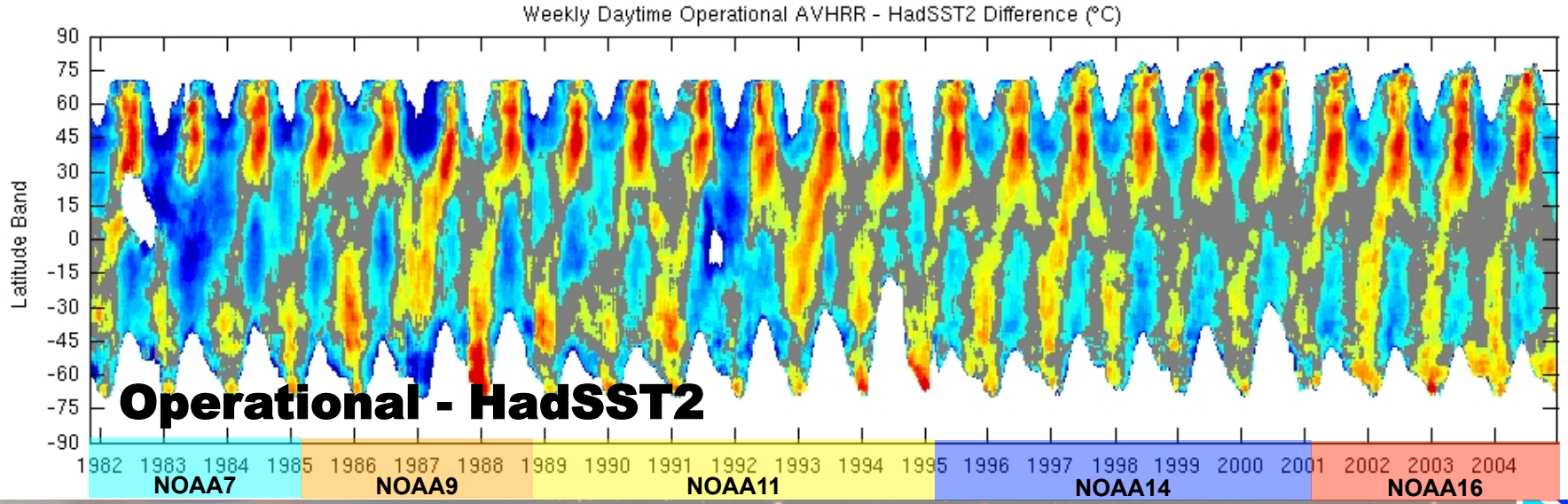
Operational - HadSST2

HadSST2: Rayner et al. (2006), *JClim*, in press.

Daytime



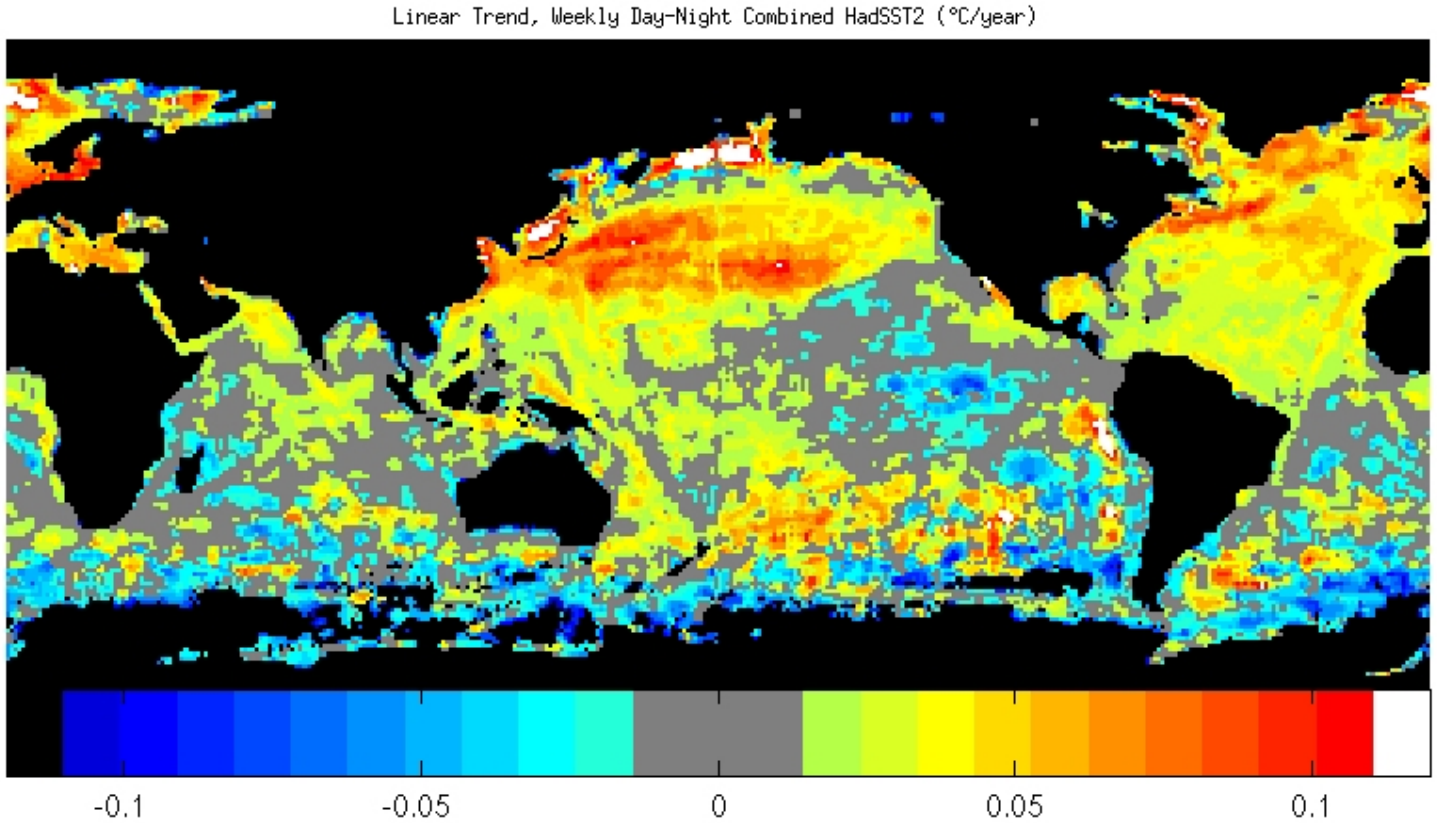
Pathfinder - HadSST2



Operational - HadSST2

Global Linear Trends, 1985-2004

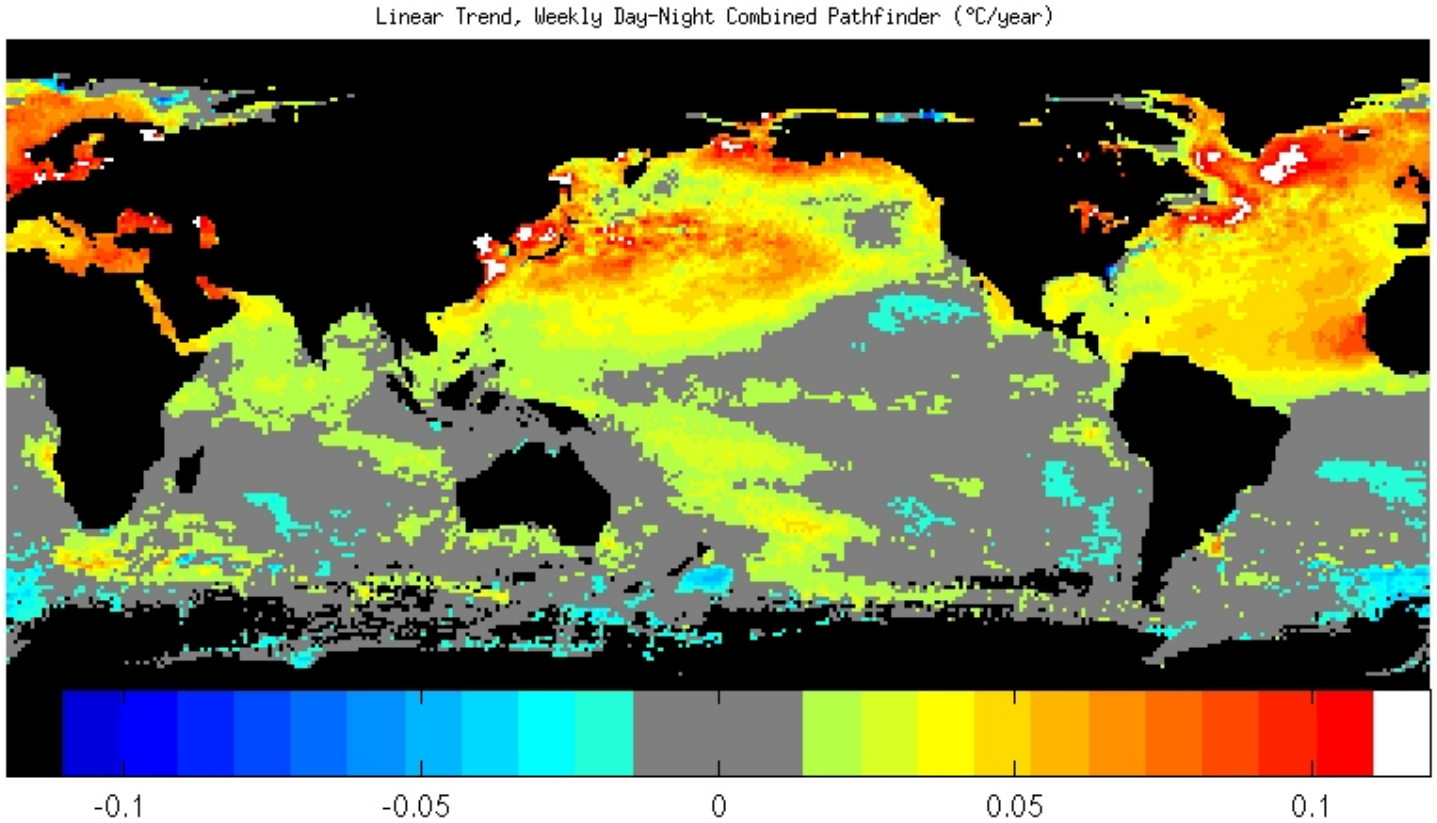
HadSST2



°C/year

Global Linear Trends, 1985-2004

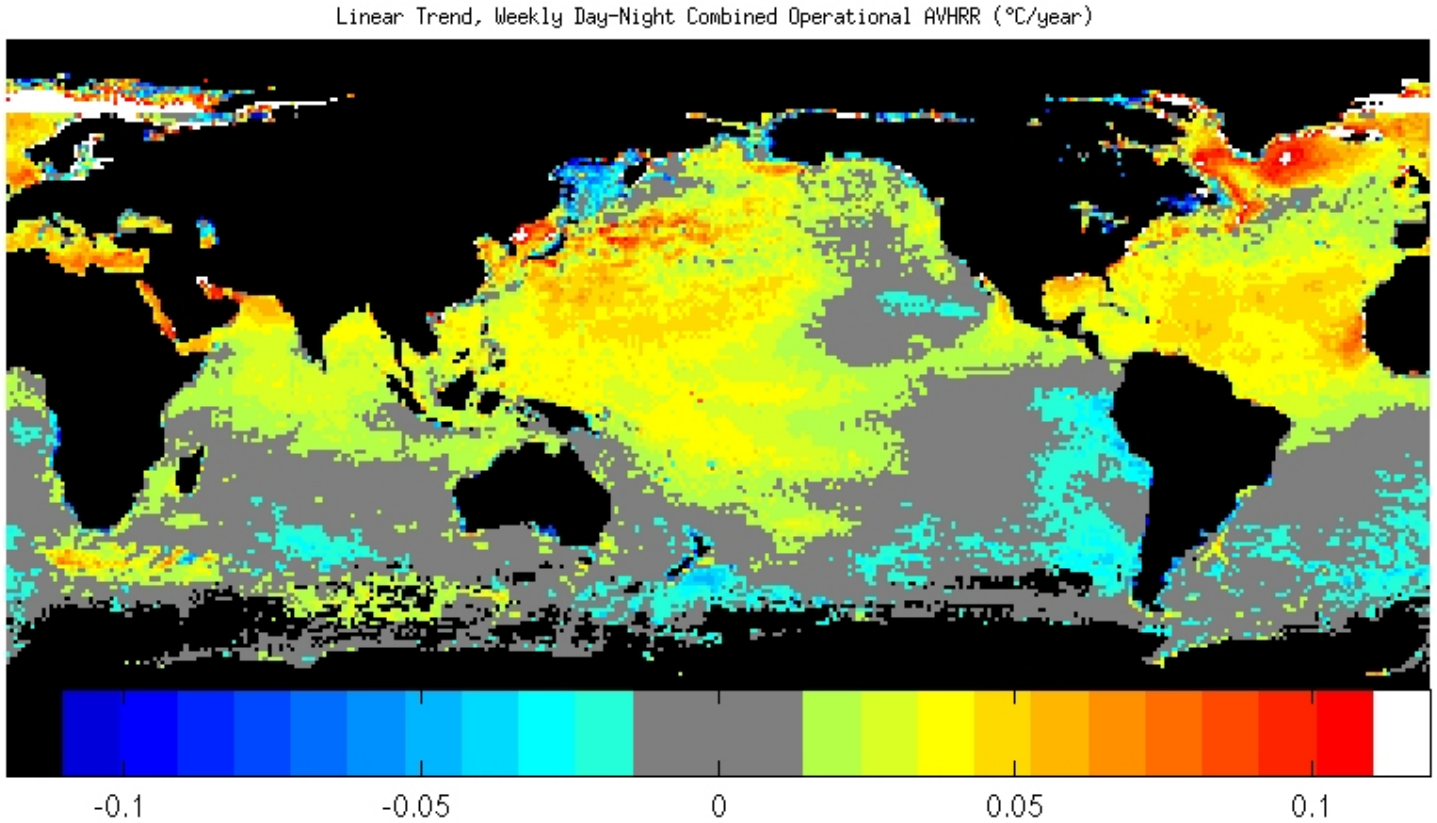
Pathfinder



°C/year

Global Linear Trends, 1985-2004

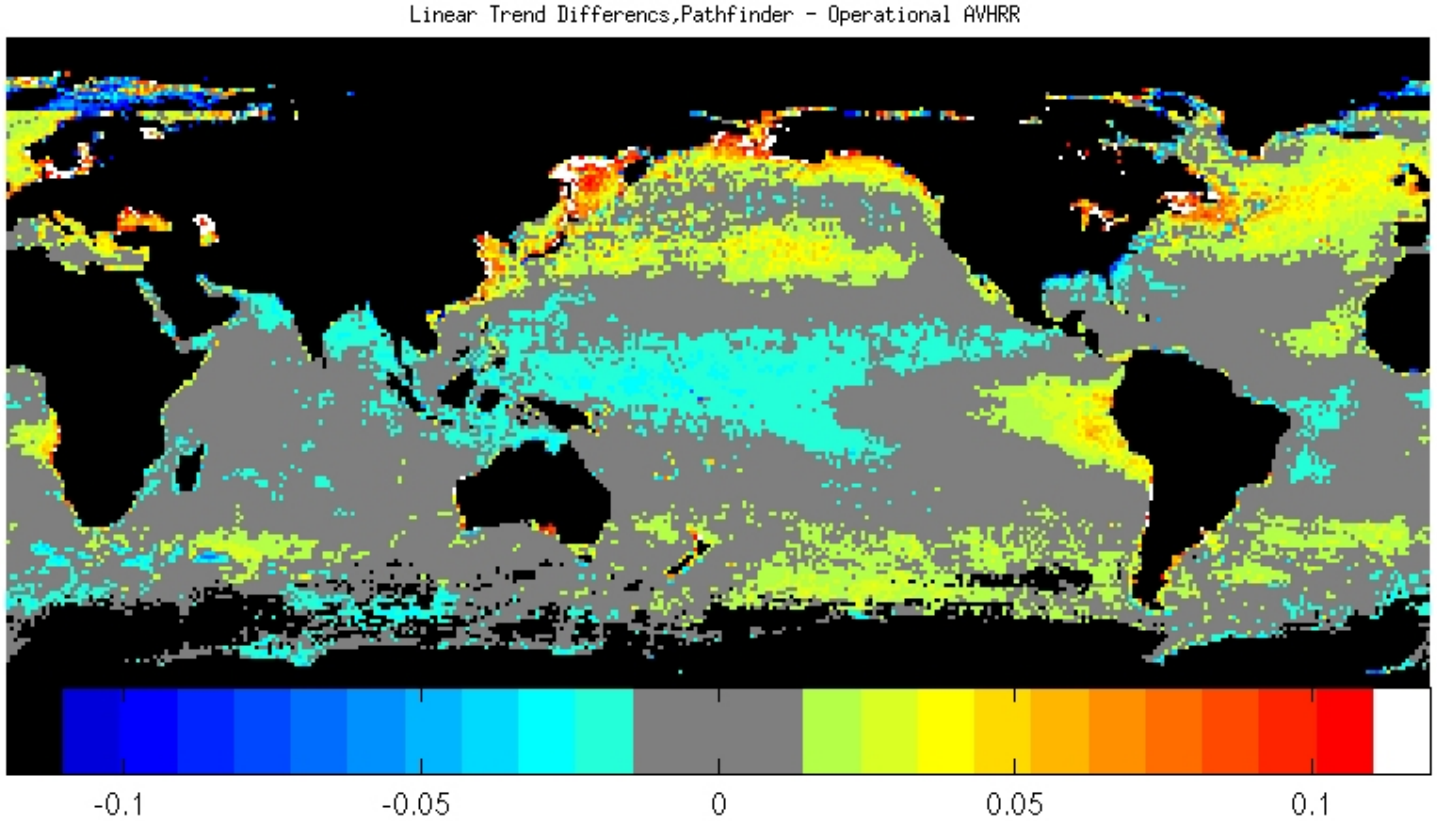
Operational



°C/year

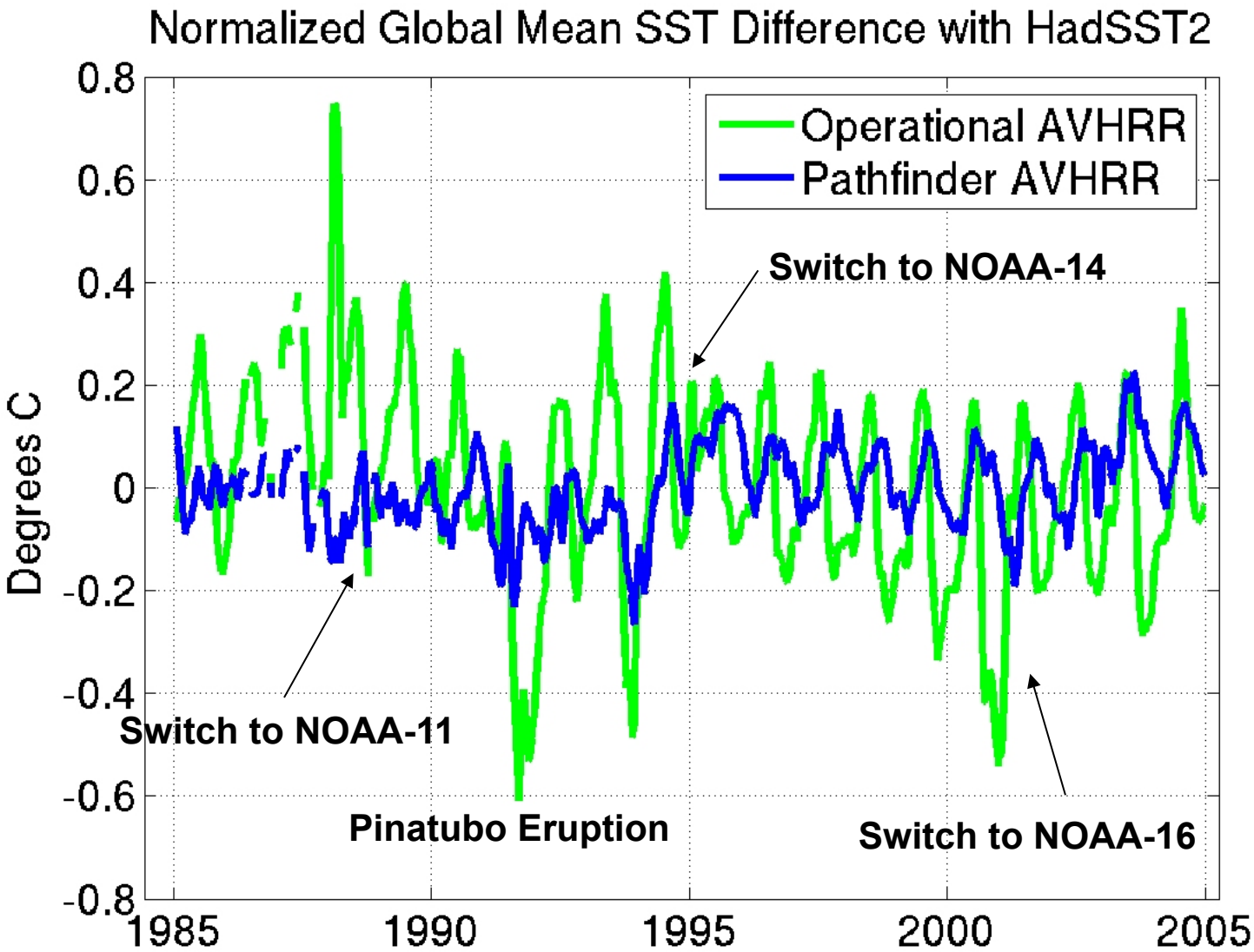
Linear Trend Differences

Pathfinder - Operational



ºC/year

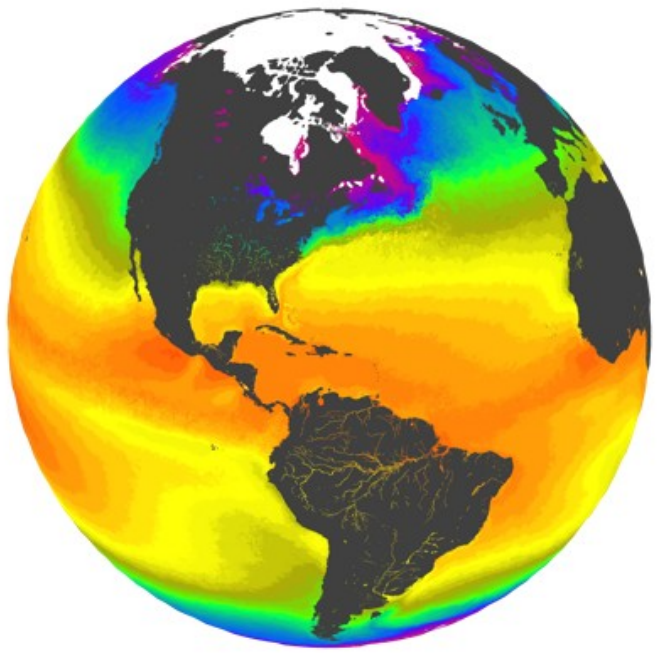
Global SST Compared to In Situ



So, what CDRs are available?

- Sea Surface Temperature
- Ocean Color
- Marine Winds
- Ocean Surface Topography
- Sea Ice

Sea Surface Temperatures



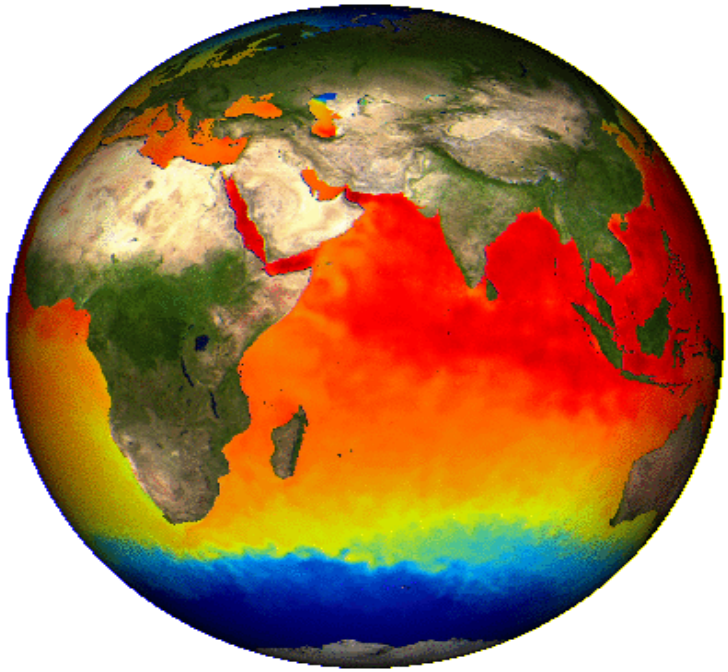
Climatological week 50 from 1985-2001 Pathfinder Version 5 SST data, with ice mask from week 50 of 2003.

NODC Pathfinder V5

- Reprocessed AVHRR from 1985-2005
- Global, 4 km resolution
- Daily, 5-, 7-, 8-day, monthly and annual time series and climatologies

pathfinder.nodc.noaa.gov

Sea Surface Temperatures



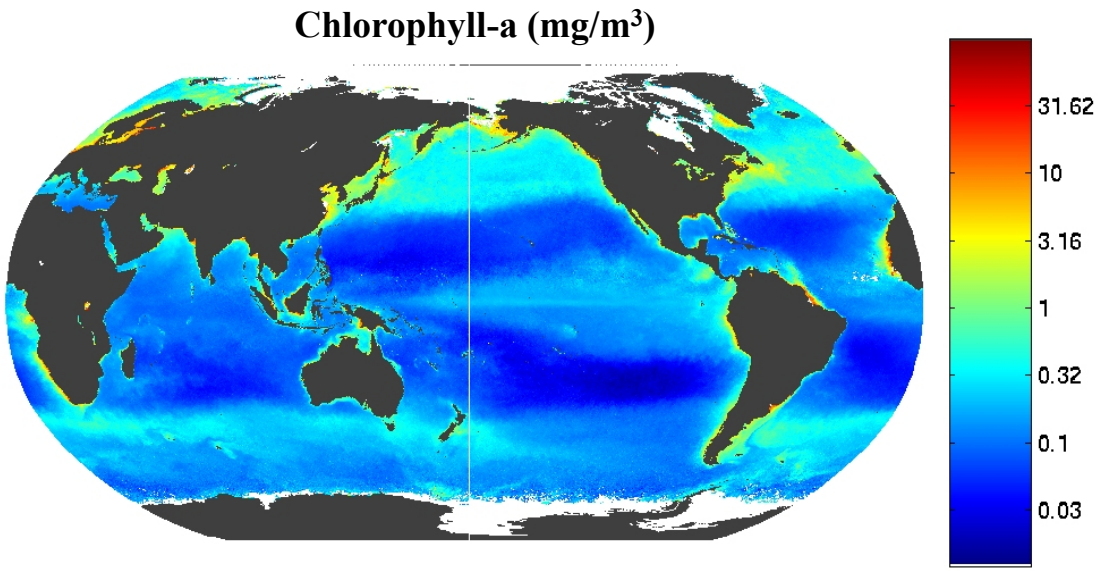
An example GHRSST L4 blended product: Global 1/20° UK Met Office OSTIA analysis, produced daily using GHRSST Level 2P data from AVHRR, AATSR, etc.

GODAE High Res (GHRSST)

- Global SSTs from multiple satellites in real time *and* delayed-mode
- L2P: AVHRR, MODIS, AMSRE, and AATSR, TMI, etc.
- AND analyzed L4 products
- PO.DAAC handles the real time
- NODC is the LTSRF, archiving and producing CDRs

www.ghrsst-pp.org

Ocean Color

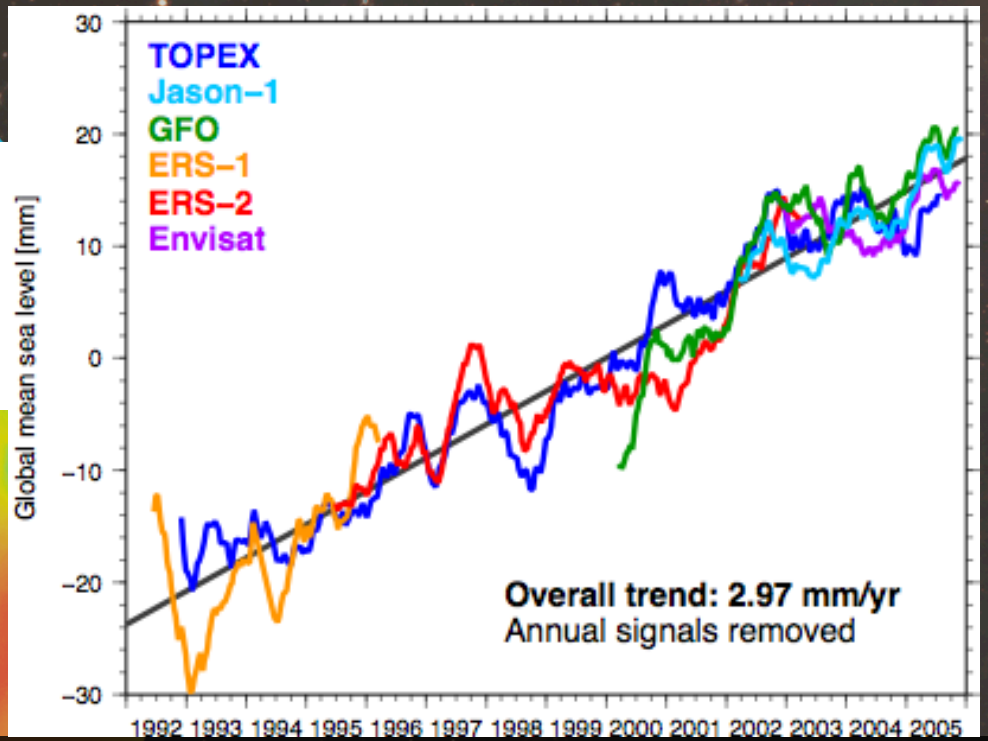


Chlorophyll-a climatology for April based on SeaWiFS v4 data from 1998-2003 from NODC SeaWiFS climatology.

- Int' l Ocean Colour Coordinating Group - ioccg.org
- NASA OBPG - oceancolor.gsfc.nasa.gov
- On SeaWiFS Version 5.1
- NOAA Users: Rick Stumpf

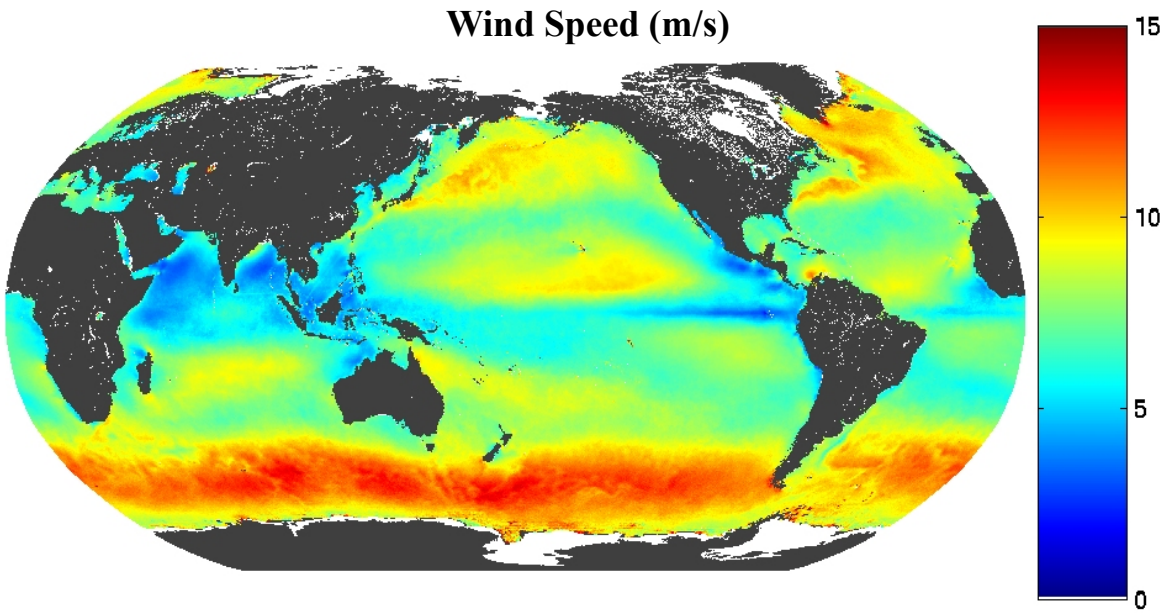
Ocean Surface Topography

Global mean sea level determined by TOPEX, Jason-1, Geosat-Follow-On (GFO), ERS-1, ERS-2, and Envisat radar altimeters



- NOAA's Lab for Satellite Altimetry - ibis.grdl.noaa.gov/SAT
- Laury Miller and John Lillibridge

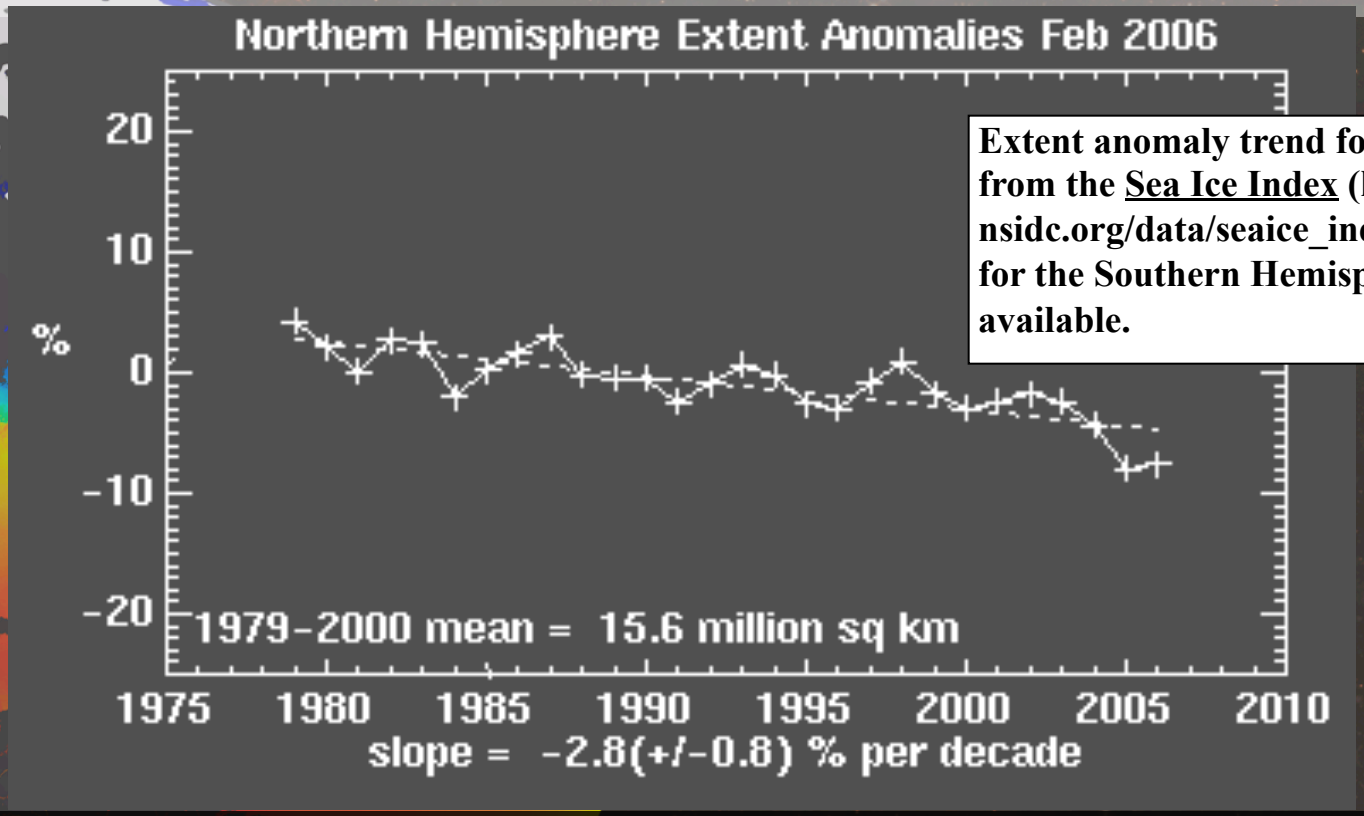
Ocean Surface Winds



QuikSCAT Winds speed climatology for April, from 1999-2004 data.
http://data.nodc.noaa.gov/pathfinder/NODC_QuikSCAT_Winds

- NESDIS/ORA Ocean Surface Winds team
  http://manati.orbit.nesdis.noaa.gov/doc/oceanwinds1.html
- Paul Chang, Lawrence Conner

Sea Ice



Extent anomaly trend for February from the Sea Ice Index (http://nsidc.org/data/seaice_index). Trends for the Southern Hemisphere are also available.

- National Snow and Ice Data Center - nsidc.org
- Florence Fetterer

Other NOAA Sources

- Office of Satellite Data Processing and Distribution - www.osdpd.noaa.gov
- Comprehensive Large-Array data Stewardship System - www.class.noaa.gov
- Via partner web sites - examples include AVHRR Pathfinder at the PO.DAAC and through OceanWatch


Death Valley
National Park
Homeland of the CDR
NATIONAL
PARK
SERVICE


BADWATER
280 FEET/85 METERS
BELOW SEA LEVEL