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Quarterly Quality Control Report, Q2 2012



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EXECUTIVE SUMMARY

This document gives the Quarterly Quality Control Report for April to June 2012 for GlobWave Near Real-Time (NRT) data.

Results are presented for SAR and altimetry giving a summary of the quality levels of the NRT L2P data set, presented by month for the quarter. Plots give percent of good quality significant wave height measurements for each L2P file together with number of data points and daily averages.

The overall quality, variability and specific anomalies are discussed with explanations for anomalies given where possible.

After ten years of operation the Envisat satellite suffered a major anomaly on 8th April 2012 when it stopped communicating with Earth. After unsuccessful attempts to re-establish operations ESA have formally declared the Envisat mission ended as of 9th May 2012. No problems with data quality were observed up to the point of failure.

1 INTRODUCTION

This document is one of the Quarterly Quality Control Reports for GlobWave. It contains information on the quality levels of NRT L2P data products, for SAR and altimetry. Results of the analysis of new collocated altimeter and buoy data (to derive estimates of the error on altimeter Hs), and results of the SAR wave spectra error analysis are not available on a quarterly basis and will be included in the Annual Quality Control Reports.

1.1 Document Structure

The document structure is as follows:

- Section 1 – Introduction: this section
- Section 2 – L2P Quality Analysis: Analysis of the quality levels of the NRT-mode L2P data set, presented by satellite and for each month of the analysis period.

1.2 Definitions and Acronyms

| Acronym | Definition |
|---------|---|
| ASAR | Advanced Synthetic Aperture Radar |
| CDIP | Coastal Data Information Program |
| CLS | Collecte Localisation Satellites |
| CNES | Centre National d'Etudes Spatiales |
| DUE | Data User Element |
| ENVISAT | ESA's Environmental Satellite |
| EO | Earth Observation |
| ESA | European Space Agency |
| ESRIN | ESA Space Research Institute |
| GDR | Geophysical Data Record |
| Hs | Significant Wave Height |
| L2P | Level-2-Preprocessed |
| MDB | Match Up Database |
| NASA | National Aeronautical Space Administration |
| NDBC | National Data Buoy Center |
| NetCDF | Network Common Data Form |
| NOAA | National Oceanic and Atmospheric Administration |
| NOCS | National Oceanography Centre Southampton |
| NODC | National Oceanographic Data Center |
| NRT | Near Real Time |
| ODR | Orthogonal Distance Regression |
| PDF | Portable Document Format |

| Acronym | Definition |
|---------|-------------------------------------|
| RMS | Root Mean Square |
| SAR | Synthetic Aperture Radar |
| SatOC | Satellite Oceanographic Consultants |
| TBC | To Be Confirmed |

2 L2P QUALITY ANALYSIS

This section gives a summary of the quality levels of the GlobWave NRT-mode L2P wave data for quarter 2 of 2012 (April to June).

2.1 Quality criteria

Each Hs measurement in the L2P has an associated quality variable (swh_quality for altimetry, quality_flag for SAR) that is assigned a quality level as follows:

| Value (decimal) | Meaning |
|-----------------|--|
| 0 | Probably good measurement |
| 1 | For altimetry: Suspect, probably okay for some applications. For example this is set when rain is detected for an otherwise good measurement. For SAR: Ambiguous spectrum |
| 2 | Probably bad measurement |
| 127 | Not evaluated |

The criteria used in evaluating these quality levels is described in Annex B of the L2P Product User Guide (D.5, D.6).

2.2 Results

This section presents a summary of the quality levels of the L2P NRT-mode data. The quality levels for each L2P data file were counted and the values presented by month for each satellite. Results of the percentage of good quality ocean measurements are presented for each L2P file together with a daily average.

The results are most useful for understanding the variability of quality levels for a particular satellite data stream. Comparison between the quality levels of different satellites and instruments requires an understanding of how quality levels are calculated, which is different in each case, and an appreciation of the physical factors affecting quality levels, such as the inclination of the satellite and the presence of sea ice.

2.2.1 Envisat SAR

It is with sadness that we report that after ten years of operation the Envisat satellite suffered a major anomaly on 8th April 2012 when it stopped communicating with Earth. After unsuccessful attempts to re-establish operations ESA have formally declared the Envisat mission ended as of 9th May 2012. No problems with data quality were observed up to the point of failure.

For SAR results are presented as the percentage of good or ambiguous quality spectra for each L2P file and all wave partitions.

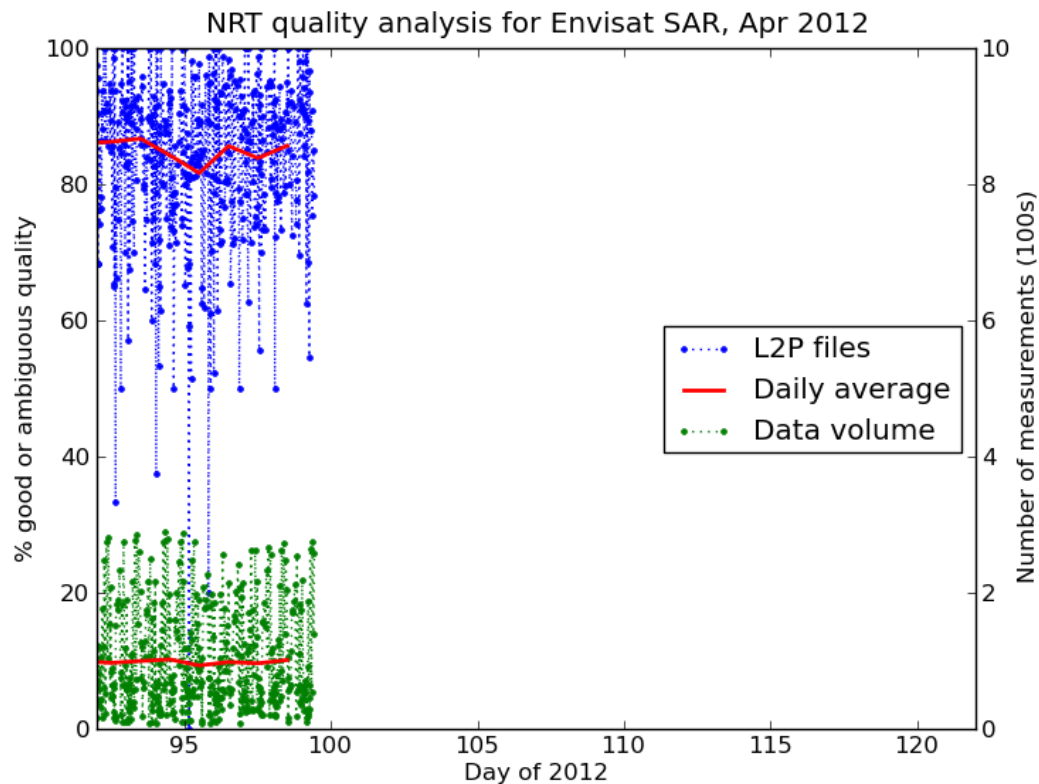


Figure 2-1: Quality levels of L2P NRT dataset for Envisat SAR, April 2012

The results for the reporting period and last results for Envisat SAR are given in Figure 2-1 and are discussed below.

Overall quality

Overall quality is consistent with that observed during quarter 1 of 2012.

L2P results variability

There is significant variability between the quality levels of the individual L2P files, and this is likely to be related to the variable quantity of data in each file. Generally data volumes are low and this results in sensitivity in the quality values. However the daily average gives a useful and much smoother indication of quality variation.

Specific issues

Terminal failure of the Envisat satellite platform occurred on 8th April 2012.

2.2.2 Envisat Altimeter

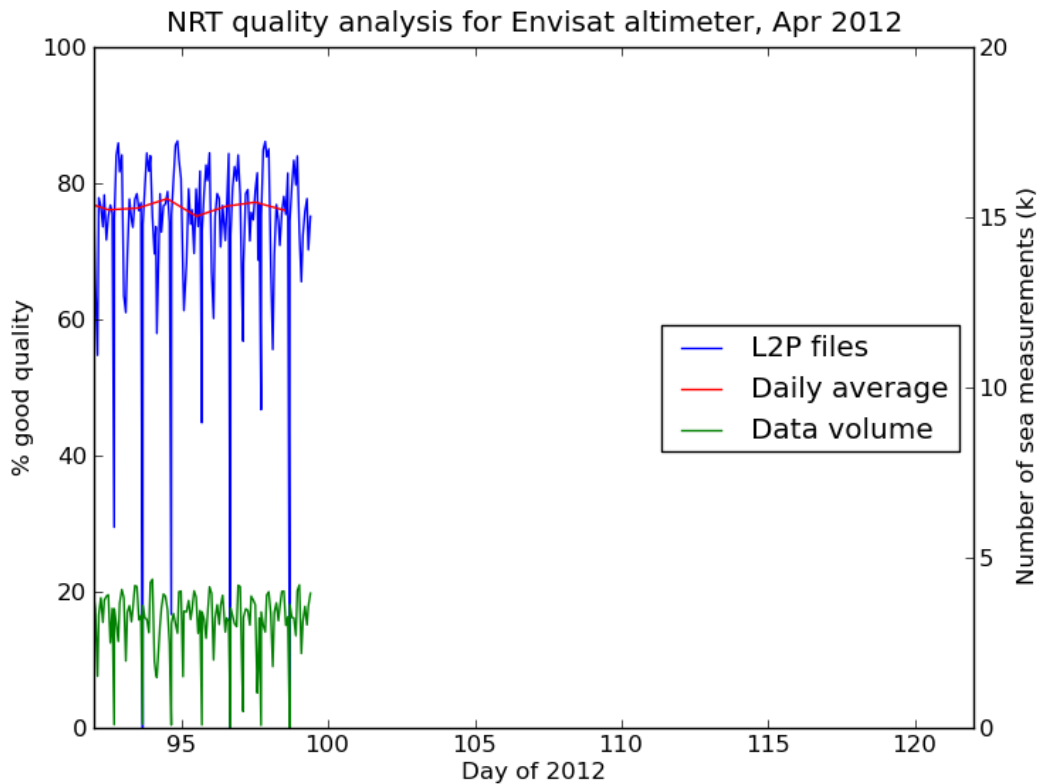


Figure 2-2: Quality levels of L2P NRT dataset for Envisat altimeter, January 2012

The only results for the reporting period and last results for Envisat altimeter are given in Figure 2-2 and are discussed below.

Overall quality

Overall quality is consistent with that observed during quarter 1 of 2012.

L2P results variability

There is significant variability in both the quality levels and data volumes in the individual L2P files. There are spikes of very low data-volume consistently once per day at around 1600UTC, and these correspond to spikes of low quality. This is due to the daily on-board calibration activity that interrupts data flow and results in a short orbit file at that time. There are also consistent intermediate dips in the data volume and quality levels at around midnight. A degree of variability in the results is expected due to the differing proportion of sea, ice and coastal areas in the ground tracks.

Specific issues

Terminal failure of the Envisat satellite platform occurred on 8th April 2012.

2.2.3 Jason-1

The last available data from Jason-1 were in March 2012 as presented in D_17.5, the QQCR for Quarter 1 of 2012.

The Jason-1 mission was reviewed following the safehold episodes that occurred in the last reporting period. It has now moved into a geodetic phase with a long repeat cycle as of May 7th 2012. NRT products up until June 16th suffered from internal calibration problems, but it is expected that NRT data provision will be re-established in the next reporting period once updates to the GlobWave processor are implemented.

2.2.4 Jason-2

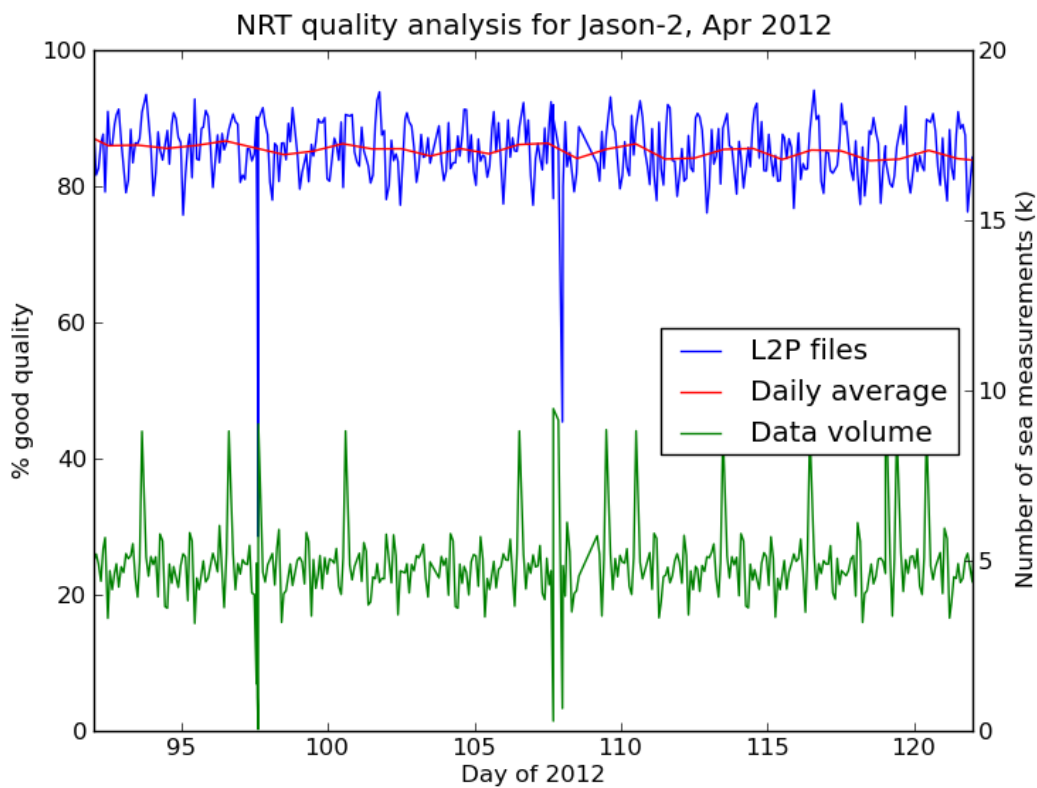


Figure 2-3: Quality levels of L2P NRT dataset for Jason-2, April 2012

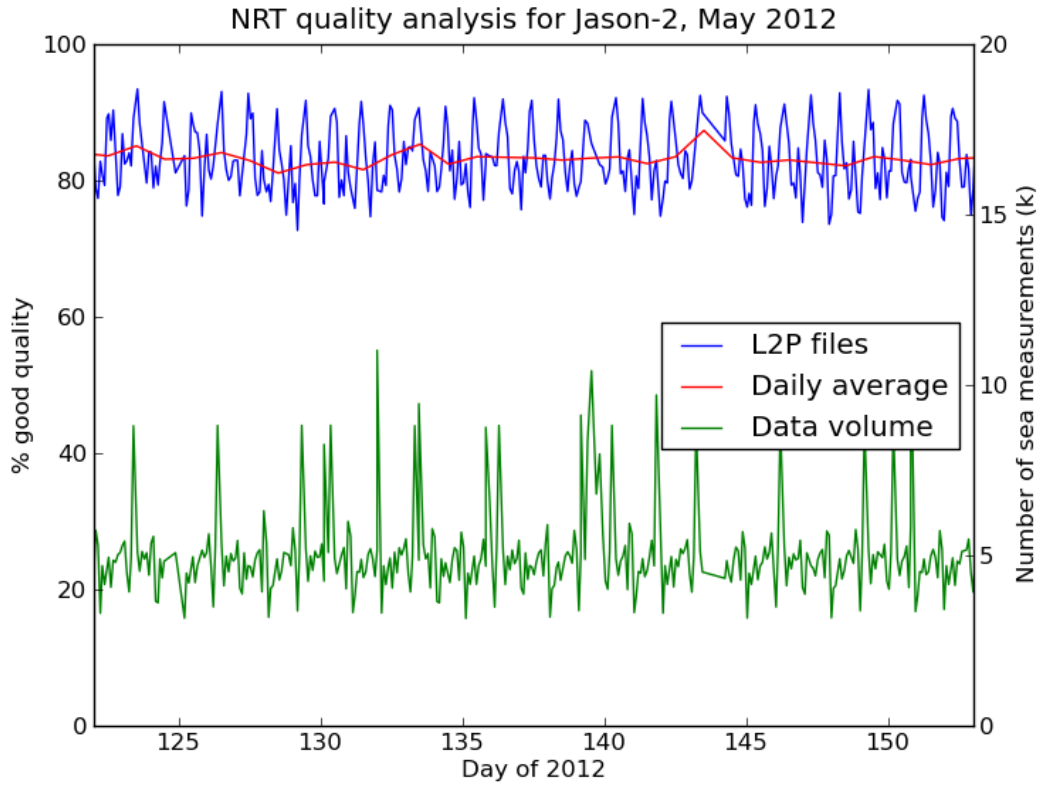


Figure 2-4: Quality levels of L2P NRT dataset for Jason-2, May 2012

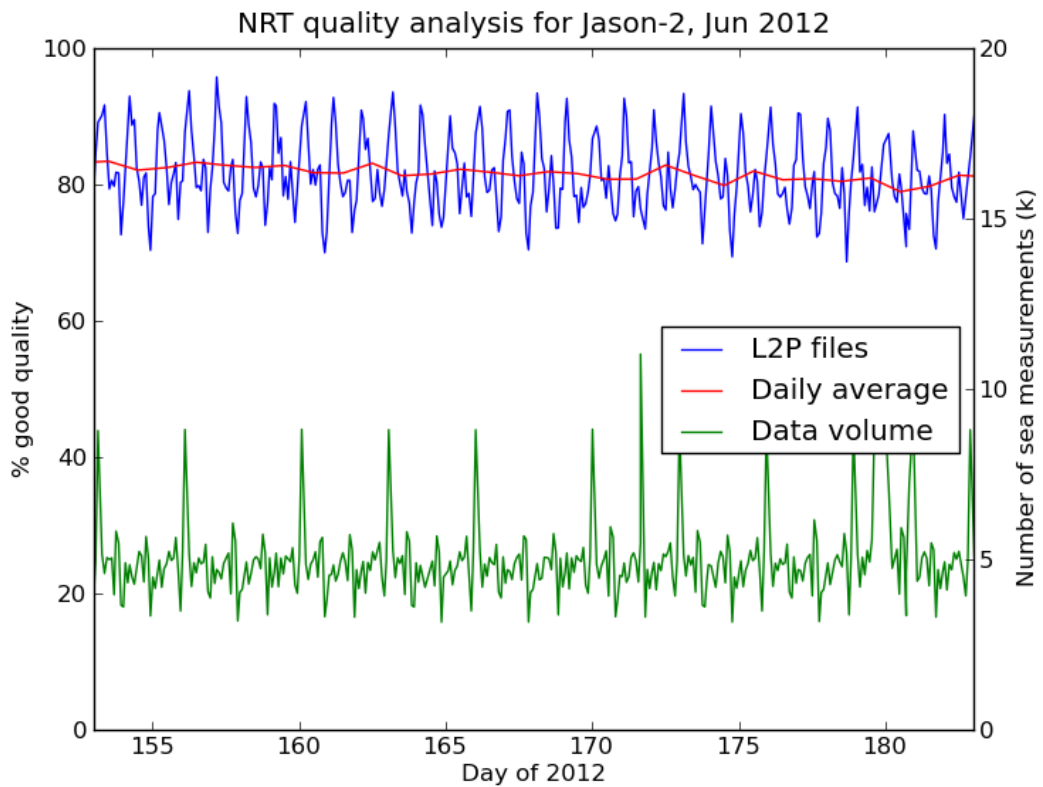


Figure 2-5: Quality levels of L2P NRT dataset for Jason-2, June 2012

The results for the reporting period are given in Figures 2-3 to 2-5 and are discussed below.

Overall quality

The daily average quality values vary between 80% and 90% and decrease slightly over the reporting period. This is consistent with the cycle-average quality results presented for the L2P GDR version in the GlobWave Satellite Wave Data Quality Report (D16).

Overall quality is consistent with that observed during quarter 1 of 2012, but the slight decreasing trend is noted and will be monitored over the next period.

L2P results variability

There is about 15% variability in the quality levels within each day for April and May, consistent with previous quarters, but this variability increase to 20% during June. There is some variability in data volumes, with many prominent spikes of large data volumes though not as regular as with Jason-1. These larger data files contain two orbits of data and will correspond to the amount of data made available in the L2 files.

Specific issues

There are data gaps on days 108 and 143 of 2012. The latter of these corresponds with an orbit manoeuvre but the reason for the former gap is not clear.

In April there are some files with low data quantity and these correspond to spikes of low data quality.



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