July 2011

Special Issue

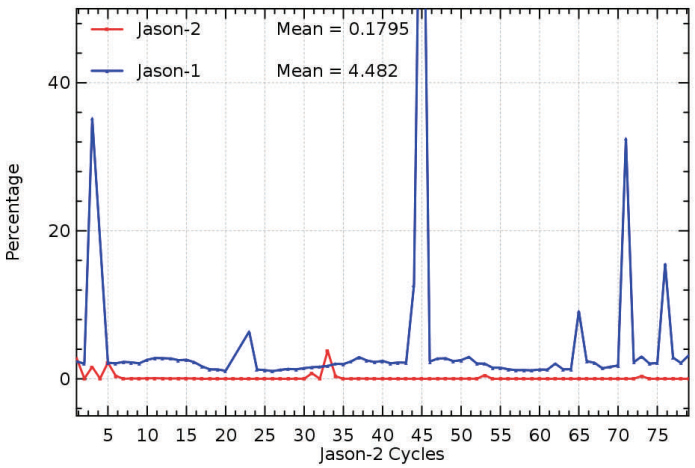
Jason-2 – three years in orbit!

N. Picot - CNES

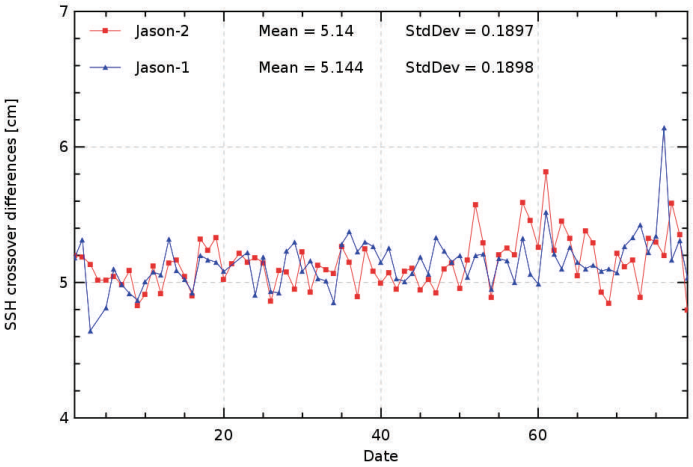
Jason-2 was launched 3 years ago, reaching its orbit on 4 July 2008. It provides state-of-the-art data to more than 2,000 teams around the world for use in a wide range of studies and applications. The satellite is fulfilling all its mission objectives, providing extremely high levels of data availability, quality and performance stability.

Jason-2 has now been in orbit for 3 years and is fulfilling all its mission objectives, providing state-of-the-art, high-quality data to more than 2,000 teams around the world. From the very outset, data availability has been extremely high thanks to the reliability of the system and the associated ground procedures. On average, only 0.18% of data have been lost since the satellite's launch – and this remarkably low figure is mainly related to scheduled operations (altimeter software upload, routine calibrations, etc.). All these events are listed in the Jason-2 annual Calval report (see: http://www.aviso.oceanobs.com/fileadmin/documents/calval/validation_report/J2/annual_report_j2_2010.pdf)

By the end of 2008, Jason-2 OGDR and IGDR data were already available to end-users in "C" version, the same version used for Jason-1 data (for better compatibility). GDR data were released in "T" version in August 2009. The quality of every product is systematically verified and the main quality indices can be found in the Jason-2 annual Calval report. As an example, the cycle-by-cycle standard deviation of SSH crossover differences is plotted for Jason-2 and Jason-1 in the graph below. Both missions show very good, and quite similar performance levels, which are stable over time. The average figure is 5.14 cm rms for both missions.



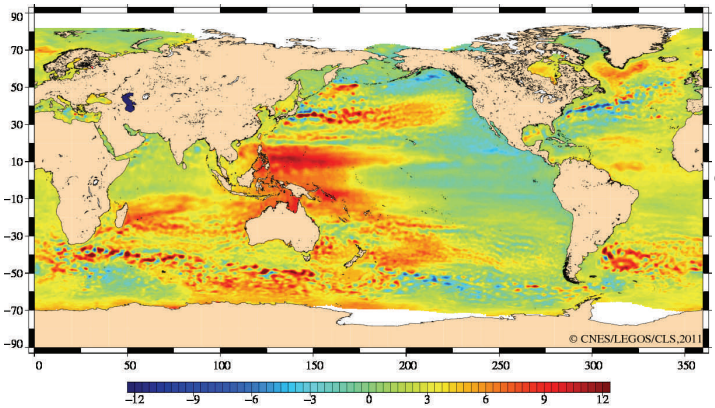
Cycle per cycle percentage of missing measurements over ocean (Credits CLS/CNES).



Cycle by cycle standard deviation of SSH crossover differences for Jason-2 and Jason-1 (Credits CLS/CNES).

Scientific results

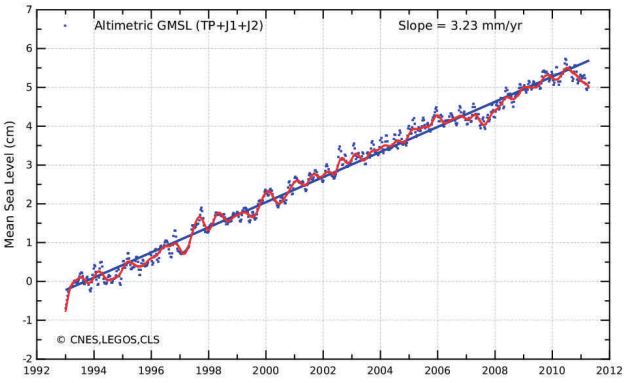
Among the major scientific results obtained thanks to Jason-2 data, we can note:



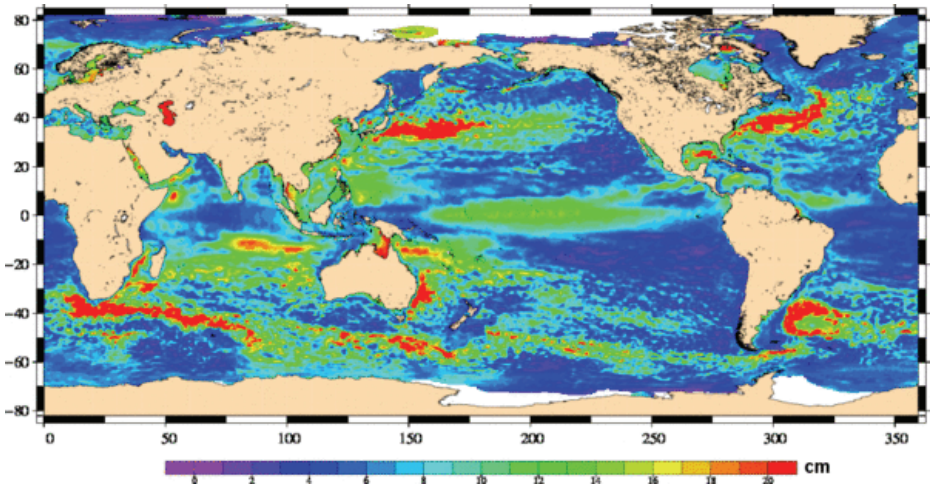
Map of regional trends (in mm/year) using gridded, multi-mission Ssalto/Duacs data since 1993. (credits CLS/CNES/LEGOS).

Mean Sea Level

The continuous monitoring of mean sea level trend. The global mean level of the oceans is one of the most important indicators of climate change, since it incorporates reactions from several different components of the climate system. Precise monitoring of changes in the mean level of the oceans, particularly through the use of altimetry satellites, is vitally important for understanding not only the climate but also the potential socio-economic consequences of any rise in sea level. See http://www.aviso.oceanobs.com/msl/ for further details



Mean sea level since January 1993 (annual and semi-annual signals removed, postglacial rebound correction and filters applied -Credits CLS/CNES/LEGOS).



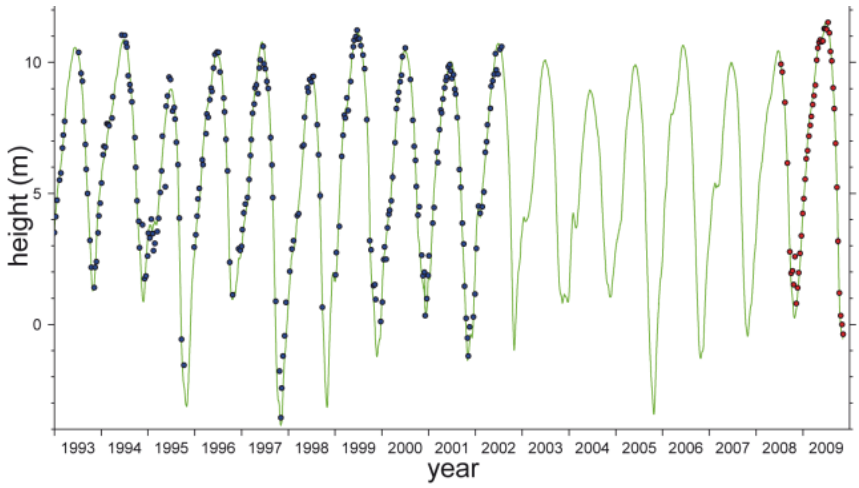
Root Mean Square of the Sea level anomalies over the whole Jan 1993-March 2010 period, made from Ssalto/Duacs multimission altimeter products. Red areas are the one where the sea surface heights change the most (Credits CNES/CLS).

Meso-scale

The analysis of meso-scale ocean feature, thanks to the combination of Jason-2, Jason-1 and ENVISAT data within the SALP/DUACS system. This reveals the number and strength of eddies which play a major role in ocean/atmosphere exchanges. See http://www.aviso.oceanobs.com/en/news/idm/2011/mar-2011-177000-eddies-in-the-oceans/index.html for further details

Hydrology

Consolidated hydrology applications. Jason-2 is continuing the work begun with Topex/Poseidon (whereas Jason-1 was optimised almost solely for oceans, Jason-2 is able to retrieve the majority of hydrological surface data). In the same way , Jason-2 data is of considerable use to coastal applications (see Pistach products) See http://www.aviso.oceanobs.com/en/news/idm/2010/apr-2010-drought-and-flood-in-the-amazon-basin/



Amazon level measured at Manaus (Brazil) by tide gauges (green curve) and by Topex/Poseidon and Jason-2 on track #063 (blue and red dots respectively) . Credits J. Santos da Silva (IRD/UFRJ).

Program background

Jason-2 continues the successful partnership between the United States and Europe. CNES and the US National Oceanic and Atmospheric Administration (NOAA) are responsible for satellite operations, while the Jet Propulsion Laboratory manages the mission for NASA. Data processing is carried out by CNES, EUMETSAT and NOAA, depending on the type of product.

A more detailed breakdown of the partnership can be found below:

CNES:

- is responsible for the overall management of the project and the system,
- provided the satellite system, using the PROTEUS platform,
- contributed to the payload by supplying the POSEIDON3 nadir altimeter, the DORIS onboard system, as well as the T2L2, Carmen2 and LTP technological "passengers",
- provided the satellite control centre and a ground station based in Germany for EUMETSAT,
- operates the satellite during the critical phases, produces the steering and orbit controls as well as satellite expertise throughout the satellite's service life,
- processes, archives and distributes off-line products (I/GDRs), archives operational data (OGDRs).
- liaises with scientific users,

EUMETSAT:

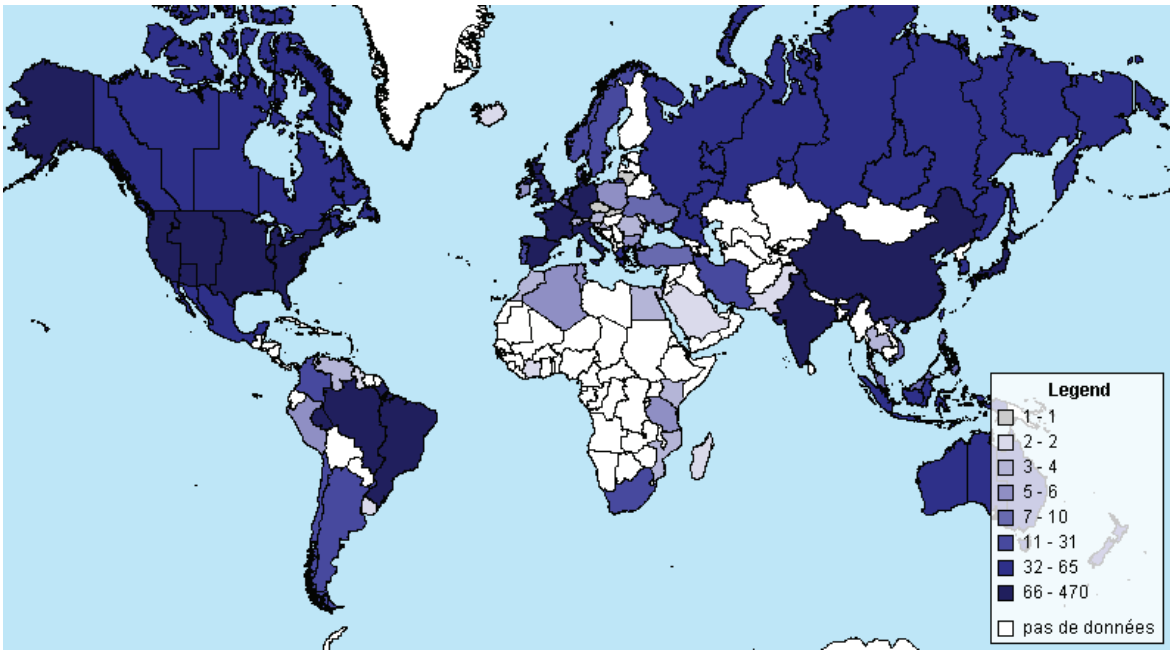
- supplies the ground station infrastructure and ensures its maintenance operations,
- processes and distributes operational data (OGDRs),
- liaises with operational users.

NASA:

- supports CNES in the overall management of the system,
- supplied the vehicle launcher, launch operations and associated infrastructures,
- contributed to the payload by supplying the UHF radiometer (designed for tropospheric corrections), the GPS receiver and the laser retro-reflector (for precise orbit determination).
- contributes to the validation and expert analysis of the off-line products (I/GDRs)

NOAA:

- supplied two ground stations,
- supplied an operations centre and conducts routine operations on the satellite,
- processes and distributes operational data,
- liaises with operational users,
- archives and distributes scientific data.



2235 Aviso user teams in 88 countries over the world in June 2011 (Credits Aviso).

Events

- **14-22 July 2011** 39th COSPAR Scientific Assembly (Mysore, India)
- **27-29 September 2011** Smos Science Workshop (Arles, France)
- **18 October 2011** Argo and Altimetry Workshop (San Diego, USA)
- **16-18 October 2011** 5th Coastal Altimetry Workshop (San Diego, USA)
- **19-21 October 2011** 2011 Ocean Surface Topography Science Team meeting (San Diego, USA)
- **5-9 September 2011** 2011 EUMETSAT Meteorological Satellite Conference (Oslo, Norway)
- **5-9 December 2011** AGU Fall meeting (San Francisco, USA)

Aviso Users Newsletter

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