Data Access is KEY

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SIDS OA Workshop

NOAA OCEAN ACIDIFICATION PROGRAM

Outline

- Why should we share OA data?
- What kinds of data?
- Data management systems….what exists or is planned
- Data declaration in the US
- Discussion: What data mgmt systems exist for SIDS?

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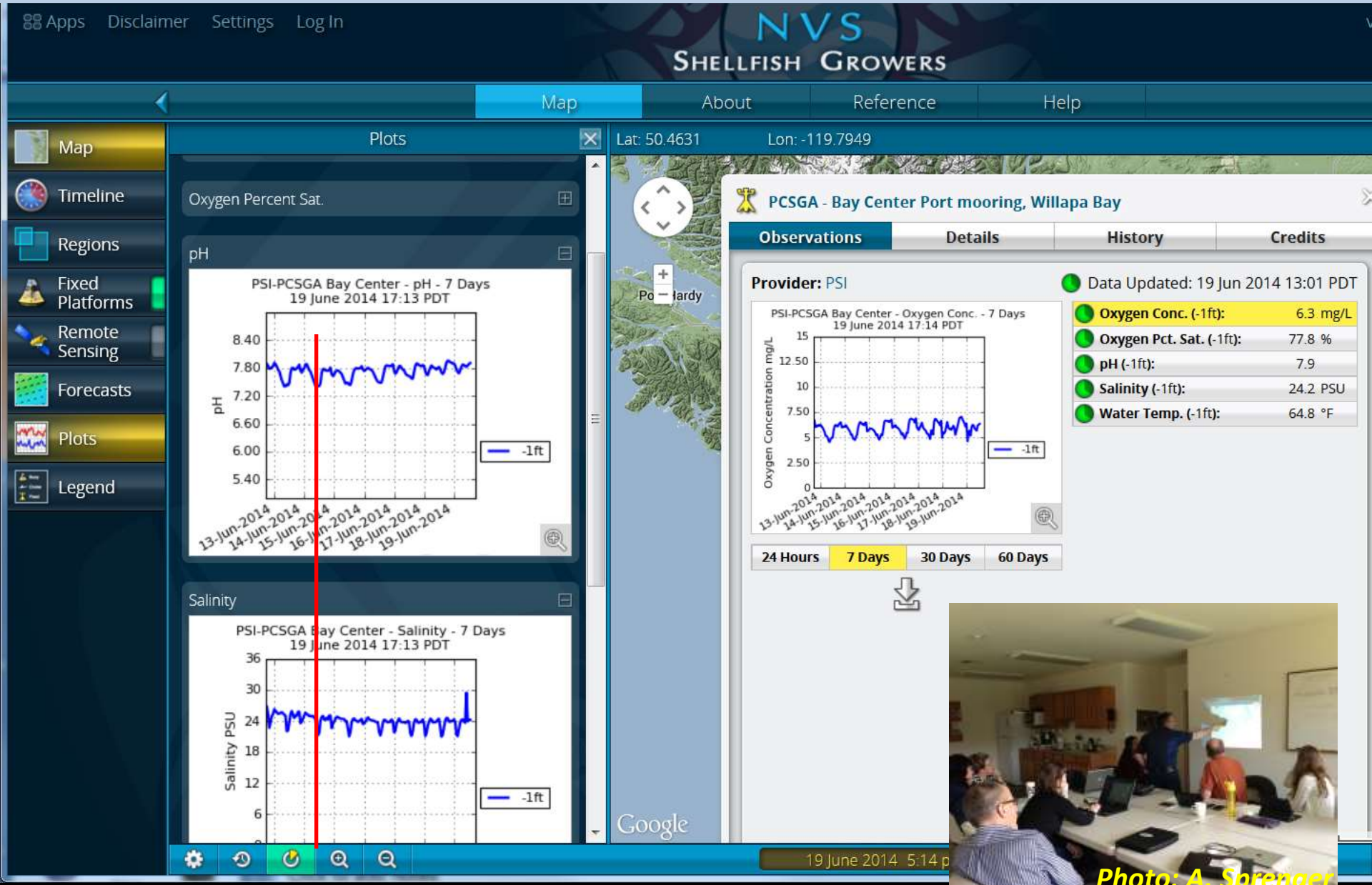
NANOOS data portal application



Background for Experiments

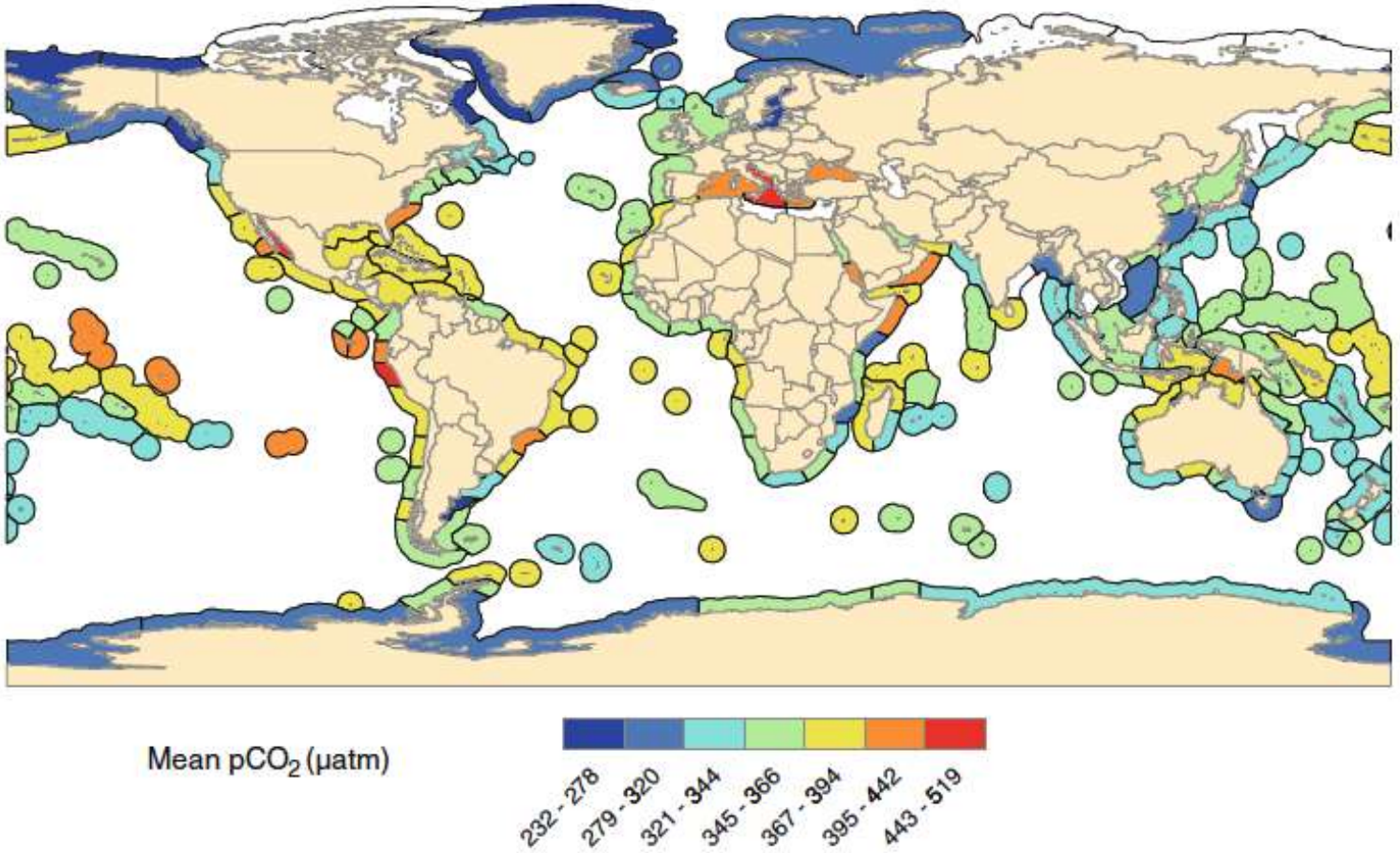
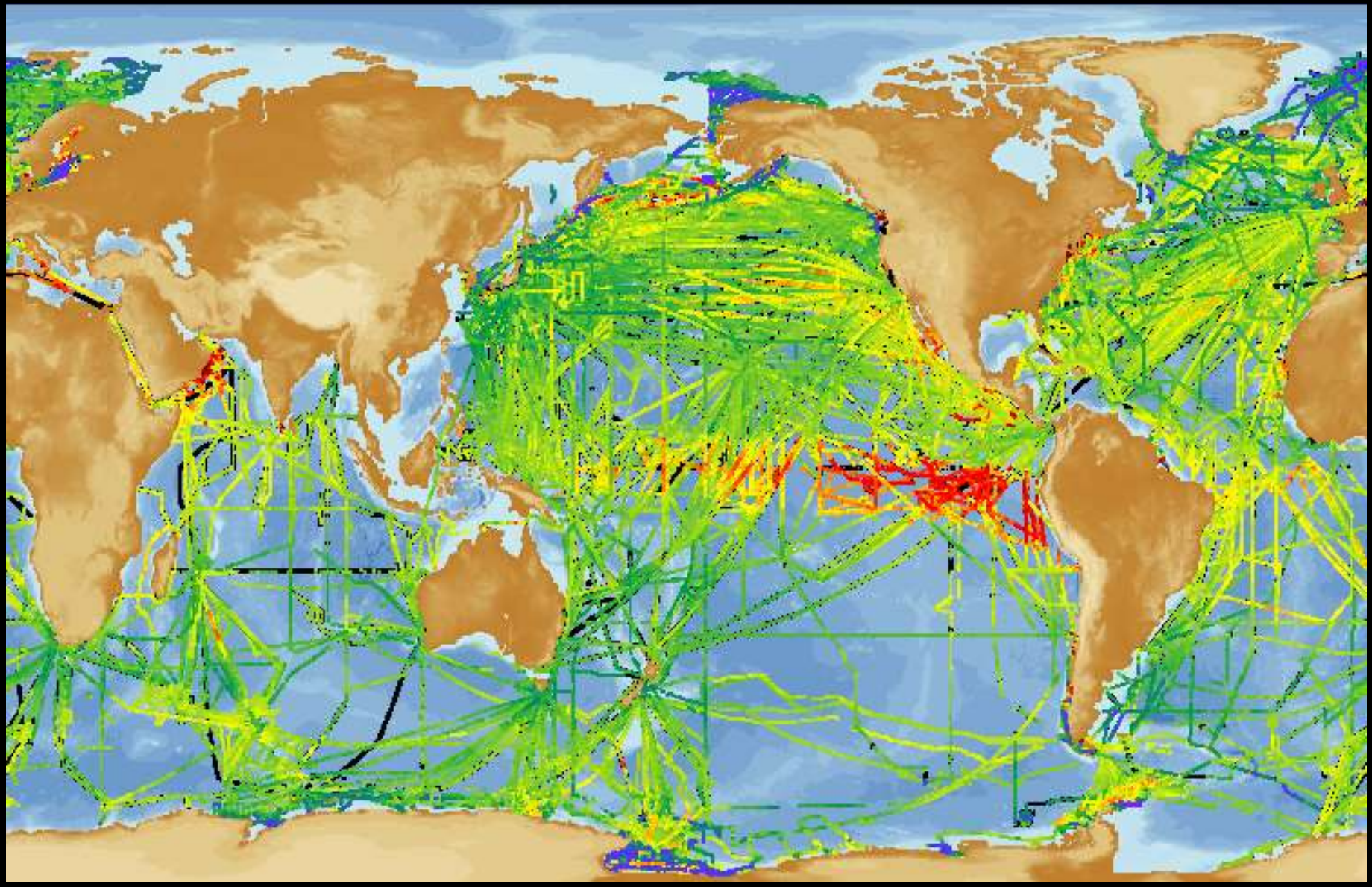


Fig. 1 Ecoregion summary of surface pCO_2 from the LDEO dataset (Takahashi et al. 2011), which compiles all available ship-based surface pCO_2 measurements collected between 1957 and 2010 for a total of 5.3 million data points (3.2 million points fall within the coastal ecoregions)



Surface Ocean CO_2 Atlas; www.socat.info

Goal 1 Level 1 Measurements

- T, S, O, Carbonate-system Constraint (**Ω** is goal)
- Fluorescence* and Irradiance*

**Except where platform is not appropriate or available for this measurement*

Carbonate-system constraint can be achieved in a number of ways, including combinations of measurements and synthetic, non-collocated estimates of other parameters.

OA Data also is…

- Chemical/physical data from last slide
- Potential biological observing data
  - Phytoplankton abundance/species
  - Pteropods – abundance and dissolution
  - Coral cover
  - Ratio of calcifying vs non-calcifying plankton
  - biodiversity
- Biological data from experiments
  - Growth rates
  - Reproduction
  - survivorship
- Model output

GOA-ON defined two data quality objectives:

- '**Climate data**': of sufficient and defined quality to assess long term trends with defined level of confidence

  Detection of changes in OA state over multi-decadal timescales

- '**Weather data**': of sufficient and defined quality to identify relative spatial patterns and short-term changes

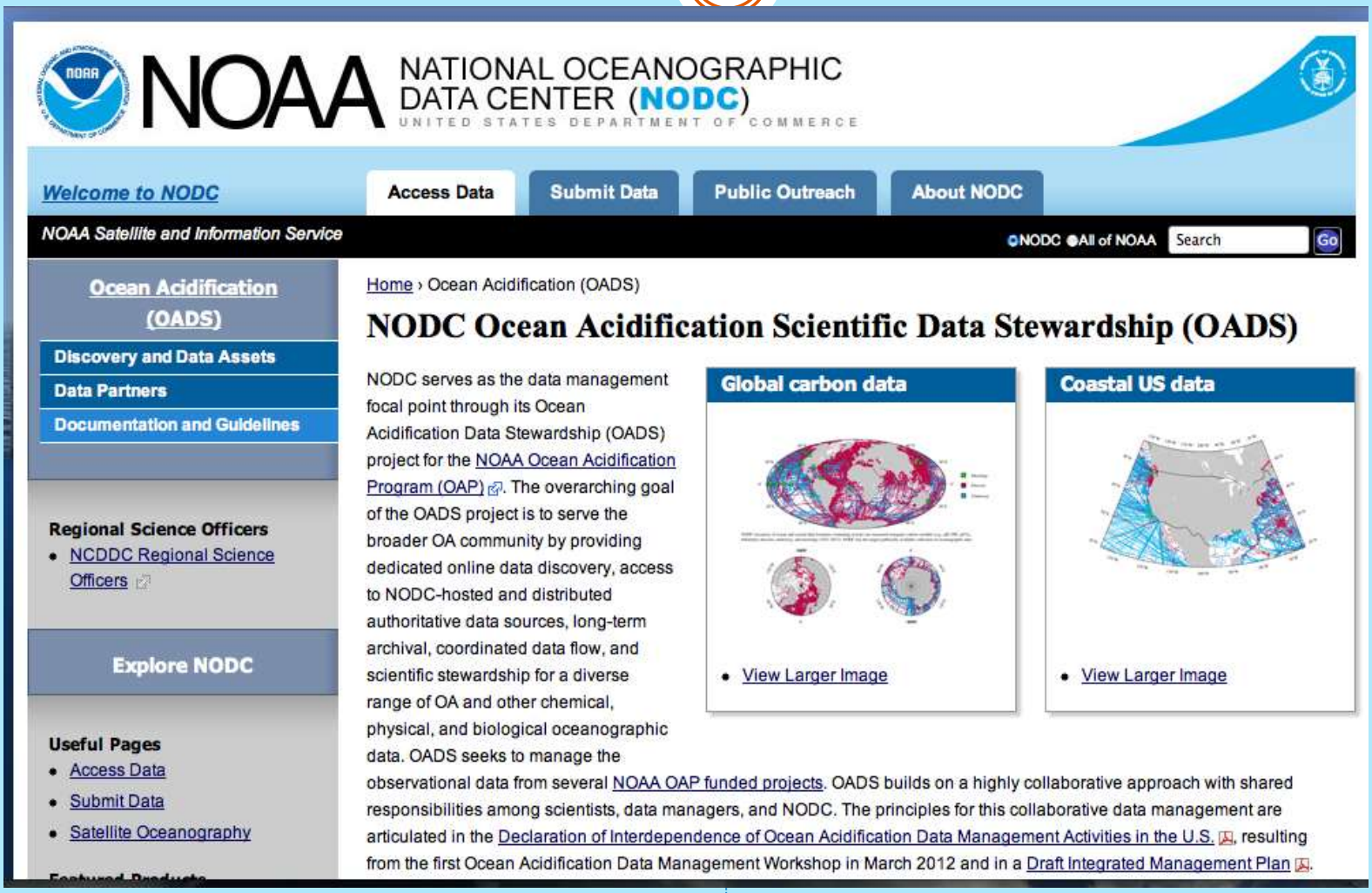
  Mechanistic interpretation of the ecosystem response to local, immediate OA dynamics

International Coordination Centre

http://www.iaea.org/ocean-acidification/

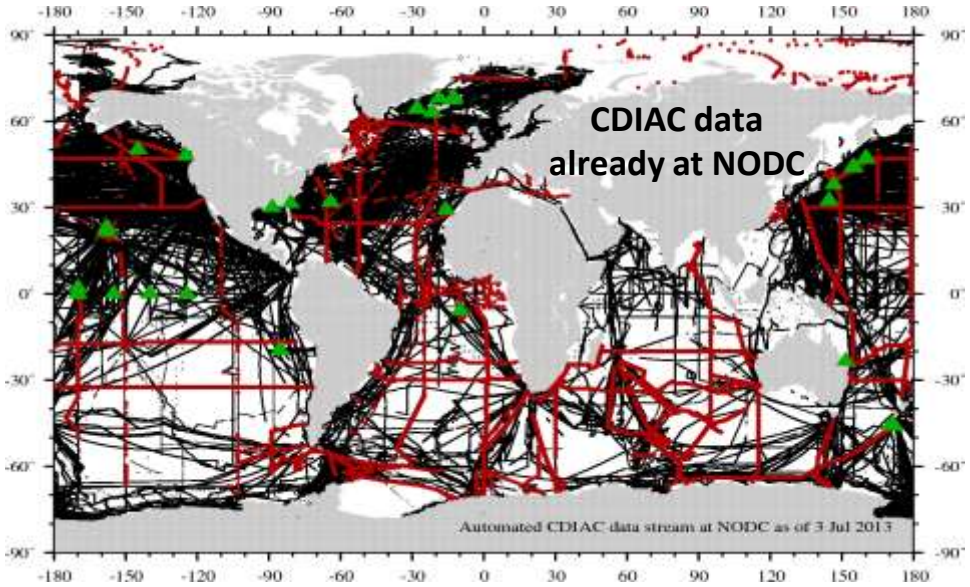
- ICC announced at Rio +20
- Focusing data management effort on access to biological impacts findings from experiments.
- Will likely host workshop on moving Global Network forward on integrated access to chemical/physical data

NOAA Data Management



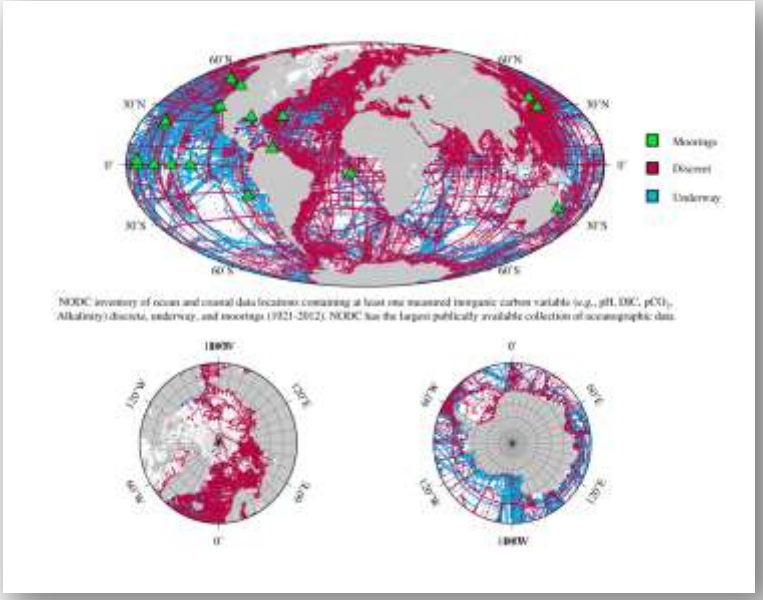
http://www.nodc.noaa.gov/oceanacidification/

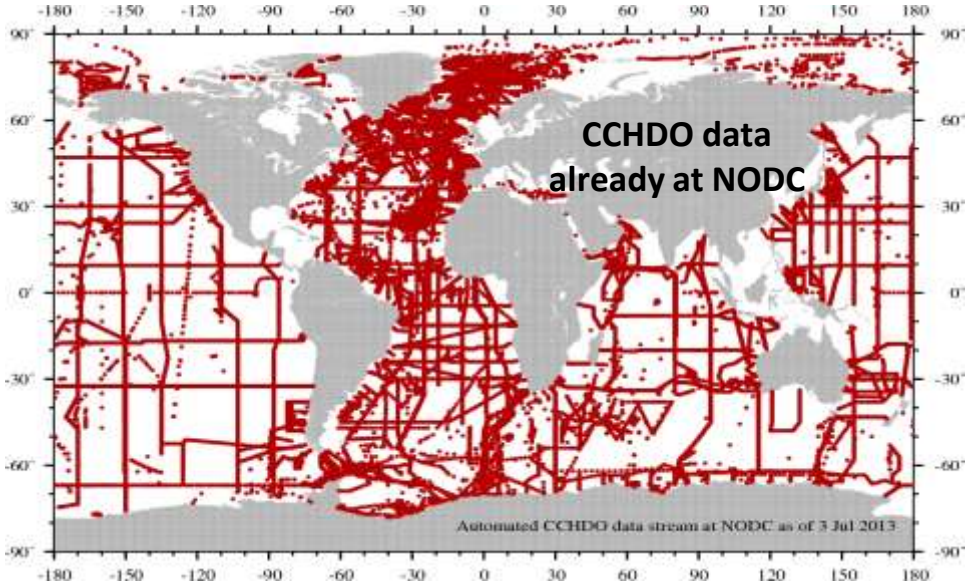
NODC: Automated Ocean Carbon Data Streams



Automated CDIAC data stream at NODC (data stream process updated daily, data version control)

Historical global ocean carbon data at NODC from international and US sources



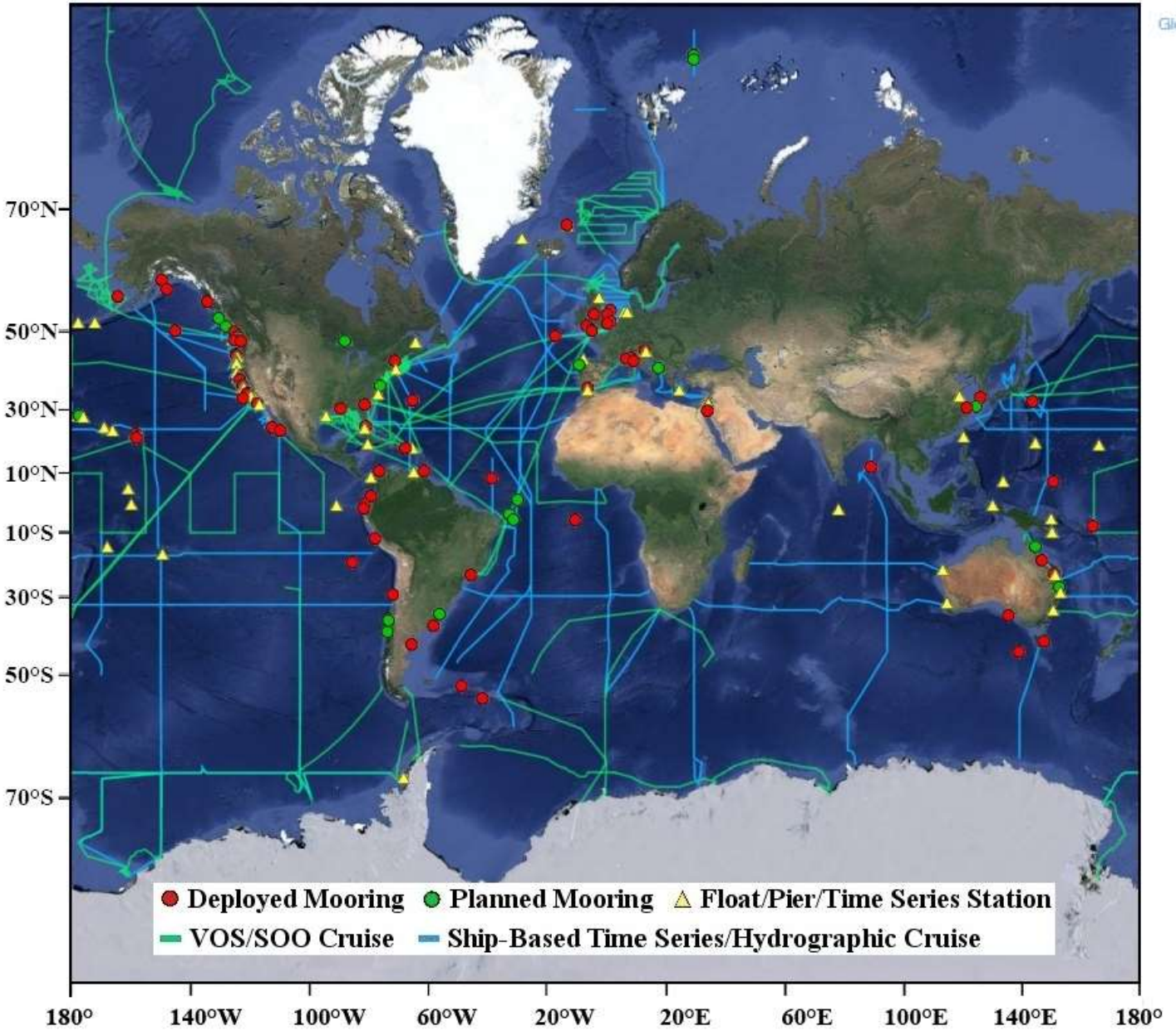


Automated CCHDO data stream at NODC (updated quarterly, data version control)

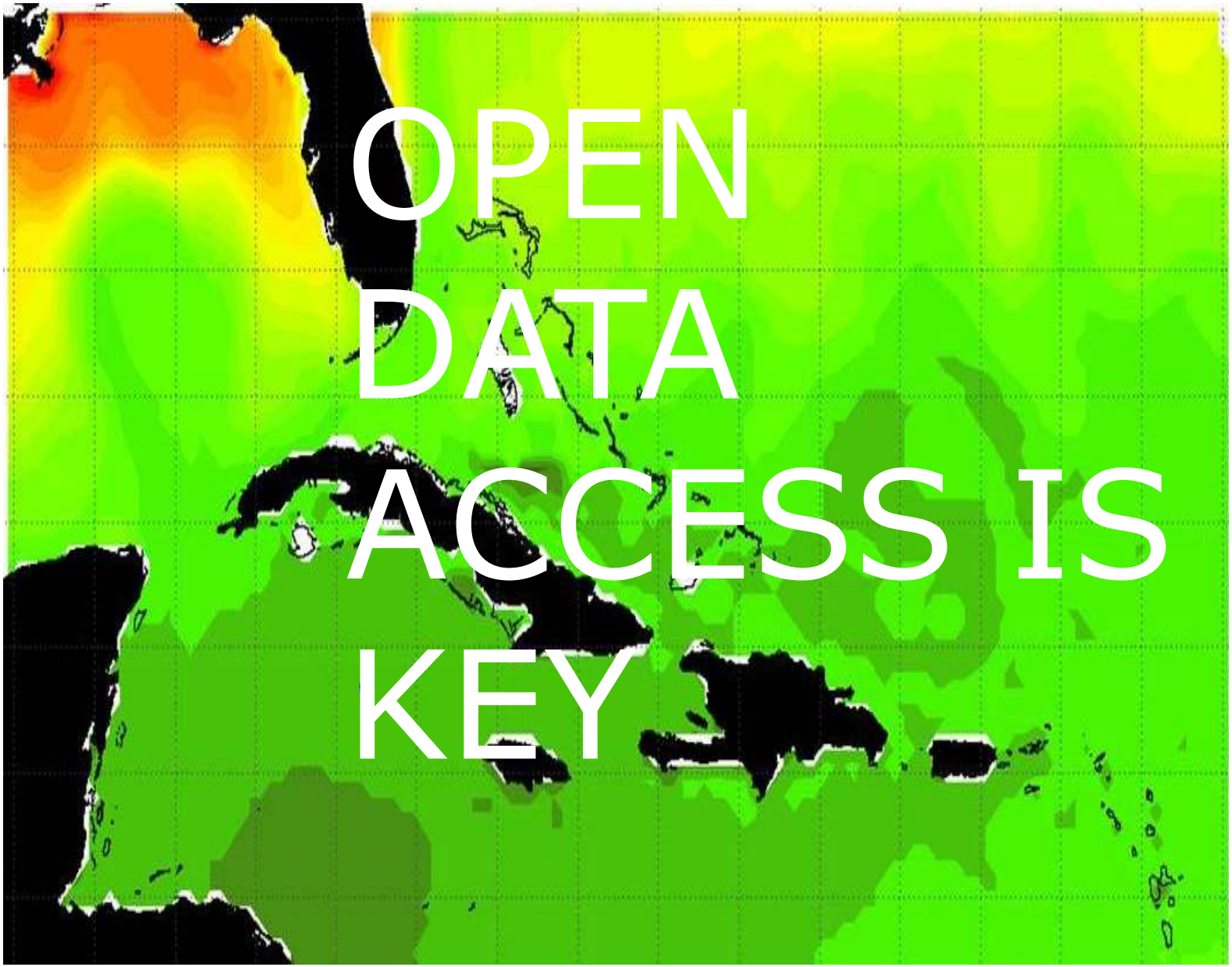
CCHDO: CLIVAR & Carbon Hydrographic Data Office
CDIAC: Carbon Dioxide Information Analysis Center

GOA-ON observing assets:

GOA-ON
Global Ocean Acidification Observing Network



Interactive map by Cathy Cosca, NOAA


OPEN
DATA
ACCESS IS
KEY

US Interagency Ocean Acidification Data Management Plan: Draft One
June 23, 2012

US OA Data Management workshop in Seattle, WA on 13-15 March 2012

"Declaration of Interdependence of Ocean Acidification Data Management Activities in the U.S."

Whereas Ocean Acidification (OA) is one of the most significant threats to the ocean ecosystem with strong implications for economic, cultural, and natural resources of the world;

Whereas our understanding of OA and our ability to: 1. inform decision makers of status, trends, and impacts, and 2. to research mitigation/adaptation strategies, requires access to data from observations, experiments, and model results spanning physical, chemical and biological research;

Whereas the various agencies, research programs and Principal Investigators that collect the data essential to understanding OA often pursue disparate, uncoordinated data management strategies that collectively impede effective use of this data for synthesis maps and other data products;

Whereas an easily accessible and sustainable data management framework is required that:
i) provides **unified access to OA data for humans and machines**; ii) **ensures data are version-controlled and citable through globally unique identifiers**; iii) documents and **communicates understood measures of data and metadata quality**; iv) is easy to use for submission, discovery, retrieval, and access to the data through a **small number of standardized programming interfaces**;

Whereas urgency requires that short-term actions be taken to improve data integration, while building towards higher levels of success, and noting that immediate value can be found in **the creation of a cross-agency data discovery catalog** of past and present OA-related data sets of a defined quality, including **lists of parameters, access to detailed documentation, and access to data via file transfer services and programming interfaces**;

Whereas this integration will also benefit other users of data for a diverse array of investigations;

Therefore, be it resolved that the 30 participants of an OA Data Management workshop in Seattle, WA on 13-15 March 2012 established themselves as the Consortium for the Integrated Management of Ocean Acidification Data (CIMOAD) and identified three necessary steps forward to achieve this vision:

1. The **endorsement of agency program directors and managers for collective use of machine-to-machine cataloging and data retrieval protocols (including THREDDS/OPeNDAP)** by each agency data center to provide synergistic, consolidated mechanisms for scientists to locate and acquire oceanographic data;

2. The commitment of the scientific community to **establish best practices for OA data collection and metadata production**, and the leadership to provide a means of gaining this consensus; and

3. The endorsement of agency program directors and managers to direct data managers to collaborate to develop the system articulated above and **contribute to a single national web portal to provide an access point and visualization products for OA**.

We, the undersigned, request your attention to this matter and commitment to bringing this vision to reality in the next five years for the benefit of our nation and contribution to the global understanding.

OAP
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Onward…

- www.GOA-ON.org
- http://www.nodc.noaa.gov/oceanacidification/
- Oceanacidification.NOAA.gov

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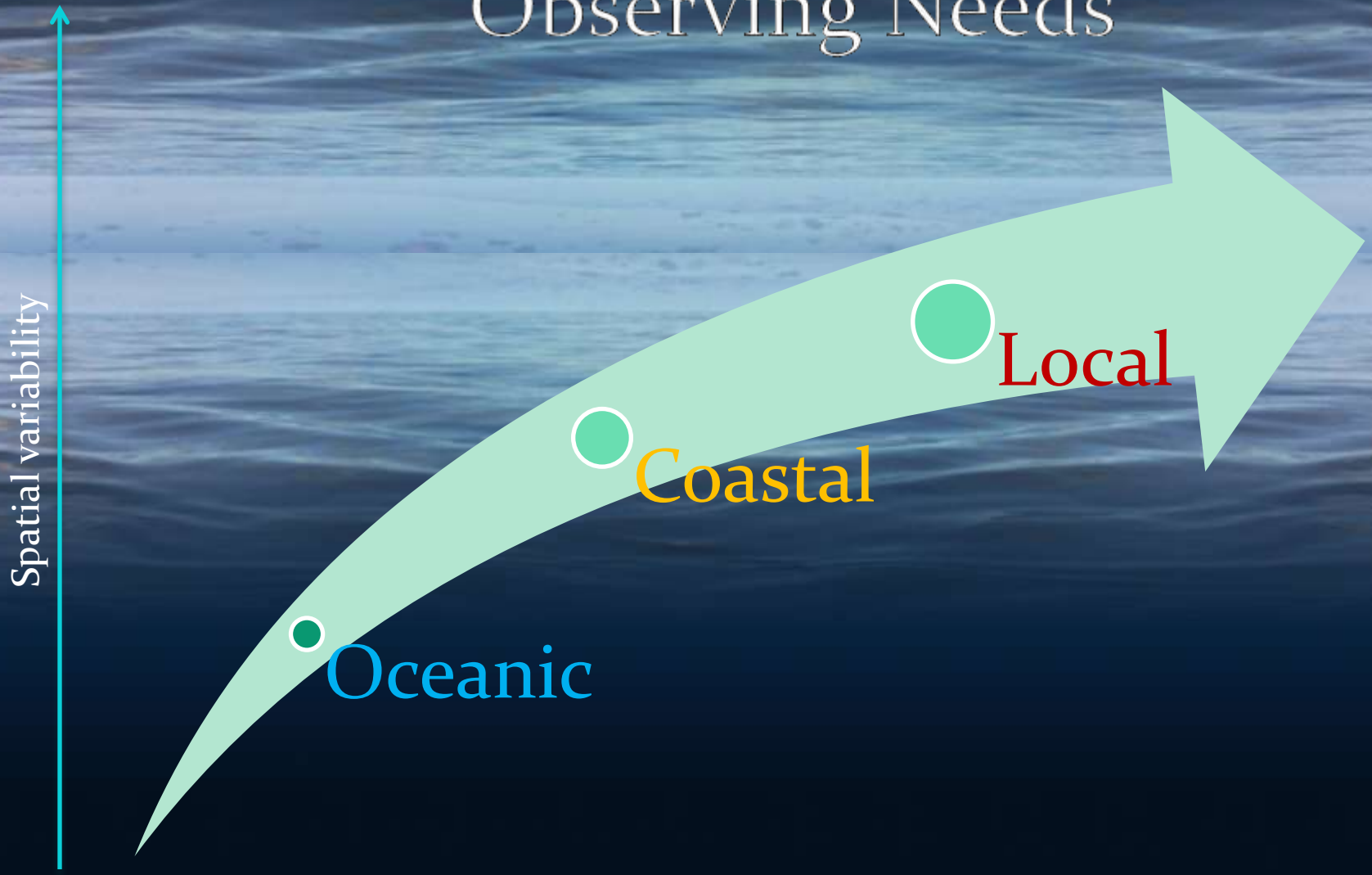
Observing Needs



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US NODC scientific data management of ocean carbon and OA data

- NODC is the US federal long-term archival data center for chemical, physical, and biological oceanographic data. We serve as NOAA's Ocean Acidification Program (OAP) data management focal point (OADS project). Hosts the World Data Center for Oceanography, Silver Spring. Worldwide scope (WOD/WOA). NODC follows the Open Archival Information System Reference Model.

- OADS is developing rich metadata templates (observational and biological response) using international standards (ISO) and netCDF that facilitate human- and machine-to-machine granular data discovery. Working towards assigning DOIs following international standards (e.g., robust ISO record).

- NODC has an array of online data web services (OPeNDAP, THREDDS, LAS, etc). Enormous amount of effort invested in implementing automated scripts to acquire oceanographic data from CDIAC, CCHDO, BCO-DMO, Argo, etc (data version control). This is a resource limited and labor intensive process because of highly non-standard ways DACs acquire and represent data and metadata online.

Observing systems and data streams

NODC Standard Online Web Data Services

NODC
National Oceanographic Data Center