Project

VALIDATION REPORT – Q1

Global High Resolution Sea Ice Drift

Reference: MYO-WP14- SIW-DTU-GLO-SEAICE_DRIFT-OBS -VALIDATION_Q1

Project N°: FP7-SPACE-2007-1	**Work programme topic:** SPA.2007.1.1.01 - development of upgraded capabilities for existing GMES fast-track services and related (pre)operational services
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WP leader: met.no	**Issue:** 1.0
Contributors: Roberto Saldo	
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Dissemination level:CO	

CHANGE RECORD

Issue	Date	§	Description of Change	Author	Checked By
1.0	2011-03-25		New	Robert Saldo	1.0
1.0	2011-04-04		Check	Lars-Anders Breivik	1.0

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GLOSSARY AND ABBREVIATIONS

AMSR	Advanced Microwave Scanning Radiometer
NetCDF	Network Common Data Form
SAR	Synthetic Aperture Radar
SIW	Sea Ice and Wind

I.1   Overall description of validation task

AD-1: The objective of the operation is to validate the SIW TAC product against high quality reference data to ensure nominal quality.

I.2   Validation metric test

List/table of tested metrics during the calibration phase, in compliance with the Scientific Calibration Plan.

Product	Metrix number	Description of metric	Threshold for acceptance
Global High Resolution Sea Ice drift	GSID_M1	Statistical correlation of error between reference data and product.	Better than 95%.
	GSID_M2	Bias of comparison between reference data and drift product.	Less than 100m X and Y
	GSID_M3	STD of comparison between reference data and drift product.	Less than 500m X and Y

Table 1 : List of metrics for calibration tests.

I.3   Validation results

As part of the validation the product has been compared to high quality positions from in-situ drifters (GPS equipped Ice Tethered Profilers – ITPs).

The Ice-Tethered Profiler data were collected and made available by the Ice-Tethered Profiler Program based at the Woods Hole Oceanographic Institution (http://www.whoi.edu/itp).

Validation has only been carried out in the arctic as there is no high quality in-situ data from the antarctic at the moment. There is nothing that indicates that the test results should not also apply (be indicative for) to the antarctic.

Co-location was done by looking for a reference drifter position closest to the start position of a drift vector not more than 8km away in space or 2 hours in time and the find another reference position (same drifter) for the end position of the drift vector also not more than 2 hours away in time. From these positions displacement in the x and y coordinates are calculated and compared.

Below is the results of a comparison of the drift product with ITP positions in the months December 2010 until end of March of 2011:

ID	N	corr	mean diff dX	stddev diff dX	mean diff dY	stddev diff dY
itp23	210	1	21m	171m	27m	196m
itp29	71	1	80m	421m	107m	740m
itp33	8	0.99	92m	223m	97m	244m
itp34	17	1	-161m	259m	-15m	202m
itp37	269	1	-109m	610m	-144m	615m

Table 2 : Comparison against ITP positions.
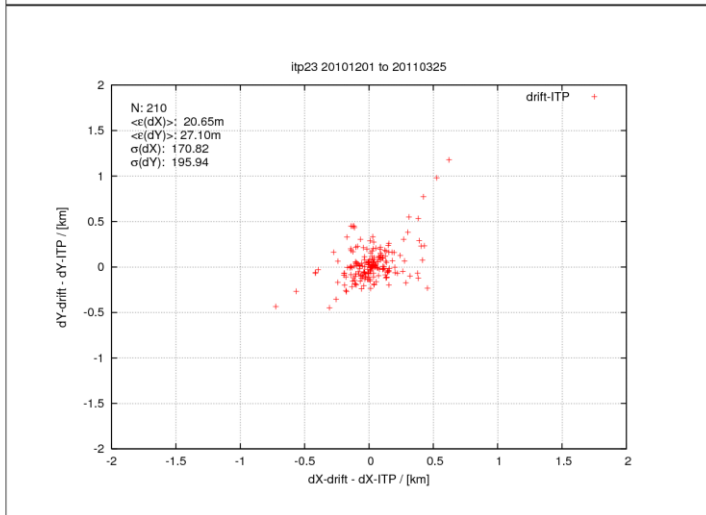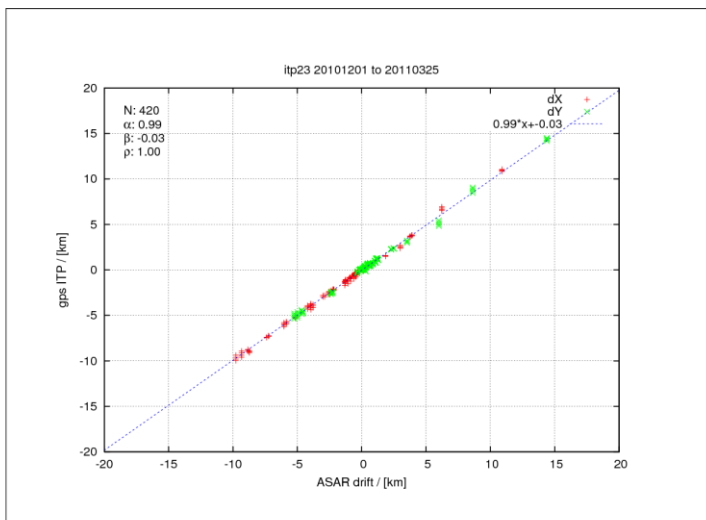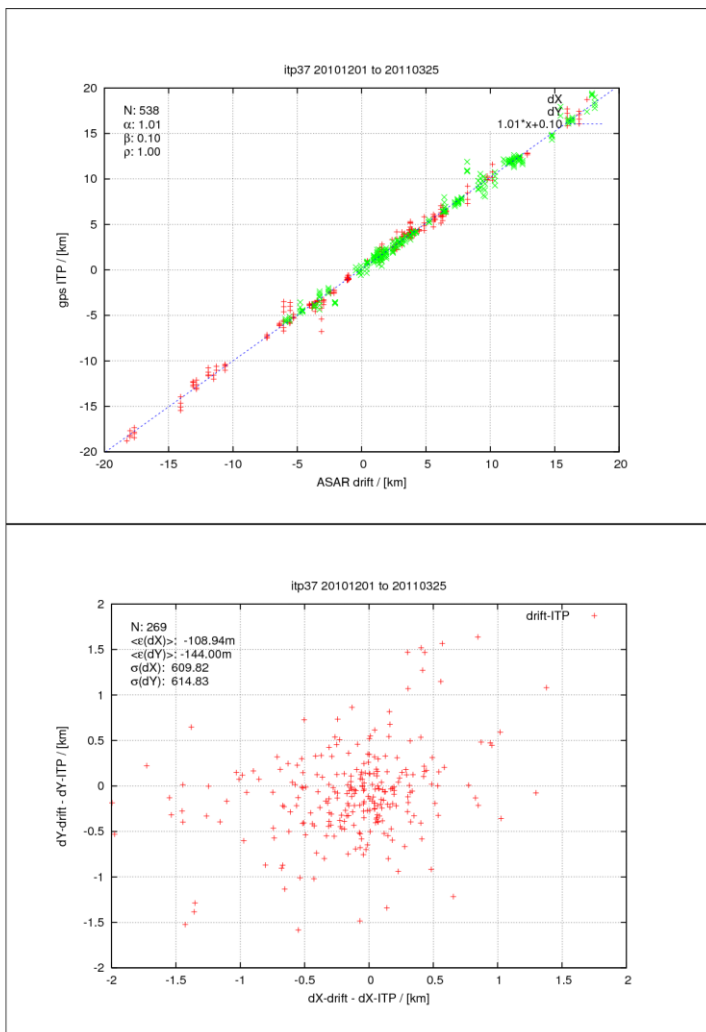
For other validation results see:

 http://www.seaice.dk/myocean/validation/

The validation is updated regularly.

Product	Metrix number	Result of test
Global High Resolution Sea Ice drift	GSID_M1	OK
	GSID_M2	OK
	GSID_M3	OK

Table 3: Results for calibration tests.

I.4   Validation technical summary

Production Unit:

SIW-DTUSPACE-COPENHAGEN-DK

Validation task:

Table 2 shows the result of a validation of the drift data against ITP buoy positions.

The results shows very good correlation between the reference and product values (almost 1.0).

Mean error values are very small which indicates almost no bias and the standard deviation af the differences is low.

ITP37 shows a bit higher STD on the error but nothing that would indicate any problems.

It is worth noting that the numbers are consistently good also for the smaller sample sizes.

Figure 1 and 2 shows the visual validation using a simple scatterplot against ITP. Top image shows the good correlation between product and reference (almost 1:1 relationship), bottom image shows the error distribution, closely centered around 0,0 which is desirable.

Validation summary:

The result of the validation is successful, the values indicates a high quality product.