Outreach session agenda:
Tuesday, 23 June 11:00-12:30

- Chairpersons: V. Rosmorduc, M. Srinivasan
- Agenda Topics:

Plotting Altimeter Data: GMT and Google Earth *R. Scharroo*

Outreach Using Web Map Service *R. Leben*

CTOH altimeter data service: data & products *R. Morrow*

Basic Radar Altimetry Toolbox:Tools for all altimetry users *V. Rosmorduc*

Reaching the public through the media: In with the new, but not out with the old *R. Sullivant, M. Srinivasan*

Jason-2 contest (*Un canard sur l'océan*) *A. Richardson, D. De Staerke*

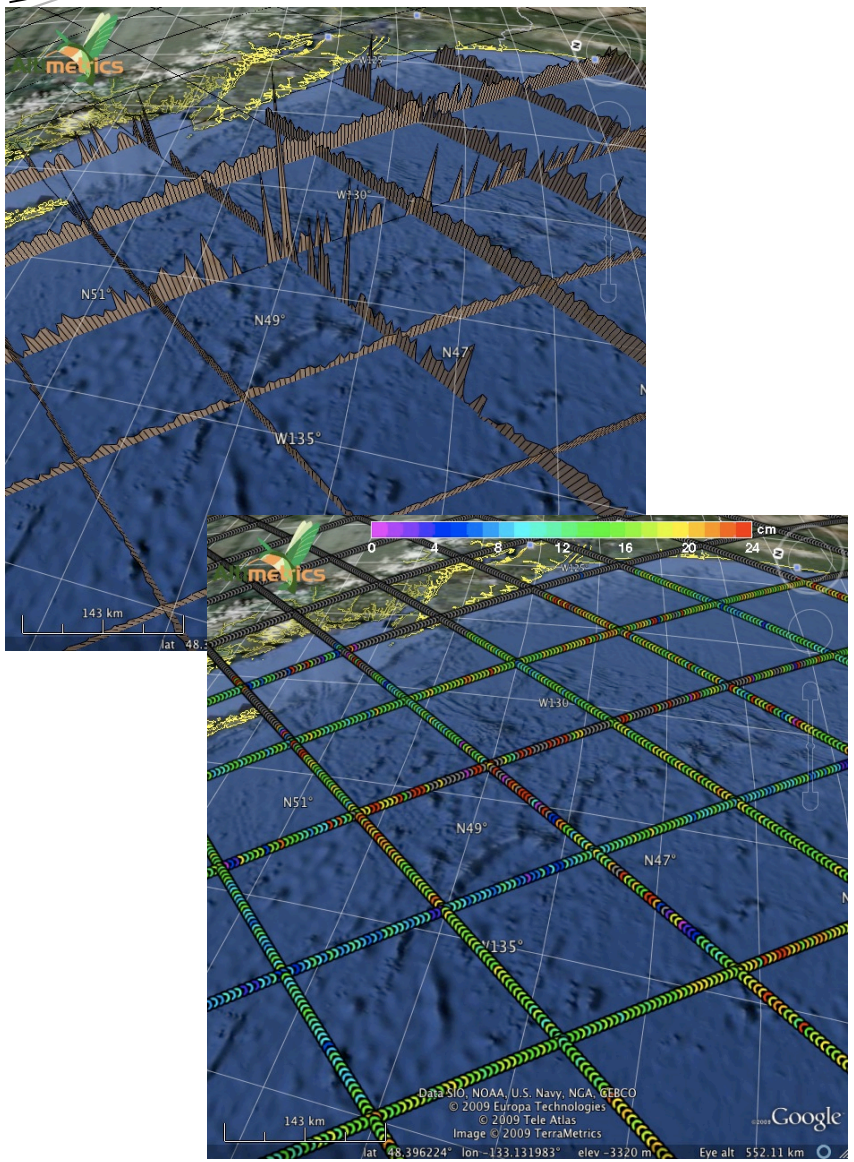
Adopt a buoy to study plastic Island *D. De Staerke*

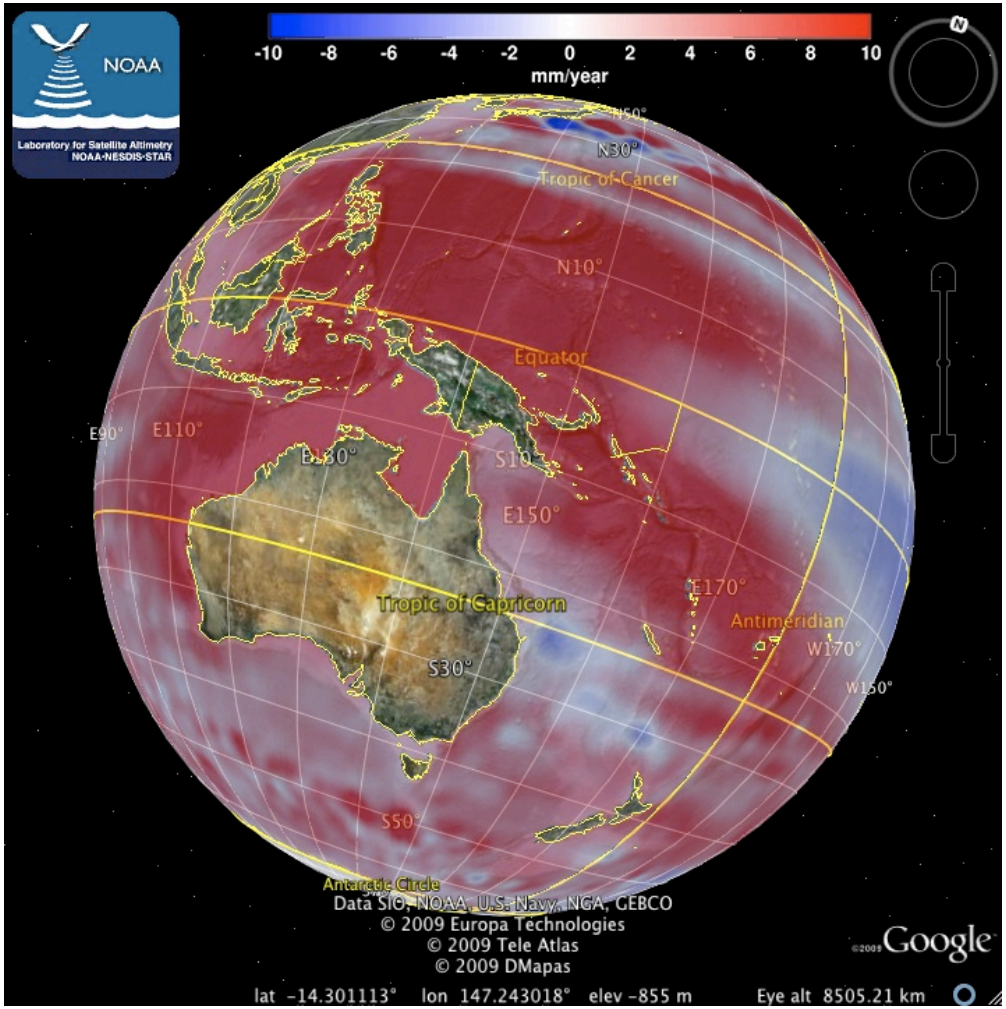
Some points made

- Altimetry data visualization
- Google Earth a major focus
- (novice-) User-dedicated approach of data definition and distribution
- Providing tools to ease the use of altimetry data, of all levels
- Training an important subject –at all levels
- Climate change, environment protection a major theme of interest
- Promotion of OST science

Visualization of altimetry data

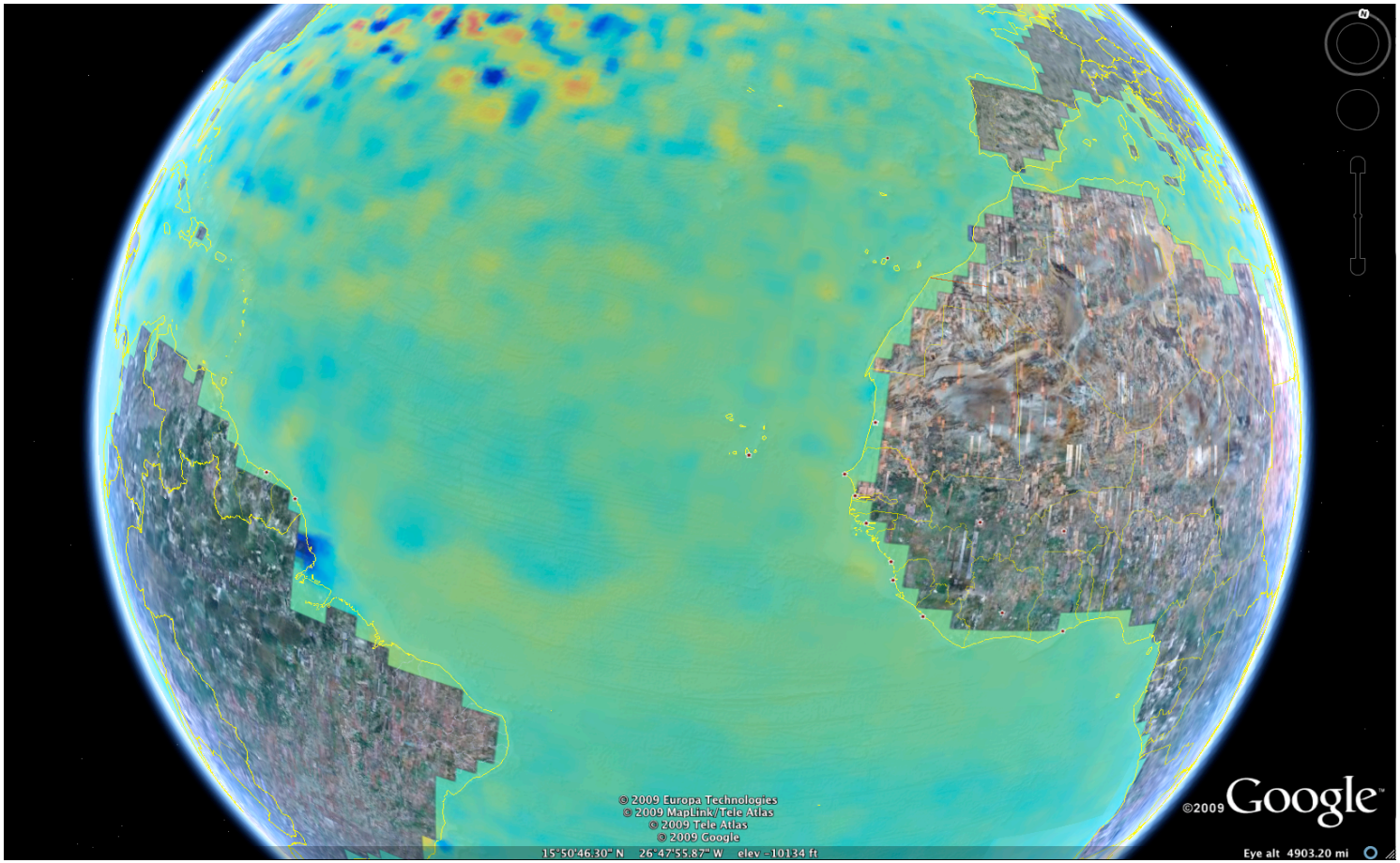
- Several presentations dealt one way or the other with the visualization of altimetry data
- Providing easy-to-use, visualization tools **IS** part of outreach and promotion of altimetry:
  - On-line tools can be used by quite a lot of people (Aviso LAS was used by students for Jason-2 contest)
  - moreover, nice plots are always much in need for efficient outreach and education
- Google Earth a major outreach tool:
  - Way to integrate an altimetry focus in “Google Earth Ocean” ?? (only bathymetry for now, it seems, but SST, ocean color appear…)





R. Scharroo – GMT+Google Earth

R. Leben – Web Map Service (WMS) (standard protocol for serving georeferenced map images over the Internet) allows dynamic changes in image resolution and color scale from within Google Earth.



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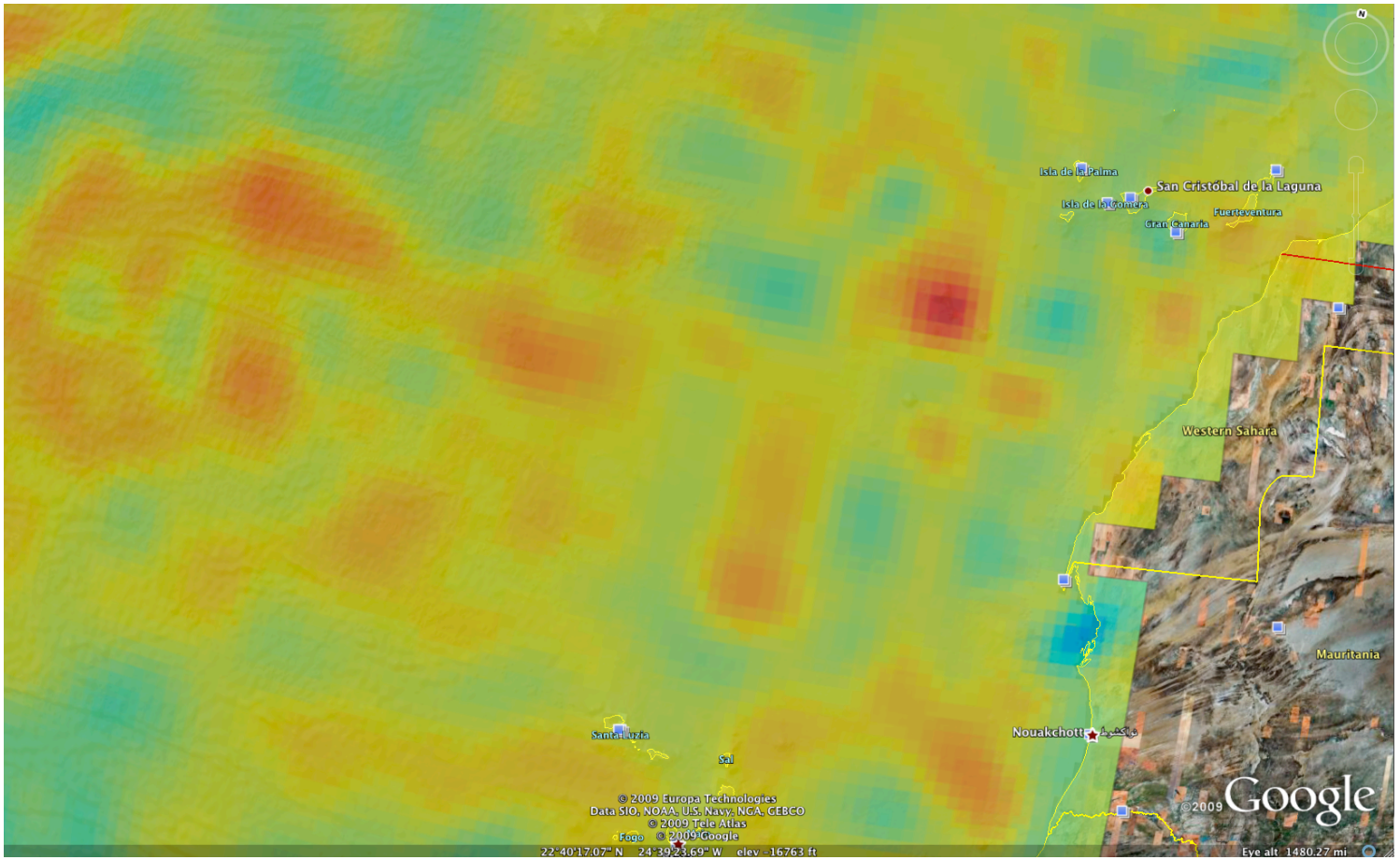

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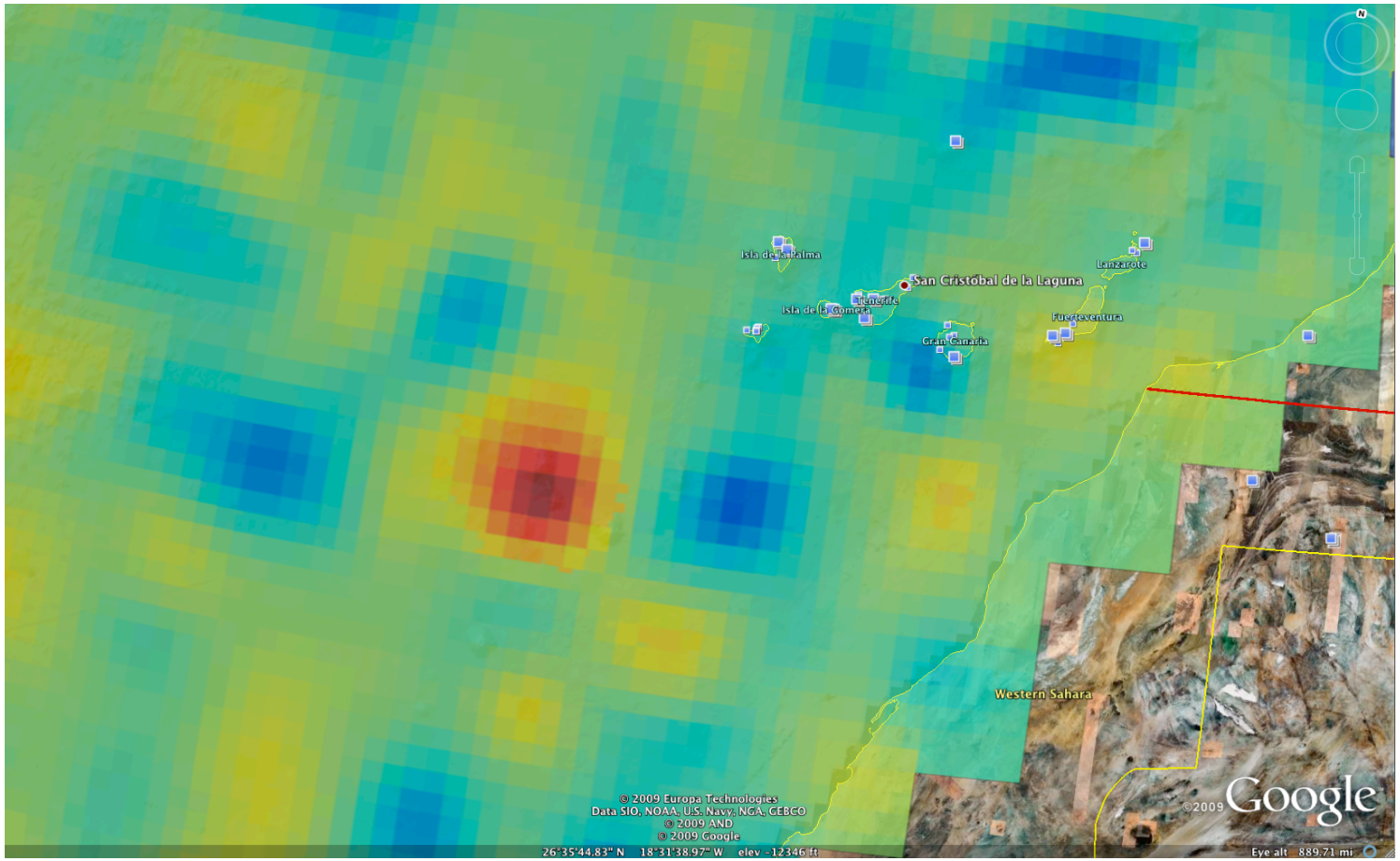
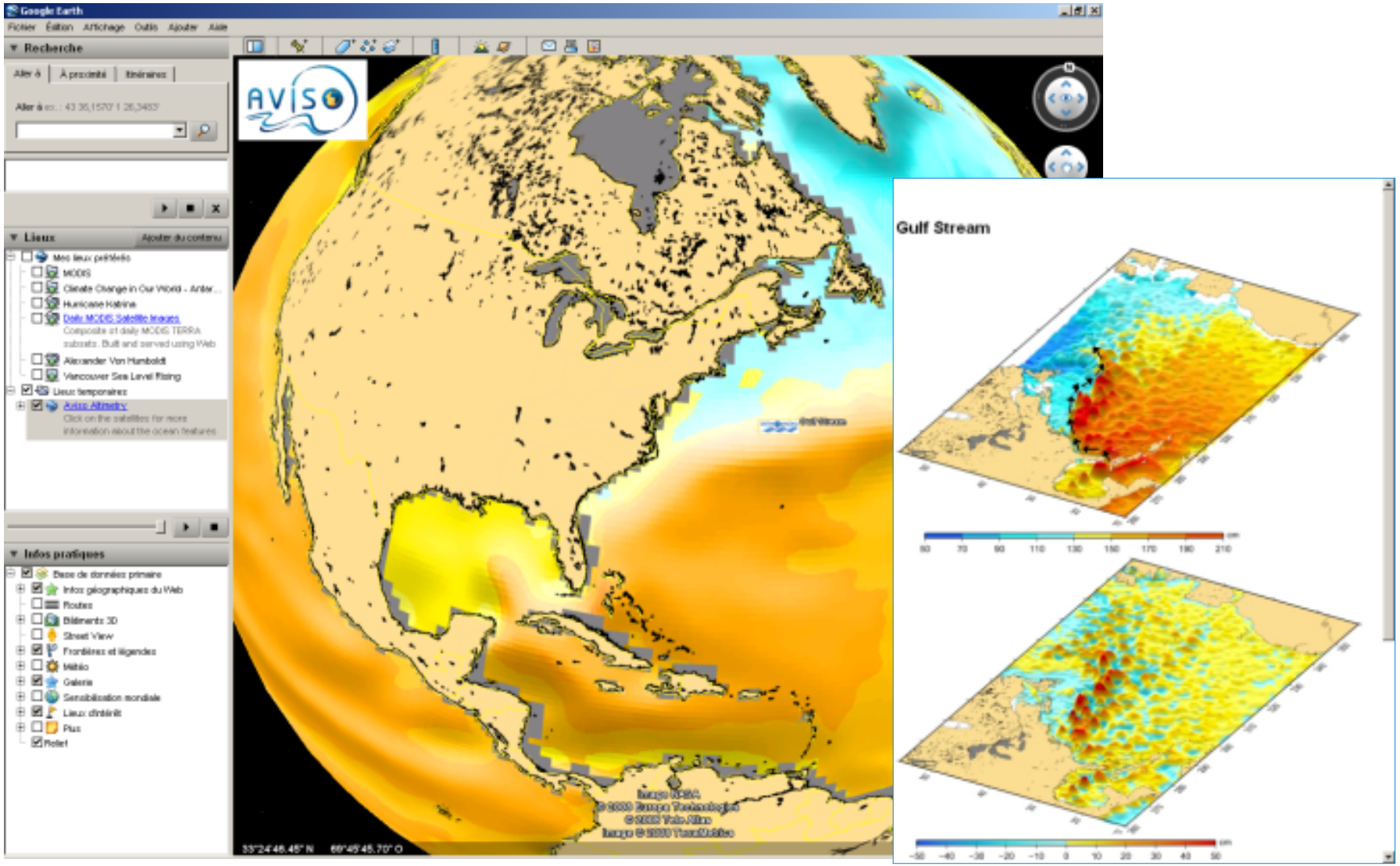



Google Earth
Recherche
Lieux
Infos pratiques
AVISO
Gulf Stream

User-dedicated approach of data & tools

- The era of "one data fit all" definitely past
- New users have different concerns and different skills
- New, highly refined, data can also help gain new users and thus prove the interest in and of altimetry

➔ development of systems to distribute data better fitted to users needs,

➔ even more refined products (filaments, indicators– e.g. MSL, ENSO),

➔ development of tools to help them

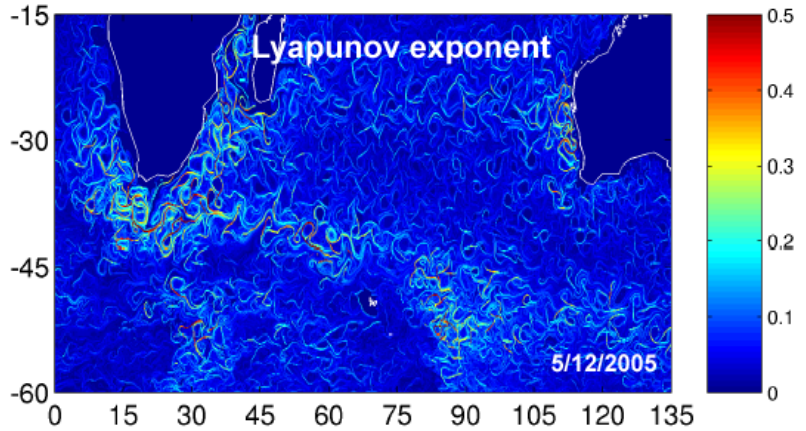
CTOH web-based tool

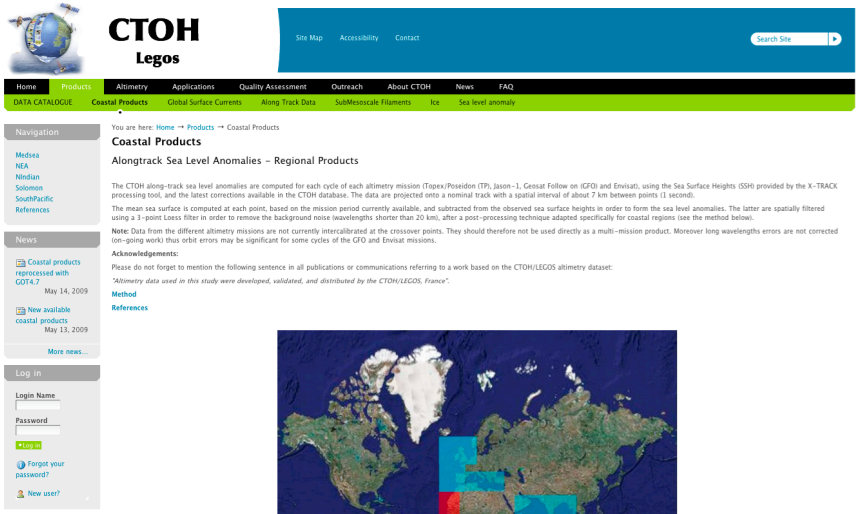
- CTOH data bases are mainly used by research groups at LEGOS, in France, and internationally who want to develop non-standard applications.
  - Coastal products
  - Continental hydrology
  - Mesoscale – submesoscale
    - Global surface currents
    - Altimetric Filament positions
  - Cryosphere products
- Today, data request by e-mail;

September 2010:

CTOH Web Toolbox:

On-line Extraction and visualisation





OSTM/JASON-2

Sensor products

Geophysical sensor data (S(I)GDR)
Along-track waveform information, corrections to apply

Auxiliary products

Mean Sea Surface (MSS CLS'01)
Gridded mean sea profile wrt reference ellipsoid

Dynamic Atmospheric Corrections (DAC)
Correction of the ocean response to atmospheric wind and pressure forcing

Tidal model (FES 2004)
Worldwide tide prediction software

Mean Dynamic Topography (MDT) [global + Med]
Gridded mean sea surface above geoid

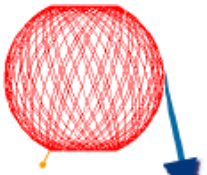
Coastal & hydrology products

Coastal & Hydrology Geophysical Data Records
Along-track altimetric measurements, averaged at 20 Hz with additional information wrt GDRs

Ocean indicators

ENSO index & maps
Monthly means of SLA over the Tropical Pacific & index over the Nino3.4 region

Mean Sea Level
Mean sea level variations & gridded trend maps



Wave heights and wind speed

Maps of Wind speed / Significant Wave Heights (MWind / MSWH)
Gridded wind speed modulus & significant wave heights

Geophysical Data Records (GDR)
Along-track altimetric measurements, averaged at 1 Hz or 20 Hz

Monomission Corrected Sea Surface Heights (CorSSH)
Along-track sea surface heights wrt reference ellipsoid + corrections and wind/wave data

Sea surface height and derived products

Geophysical Data Records (GDR)
Along-track altimetric measurements, averaged at 1 Hz or 20 Hz

Monomission Corrected Sea Surface Heights (CorSSH)
Along-track sea surface heights wrt reference ellipsoid + corrections and wind/wave data

Ssalto/Duacs Extended Sea Level Anomalies (SLA-ext) [N. Atlantic + Gulf of Mexico]
Along-track sea level anomalies wrt a several-year mean with some corrections

Ssalto/Duacs Sea Level Anomalies (SLA) [global + Med + Black Sea]
Along-track sea level anomalies wrt a several-year mean

Ssalto/Duacs Absolute Dynamic Topography (ADT) [global + Med]
Along-track sea surface height wrt geoid (dynamic topography)

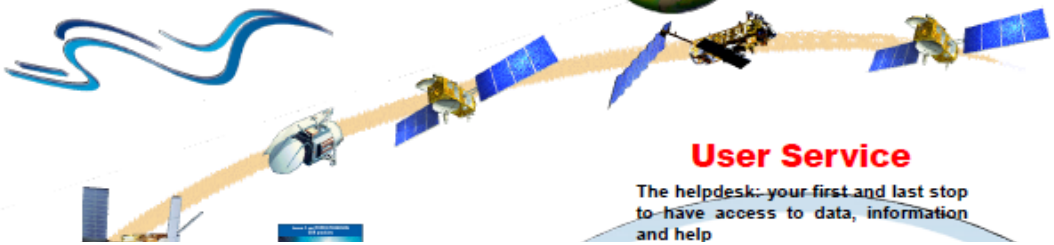
Ssalto/Duacs Maps of Sea Level Anomalies (MSLA) [global + Med + Black Sea]
Gridded sea level anomalies wrt a several-year mean

Ssalto/Duacs Maps of Absolute Dynamic Topography (MADT) [global + Med]
Gridded sea surface height wrt geoid (dynamic topography)

Gridded products

Along-track data

Data available in Near-Real Time

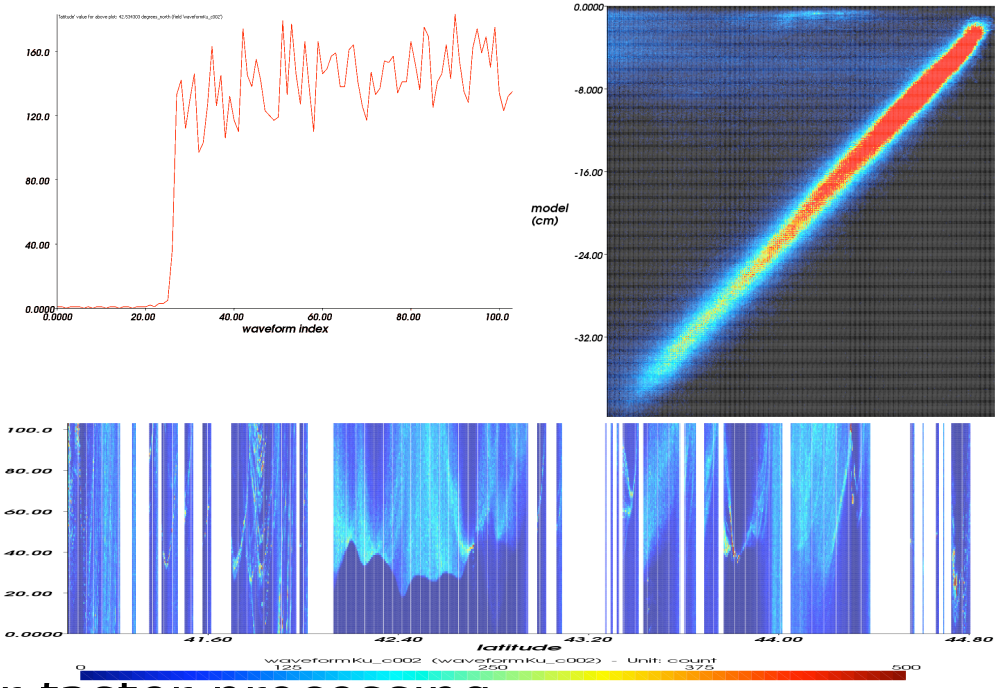


User Service

The helpdesk: your first and last stop to have access to data, information and help

BRAT newest developments

- Tutorial upgrades:
  - More Data use cases (Hydrology, Land, Ice and Sea ice)
  - Additional information
- Toolbox upgrades:
  - Ergonomic improvements
  - Mac OS X version
  - Data Pre-Selection: select potentially relevant files for faster processing
  - Waveform plots, Generic 3D plots (plot of any field wrt any two other fields), Geo-localised output images
  - River & Lake products
- More than 700 on-line requests since June 2007
- http://www.altimetry.info or http://earth.esa.int/brat/



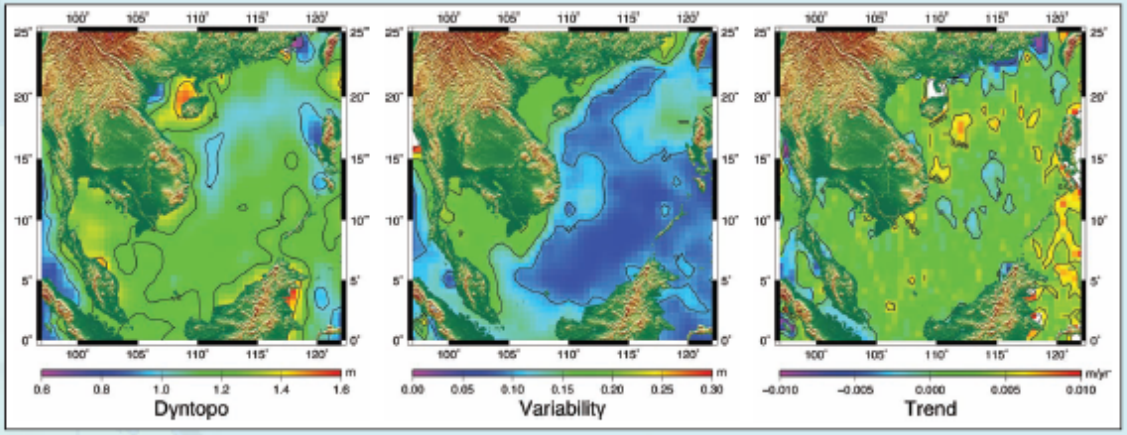
Education

- Training is a recurring concern
  - in “classic” frame (students within university in our countries),
  - but also in developing countries, for scientists and engineers with very few, or even no experience in satellite data use
- Young people concerned by climate change, protection of the environment, sustainable development…
  Telling them about ocean (and altimetry) “ensure you to have graduate students in the future” (Annie)

SALT course (Bangkok, May 2009)

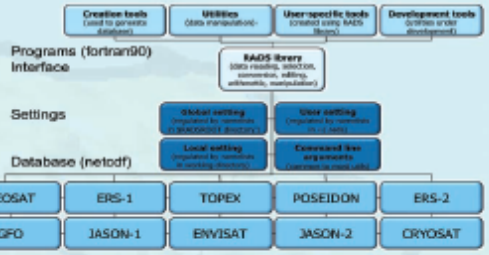
GNSS course (Bangkok, May 2009)

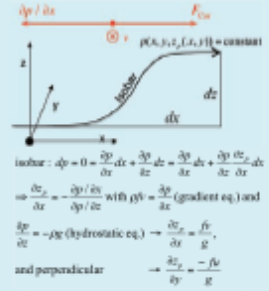
Satellite radar ALTimetry (SALT)



Early SALT sea level results for Gulf of Thailand and South China Sea

RADS data base and tools



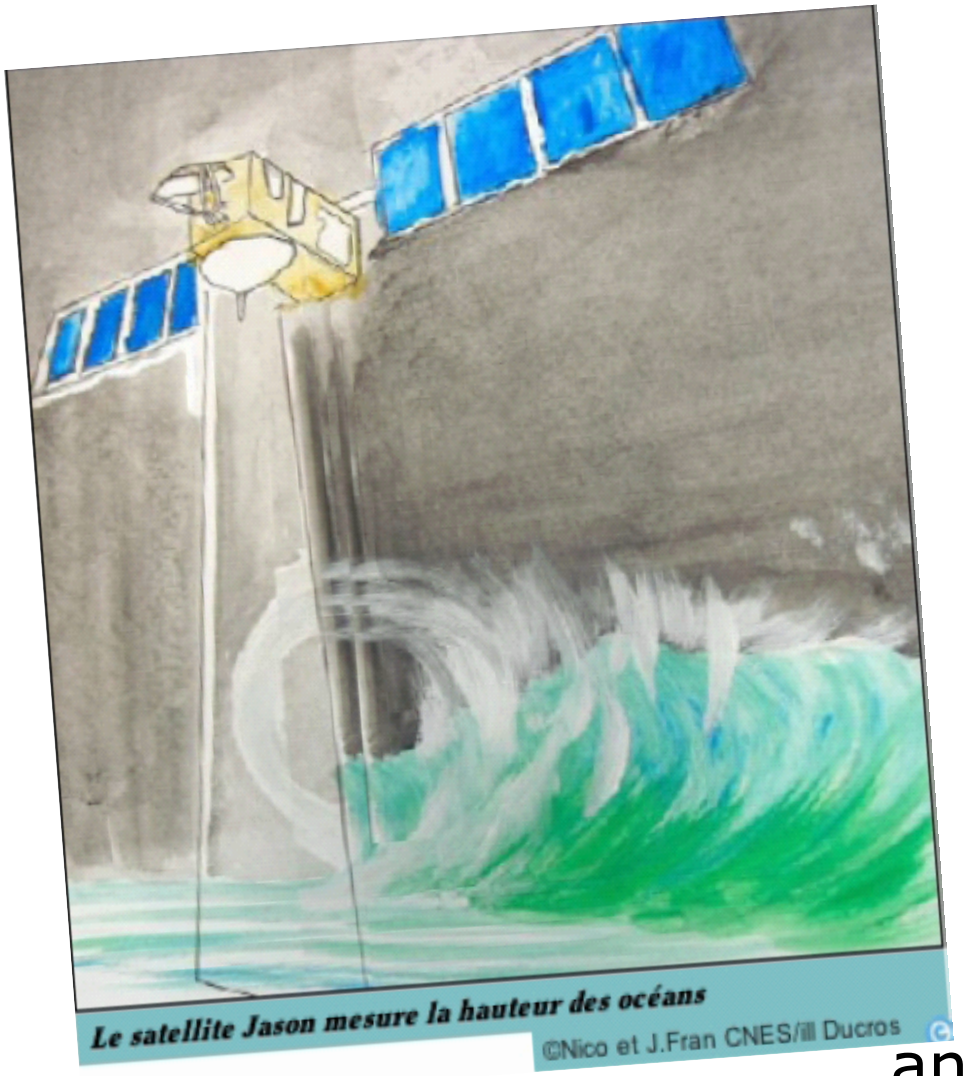


details can be found on the web site http://www.sv.eng.chula.ac.th/geo2tecdi

"Un canard sur l'océan" (Jason-2 contest)

- CNES proposed a contest aimed at young people, based on resources (video, Web…) that include those developed for the launch.
- Using a simple desktop publishing software, young people were invited to produce a newspaper covering the various ways in which satellites, particularly Jason-2, contribute to:
  - studying ocean circulation (e.g. Gulf Stream, El Niño)
  - monitoring the rise in sea level
  - generating 'ocean' bulletins
  - forecasting extreme events: El Niño, cyclones, etc.
  - a better understanding of climate change.
- Total: 4368 visits from 22 countries; 245 newspapers were initially submitted ; 60 accepted

They wrote about…



Le satellite Jason mesure la hauteur des océans

©Nico et J.Fran CNES/Ill Ducros

L'Europe sous influence de la NAO

NAO & Météo à Paris !

Quelles sont les conditions climatiques en Europe du Nord associées à un épisode de NAO positif ou négatif ?

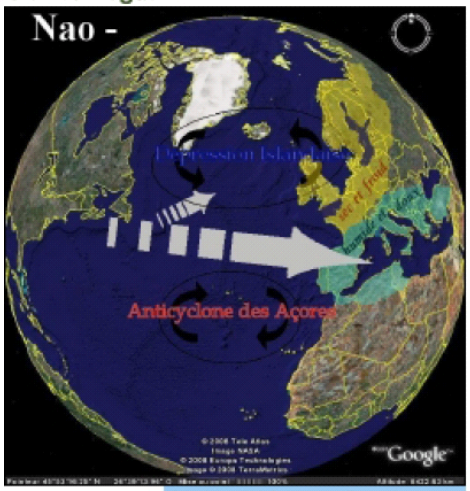


Schéma NAO- Forni/Bison

…and more!

Results

- "50 years ago there were no more than 5 people in the world aware of ocean altimetry. Today more than 1500 students participated in this ocean altimetry contest …" Jean Louis Fellous (jury member)
- An e-mail survey was sent to all participant teachers; 70% responded:
  - All were very enthusiastic about the contest
  - Contest provided motivation for students, including at risk students
  - Some classes created follow-on activities (musical production, astronomy club…)

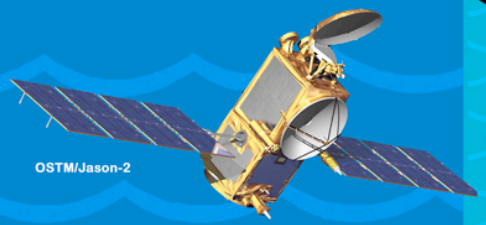
National Aeronautics and Space Administration

Voyage on the High Seas:
Using a NASA Board Game to Reinforce Ocean Literacy Principles

Annie H. Richardson, NASA/Jet Propulsion Laboratory

Abstract: In 2002, the Ocean Surface Topography education and public outreach (EPO) team partnered with NASA's award-winning Space Place education program to develop a poster/board game designed for play by middle-school students. The game has become one of our most successful and useful tools in explaining satellite oceanography, global ocean circulation, and the ocean's role in climate. It has proven to be fun and engaging for ages 9 to adult, and in formal and informal settings. Activities on the back are suitable for direct classroom use. As we continue to focus our outreach activities on promoting ocean literacy, we are developing supplemental activities that allow educators to use the game to reinforce learning of the seven essential principles of ocean literacy, specifically the ones for which the science objectives of measuring ocean surface topography from space are most relevant (Principles 1, 3, and 7).

World map shows interconnectedness of ocean basins (Principle 1)

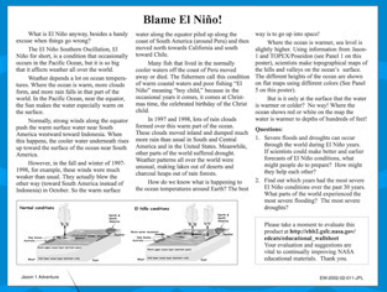


OSTM/Jason-2

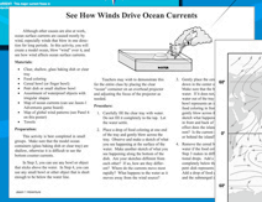
Measuring ocean surface topography from space helps us understand global ocean currents

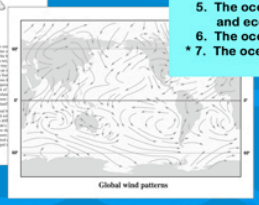
Radar altimeters and other satellite instruments provide a global view of the mostly unexplored ocean (Principle 7)

Quiz and Discovery Cards reinforce all seven essential principles



Classroom activities illustrate the ocean's influence on weather and climate (Principle 3)





What you should know about the ocean

Seven Essential Principles

* 1. Earth has one big ocean with many features.
2. The ocean and life in the ocean shape the features of Earth.
* 3. The ocean is a major influence on weather and climate.
4. The ocean makes Earth habitable.
5. The ocean supports a great diversity of life and ecosystems.
6. The ocean and humans are inextricably linked.
* 7. The ocean is largely unexplored.

sealevel.jpl.nasa.gov

Adopt a buoy to study plastic Island

- 2 classes from France
- They discovered the « plastic island » problem1
- Met in the Argonautica annual meeting in La Rochell
- Launched 3 Argonautica buoys & studied their paths
- They would like to be able to work with a US (California) school.

Media & Public Outreach

- Activities continuing – web, press releases, features, etc.
- JPL getting involved in “new” medias (social network, blogs, etc.)

- Promotion of OST science

On the web

MSL "home page" http://www.aviso.oceanobs.com/msl/

Data and Image selection

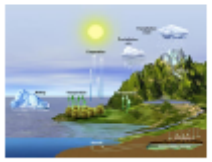
Web interface to choose between the options, to view a figure, and/or download data (NetCDF)

Processing & corrections used

How the altimetry data are computed, Corrections and models applied

Overview

The basics of Mean Sea Level, rise sources, and MSL measurements



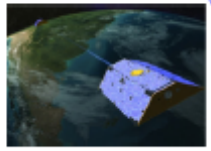
Comparisons with other techniques

MSL results from other techniques (*in situ*, Grace)

Recent developments

Grace

Analysis from the Grace satellite, computed by GOHS/Legos have been added, combined with Argo and altimetry to estimate MSL budget.



Glacial Isostatic Adjustment (Post-Glacial Rebund)

The GIA effect on Mean Sea Level have been added to the global time series.

Validation by comparison with tide gauges

Mean sea level computed from tide gauges network will be shown for validation issues. Those will be computed operationally as altimetry MSL.

Mean sea level accuracy

The MSL accuracy can be impacted by different error sources, including inhomegeneities between satellites. For example, wet tropospheric correction has to be estimated from radiometer or ECMWF model depending on the satellite; orbits are not homogeneous. Other corrections could impact the MSL as e.g. the ECMWF pressure fields in the T/P data. GOHS/Legos and CLS are jointly conducting studies to estimate a more realistic MSL error budget.

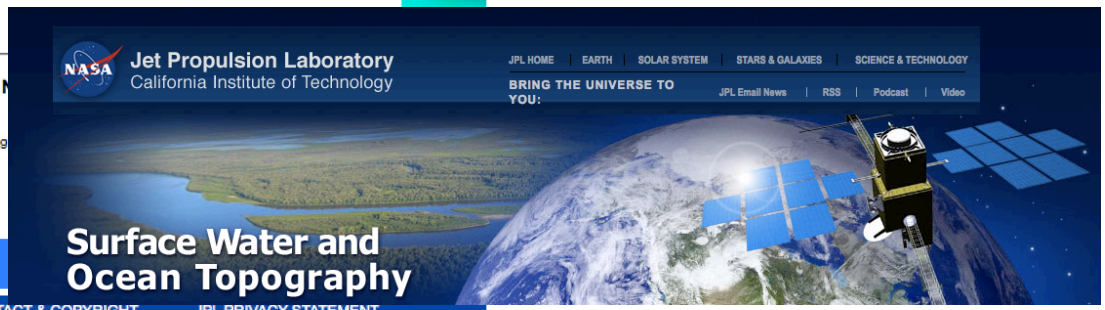
Merged time series continued with Jason-2

Jason-2 data added to continue the T/P-Jason-1 series

Promoting the OSTST

http://sealevel.jpl.nasa.gov

Several opportunities to promote your science research, activities, awards, etc.



NASA/JPL SWOT http://swot.jpl.nasa.gov

Activities at JPL

- JPL/NASA still do much of what they've always done:
  - Press releases for major news – launches, major findings, news of interest to the general public
  - Also, other materials such as science writer's guides, videos, animations, etc.
- What's new:
  - NASA site–Hurricane page
  - JPL's new climate website. Launched last year.
  - Wikipedia (not exactly new), but important, since 1st on search engine report most of the time
  - JPL Blog,
  - Social media (Facebook…)
  - Twitter

OSTST posters on the web

- A complete overview of what was shown during this meeting
- An archive of past meetings (from 1998)

- Send them in pdf to aviso@cls.fr
- Your posters available online at: http://www.aviso.oceanobs.com/ostst/

New Planned Efforts

- Jason-2/OSTM, SWOT, Saral and Jason-3 education & public outreach and applications outreach
- Altimetry and multisensor applications promotion
- Coverage of science team research and other applications on web
- Google Earth altimetry application browser with a series of new images (cont'd)