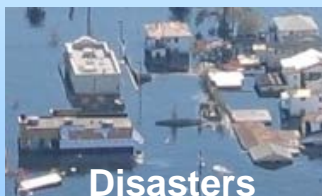# Tool Kit Development to Refine and Visualize Essential Climate Data and Information for Marine Protected Areas

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2. NOAA's National Climatic Data Center

Climate Data Records-Program (CDR-P)

Energy

Water

Agriculture

Disasters

- *NOAA's National Climatic Data Center (NCDC) initiated a satellite Climate Data Record (CDR) program to continuously provide objective climate information derived from satellite data.*

- *These data comprise the longest record of global satellite mapping measurements in the world, and are complemented by data from other sources including NASA, Department of Defense satellites, as well as foreign satellites.*

- *The mission of NOAA's Climate Data Record Program is to develop and implement a robust, sustainable, and scientifically defensible approach to producing and preserving climate records from satellite data.*
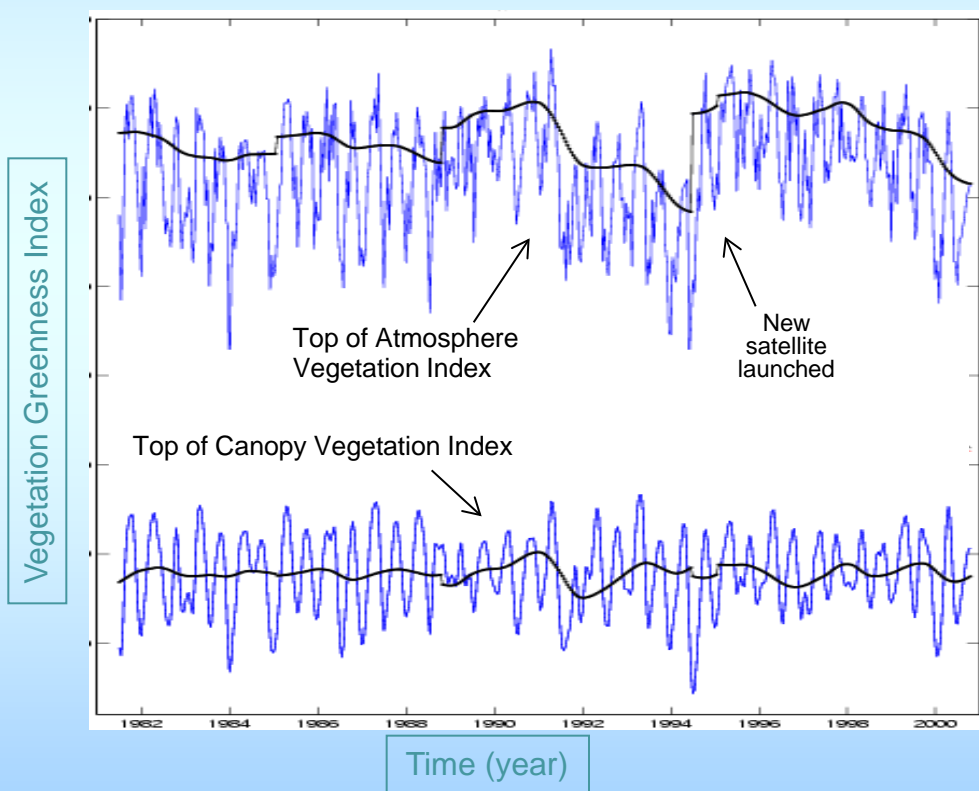
NOAA (and Others) Collects Decades of Data Using Same or Similar Observation Systems
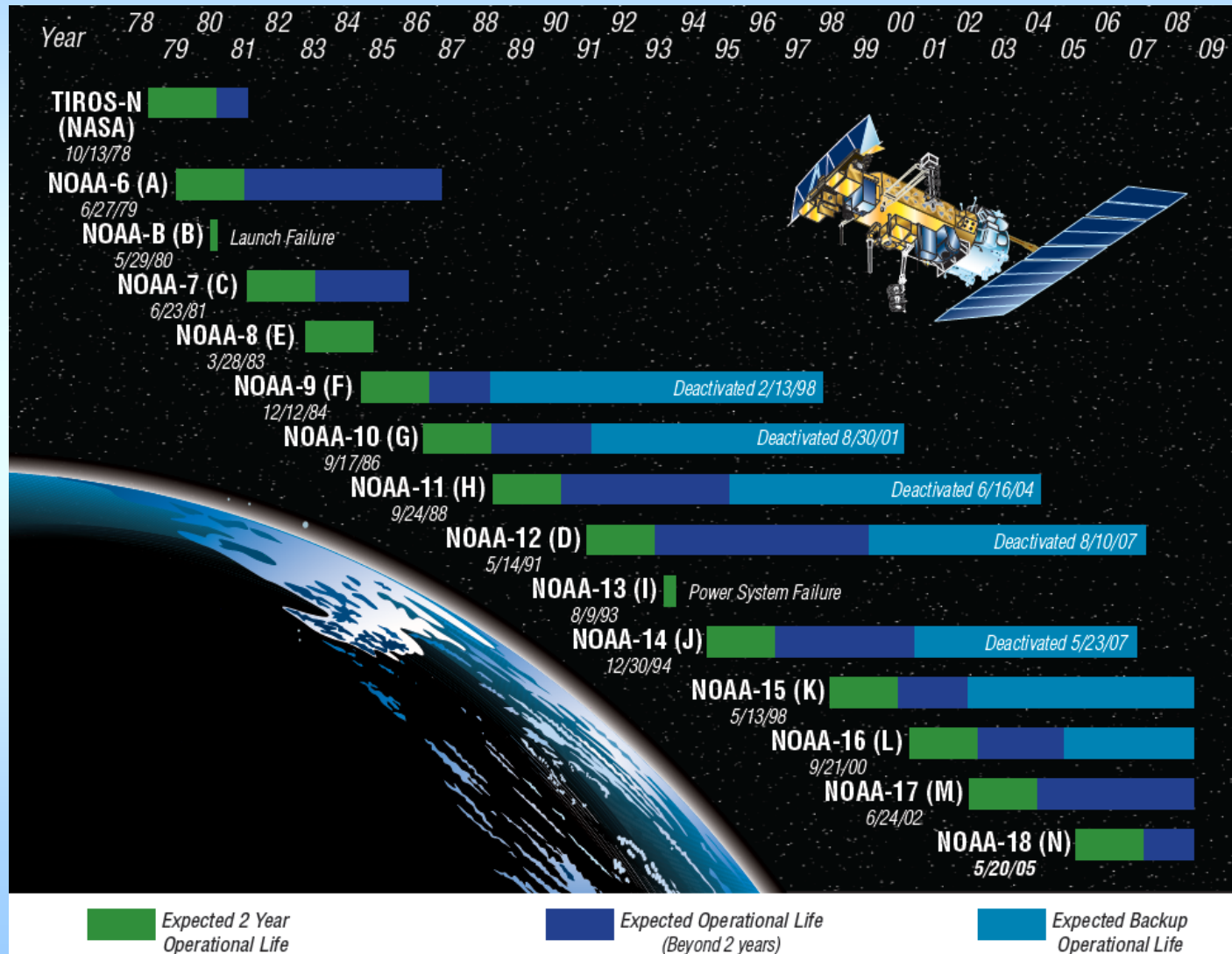
CDRs Require Consistent (Re-)Application of Advanced Algorithms Over Many Satellites and Situations

Uncorrected Data Time Series Contain Both Environmental Information and Satellite-induced Artifacts

Vegetation Greenness Index

Top of Atmosphere Vegetation Index

New satellite launched

Top of Canopy Vegetation Index

1982 1984 1986 1988 1990 1992 1994 1996 1998 2000

Time (year)

Operational weather and hazard products are produced rapidly to potentially save life and property

Climate Data Records (CDRs) provide long term product consistency through rigorous reprocessing with advanced algorithms, ancillary data and evolved instrument understanding.

Climate Information Records (CIRs) provide specific information about environmental phenomena of particular importance to science and society (e.g., hurricane trends, drought patterns)

4

Serving Up Data

Data Center Model Of Data Access

Current method of data access and delivery

**User Model Of Data Access**

Preferred method of same

Going from "drinking from the fire hose" to "sipping a nice cup of tea"

Reduce the data volume, filter what remains, and mix with relevant ecological data to produce a desired product.

IMPACT
## Integrated Marine Protected Area Climate Tools

- *Provide climate information for marine resource managers*
  - *Highest quality, most relevant climate data for ecosystem studies*

- *Reduce data complexity and size applying a user-focused data access model*

- *Allow integration of climate data with ecological data*

- *Scalable, needs-based focus*
  - *Include user perspective and voice throughout*
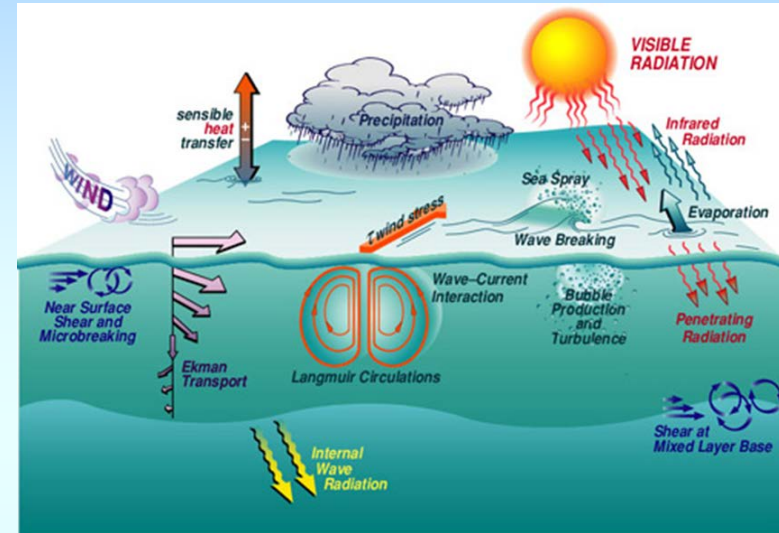
Impacts from climate are driven by far more than temperature or precipitation anomalies, and usually at scales/resolutions far smaller/finer than what is contained in most climate data sets. Complex interactions require the ability to access climate elements and behaviors not traditionally explored in climate impact assessments.
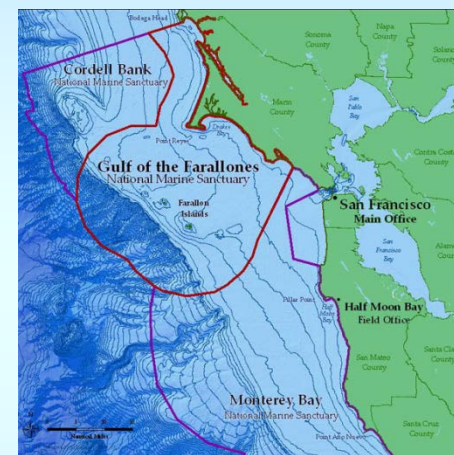
WCT-IMPACT
A Tool to Visualize Climate Data Records
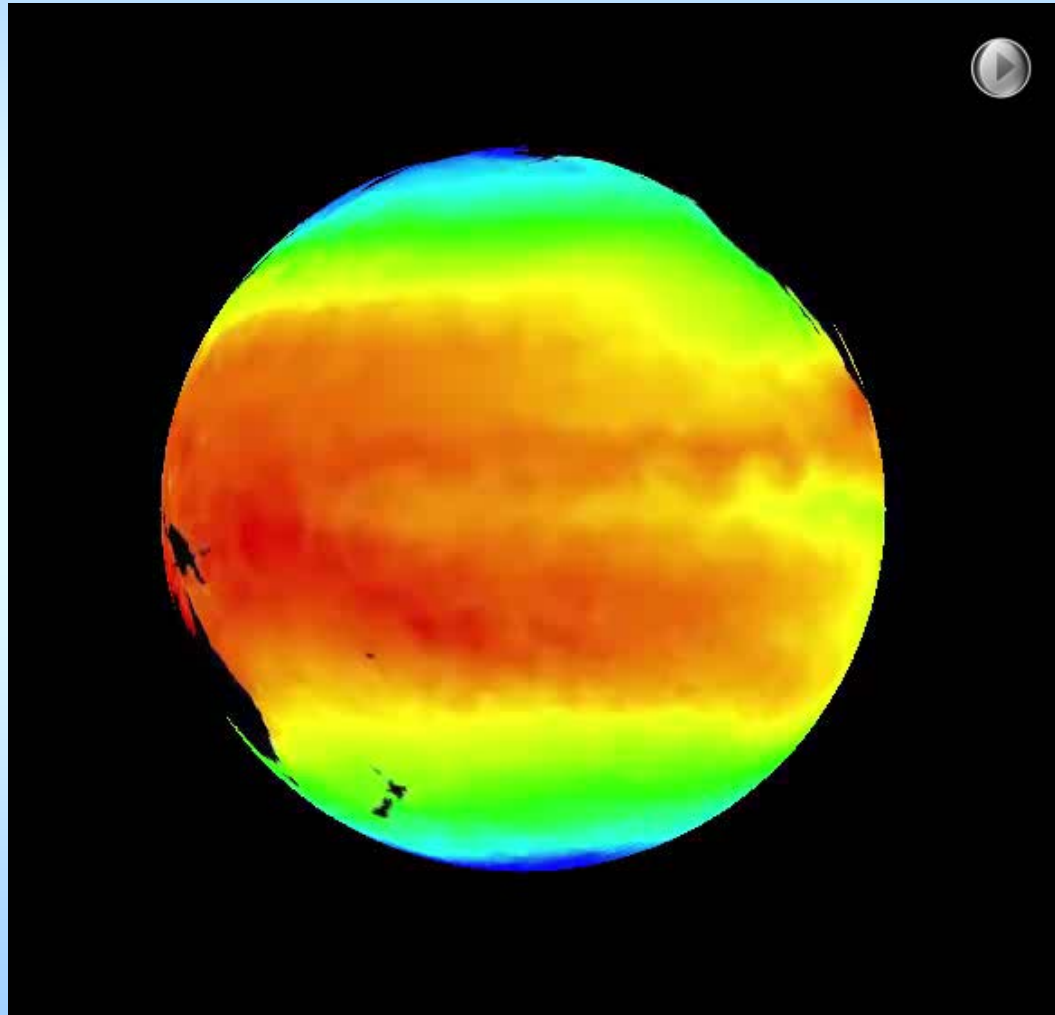
IMPACT User Community

Marine resource managers needing to know how climate changes effect their ecosystems:

- *1700 Marine Protected Areas*
- *14 NOAA Marine Sanctuaries**
- *5 Sentinel Sites*

**Gulf of the Farallones National Marine Sanctuary (GFNMS) for rapid prototyping*

- *Pacific Coast Federation of Fisherman's Associations*
- *Ocean Climate Center*
- *Visitor and Education Center*

Example Data Provided with IMPACT

| Variable	Resolutions
Sea Surface Temperature (SST) *Pathfinder SST – Bob Evans*	*Daily, 4 km*
Ocean Color (chlorophyll) *SeaWiFS 9/1997 – 12/2004* *MODIS Aqua 2002 - 2011*	 *Daily, 9 km* *Daily, 4 km & 9 km*
Cloud Cover *ISCCP Pixel Level Cloud Product (Dx)*	*3 hourly, 4 km pixel, every 32 km*
Top of Cloud Temps *GridSat – Ken Knapp*	*3 hourly, 0.07 x0.07 deg*

Needed for this application: Daily, 32km or finer
Your CDR?

IMPACT User Interface
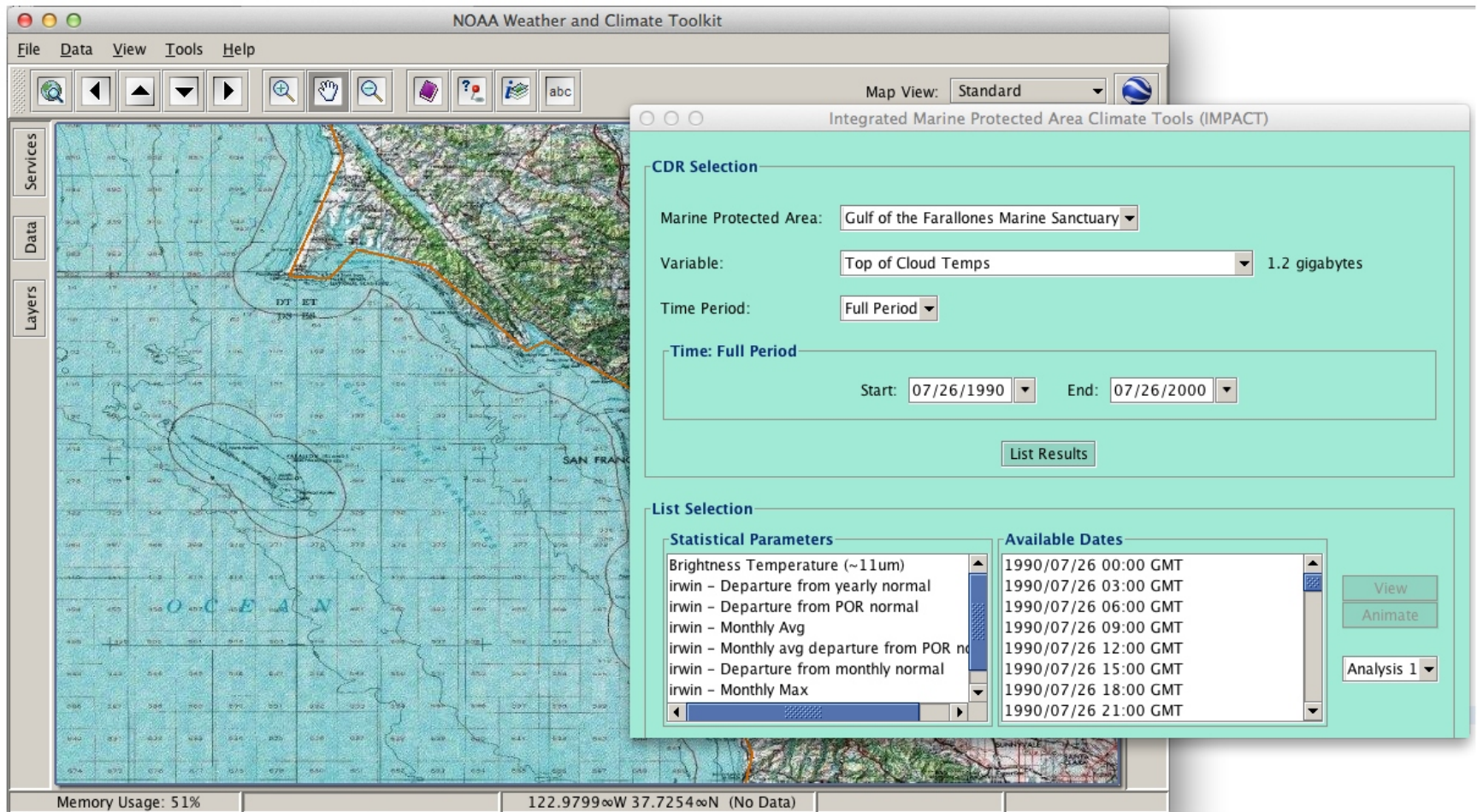
Visualization Capabilities

Stepping Through Time

Sea Surface Temperature 1/01/2005
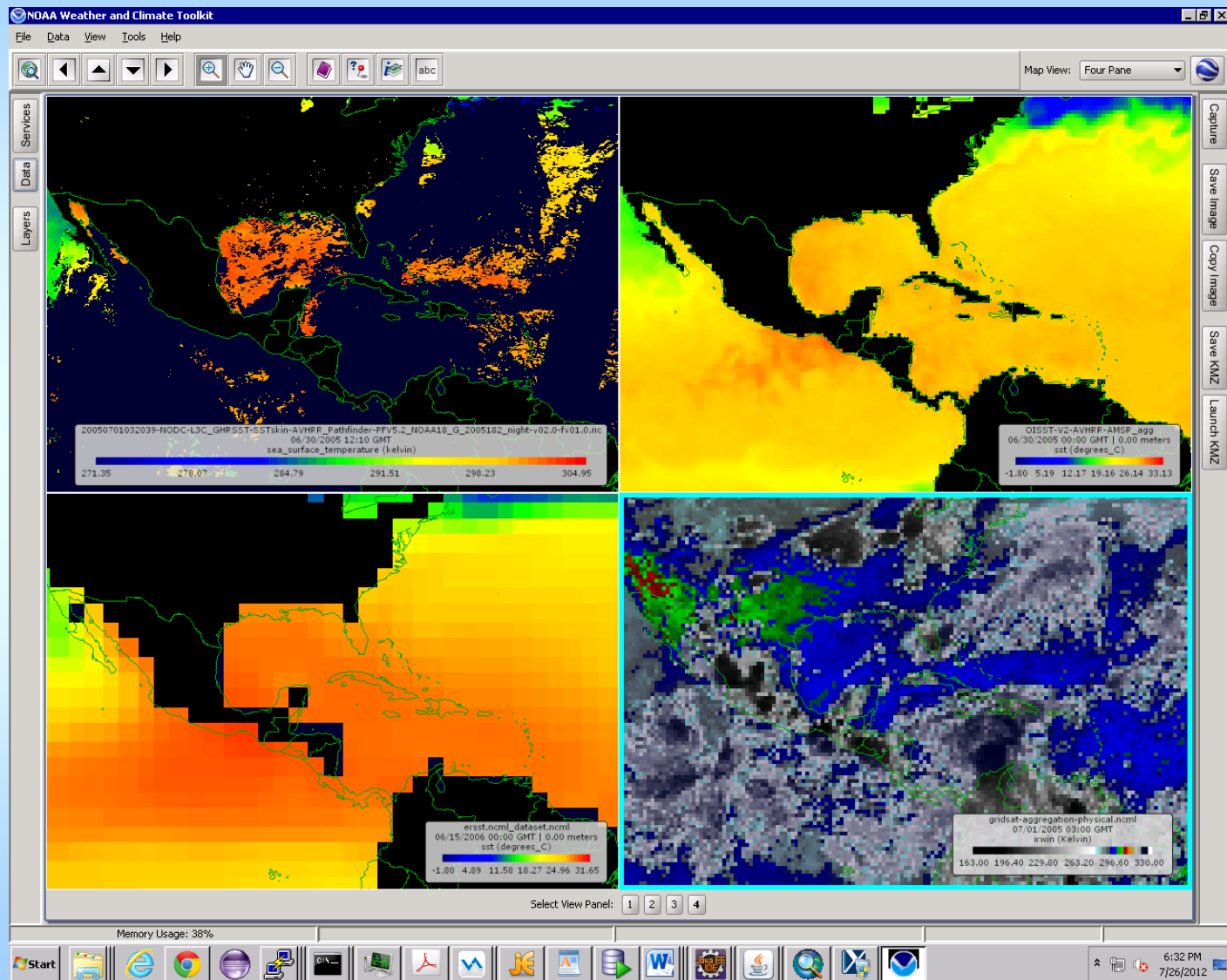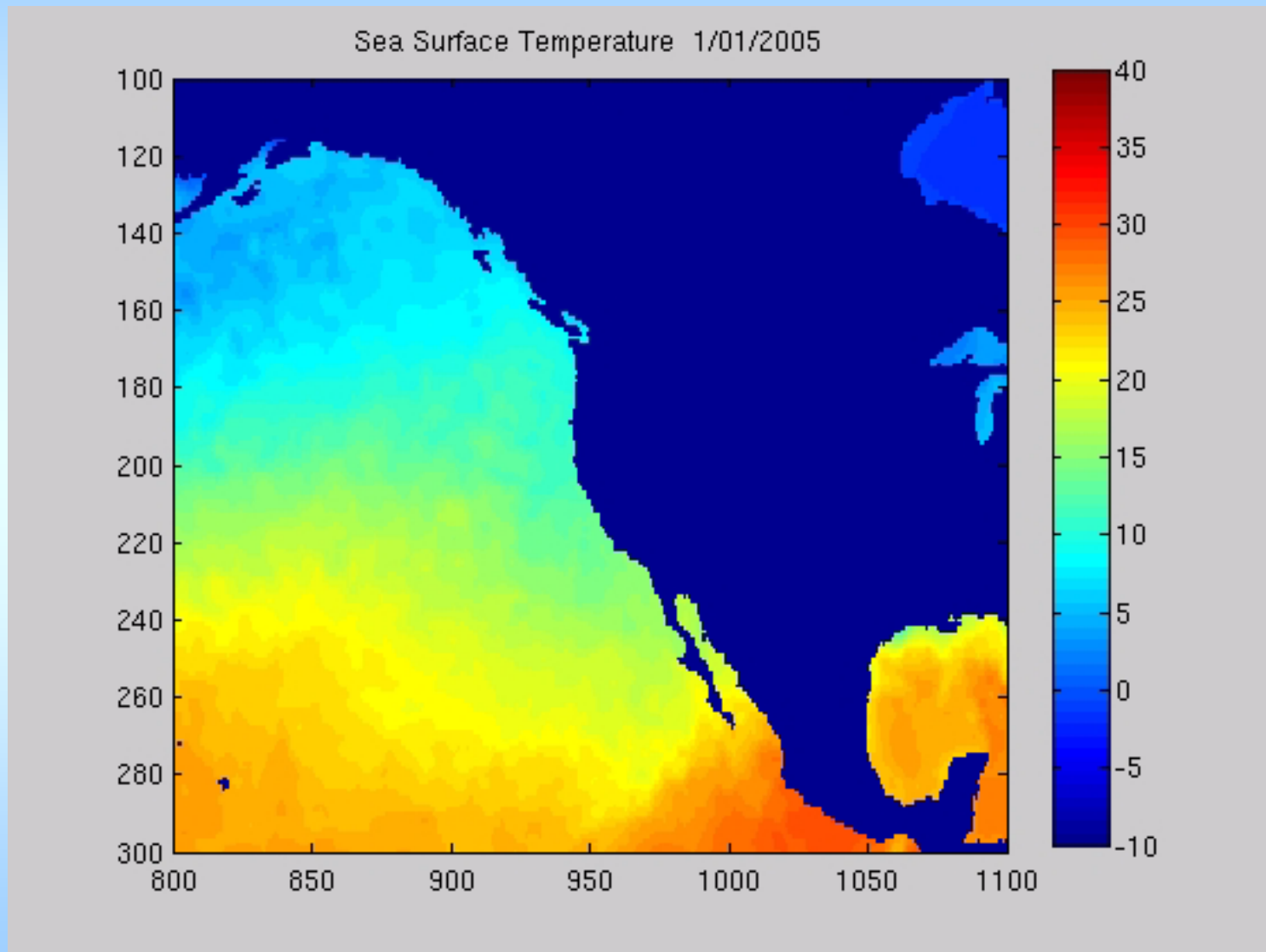
Next Steps

- *Analysis module under development*

- *Predictive/Forecasting Module being conceptualized*

- *Develop capacity to integrate locally-held data sets*

- *Tutorial module, including a regional rapid response climate team is under development*

NCDC Colleagues:

Steve Ansari, Climate Services Division
Mike Urzen, Remote Sensing Applications Division

GFNMS Colleagues:

Dr. Benêt Duncan, PACE
Kelley Higgason, Director, Ocean Climate Center

IMPACT Needs Assessment:

Pamela Fletcher, Florida Sea Grant
James Hendee, NOAA/AOML
Doug Pirhalla, NOAA/NCCOS
Catherine Marzin, NOAA/ONMS
Billy Causey, NOAA/ONMS
Hernan Garcia, NOAA/NODC

THANK YOU