



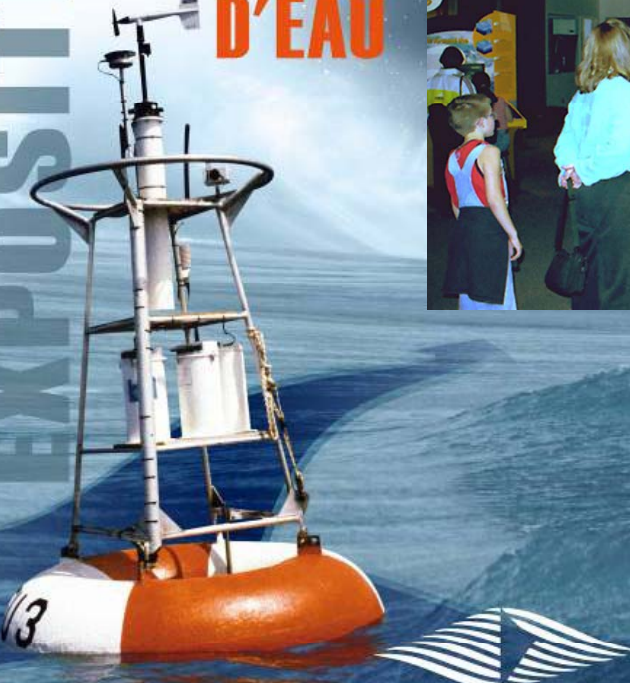
Outreach is...

Helping in the making of exhibitions


Du 5 mai au 16 juillet 2006

EXPOSITION

COURANTS D'AIR COURANTS D'EAU



MUSEE DE L'HISTOIRE MARITIME
DE NOUVELLE CALEDONIE
en partenariat avec l'IRD



Observacions des del satèl·lit ENVISAT:

El nivell de la mar a les Illes Balears



del 12 al 13 de maig de 2003
Extensió de la U10 a Eivissa-Formentera
C/ Bes, 9 · Eivissa



Doing public lectures / conferences



ACTUALITÉS

"Votre association est cette magicienne qui permet de ouvrir les esprits à la con- es généreux militants sont teur. Au point qu'ils font toiles mais aussi les fleurs, an. Bravo à eux."

Hubert Reeves

ation loi 1901 à but non lucratif
Observatoire Midi-Pyrénées
Édouard Belin - 31400 Toulouse



Participating in classroom activities



Climat
C'est chaud!

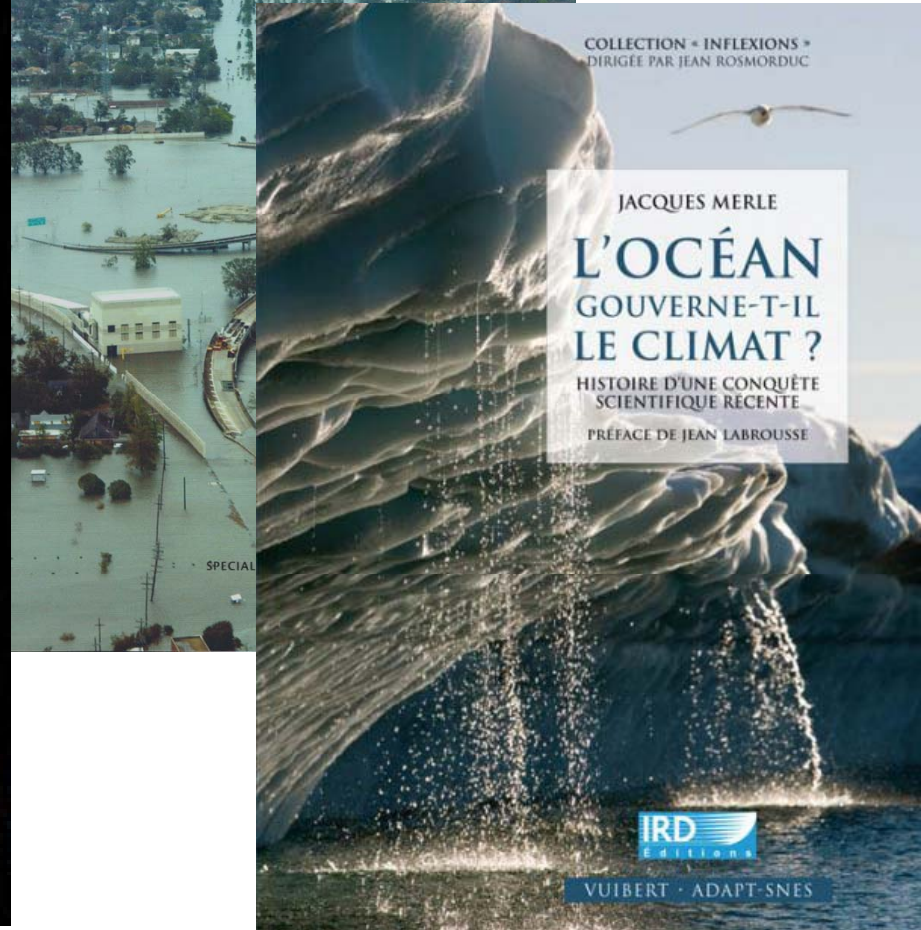
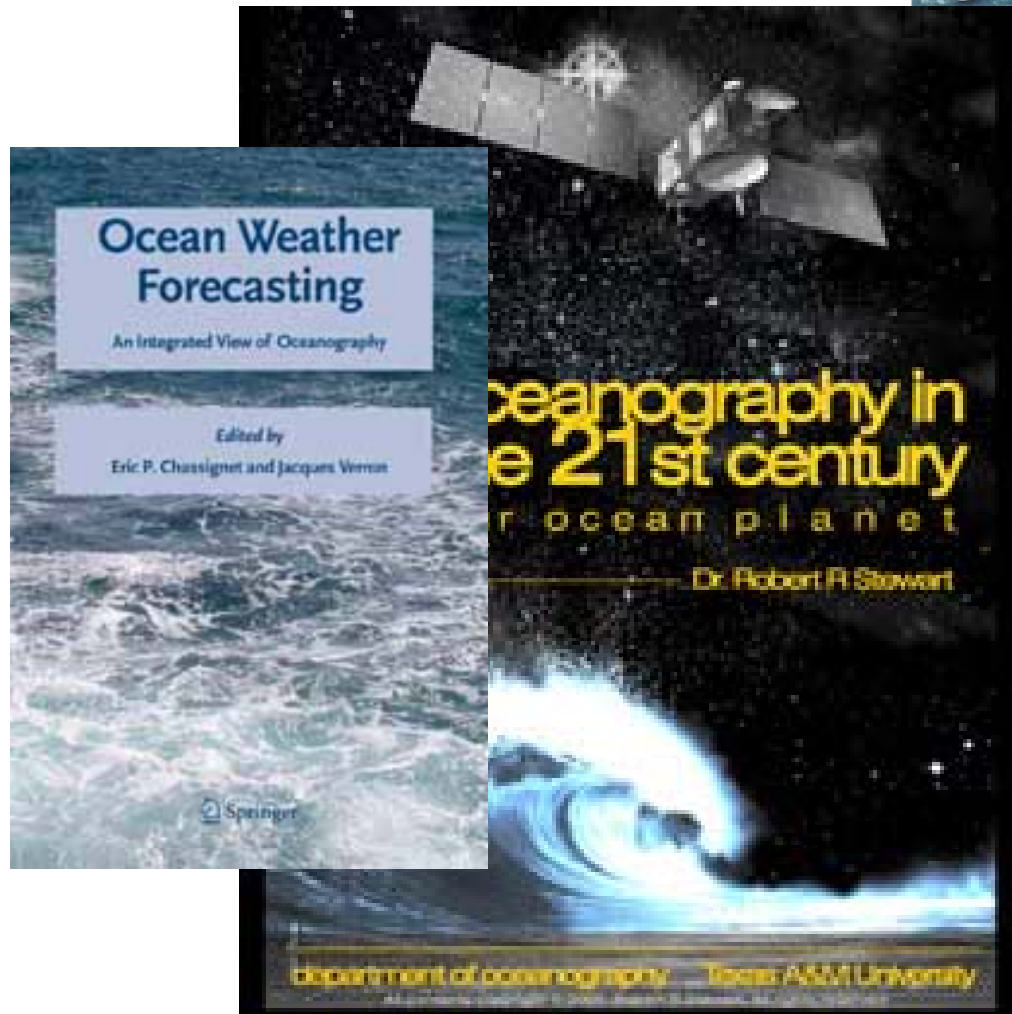
L'environnement
Développement durable

Agir
chaque
jour

Sauvons la planète!

Une mesure simple à mettre en oeuvre
collage, feutre, Daniel & Ahmed © images-google.fr

Writing & editing books



Or making other "hard copy" material

La circulation océanique

Les couches océaniques

- Couche de surface (0-500 m)
- Couche intermédiaire (500-3500 m)
- Couche profonde (>3500 m)

les courants les plus forts
la plus grande concentration d'êtres vivants
les échanges directs avec l'atmosphère

LES GÉONAUTES ENQUÊTENT SUR LES OcéANS
THE GEONAUTS INQUIRE INTO THE OCEANS

Océans, reflet de la Terre

Cette carte illustre la répartition de la surface topographique océanique à l'échelle globale par couleur et par hauteur. Elle est basée sur les données de la mission TOPEX/Poseidon.

Oceans mirror the deep

The high-resolution map of the world's sea surface topography is derived from the altimetry data acquired by the TOPEX/Poseidon satellite.

Monitoring the ocean with altimetry

The altimetry data provided by the TOPEX/Poseidon satellite is used to monitor the ocean's surface topography. This data is essential for understanding the ocean's circulation and its impact on the climate.

The level is rising

The altimetry data shows a clear upward trend in sea level rise over the past few decades. This is due to the melting of glaciers and ice sheets, as well as the thermal expansion of seawater.

Climate, an exchange between air and water

The ocean and the atmosphere are closely linked. The ocean absorbs and releases heat, and the atmosphere circulates this heat around the globe. This exchange is essential for the Earth's climate system.

Winds and waves

The wind is the primary driver of ocean circulation. It creates waves and currents that transport energy and matter across the ocean. Understanding these processes is crucial for predicting the ocean's impact on the climate.

The environment and safety at sea

The ocean is a vast and complex environment. It is home to a wide variety of life, and it plays a vital role in the Earth's climate system. Understanding the ocean's environment is essential for protecting it and ensuring the safety of those who work on the sea.

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

The TOPEX/Poseidon satellite is used to measure the ocean's surface topography. This data is used to understand the ocean's circulation and its impact on the climate.

High Seas: Force Ocean Literacy Principles

PO team partnered with NASA's award-winning Space Place education team. The game has become one of our most successful and useful tools in climate. It has proven to be fun and engaging for ages 9 to adult, classroom use. As we continue to focus our outreach activities on programs to use the game to reinforce learning of the seven essential principles of ocean surface topography from space are most relevant (Principles 1, 3, and 7).

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

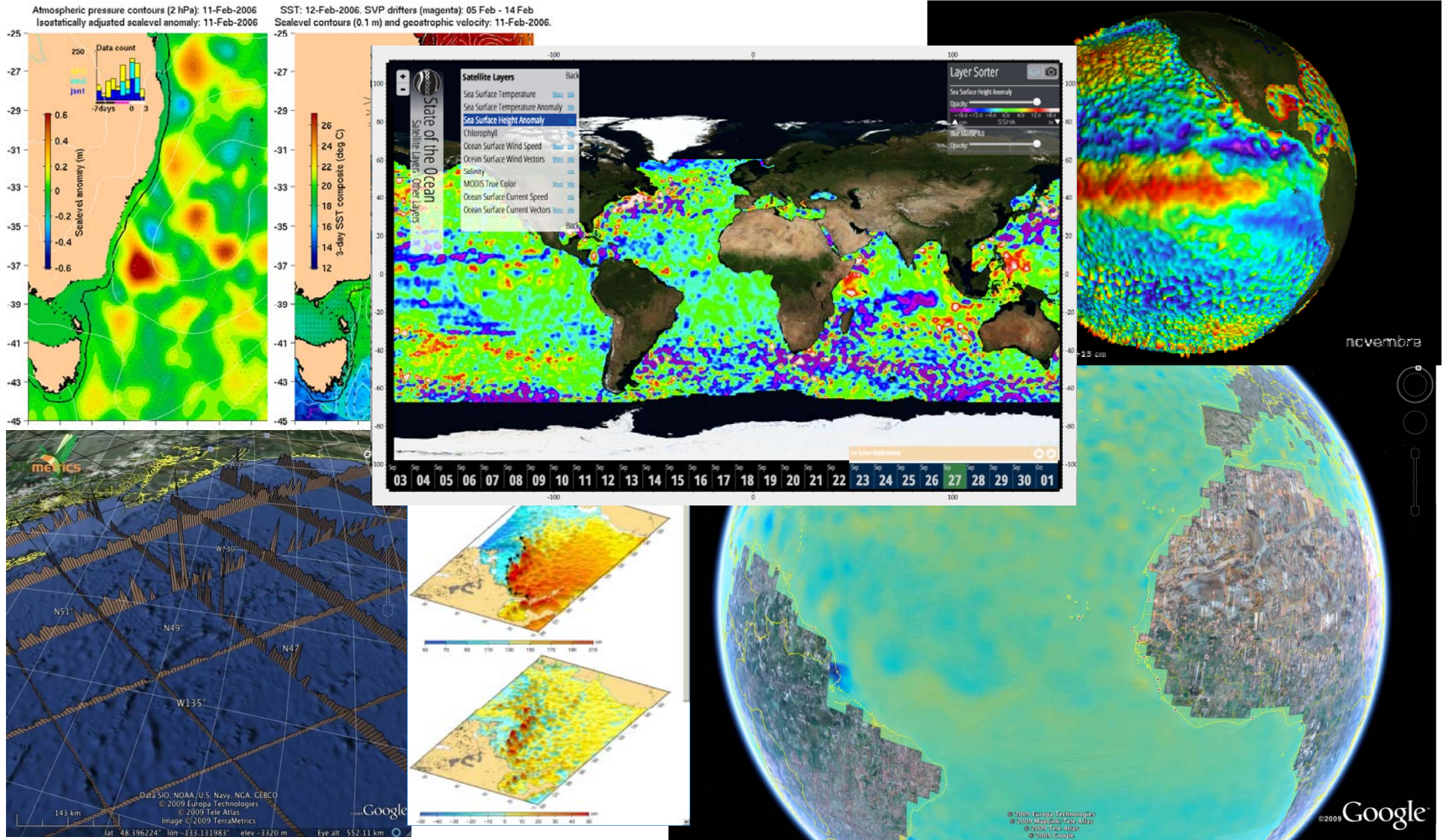
What you should know about the ocean Seven Essential Principles

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.

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

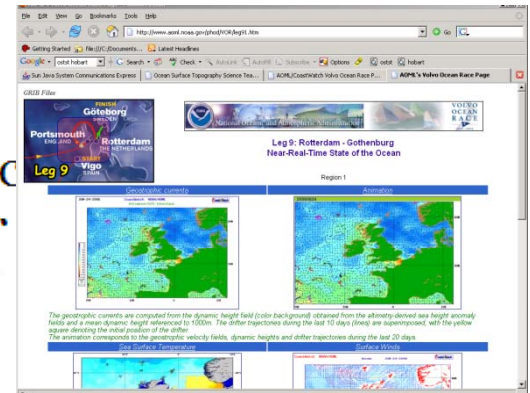
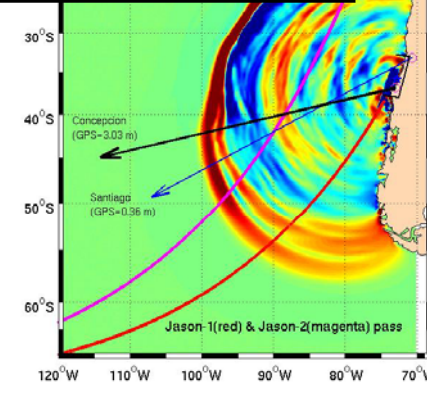
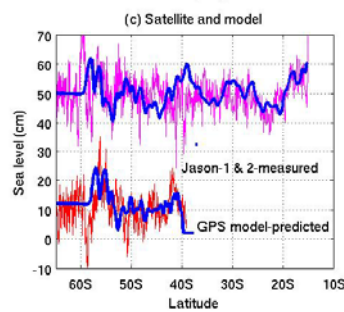
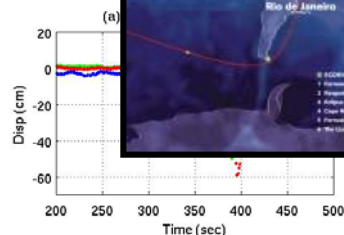
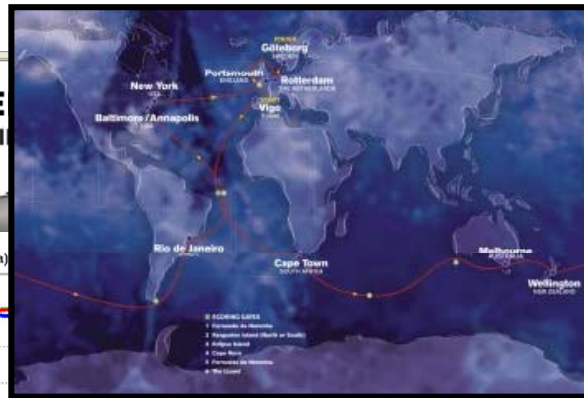
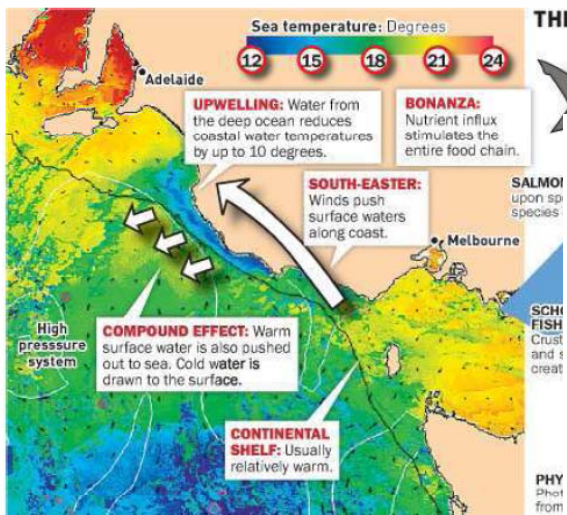
Data and Discovery Cards reinforce all seven essential principles

Generating animations and images

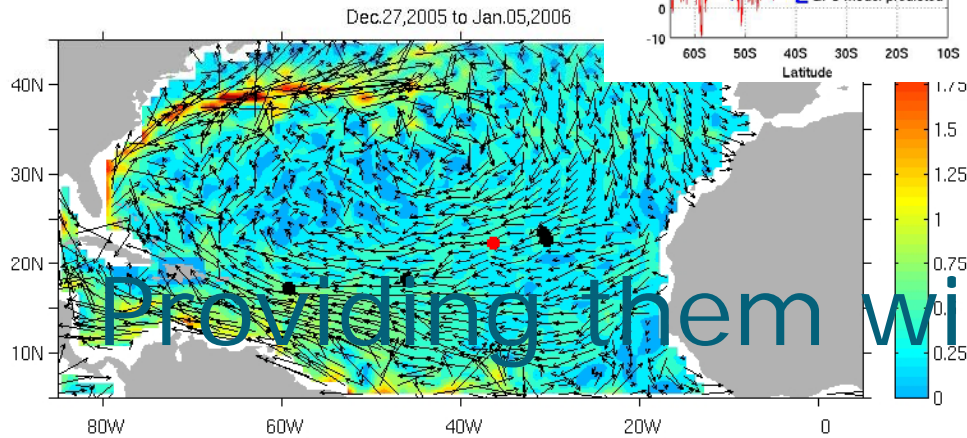


Talking with journalists/media people

UPWELLING STIMULATES MARINE ECOSYSTEM



TAKE a dip in the ocean this weekend - it might be the last for a few months. After about eight weeks of unusually high water temperatures off Sydney, often reaching 25 degrees, the cold currents are set to finally arrive next week.



Providing them with "stories" (ours)

Putting up web sites / pages

AVISO - Ocean Indicators: Mean Sea Level Data and Image Selection - Mozilla Firefox

Selection | Problematics | Processing | Other datasets

Mean Sea Level data and Image selection

Select the area, corrections and the kind of plot (map or time serie curve) you wish, visualise the corresponding mean sea level and download the data (NetCDF format)

Note that, for now:

- only global maps and global merged data time series are available
- only data uncorrected from seasonal signal are available
- merged data are only available corrected from inverse barometer
- post-glacial rebound effect are not removed

Global | North Atlantic | South Atlantic | North Pacific | South Pacific | Indian | Mediterranean

Map | Time serie

Merged data*

TOPEX/Poseidon

ERS-2

GFO

Jason-1

Envisat

Inverted Barometer

Included*

Removed

Download the image

Download the data

University of Colorado Global mean sea level

http://sealevel.colorado.edu/

Mean Sea Level Overview

Long-term mean sea level change is a variable of considerable interest in the studies of **global climate change**. The measurement of long-term changes in global mean sea level can provide an important corroboration of predictions by climate models of global warming. Long term sea level variations are primarily determined with two different methods. Over the last century, global sea level change has typically been estimated from **tide gauge** measurements by long-term averaging. Alternatively, **satellite altimeter** measurements can be combined with precisely known spacecraft orbits to provide an improved measurement of global sea level change.

Since August 1992 the TOPEX/POSEIDON (T/P) satellite mission has been measuring sea level on a global basis with unprecedented accuracy and precision. Jason, launched in late 2001 as the successor to T/P, continues this record by providing an estimate of global mean sea level every 10 days with an uncertainty of 3-4 mm. The latest **mean sea level time series** and **maps of regional sea level change** can be found on this site. Concurrent **tide gauge calibrations** are used to estimate altimeter drift. Sea level measurements for specific locations can be obtained from our **Interactive Wizard**. Details on how these results are computed can be found in the **documentation** and the **bibliography**. Please **contact us** for further information.

Overview

Data and Plots

- Time Series
- Maps
- Interactive Wizard
- Publication Requests/Permissions

Information

- Documentation
- Calibration
- Tide gauges
- Bibliography
- Acknowledgments

Support

Rate = 2.8 ± 0.4 mm/yr

Seasonal signals removed

Ocean Motion : Main Page - Mozilla Firefox

http://www.oceanmotion.org/

Ocean Motion and surface currents

Impact | Gathering Data | Researchers/Applications | Data Resources | Teachers | Students | Glossary

The ocean is a major player in the Earth system. It is in constant motion, with currents flowing on all levels, with currents flowing on all levels. Data from buoys, drifters, and satellites such as ocean color, sea height, temperature, and winds, provide us with observations about the speed and direction of currents and about heat stored in the ocean, which help to predict global climate variations.

remote sensing from satellites is the most efficient way to get global information about these vast, hard-to-measure expanses.

SEIS - Ocean Currents

Local currents

What are ocean currents and why are they important?

Wind driven currents

Measuring currents

The global conveyor

Additional material

Games, quizzes and exercises

Currents and life in the ocean

Topics of the Ocean Currents Tutorial

(Click on an image to enter a chapter)

1993 TOPEX-POSEIDON TRAQUE EL NINO

Mise à jour : 19/09/2011

matiques. « El Niño », se produit dans le Pacifique Tropical. Ses vagues, ont conduit à mettre en place des moyens importants de « le dans l'espace. L'altimétrie par satellite, avec TOPEX/Poseidon (1992-2000) a permis une aide indispensable à la détection précoce, à ne. On peut ainsi détecter le plus tôt possible son apparition et, surtout, par ses impacts et réduire son incidence.

qui, entendez-vous, car il bat en (est) est l'une des perturbations si celle où l'interaction entre océan

n observe un affaiblissement, voire (Pacifique Tropical, l'océan réagit : sent pousser vers l'Indonésie par ces côtes d'Amérique du Sud. L'eau il l'Indonésie n'est plus là, plus est également absente, d'où sécheresse. Au contraire, l'air plus sec et humide - et on assiste alors à l'augmentation et de glissement fait les anches qui nourrissent les (il s'agit cependant toutes

e situation a été prévue à l'avance : évenir plus tôt pendant cette

Debut 1997, Topex/Poseidon met en évidence une élévation du niveau de la mer de plus de 30 cm (en rouge) dans le Pacifique central, se déplaçant vers l'est. Dès juillet 1997, la signature d'El Niño est claire, et attend son paroxysme en novembre.

sent sévère de 1992-1993, il a été prévu sur la zone. Des moyens, aussi bien en mer, dans les airs que à réaliser des observations et pouvoir alerter rapidement. En particulier, (rés), lancés en 1992, a montré que l'altimétrie précise par satellite a généré d'un tel phénomène plusieurs mois à l'avance. Il a permis analyser et de comprendre ce phénomène complexe où océan et

e Topex/Poseidon, puis Jason-1 (CNES/Nasa) et maintenant Jason-2 est depuis 1993 une surveillance continue de l'ensemble des océans.

Global Reservoir and Lake Monitor

Crop Intensity

20% 100%

Lake Height Variation* (m)

- > +1
- +0.1 - +1
- 0.4 - 0
- 2 - -0.5
- < -2

Click on a region to view Reservoir/Lake Heights

* from 10-year mean level

Giving courses



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

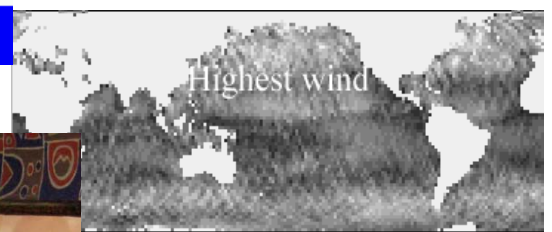
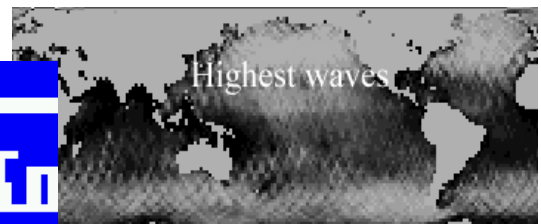
- Create data (netcdf)
- Write (netcdf)
- View specific data (netcdf)
- Development tools (netcdf)

Programs (fortran/gis) interface

Settings

Database (netcdf)

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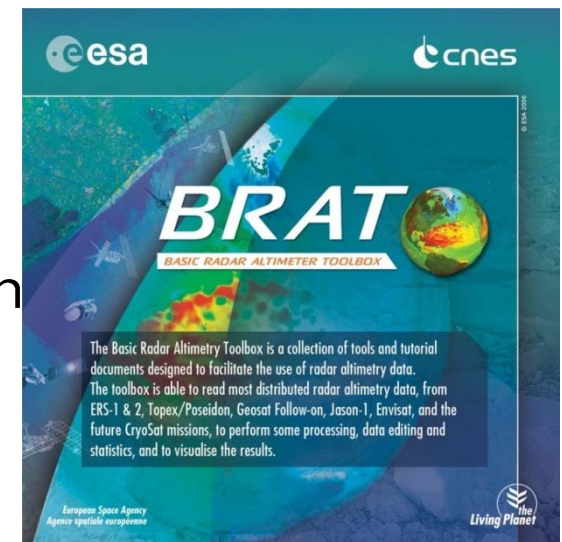


details can be found on the web site <http://www.sv.eng.chula.ac.th/geo2tecdi>



Providing with dedicated tools

- (along-track) altimetry data needs quite different tools than “imagery” data:
 - Use of several hundreds(thousands) files at the same time
 - Computation
 - Editing selection on criterias (on different variables)
 - A lot of different satellites/formats
- Basic Radar Altimetry Toolbox:
 - A Joint project between ESA and CNES,
 - Data reading, processing and visualisation
 - from ERS-1 (1991) up to Saral
 - <http://www.altimetry.info>,
 - <http://earth.esa.int/brat/> (mirror),
 - DVD





Recommendations / perspectives

- A number of resources (figures, maps, movies, animations, schemes...) available
 - On the web
 - On our computers / databases
- don't hesitate to ask for general material or a specific theme / figure
(at worst, we can think about having it made for future uses)
- A database of existing material?
With also past outreach activities? (so as to be able to contact people having done similar things in the past to benefit from their experience)



Recommendations / perspectives

- Link between the different data available by the different data center
- Joint user report?: built upon the cooperation to strengthen our case by showing the “total” number of altimetry users (CNES, NASA, NOAA, EUMETSAT...)
- Process all data in self-describing, homogeneous universal format following acknowledged standards



Recommendations / perspectives

- Heightened interest of general public concerning all things concerning climate, more efforts should be made in altimetry visibility
- Organize more trainings, make more tutorials, let them be known, share material
- Develop international collaboration between students ; material in several languages.
- Keep trying to organize for US (high school) students to participate to OSTSTs
- Support applications user communities and applications science



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@oceanobs.com
- Your posters available online at:
<http://www.aviso.oceanobs.com/ostst/>