GLOBWAVE Newsletter

2011

May

GlobWave – An ESA Initiative

GlobWave is an ESA initiative to improve the uptake of satellite-derived wind-wave and swell data by the scientific, operational and commercial user community. The project covers the development of an integrated set of information services based on satellite wave data, and the operation and maintenance of these services for a demonstration period.

The project, funded by ESA and CNES, kicked off in January 2009 and is due to end in December 2012.

Historical and Near Real Time products are now freely available. Further developments have included delivery of the Satellite Wave Data Quality Report and first Quarterly Quality Control Report and the Global Wave Statistics (GWS) document.

Project Consortium

The project is led by Logica UK with expertise from SatOC, CLS, Ifremer and NOCS.

Each brings experience that is vital to the success of the project, in defining products that directly meet user community needs.

Steering Team and User Group

The project team are guided through the development with the help of the Steering Team, ensuring the interests of the user community are met.

The Steering Team comprises of seven key members of the user community representing operational, commercial and research areas. The team monitors progress at vital milestones and consults with ESA, providing recommendations for each phase of activity.

The User Group provided the initial requirements upon which the project is based, and are engaged continuously to ensure requirements are relevant and the system is aptly tested.

Satellite Data Products

GlobWave data is comprised of a harmonised set of wave products, built from SAR and Altimeter data, with a uniform error characterisation.

The full historical archive from each satellite is made available via GlobWave as a series of Delayed Time products, consisting of 11 data streams from 8 satellites, stretching back as far as 1985 with GEOSAT.

Altimeter Level-2-Preprocessed wave products are available from ERS-1, ERS-2, Envisat, Topex/POSEIDON, Jason-1, Jason-2, US Navy GEOSAT and US Navy/NOAA GEOSAT Follow On.

SAR Level-2-Preprocessed wave products are available from ERS-1, ERS-2 and Envisat.

The GlobWave Team has been providing Near Real Time (NRT) data within 1-4 hours of observation since the end of 2010, consisting of 4 data streams from 3 satellites. Altimeter and SAR data are available from Envisat, with additional Altimeter data available from Jason-1 and Jason-2.

The Product User Guide should be consulted for a detailed listing of all product content.

Past Events & Forthcoming Schedule

4th Coastal Altimetry Workshop (Porto, Portugal) – 14th to 15th October 2010 – A poster presentation was delivered on the GlobWave Pilot Spatial Wave Forecast Verification Scheme.

GlobWave PM4 (ESRIN) – 4th May 2011 - Progress Meeting 4 will be taking place to discuss deliverables and assess project progress,

MARCDAT-III Workshop (ESRIN) – 2nd to 6th May 2011 – An oral presentation is due to be given on Project GlobWave.

User Consultation Meeting 2 (Cork, Ireland) – 5th to 6th October 2011 - The aim of UCM-2 is to review GlobWave data and services, in order to ensure future plans align with user needs. A series of presentations will be made by the project team and User Group.

Quality Control

We are pleased to announce the formal acceptance of the Satellite Wave Data Quality Report, which comprises: (i) an analysis of the quality levels of the delayed mode L2P data set, (ii) an analysis of L2P error characterisation through collocation measurements with *in situ* buoys, offering an estimate of significant wave height standard error, and (iii) analysis of L2P inter-comparison via satellite crossover measurements.

With regards to the first of these, the quality analysis illustrates different results for different sensors, with the most modern instruments generally being associated with the highest quality levels.

For the error characterisation analysis, the assessment for Altimetry illustrates that wave heights greater than 1m follow a linear function of the significant wave height that varies with sensor, whereas for wave heights less than 1m the errors are less certain. For SAR, the bias on the significant wave height was found to be a function of dominant wavelength as well as the usual increase with swell height with wind speed.

Regarding the last point, the satellite crossover analysis shows generally good agreement across sensors, with two exceptions which warrant further investigation – nonlinearity between Topex and ERS1 at high significant wave heights, and an anomalous relationship between GFO and Jason-1 during 2008.

Aside from the Satellite Wave Data Quality Report, also delivered has been the first Quarterly Quality Control Report for January to March 2011, which observes L2P error characterisation using newly available collocation measurements with in situ buoys, and SAR wave spectra quality analysis. The report contains a summary of the quality levels of the Near Real Time L2P data set during the quarter.

Pilot Extension to the JCOMM Wave Forecast Verification Scheme (WFVS)

Development of the Pilot Extension to the WFVS has progressed, with test reports for the UKMO and SHOM delivered, and reports now being automatically generated on a daily basis.

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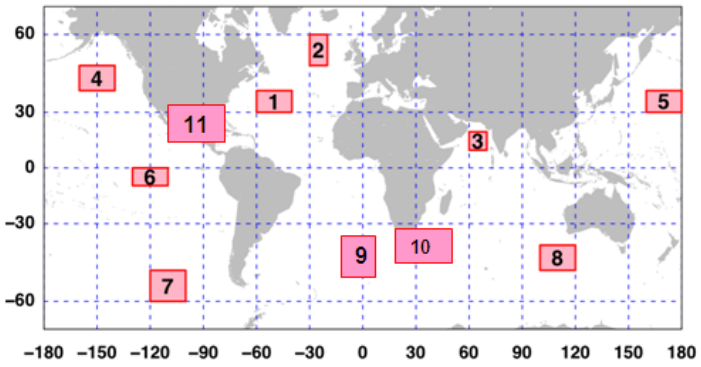
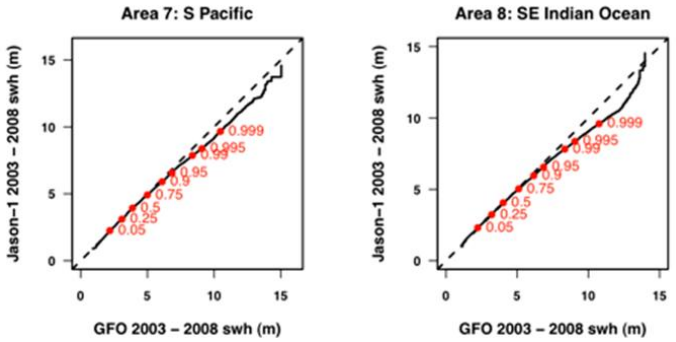
Global Wave Statistics

A Global Wave Statistics document has been delivered, observing a number of geospatial areas across different ocean basins for statistical analysis, with each area associated with particular wave characteristics and also large enough to be associated with enough data for meaningful analysis.



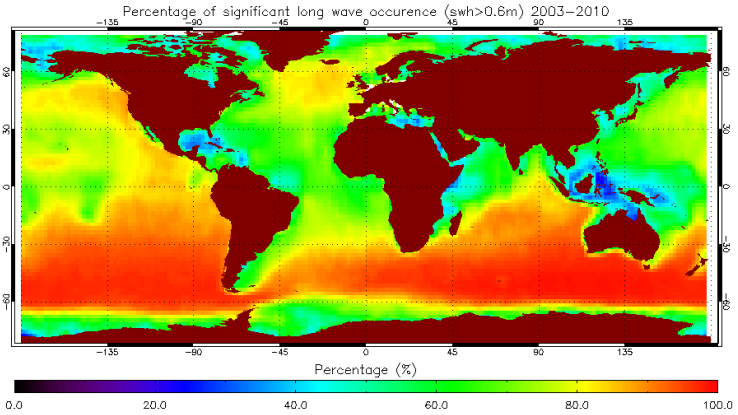
In the case of Altimetry statistics, comparisons on significant wave height (Hs) measurements were assessed, the main vehicle for altimeter statistical comparison being quantile-quantile (QQ) plots of Hs percentile values.

The Altimetry analysis illustrates a lower proportion of high waves measured by Jason-1in comparison to other altimeters, as depicted below for GFO versus Jason-1 across areas 7 and 8, respectively.

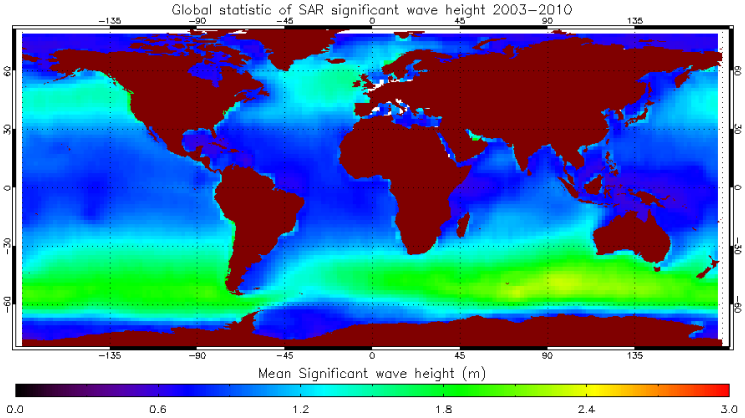


In the context of Envisat and Jason-1, further analysis has revealed that the Jason-1 validation process flags a lower proportion of data as being of good quality, suggesting that over cautiousness in Jason-1 validation may be prevalent. Additionally, the possibility of calibration at high wave height was considered, but not deemed a contributing factor.

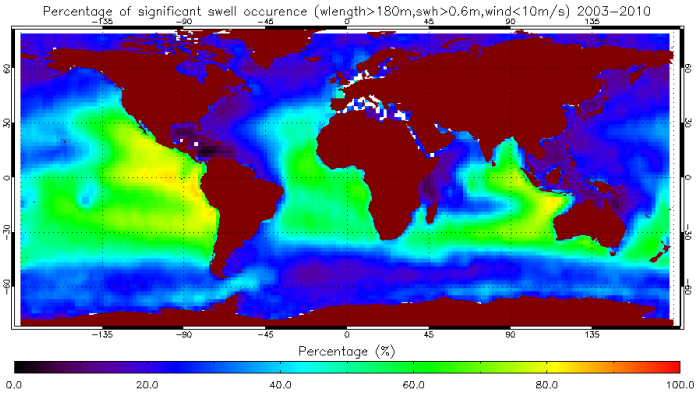
In contrast, the SAR analysis has gathered statistics based on the ENVISAT SAR instrument, for the time period spanning the start of 2003 to end of 2010. An analysis on a global scale has been accomplished under various statistical perspectives. For instance, the percentage of all valid wave spectra across 2003 to 2010 exhibiting at least one wave partition with Hs greater than 0.6m, has been illustrated as follows –



Similarly, a map portraying mean significant long wave height across 2003 to 2010 portrays the predominance of long wave energy in the southern ocean, and to a lesser extent in the northern mid-latitudes.



The global SAR statistical analyses has also included significant swell occurrence between 2003 and 2010, via constraining of dominant wavelength and wind speed, which has portrayed swell regions as located mostly in the tropical and equatorial regions.



The statistical analysis of global SAR data considered other perspectives, including cross sea occurrence, before then turning to yearly, seasonal, monthly and regional analysis, which absorbed factors such as dominant direction, dominant wavelength, and 1st & 2nd partition significant wave height..

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