

# WORLD OCEAN ATLAS

Viewer for K-12 use: looking to find its value in the  
classroom...

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# HISTORY OF THE WOA

- Data collected by the Ocean Climate Laboratory of the National Oceanographic Data Center (NODC).
- Syd Levitus and others at the NODC first prepared this atlas in 1982. Current version is 2005. (Viewer is based on 1998 version).
- climatologies of ocean properties at  $1^\circ$  resolution
- See: NOAA NODC webpage:  
<http://www.nodc.noaa.gov/OC5/indprod.html>



CALIFORNIA, 1998 — NEARLY 22 INCHES OF FEBRUARY RAIN IN SANTA BARBARA MAKE IT THE RAINIEST MONTH ON RECORD.



# WOA DATA

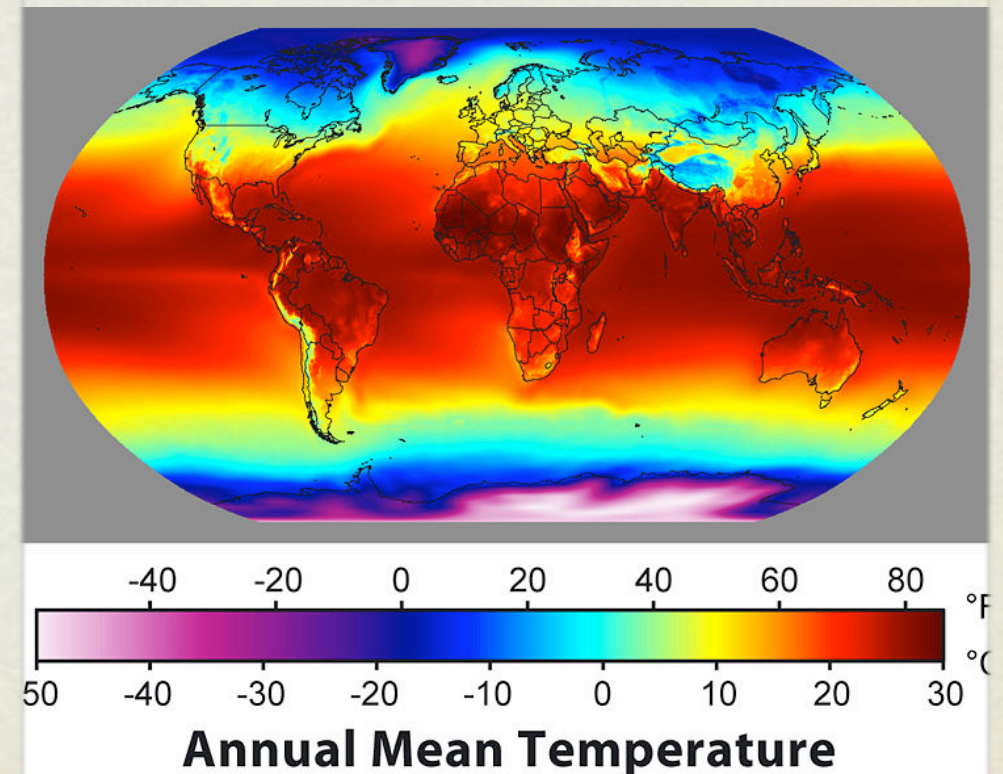
- Temperature, salinity, dissolved oxygen, apparent oxygen utilization (AOU), percent oxygen saturation, phosphate, nitrate, silicate, chlorophyll.
- Most data are aggregated to monthly, seasonal, and annual data means.
- Most data have 33 layers that extend down to 5500 meters
- Data are from 1900 to 1998: they are climatologies



# CLIMATOLOGIES

- Long-term data means enable the study of trends and periodicity
- Can be used with shorter term data to look at anomalies
- Can be used to identify linkages in larger climate system

This image was created by [Robert A. Rohde](http://en.wikipedia.org/wiki/User:Dragons_flight) for Global Warming Art. [[http://en.wikipedia.org/wiki/User:Dragons\\_flight](http://en.wikipedia.org/wiki/User:Dragons_flight)]





# WOA VIEWER

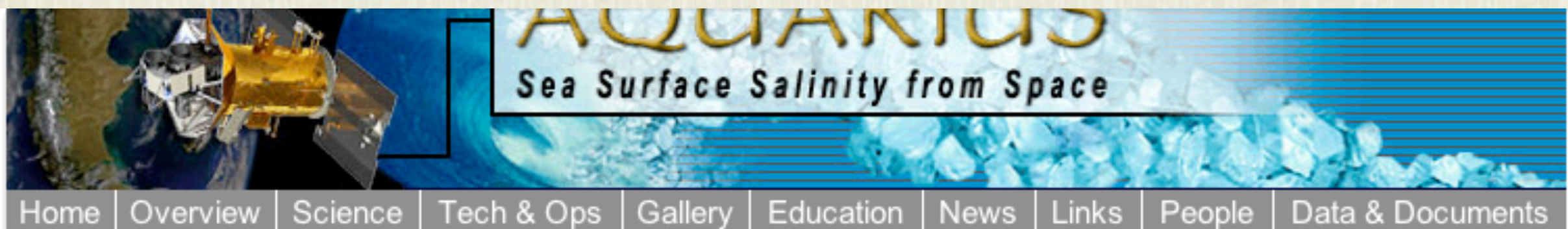
- Uses WOA (Levitus) 1998 datasets from NOAA/ NODC
- Created using technology funded by NASA and the NSF
- Built with ITTvis's IDL software and Adobe Director™  
--Optimized for simplicity and user experience
- Licensed for free distribution within educational settings
- NOT images of data, but actual data access
- 3D slicer shows what is under the surface



# DATA IN THE CLASS

- Ocean chemistry and properties... what are the physical ocean properties and how are these distributed?
- Ocean dynamics and Earth system... what is the contribution of the ocean to the larger Earth system?
- Data visualization... how can changing color schemes reveal or conceal information?
- Slicing data for a 3D view... how does the data change at depth?





## EDUCATION

+ [Salinity Basics](#) + [Classroom Activities](#) + [Concept Map](#) + [Salinity Data & Tools](#) + [Links](#)

After its 2010 launch, the [Aquarius instrument](#) will measure [Sea Surface Salinity \(SSS\)](#) with unprecedented resolution. Our highly integrated and complementary Education & Public Outreach (EPO) goal is to demonstrate how better understanding of *salinity*-driven [ocean circulation](#) – and its influence on *climate* and the [water cycle](#) – can benefit student learning and society as whole. We will bridge the gap between what people know and what they can learn about our oceans:

YOU MAY KNOW THESE FACTS...	BUT DO YOU KNOW THESE?
Oceans are salty	Salinity has NEVER been measured over 24% of the ocean's surface

# NEW DATA SOURCES

*Aquarius: contact Annette deCharon*



# NEXT VERSION FOR U

- What would make the viewer more useful for your classroom?
- What questions might your students have that the data can answer?
- How might the WOA Viewer integrate with other tools you use?



## NEw IDEas....

Profile line moves in parallel across the ocean

Flying through the profile...

Let the kids type in a lat-long

Put the color bar closer to the data (vertical)

double window (4 windows)

resize

land colors...



Nitrates... runoff from coastlines...

animations through month/seasons

horizontal slice animation

chasing the ocean monster

metadata on the layers (pop-up)...

inquiry: questions to ask about the data. climate system questions that  
real scientists do.

add impact information

video introduction



a case study as a starting point.

helping students ask their own research questions

currents... add picture