OSI SAF CDOP2

—

HALF-YEARLY OPERATIONS REPORT

—

1st Half 2013

—

October 2014

–

Version 1_2

Prepared by DMI, IFREMER, KNMI, Meteo-France and MET Norway.

Table of contents

1 Introduction

1.1 Scope of the document

The present report covers from 1st of January to 30 June 2013.

The objective of this document is to provide EUMETSAT and users, in complement with the Web Site, www.osi-saf.org , with an overview on O&SI SAF products availability and quality, main anomalies and events, product usage, users' feedback, and updated available documentation.

SS1 is the Production Sub-system 1, involving M-F/CMS, MET Norway and DMI, under M-F/CMS responsibility. It concerns SST and Radiative Fluxes products.

SS2 is the Production Sub-system 2 which involves MET Norway and DMI, under MET Norway responsibility. It concerns the Sea Ice products.

SS3 is KNMI. It concerns the Wind products.

1.2 Products characteristics

The characteristics of the current products are specified in the Service Specification Document [AD-1] available on the OSI SAF Web Site at:
http://www.osi-saf.org/biblio/bibliotheque.php?safosi_session_id=66f6d7af18b0c709ce734bb91423da64

1.3 Reference and applicable documents

1.3.1 Applicable documents

[AD-1] : Service Specification Document, SESP.

1.3.2 Reference documents

[RD-1] : Surface Solar Irradiance Product User Manual.
[RD-2] : Downward Longwave Irradiance Product User Manual.
[RD-3] : Atlantic Sea Surface Temperature Product User Manual.
[RD-3] : North Atlantic Regional Sea Surface Temperature Product User Manual.
[RD-4] : OSI SAF Sea Ice Product User Manual.
[RD-5] : SeaWinds Wind Product User Manual.
[RD-6] : ASCAT Wind Product User Manual.
[RD-7] : Low Earth Orbiter Sea Surface Temperature Product User Manual.
[RD-8] : Low Resolution Sea Ice Drift Product User's Manual.

1.4 Definitions, acronyms and abbreviations

AHL	Atlantic High Latitude
AMS	American Meteorological Society
ASCAT	Advanced SCATterometer
ATL	Atlantic low and mid latitude
AVHRR	Advanced Very High Resolution Radiometer
BUFR	Binary Universal Format Representation
CDOP	Continuous Development and Operations Phase
CMS	Centre de Météorologie Spatiale
DLI	Downward Long wave Irradiance
DMI	Danish Meteorological Institute
DMSP	Defense Meteorological Satellite Program
ECMWF	European Centre for Medium range Weather Forecasts
EPS	European Polar System
FAQ	Frequently Asked Question
FTP	File Transfer Protocol
GLB	Global oceans
GOES	Geostationary Operational Environmental Satellite
GOES-E	GOES-East, nominal GOES at 75°W
GRIB	GRIdded Binary format
GTS	Global Transmission System
HIRLAM	High Resolution Limited Area Model
HL	High Latitude
HRIT	High Rate Information Transmission
IFREMER	Institut Français de Recherche pour l'Exploitation de la MER
IOP	Initial Operational Phase
KNMI	Koninklijk Nederlands Meteorologisch Instituut
LEO	Low Earth Orbiter
LML	Low and Mid Latitude
MAP	Merged Atlantic Product

MET	Nominal Meteosat at 0°longitude
MET Norway	Norwegian Meteorological Institute
Metop	METeorological OPerational Satellite
M-F	Météo-France
MGR	Meta-GRanule
MSG	Meteosat Second Generation
NAR	Northern Atlantic and Regional
NCEP	National Centre for Environmental Prediction
NESDIS	National Environmental Satellite, Data and Information Service
NetCDF	Network Common Data Form
NMS	National Meteorological Service
NOAA	National Oceanic and Atmospheric Administration
NPP	NPOESS Preparatory Project
NPOESS	National Polar-orbiting Operational Environmental Satellite System
NRT	Near Real-Time
NWP	Numerical Weather Prediction
OSI SAF	Ocean and Sea Ice SAF
QC	Quality Control
R&D	Research and Development
RMDCN	Regional Meteorological Data Communication Network
RMS	Root-Mean-Squared
SAF	Satellite Application Facility
Std Dev	Standard deviation
SEVIRI	Spinning Enhanced Visible and Infra-Red Imager
SMHI	Swedish Meteorological and Hydrological Institute
SSI	Surface Short wave Irradiance
SSMI	Special Sensor Microwave Imager
SSMIS	Special Sensor Microwave Imager and Sounder
SST	Sea Surface Temperature
TBC	To Be Confirmed
TBD	To Be Defined
UMARF	Unified Meteorological Archive & Retrieval Facility
WMO	World Meteorological Organisation
WWW	World Wide Web

table 1 : Definitions, acronyms and abbreviations.

2 OSI SAF products availability and timeliness

As indicated in the table 1, extracted from the Service Specification Document [AD-2], operational OSI SAF products are expected to be available for distribution within the specified time in more than 95% of the cases where input satellite data are available with the nominal level of quality, on monthly basis.

In section 2.1 the above specifications are matched with the measured availability on the local FTP servers. In section 2.2 the above specifications are matched with the measured availability via EUMETCast.

The dissemination of the OSI SAF products via EUMETCast implies an additional step, not under the strict OSI SAF responsibility, but general EUMETSAT's one. The timeliness of the wind products on the KNMI FTP server is not measured separately and therefore the figures in table 2 are copied from table 3 for the wind products. Since the EUMETCast transmission is known to add only a very small delay to the timeliness, the availabilities on the KNMI FTP server are very close to or slightly better than the figures measured via EUMETCast.

The measured availability of the Global Sea Ice concentration (resp. edge, type) products corresponds to the situation when a product file is provided within 5 hours, whatever if there are input data or not. The sea ice type is the last product being produced, therefore the most likely to be outside this 5 hour spec.

2.1 Availability on FTP servers

The following table indicates the percentage of the products that have been made available within the specified time on the local FTP servers.

Percentage of OSI SAF products available on the FTP servers within the specified time over 1rst half 2013																						
Month	ASCAT-A 25 km Wind	ASCAT-A 12.5 km Wind	ASCAT-A Coastal Wind	ASCAT-B 25 km Wind	ASCAT-B Coastal Wind	OSCAT 50 km Wind	GLB SST	NAR SST	AHL SST	MGR SST	METEOSAT SST	GOES-E SST	AHL DLI	AHL SSI	METEOSAT DLI	GOES-E DLI	METEOSAT SSI	GOES-E SSI	GBL Sea Ice Concentration	GBL Sea Ice Edge	GBL Sea Ice Type	GBL Low Res. Sea Ice Drift
Jan. 2013	100	100	99.9	N/A	N/A	97.4	100	100	98.4	99.6	99.9	99.6	100	100	100	99.9	100	99.9	96.8	96.8	96.8	96.8
Feb. 2013	99.9	99.9	99.7	N/A	N/A	96.9	100	100	98.2	100	100	99.9	100	100	100	100	100	100	100	100	100	100
Mar. 2013	100	100	99.2	N/A	N/A	97.5	100	100	98.4	99.7	100	100	100	100	100	100	100	100	87.1	87.1	87.1	83.9
Apr. 2013	97.7	97.7	97.5	100	99.8	93.4	100	100	98.3	99.9	100	100	100	100	100	100	100	100	93.3	93.3	93.3	90.0
May 2013	99.6	99.7	99.6	100	99.7	96.3	100	100	100	99.8	99.9	68.1	100	100	100	68.1	100	68.1	100	100	100	100
Jun. 2013	99.9	100	99.8	99.8	99.8	98.6	100	99.2	100	99.3	99.7	81.1	96.7	96.7	99.8	82.2	99.8	82.2	96.7	96.7	96.7	96.7

table 2 : Percentage of OSI SAF products available on the FTP servers within the specified time over 1st half 2013.

Note : The timeliness of the wind products on the KNMI FTP server is not measured separately and therefore the figures in table 2 are copied from table 3 for the wind products. Since the EUMETCast transmission is known to add only a very small delay to the timeliness, the availabilities on the KNMI FTP server are very close to or slightly better than the figures measured via EUMETCast.

Comments :

See anomaly details in section 3.

The availability of the OSCAT 50 km winds is systematically lower than the availability of the ASCAT wind products. This is due to delays in the level 0 and level 1 processing which occur from time to time and which are outside the scope of the OSI SAF.

Availability of GOES-E products have been impacted in May/June due to GOES-E outage.

2.2 Availability via EUMETCast

The following table indicates the percentage of the products that have been delivered within the specified time :

Percentage of OSI SAF products available via EUMETCast within the specified time over 1rst half 2013																						
Month	ASCAT-A 25 km Wind	ASCAT-A 12.5 km Wind	ASCAT-A Coastal Wind	ASCAT-B 25 km Wind	ASCAT-B Coastal Wind	OSCAT 50 km Wind	GLB SST	NAR SST	AHL SST	MGR SST	METEOSAT SST	GOES-E SST	AHL DLI	AHL SSI	METEOSAT DLI	GOES-E DLI	METEOSAT SSI	GOES-E SSI	GBL Sea Ice Concentration	GBL Sea Ice Edge	GBL Sea Ice Type	GBL Low Res. Sea Ice Drift
Jan. 2013	100	100	99.9	N/A	N/A	97.4	100	100	100	99.6	100	100	100	100	100	100	100	100	96.7	96.7	96.7	96.7
Feb. 2013	99.9	99.9	99.7	N/A	N/A	96.9	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Mar. 2013	100	100	99.2	N/A	N/A	97.5	91.9	95.2	100	91.3	95.4	95.8	100	100	96.3	95.0	95.9	96.0	93.6	93.6	93.6	87.1
Apr. 2013	97.7	97.7	97.5	100	99.8	93.4	100	100	98.3	99.9	100	100	96.7	96.7	100	100	100	100	86.7	86.7	86.7	80.0
May 2013	99.6	99.7	99.6	100	99.7	96.3	98.4	98.4	100	98.2	98.3	66.5	100	100	98.2	66.8	98.3	66.7	100	100	100	93.6
Jun. 2013	99.9	100	99.8	99.8	99.8	98.6	100	100	98.3	99.3	100	81.1	93.3	93.3	100	81.3	100	81.3	93.6*	93.6*	93.6*	80.0*

table 3 : Percentage of OSI SAF products delivered via EUMETCast within the specified time over 1st half 2013. (*) indicates uncertain numbers, see explanation in section 3.

Comments:

See details in section 3.

Performance of GLB, NAR, MGR SST, METEOSAT and GOES SST, SSI and DLI have been low in March due to an internet access problem.

Availability of GOES-E products have been impacted in May/June due to GOES-E outage.

3 Main anomalies, corrective and preventive measures

In case of anomaly (outage, degraded products…), correspondent service messages are made available in near-real time to the registered users through the Web site www.osi-saf.org.

3.1 At SS1

Between 15 March 14:30 UTC to 21 March 16:30 UTC, transmission to EUMETSAT was very low impacting all the products. The problem is due to the internet access in Toulouse. In order to mitigate the problem, some transfer have stopped. After investigation between SS1 and EUMETSAT IT teams, a temporary solution was found to resume the transmissions. The switch back to the nominal link was done some days after without impact.

Between 22 May 03:30 UTC and 6 June 2013 16:00 UTC, due to failure of imager on GOES-13 satellite in GOES-E position, GOES-E hourly SST, hourly and daily Fluxes (DLI, SSI) products were not produced.

In order to improve the reliability of the delivery of incoming SAF files on IFREMER FTP, the ingestion chain has been simplified. The files are first moved to the FTP area before checking and registration of these products into IFREMER central catalogue is performed. This will avoid future problems where the delivery was blocked for instance because of the unavailability of the database.

3.2 At SS2

January 2013

The daily products were slightly delayed one day during the month, probably due to heavy load on MET Norway production machine.

March 2013

During Easter holiday a problem occurred in the processing of sea ice products that blocked the generation of daily sea ice products. It took a couple of days to resolve this issue. The processing chain has been fixed to avoid similar errors in the future. Users were notified in a service message (#806), but delayed due to all key persons out of office at the same time.

April 2013

A processing overload on the production machine delayed the production of sea ice products. The users were notified in service message #813.

15th June – 3rd July 2013

From the 15th June MET Norway suddenly experienced problems to upload sea ice , SST and Flux products to the EUMETCast upload server at EUMETSAT. During this period products were partly uploaded several times, and sometimes distributed more than once over EUMETCast, The current monitoring only keeps the time stamp of when the last file was received, so the numbers for June are estimates.

It took a while for the engineers at MET Norway and EUMETSAT to debug the problem, and in the end a new way of distributing the sea ice products was implemented. This has reduced the distribution problem to a minimum.

Service messages were sent to users (#829, #833, #836).

3.3 At SS3

The ASCAT-A and -B winds have been unavailable on 6 February between 1:00 and 5:00 UTC sensing time due to an issue with the KNMI EUMETCast reception station.

The OSCAT winds have been unavailable or delayed on 6 February between 0:00 and 4:30 UTC sensing time due to an issue with the KNMI EUMETCast reception station.

The OSCAT winds have been delayed on 13 February between 0:00 and 7:00 UTC sensing time.

OSCAT data have been unavailable from 2 March, 3:58 until 5 March, 21:50 UTC sensing time due to a satellite transmission problem.

No ASCAT-A winds have been available between 20 March, 12:27 and 21 March, 6:50 UTC due to a Metop out of plane manoeuvre.

No ASCAT-A winds have been available between 24 April, 11:03 and 25 April, 0:35 UTC due to a data reception issue at KNMI.

4 Main events and modifications, maintenance activities

In case of event or modification, corresponding service messages are made available in near-real time to the registered users through the Web site www.osi-saf.org.

4.1 At SS1

Meteosat-10 was switched into operation by EUMETSAT for the 0° mission on 21 January at 0945 UTC. In the same time, the concerned OSISAF SST and Fluxes products (hourly METEOSAT SST, DLI and SSI, daily DLI an SSI) were processed with Meteosat-10.

The change of the OSISAF web site server was done on 2 April without impacting information for the users. Only some statistics before this change are unavailable (provider constraints).

IFREMER has upgraded its ingestion chains and product dissemination to cope with the format change of the O&SI SAF SST and flux products.

The storage space has also been largely extended in order to allow for the full product archive to be available online through FTP and OpenDAP.

4.2 At SS2

N/A.

4.3 At SS3

AWDP version 2_2_00 was put into operations on 14 May for ASCAT-A and ASCAT-B: preparation for level 1b data format change.

ASCAT-B 25 km and coastal winds have the (pre)operational status since 15 May.

OWDP version 1_1_02 was put into operations on 23 May to accommodate the upgrade to ISRO data version 1.4.

AWDP version 2_2_01 was put into operations on 19 June for ASCAT-B: preparation for ASCAT-B backscatter calibration change.

5 OSI SAF products quality

5.1 SST quality

The comparison between SST products and Match up data bases (MDB) gathering in situ (buoy) measurements is performed on a routine basis for each METEOSAT and GOES-E satellite, currently METEOSAT-09 and GOES-12.
Hourly SST values are required to have the following accuracy when compared to night time buoy measurements (see PRD) :

- monthly bias (Bias Req in following tables)less than 0.5° C,
- monthly difference standard deviation (Std Dev Req. in following tables) less than 1° C for the geostationary products (METEOSAT SST and GOES-E SST), and 0.8°C for the polar ones (MGR SST, GLB SST, NAR SST and AHL SST).

For LEO SST, according to GHRSST-PP project, for IR derived products, the normalized Proximity Confidence Value scale fixes 6 values : 0: unprocessed, 1: cloudy, 2: bad, 3: suspect, 4: acceptable, 5: excellent. Those values are good predictors of the errors. It is recommended not to use the confidence value 2 for quantitative use. Usable data are those with confidence values 3, 4 and 5.

For GEO SST, similar to the LEO SST, for IR derived products, the normalized quality level scale shows 6 values. A quality level is provided at pixel level, with increasing reliability from 2 (=”bad”) to 5 (=”excellent”). 0 means unprocessed and 1 means cloudy. Users are recommended to use quality levels 3 to 5 for quantitative applications.

The list of blacklisted buoys over the concerned period is available here :
ftp://ftp.ifremer.fr/ifremer/cersat/projects/myocean/sst-tac/insitu/blacklist

5.1.1 METEOSAT SST quality

The following maps indicate the locations of buoys for each month.

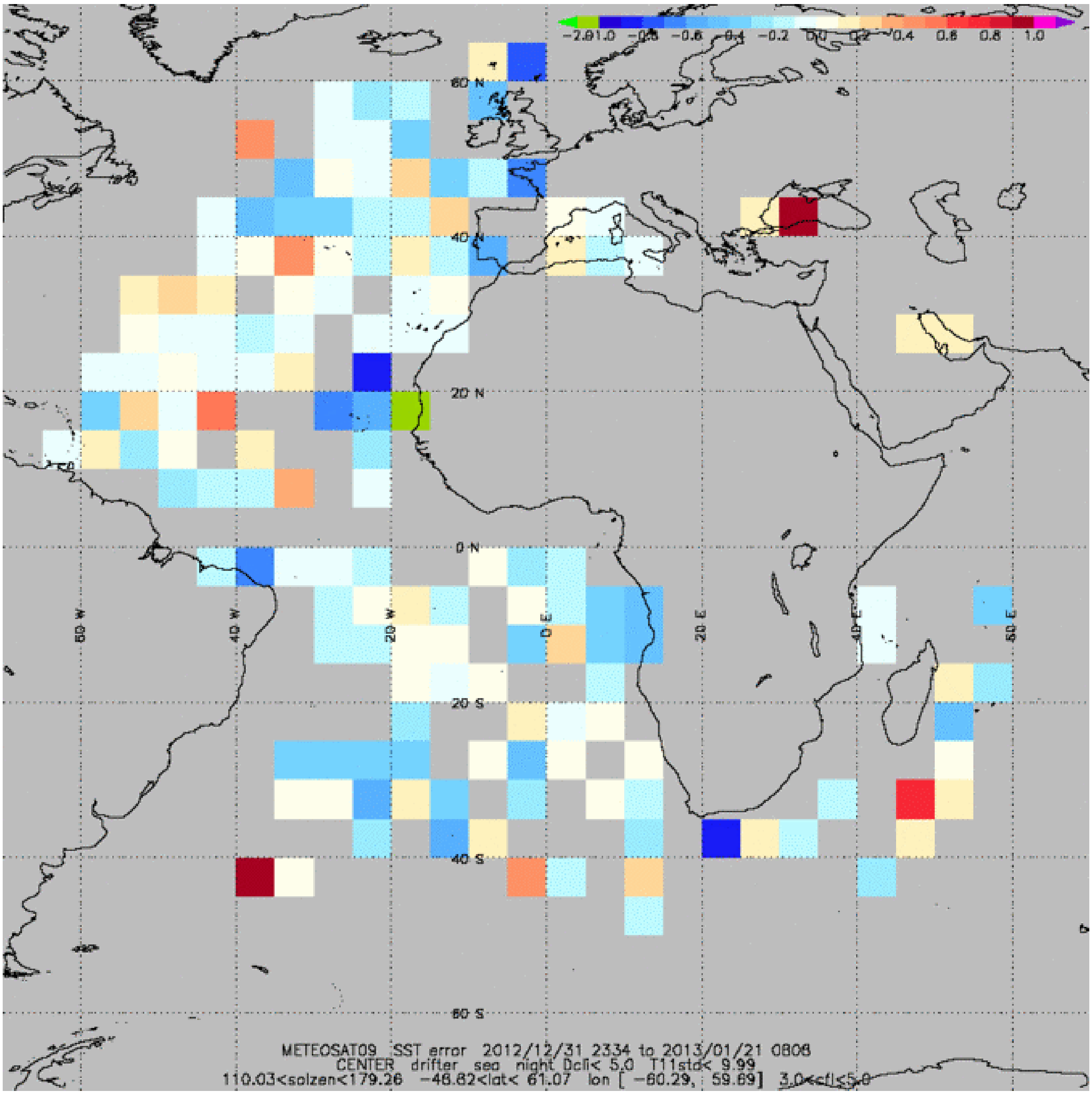


Figure 1 : Location of buoys for METEOSAT SST validation in JANUARY 2013, for 3,4,5 quality indexes and by night.

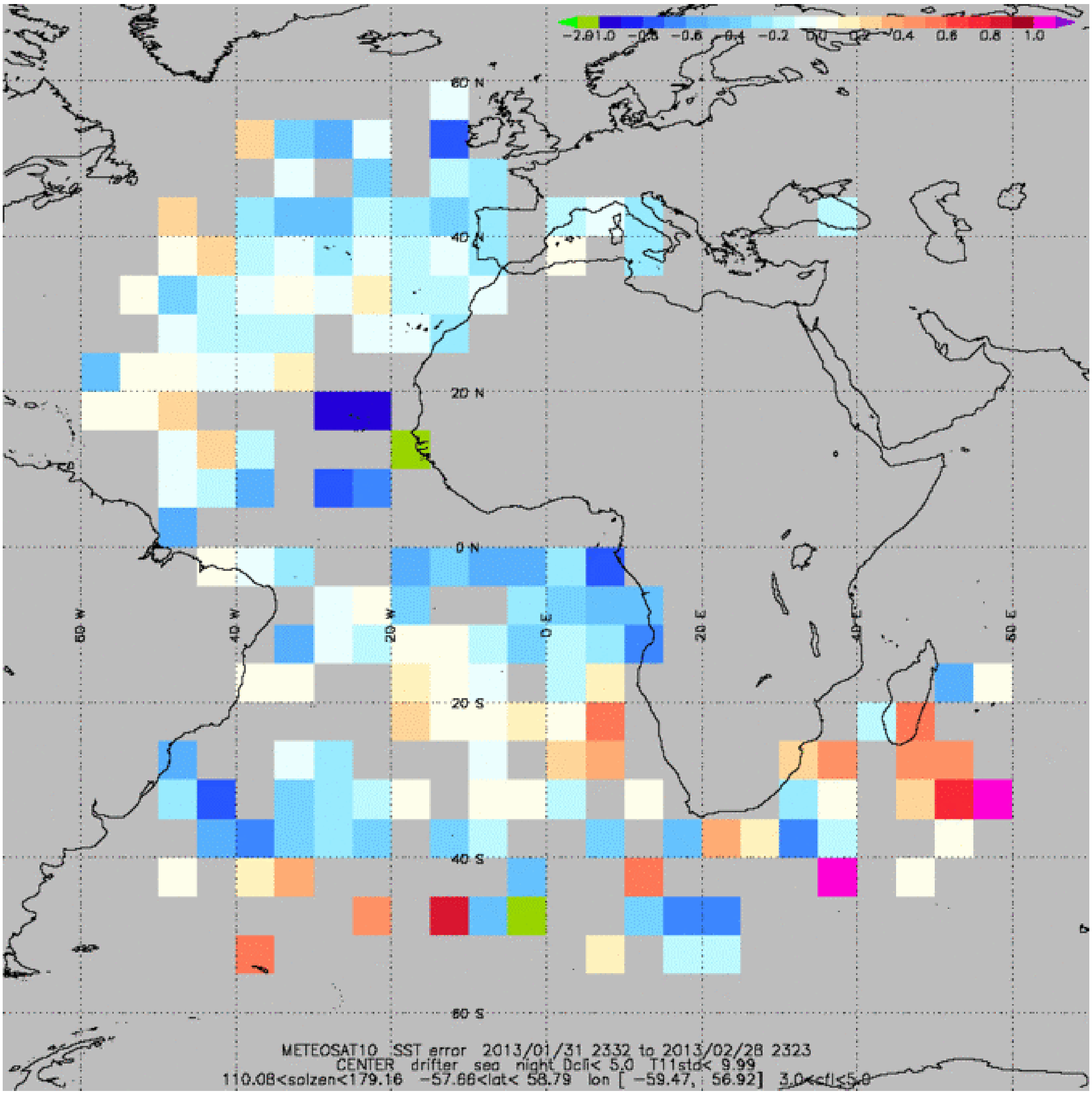


Figure 2 : Location of buoys for METEOSAT SST validation in FEBRUARY 2013, for 3,4,5 quality indexes and by night.

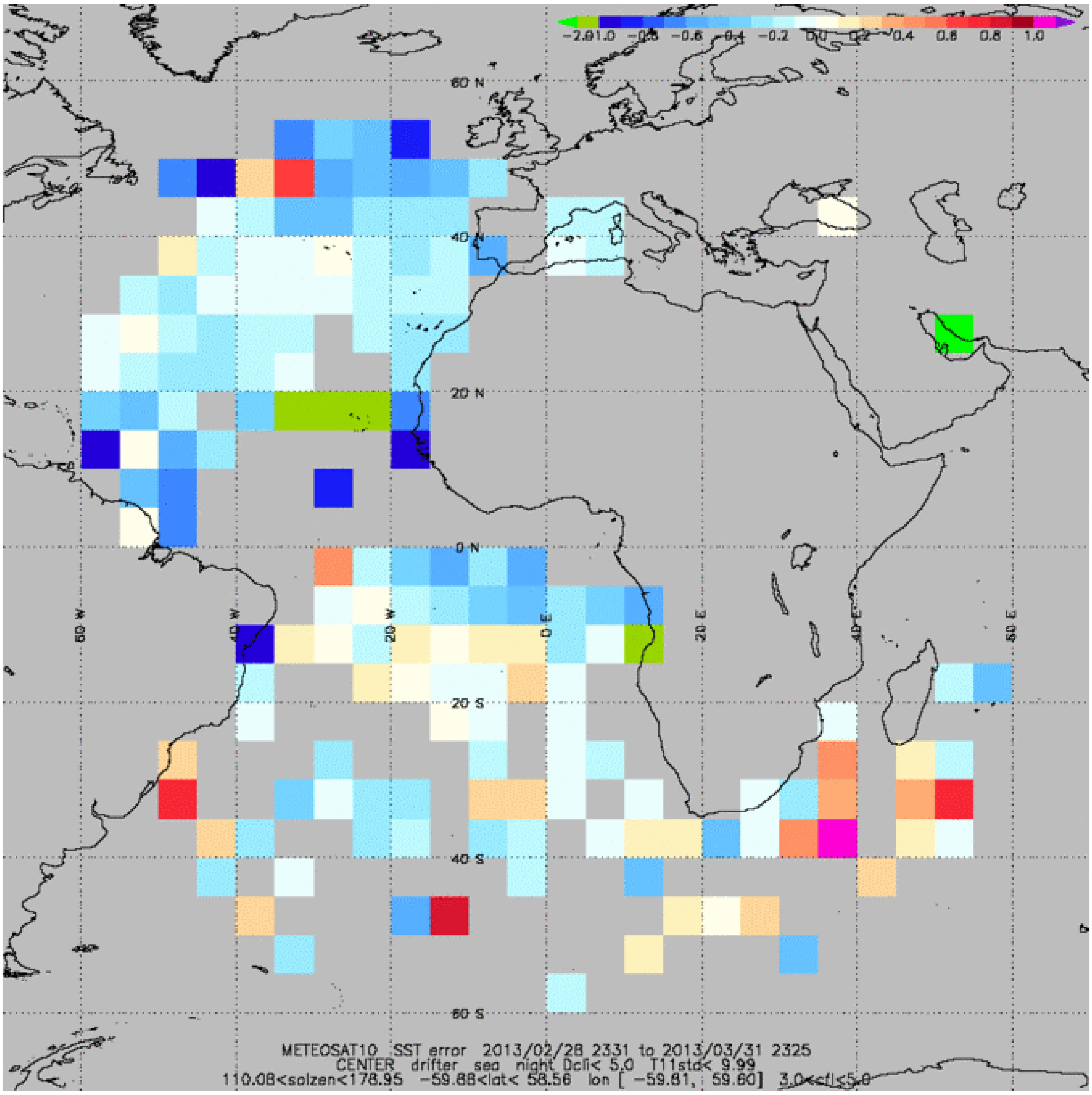


Figure 3 : Location of buoys for METEOSAT SST validation in MARCH 2013, for 3,4,5 quality indexes and by night.

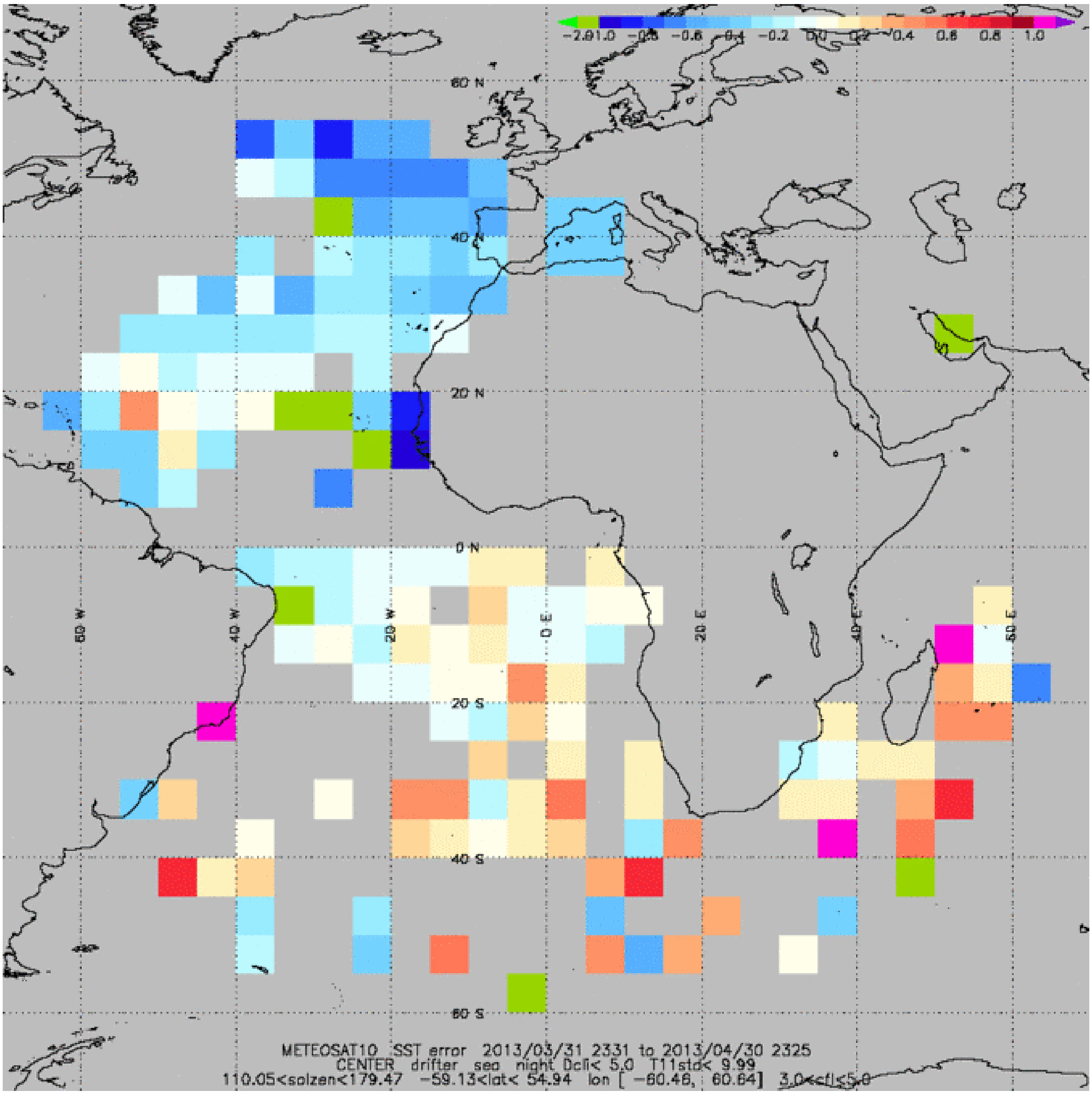


Figure 4 : Location of buoys for METEOSAT SST validation in APRIL 2013, for 3,4,5 quality indexes and by night.

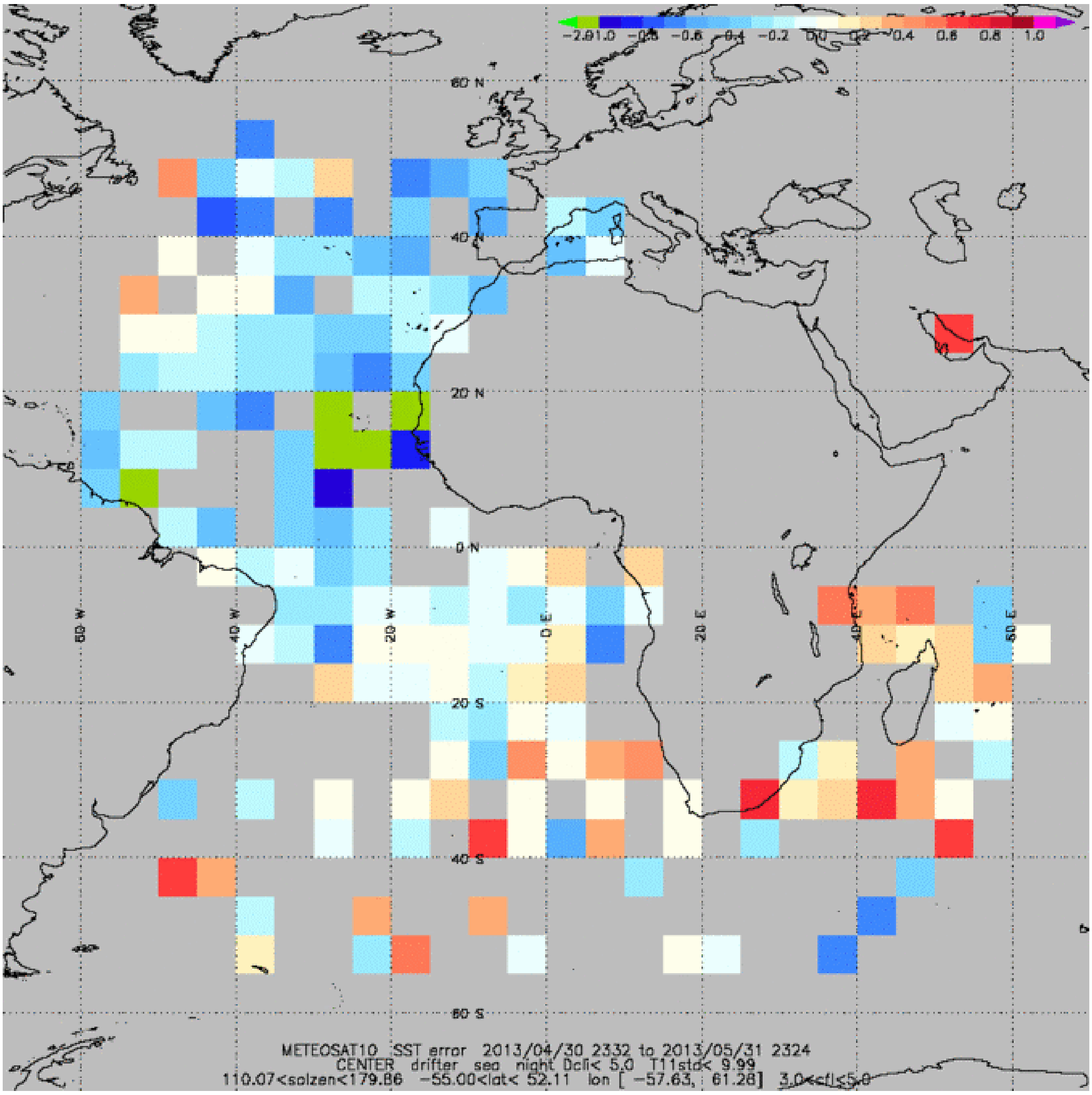


Figure 5 : Location of buoys for METEOSAT SST validation in MAY 2013, for 3,4,5 quality indexes and by night.

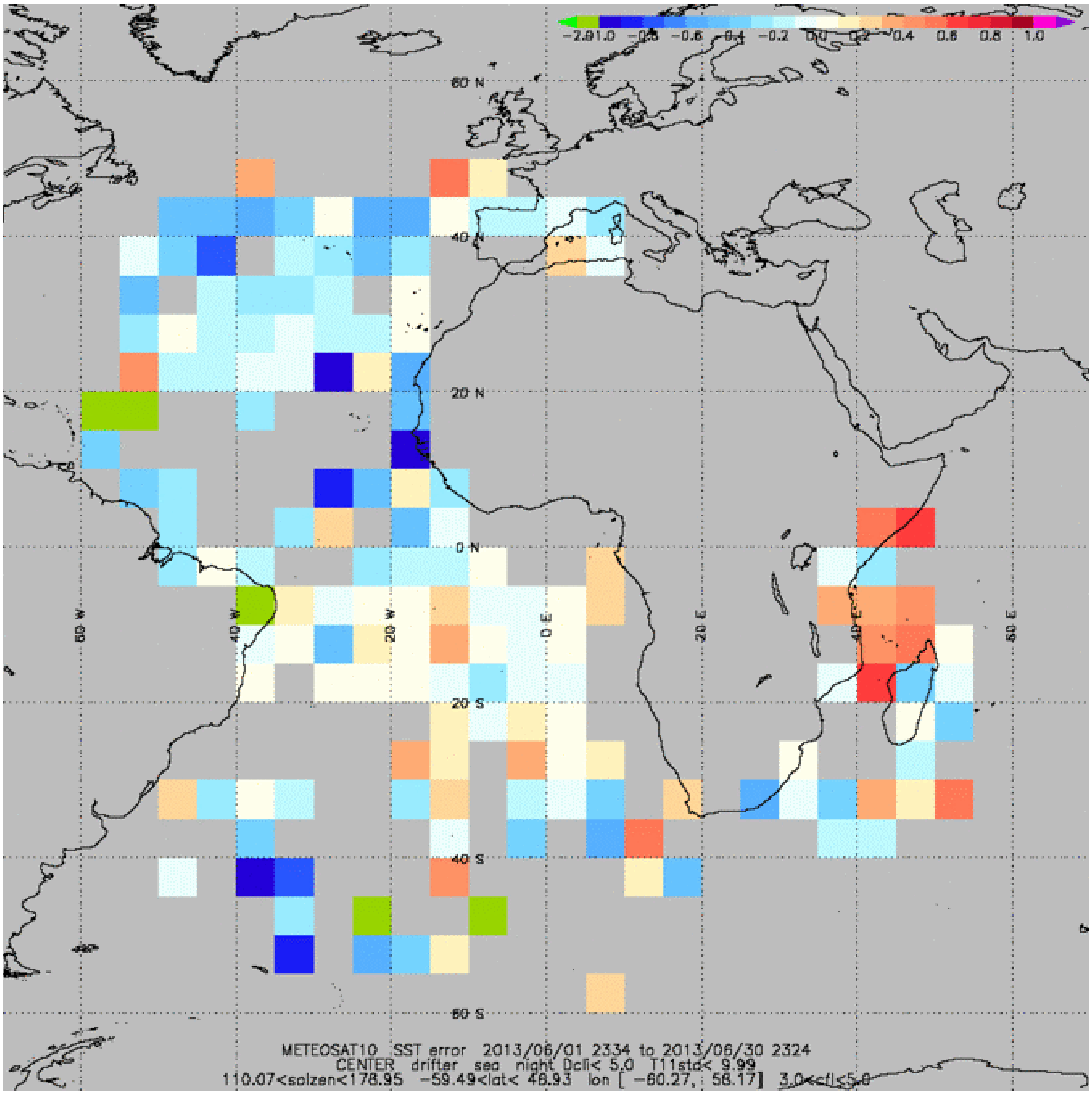


Figure 6 : Location of buoys for METEOSAT SST validation in JUNE 2013, for 3,4,5 quality indexes and by night.

The following table provides the METEOSAT-derived SST quality results over the reporting period. METEOSAT SST quality results over 1st half 2013.

METEOSAT SST quality results over 1st half 2013							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (*)
Jan. 2013	8845	-0.100	0.5	80.00	0.53	1.0	47.00
Feb. 2013	12175	-0.110	0.5	78.00	0.53	1.0	47.00
Mar. 2013	14413	-0.200	0.5	60.00	0.53	1.0	47.00
Apr. 2013	15071	-0.140	0.5	72.00	0.53	1.0	47.00
May 2013	15475	-0.160	0.5	68.00	0.52	1.0	48.00
Jun. 2013	9559	-0.050	0.5	90.00	0.51	1.0	49.00

table 4 : METEOSAT SST quality results over 1st half 2013, for 3, 4, 5 quality indexes and by night.

(*)Bias Margin = 100 * (1-(|Bias / Bias Req|))
(*)Std Dev margin = 100 * (1-(Std Dev / Std Dev Req))
100 refers then to a perfect product. 0 to a quality just as required. without margin.
A negative result indicates that the product quality does not fulfill the requirement.

Comments : Note that due to the switch into operational mode of Meteosat-10 on 21 January 2013, replacing Meteosat-9 for the 0° mission, the January statistics are only based on Meteosat-9. This explains the low level of number of cases in comparison with the others months of the period. Since February, Meteosat-10 is processed for these statistics. No impact is observed during this satellite transition.

The following graphs illustrate the evolution of METEOSAT-derived SST quality results over the past year.

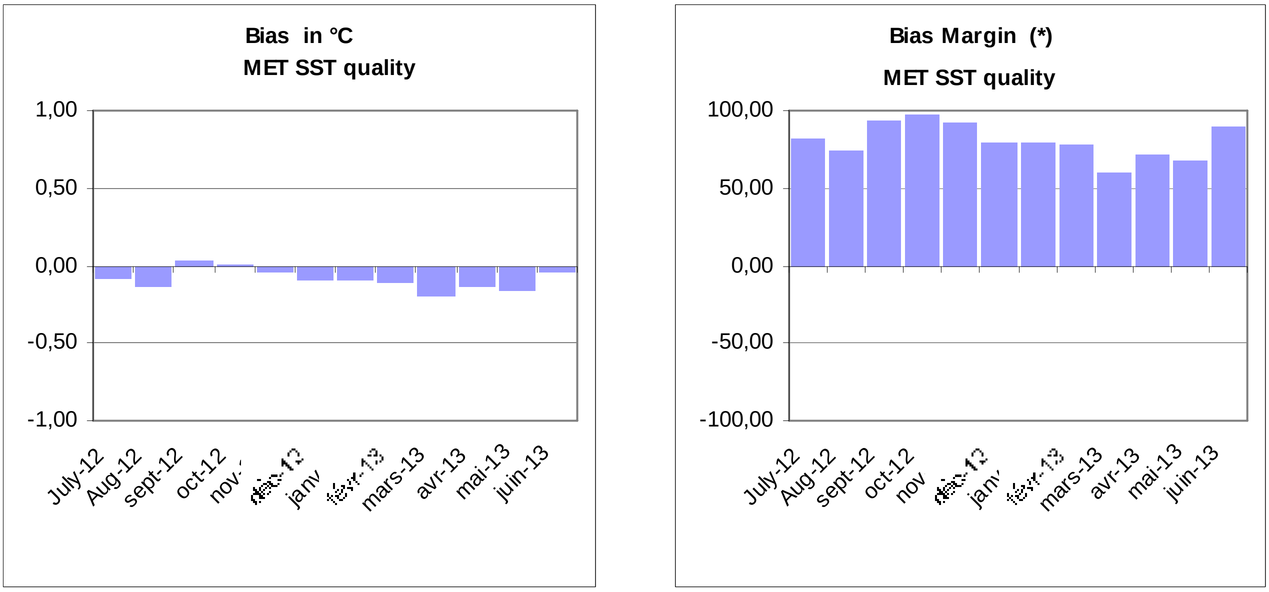


Figure 7 : Left: METEOSAT SST Bias. Right METEOSAT SST Bias Margin

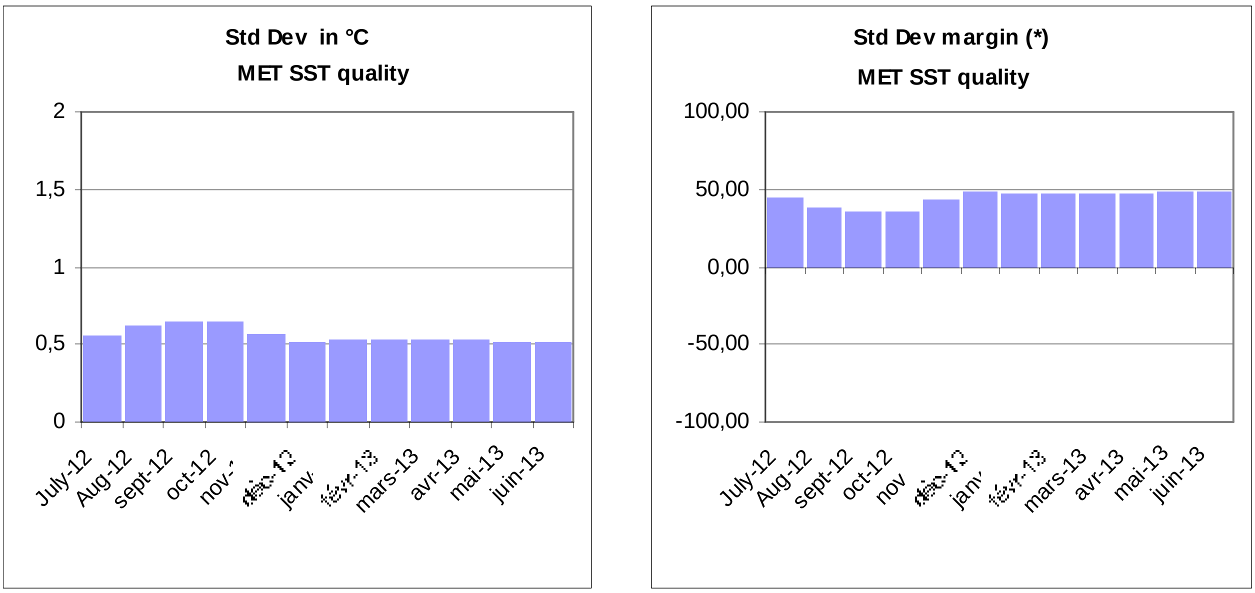


Figure 8 : Left: METEOSAT SST Standard deviation. Right METEOSAT SST Standard deviation Margin.

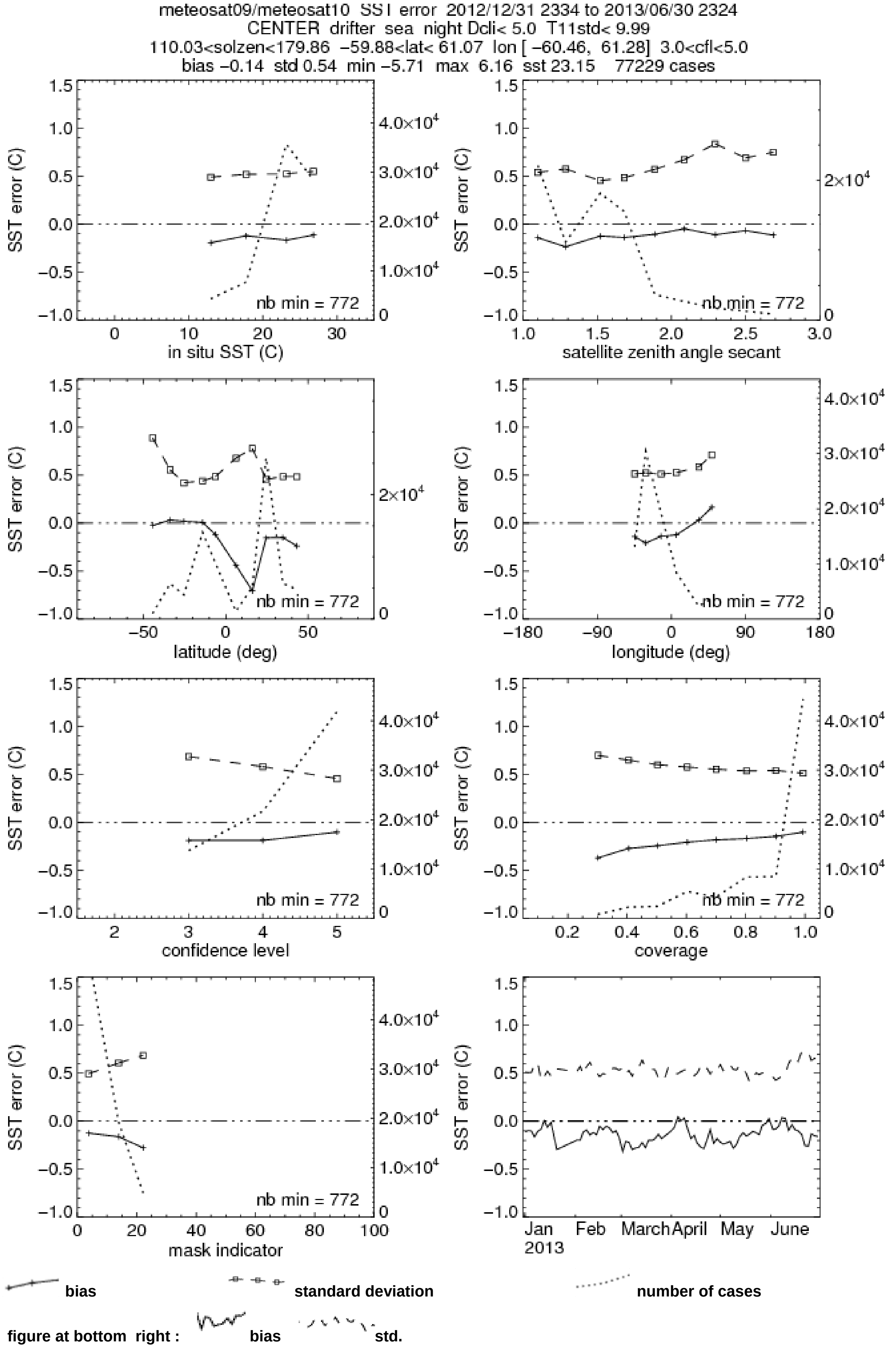


Figure 9 : Complementary validation statistics on METEOSAT SST.

5.1.2 GOES-E SST quality

The following maps indicate the location of buoys for each month.

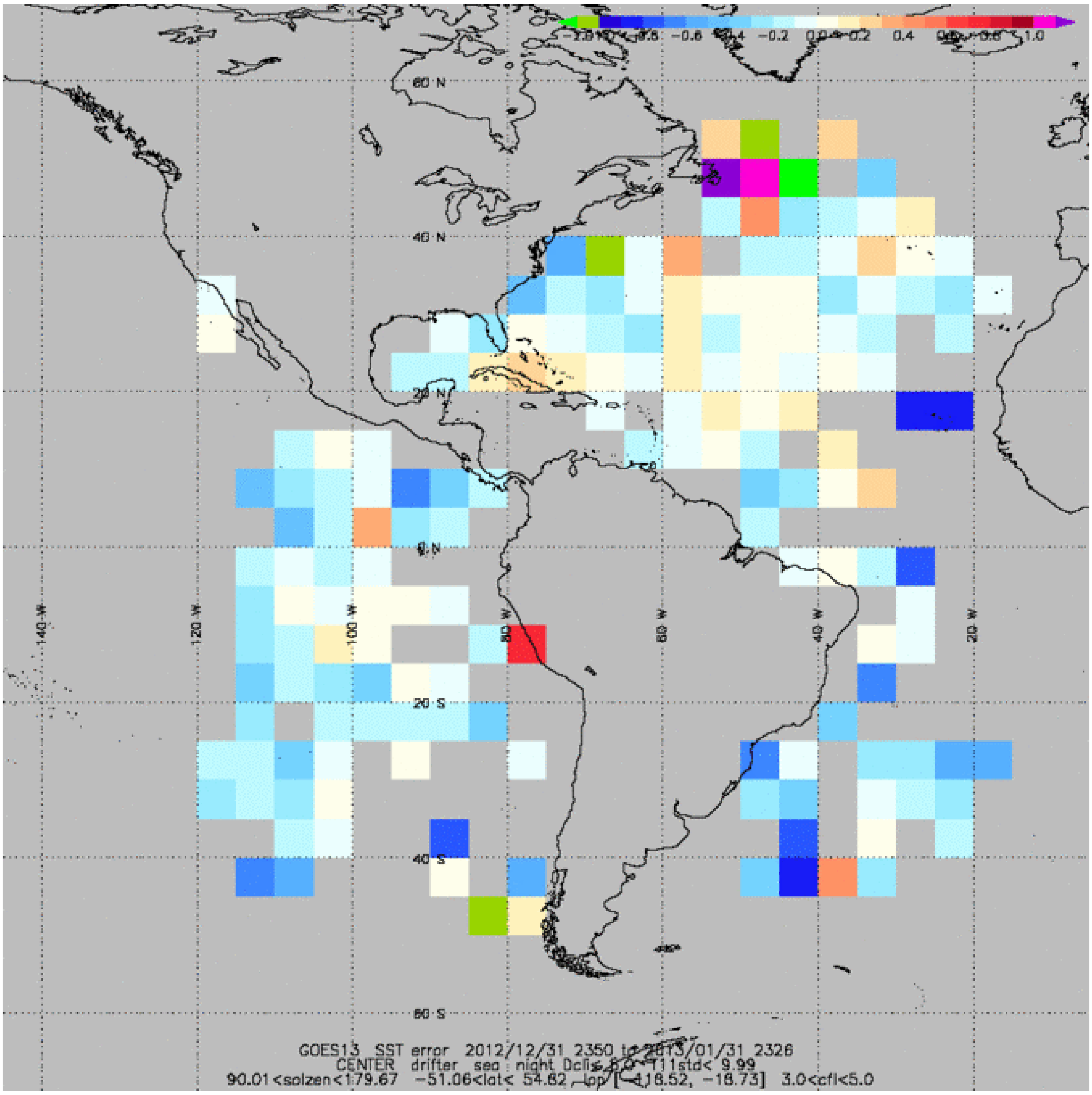


Figure 10 : Location of buoys for GOES-E SST validation in JANUARY 2013, for 3, 4, 5 quality indexes and by night.

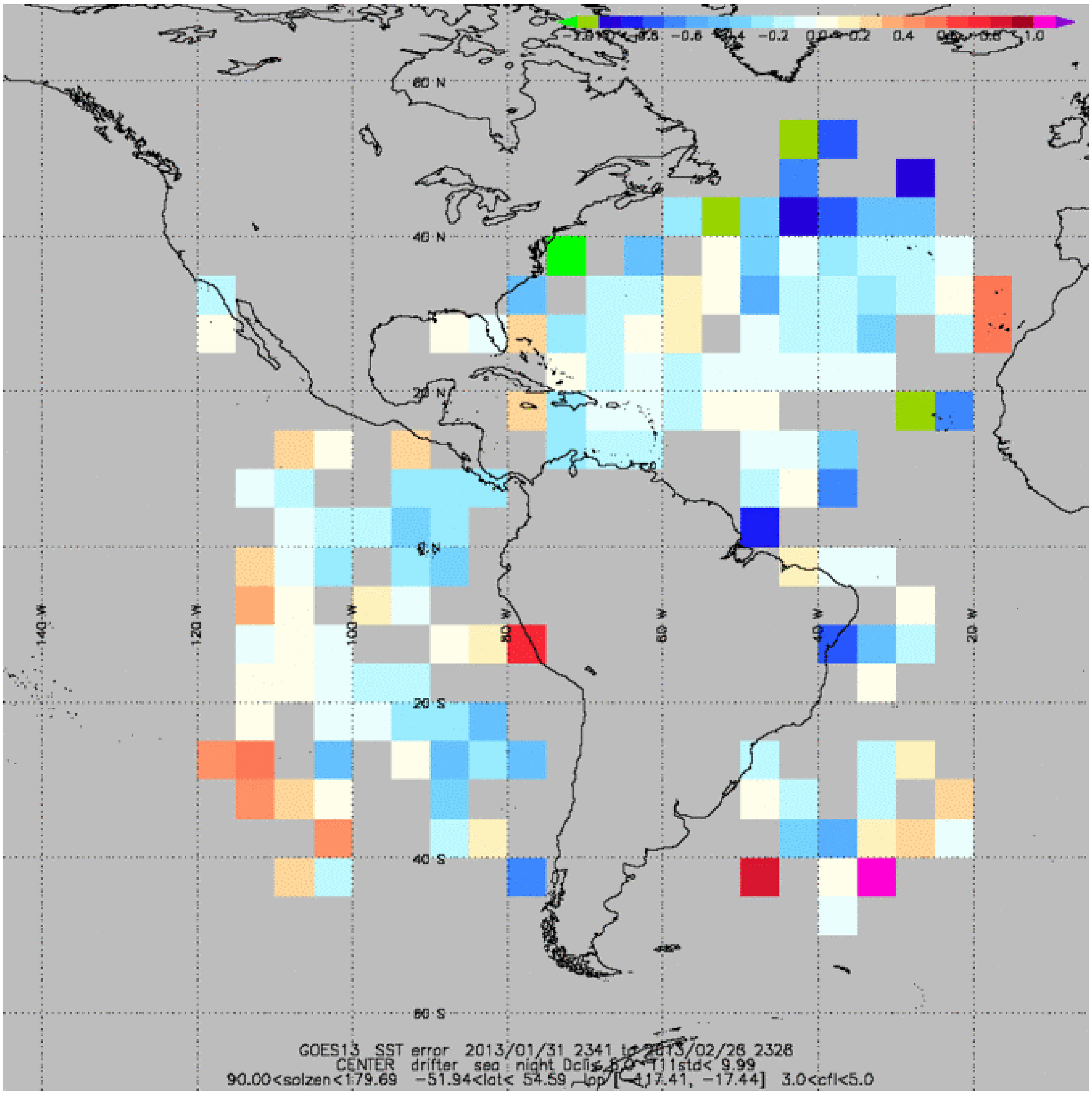


Figure 11 : Location of buoys for GOES-E SST validation in FEBRUARY 2013, for 3, 4, 5 quality indexes and by night.

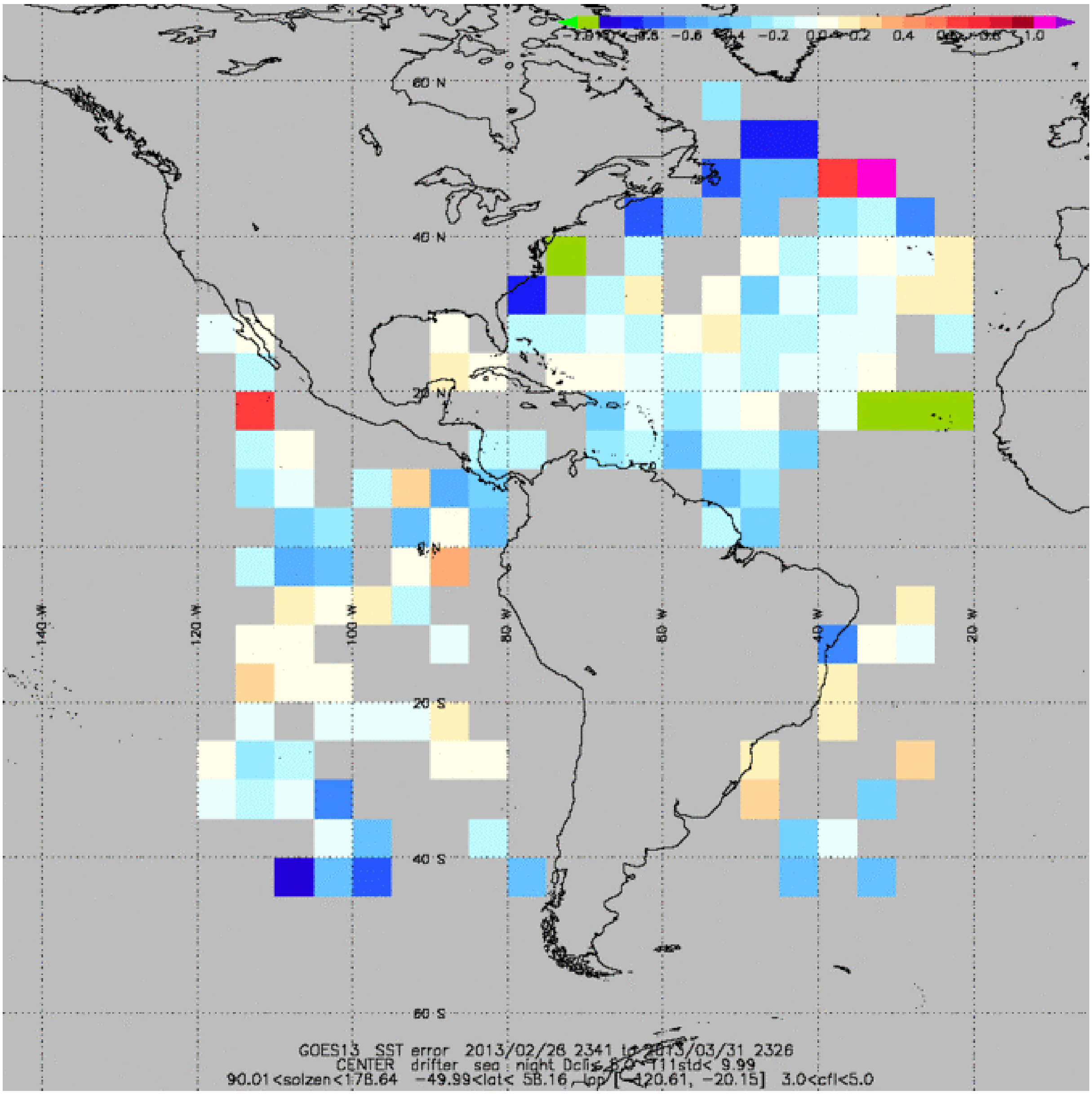


Figure 12 : Location of buoys for GOES-E ST validation in MARCH 2013, for 3, 4, 5 quality indexes and by night.

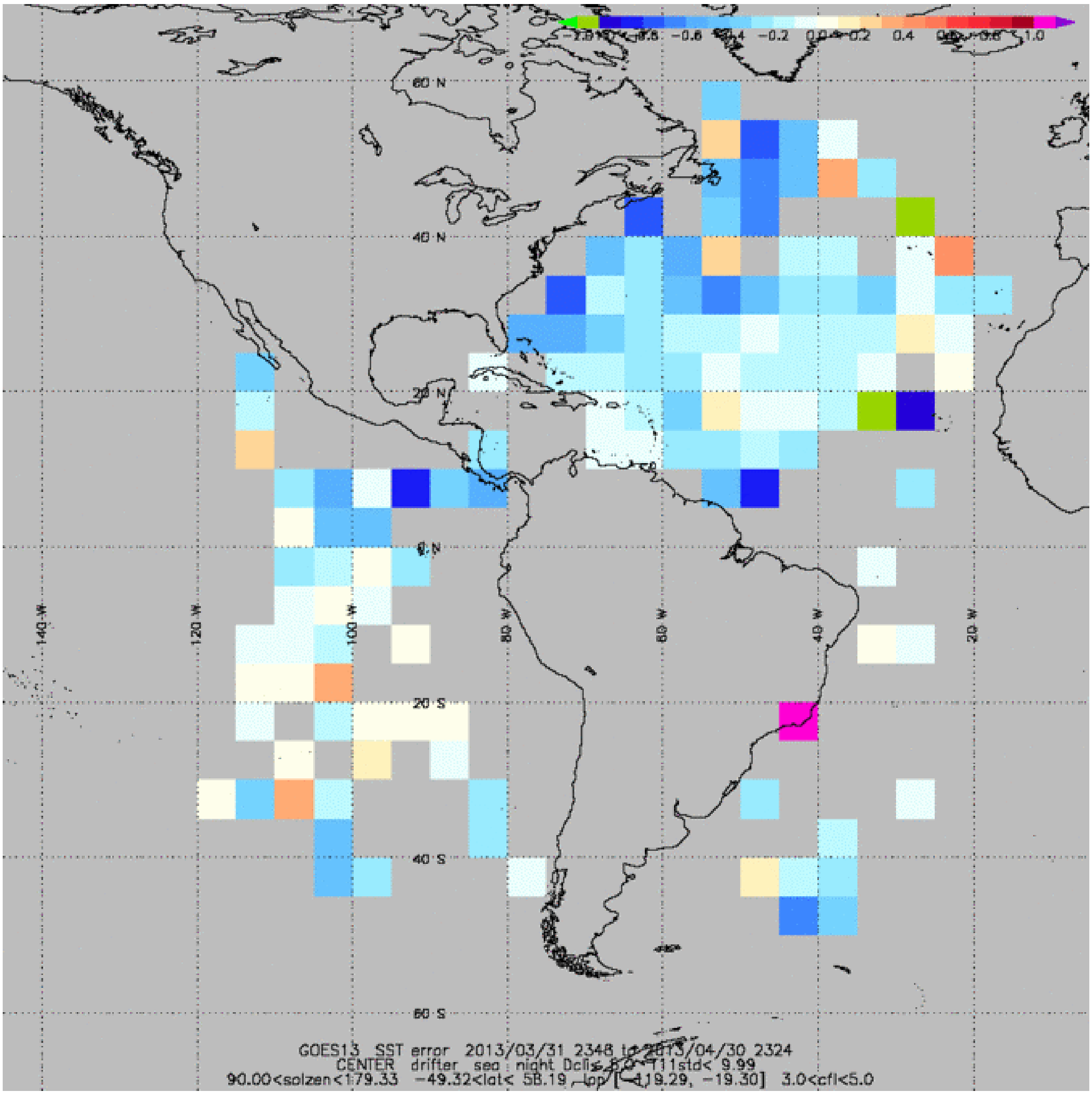


Figure 13 : Location of buoys for GOES-E ST validation in APRIL 2013, for 3, 4, 5 quality indexes and by night.

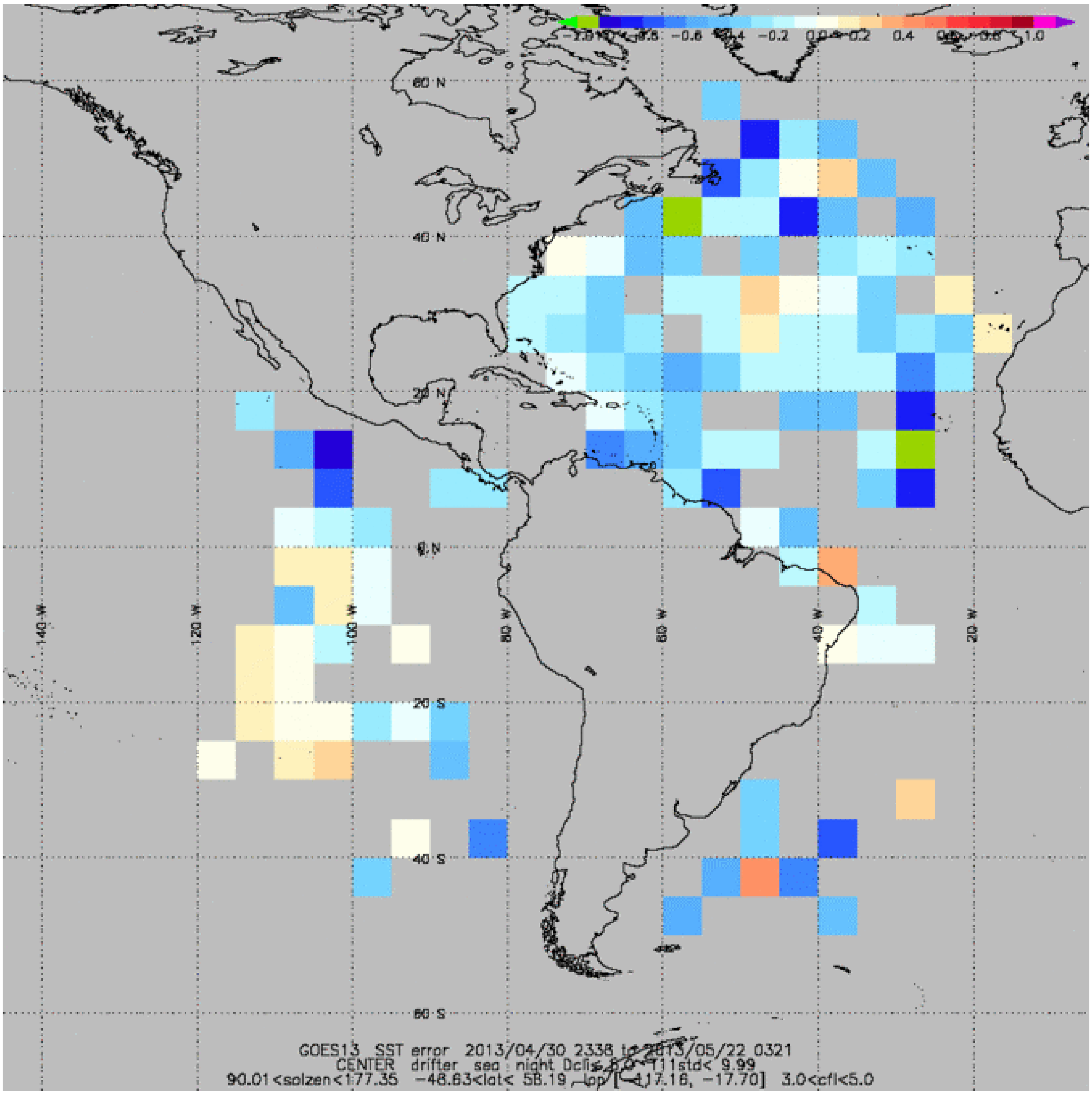


Figure 14 : Location of buoys for GOES-E ST validation in MAY 2013, for 3, 4, 5 quality indexes and by night.

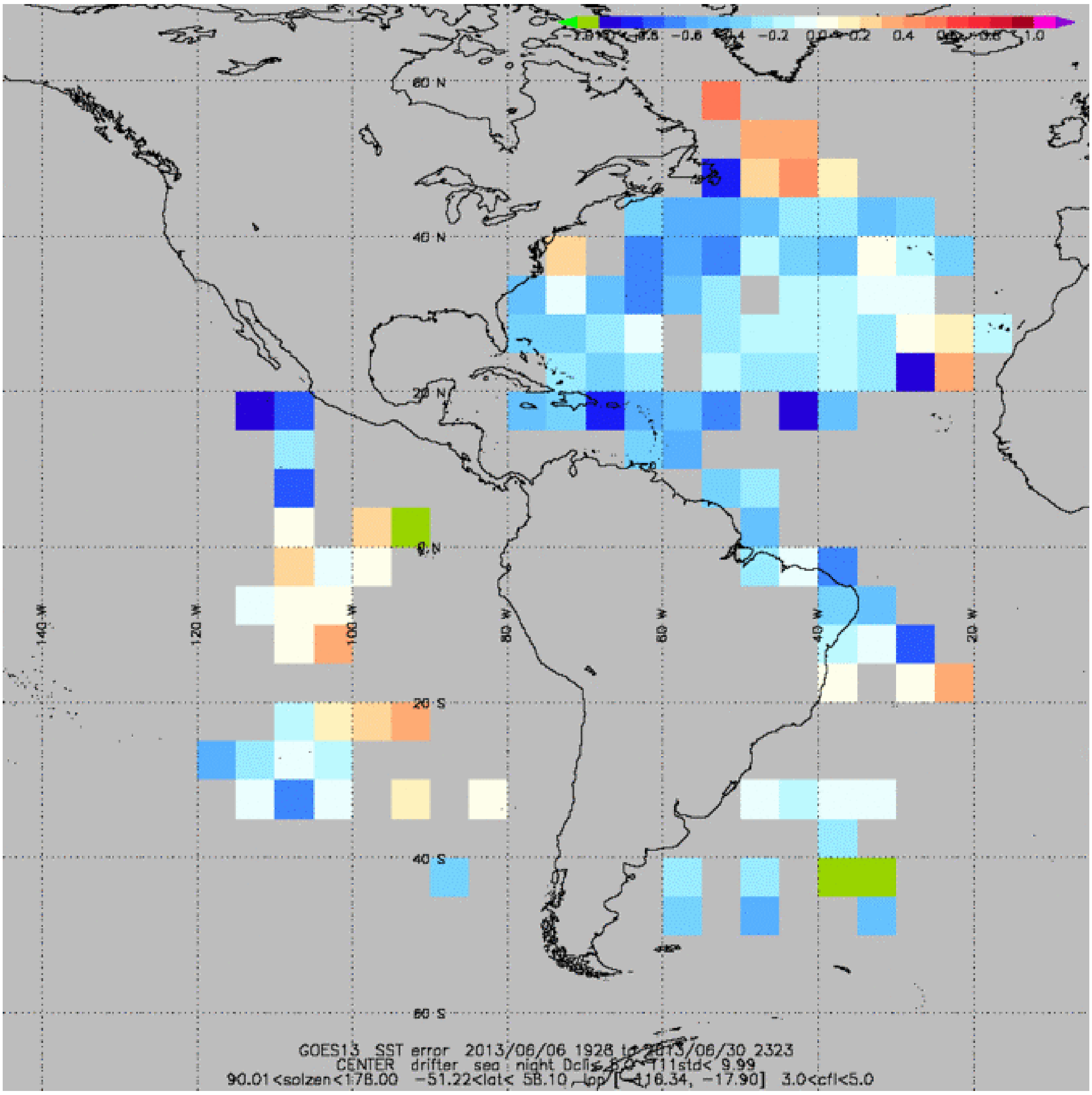


Figure 15 : Location of buoys for GOES-E ST validation in JUNE 2013, for 3, 4, 5 quality indexes and by night.

The following table provides the GOES-E-derived SST quality results over the reporting period.

GOES-E SST quality results over 1st half 2013							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (*)
Jan. 2013	15465	-0.070	0.5	86.00	0.48	1.0	52.00
Feb. 2013	13170	-0.080	0.5	84.00	0.51	1.0	49.00
Mar. 2013	14637	-0.120	0.5	76.00	0.49	1.0	51.00
Apr. 2013	13961	-0.190	0.5	62.00	0.47	1.0	53.00
May 2013	9720	-0.200	0.5	60.00	0.48	1.0	52.00
Jun. 2013	10612	-0.240	0.5	52.00	0.49	1.0	51.00

table 5 : GOES-E SST quality results over 1st half 2013, for 3, 4, 5 quality indexes and by night.

(*)Bias Margin = 100 * (1-(|Bias / Bias Req|))
(*)Std Dev margin = 100 * (1-(Std Dev / Std Dev Req))
100 refers then to a perfect product. 0 to a quality just as required. without margin.
A negative result indicates that the product quality does not fulfill the requirement.

Comments : The low number of cases in May/June is due to the GOES-E outage. Quality results are good and quite stable.

The following graphs illustrate the evolution of GOES-E-derived SST quality results over the past year.

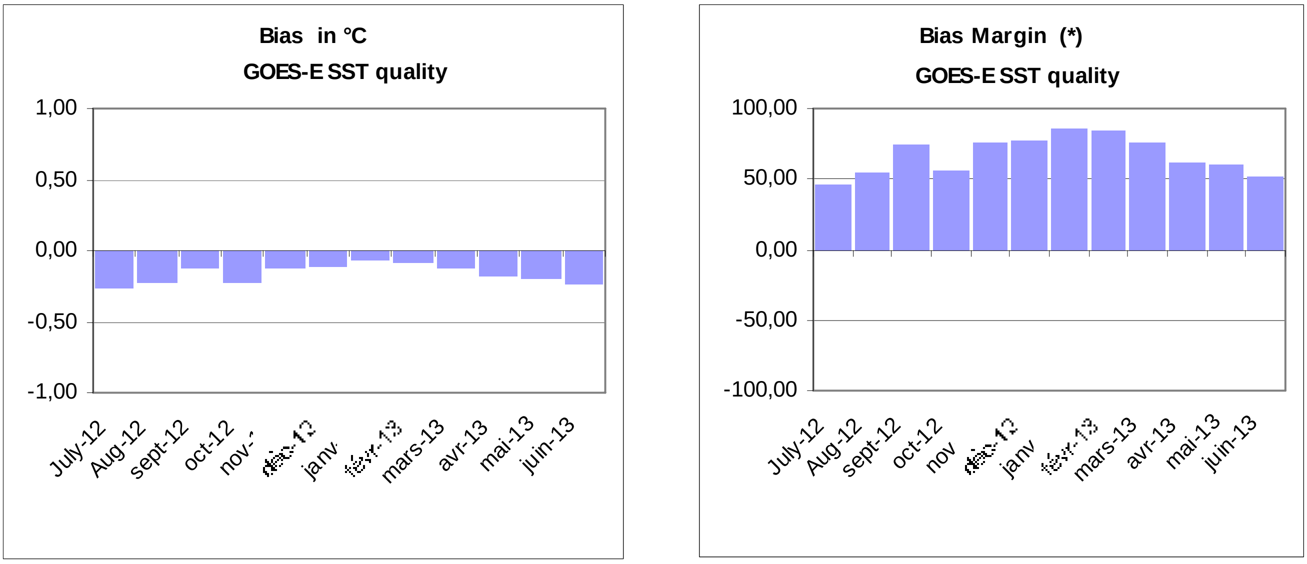


Figure 16 : Left: Goes-E SST Bias. Right: Goes-E SST Bias Margin.

Figure 17 : Left: Goes-E SST Standard deviation. Right Goes-E SST Standard deviation Margin.

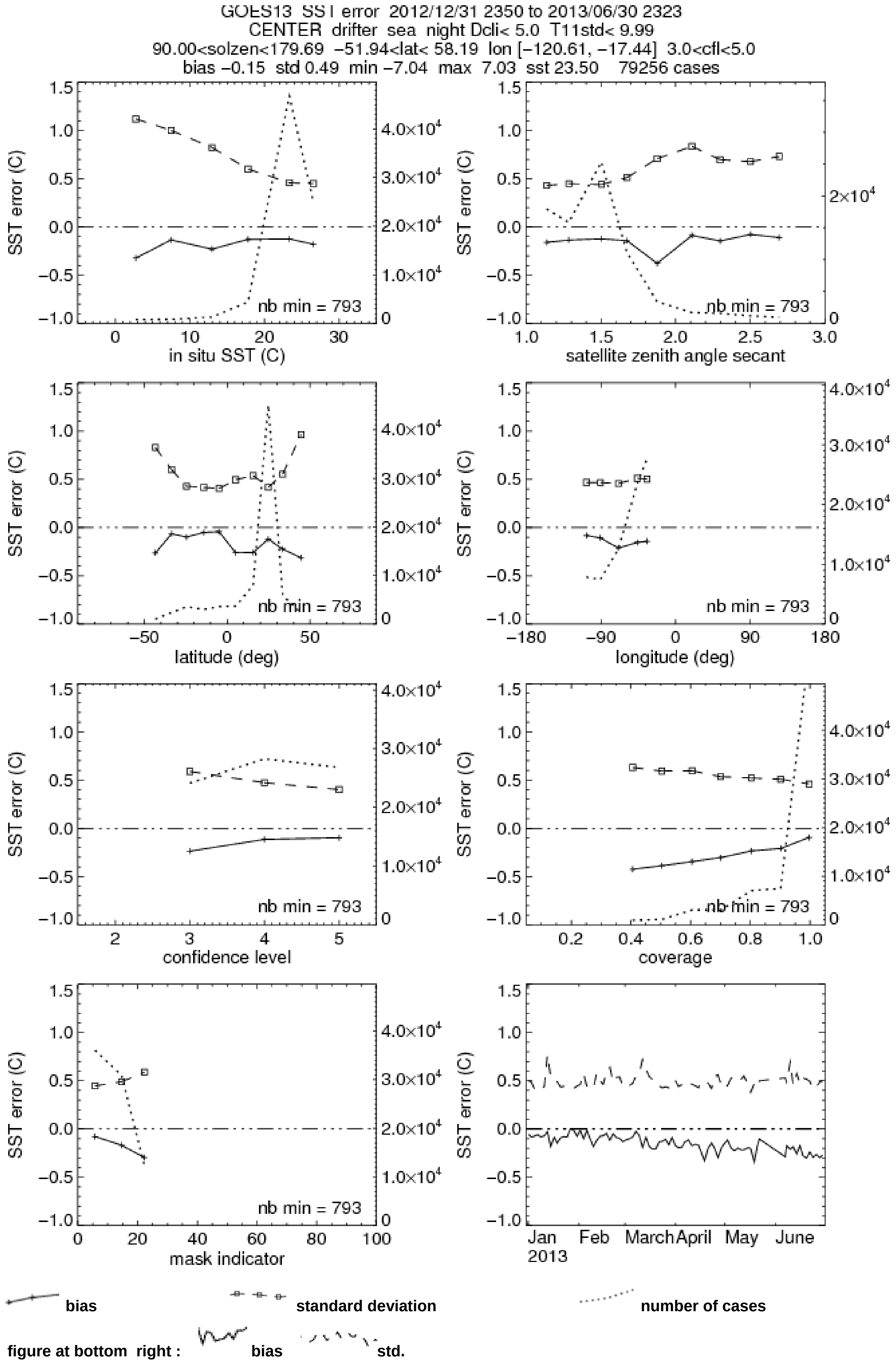


Figure 18 : Complementary validation statistics on GOES-E SST.

5.1.3 NAR SST quality

The operational NAR SST processing relies on two satellite data sources, Metop/AVHRR for the morning orbit and NOAA/AVHRR for afternoon orbit.
Currently Metop-A and NOAA-19 are used.

The comparison between NAR SST products and Match up data bases (MDB) gathering in situ (buoy) measurements is performed on a routine basis for each operational NOAA and Metop satellite. Compiled results are also provided in the first part of this section.

5.1.3.1 NAR Compiled SST quality

The following table provides NAR Metop-NOAA compiled SST quality results over the reporting period.

NAR compiled SST quality results over 1st half 2013							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (*)
Jan. 2013	1870	-0.130	0.5	74.00	0.39	0.8	51.25
Feb. 2013	1688	-0.130	0.5	74.00	0.43	0.8	46.25
Mar. 2013	1780	-0.100	0.5	80.00	0.39	0.8	51.25
Apr. 2013	1405	-0.100	0.5	80.00	0.35	0.8	56.25
May 2013	1181	-0.070	0.5	86.00	0.34	0.8	57.50
Jun. 2013	811	-0.090	0.5	82.00	0.39	0.8	51.25

table 6 : Quality results for NAR compiled SST over 1st half 2013, for 3, 4, 5 quality indexes and by night.

(*)Bias Margin = 100 * (1-(|Bias / Bias Req|))
(*)Std Dev margin = 100 * (1-(Std Dev / Std Dev Req))
100 refers then to a perfect product. 0 to a quality just as required. without margin.
A negative result indicates that the product quality does not fulfill the requirement.

Comments : Quality results are good and quite stable.

The following graphs illustrate the evolution of NAR SST quality results over the past year.

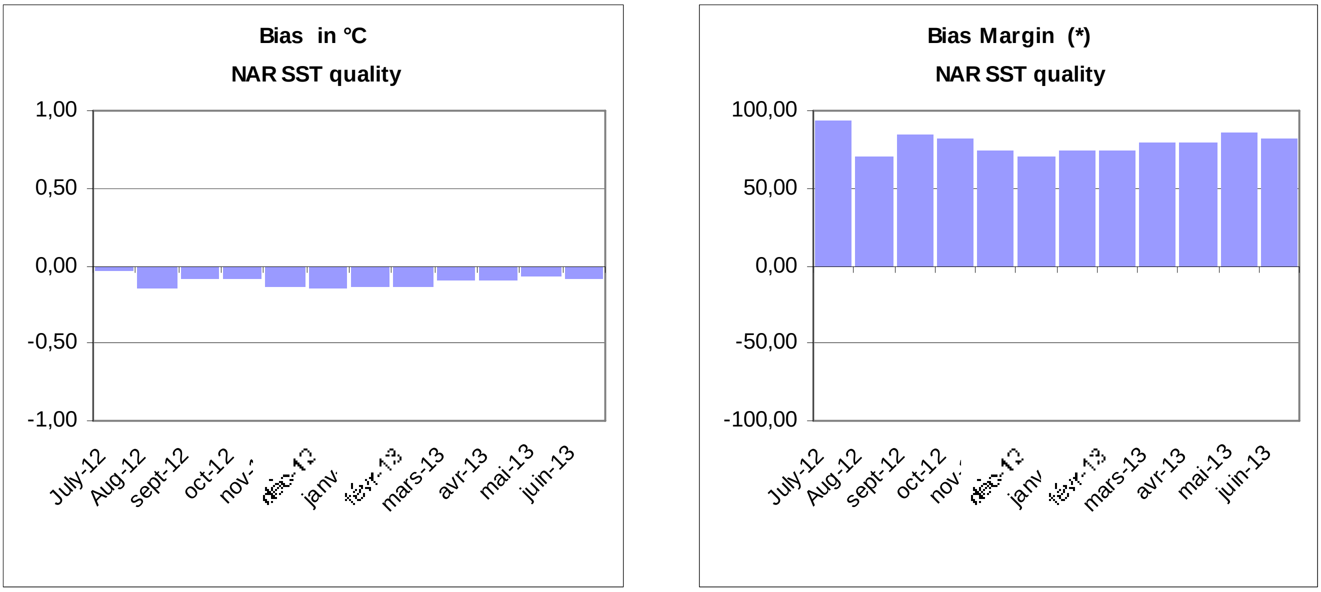


Figure 19 : Left: NAR SST Bias. Right: NAR SST Bias Margin.

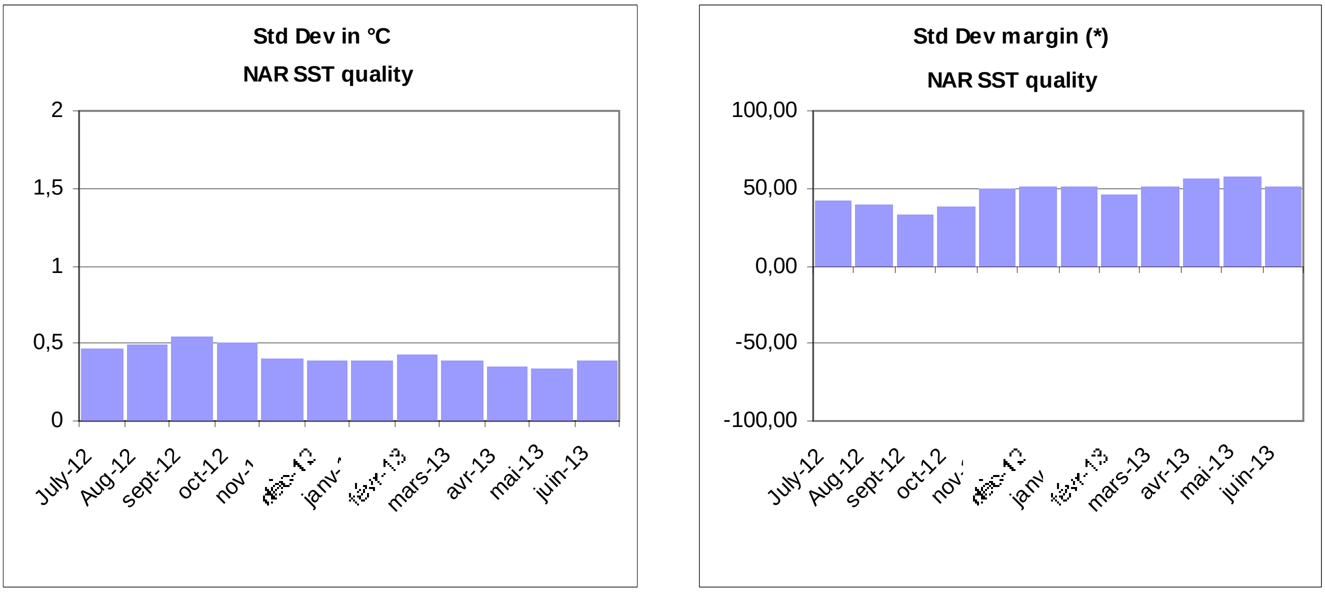


Figure 20 : Left: NAR SST Standard deviation. Right: NAR SST Standard deviation Margin.

5.1.3.2 NOAA-19 NAR SST quality

The following maps indicate the locations of buoys for each month.

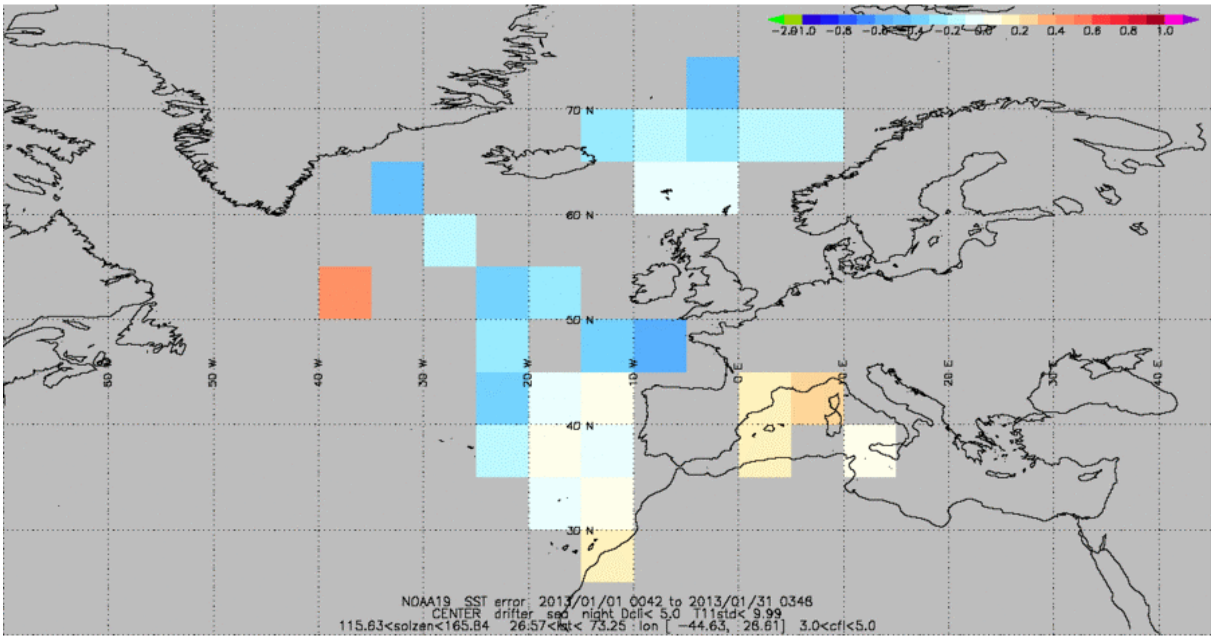


Figure 21 : **Location of buoys for NOAA-19 NAR SST validation in JANUARY 2013, for 3, 4, 5 quality indexes and by night.**

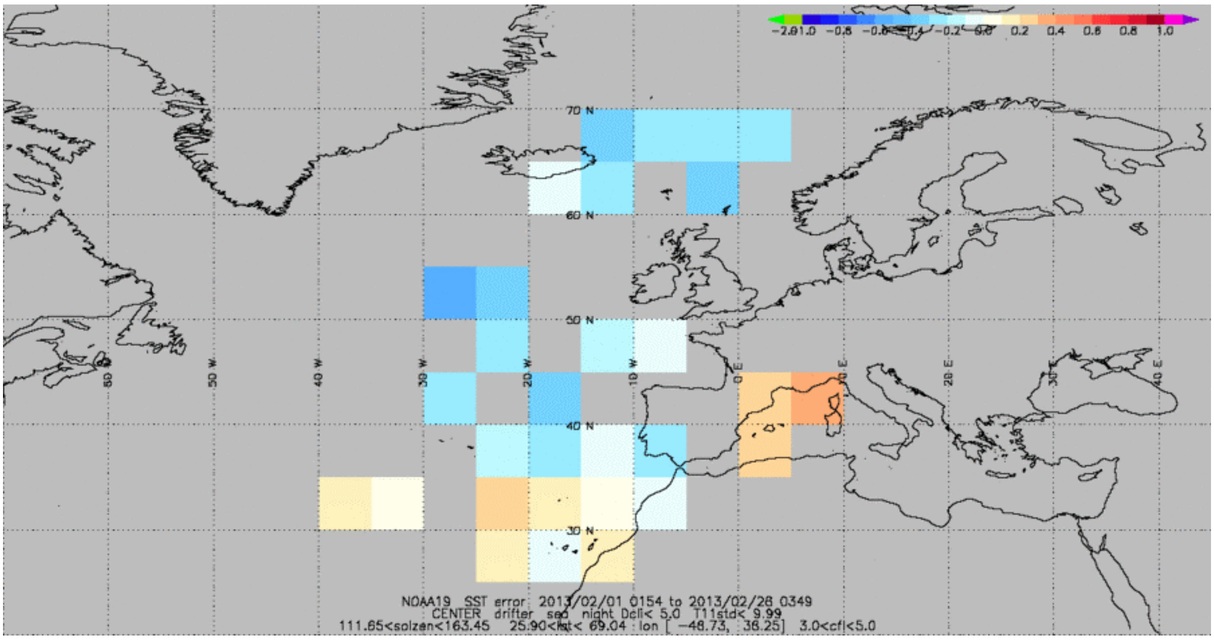


Figure 22 : **Location of buoys for NOAA-19 NAR SST validation in FEBRUARY 2013, for 3, 4, 5 quality indexes and by night.**

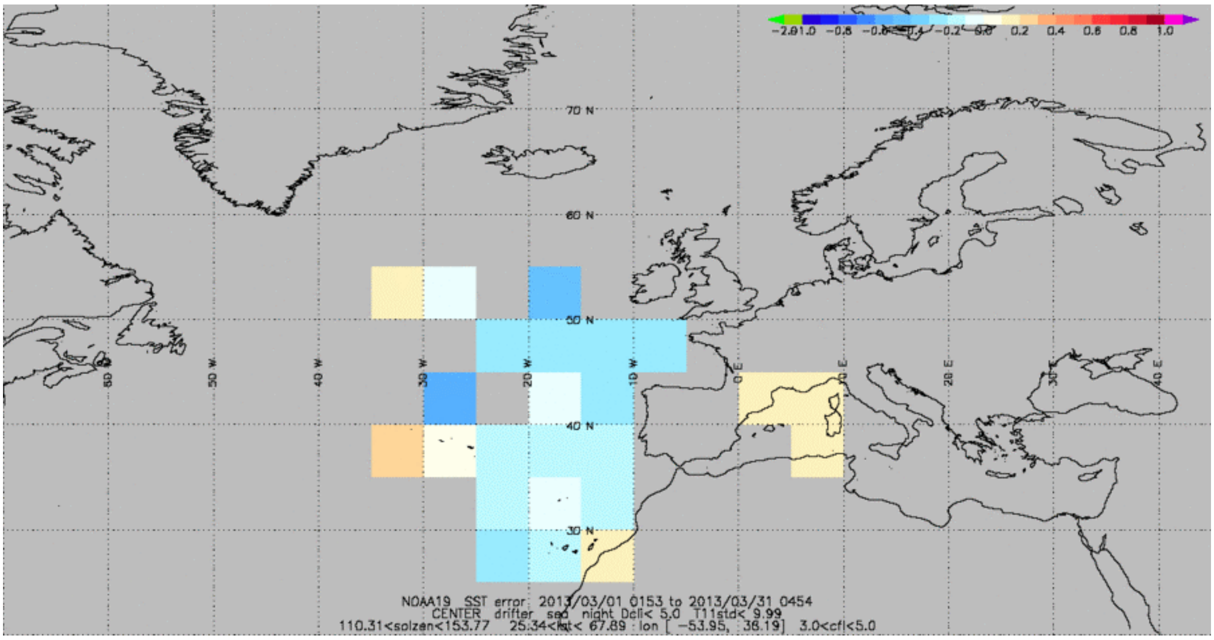


Figure 23 : Location of buoys for NOAA-19 NAR SST validation in MARCH 2013, for 3, 4, 5 quality indexes and by night.

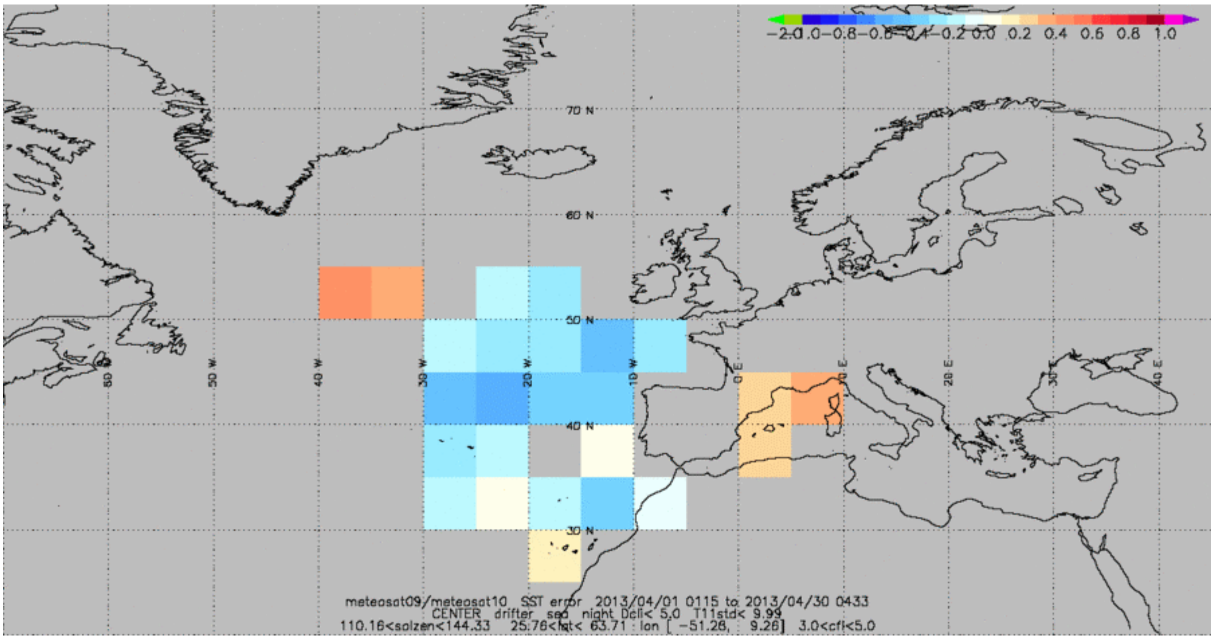


Figure 24 : Location of buoys for NOAA-19 NAR SST validation in APRIL 2013, for 3, 4, 5 quality indexes and by night.

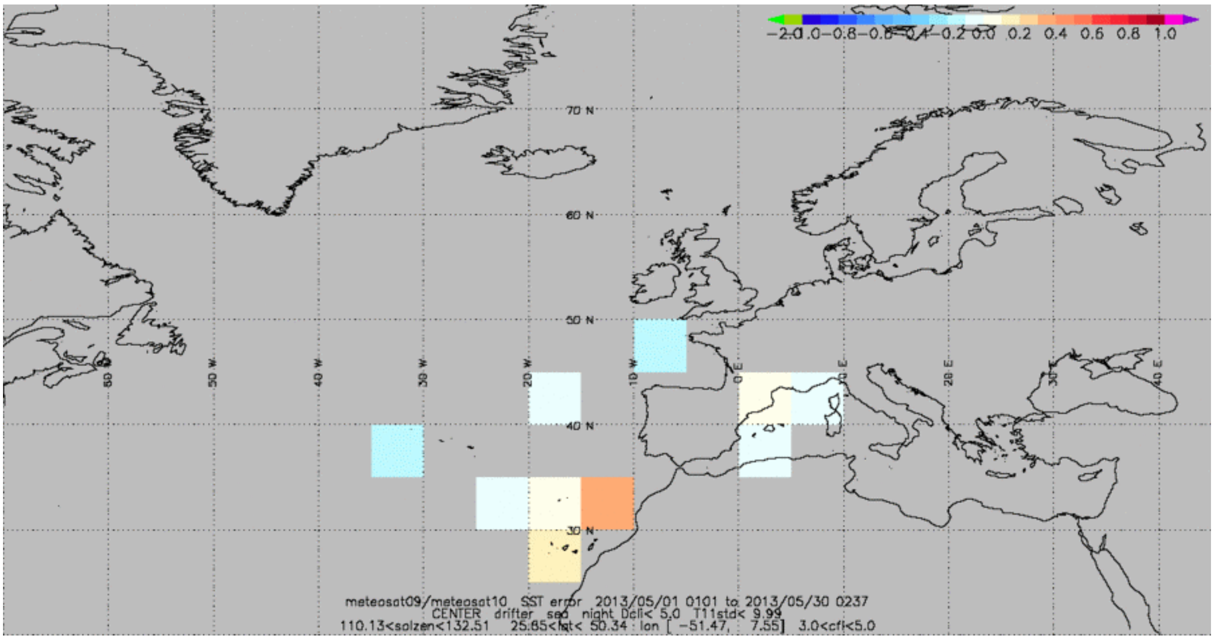


Figure 25 : Location of buoys for NOAA-19 NAR SST validation in MAY 2013, for 3, 4, 5 quality indexes and by night.

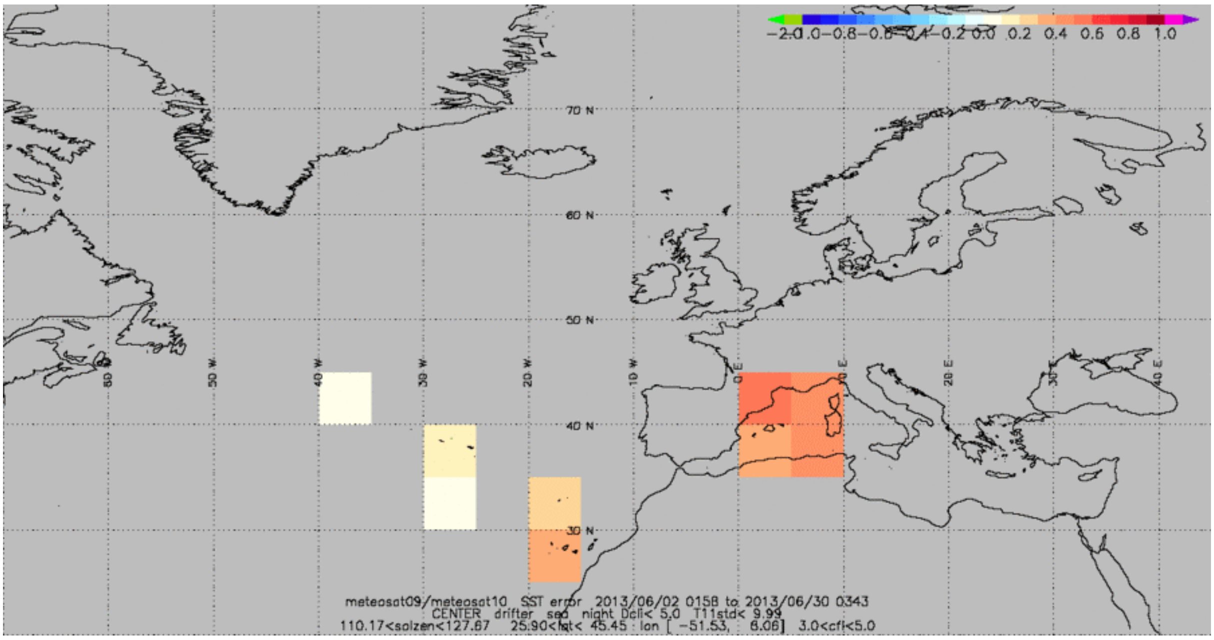


Figure 26 : Location of buoys for NOAA-19 NAR SST validation in JUNE 2013, for 3, 4, 5 quality indexes and by night.

The following table provides the NOAA-19-derived SST quality results over the reporting period.

NOAA-19 NAR SST quality results over 1st half 2013							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (*)
Jan. 2013	395	-0.08	0.5	84	0.38	0.8	52.50
Feb. 2013	435	0.01	0.5	98	0.46	0.8	42.50
Mar. 2013	359	-0.08	0.5	84	0.38	0.8	52.50
Apr. 2013	402	0.03	0.5	94	0.46	0.8	42.50
May 2013	172	0.03	0.5	94	0.50	0.8	37.50
Jun. 2013	136	0.27	0.5	46	0.35	0.8	56.25

table 7 : **Quality results for NOAA-19 NAR SST over 1st half 2013, for 3, 4, 5 quality indexes and by night.**

(*)Bias Margin = 100 * (1-(|Bias / Bias Req|))
(*)Std Dev margin = 100 * (1-(Std Dev / Std Dev Req))
100 refers then to a perfect product. 0 to a quality just as required. without margin.
A negative result indicates that the product quality does not fulfill the requirement.

Comments : Quality results are good. The bias observed in June 2013 is consistent with the one in June 2012.

The following graphs illustrate the evolution of NOAA-19 NAR SST quality results over the past 6 months.

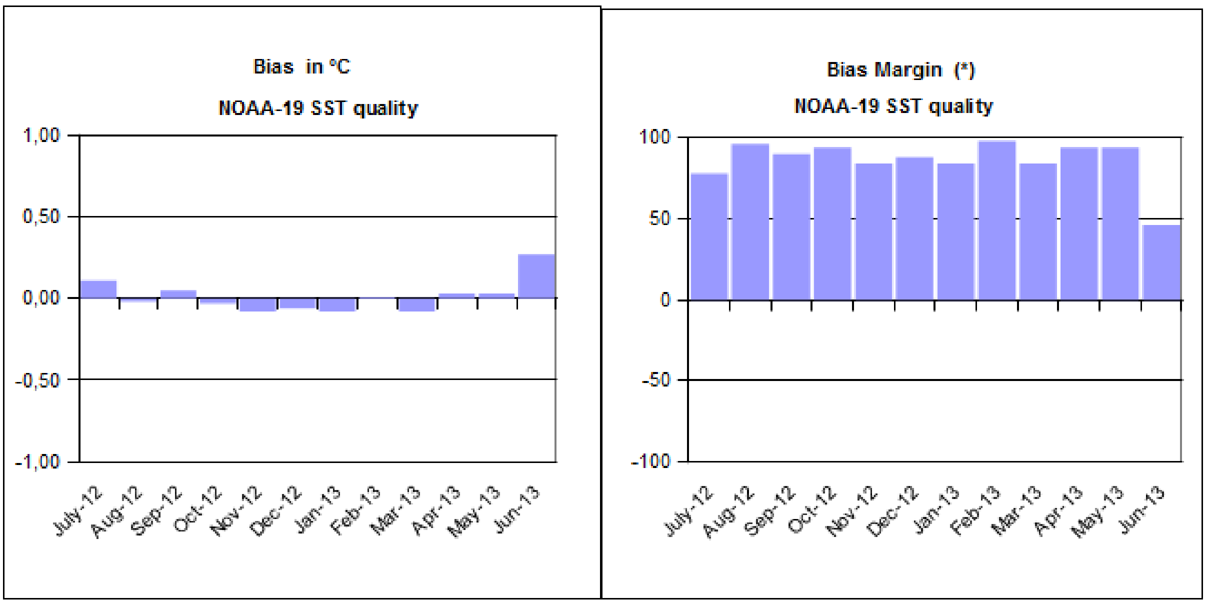


Figure 27 : **Left: NOAA-19 NAR SST Bias. Right NOAA-19 NAR SST Bias Margin.**

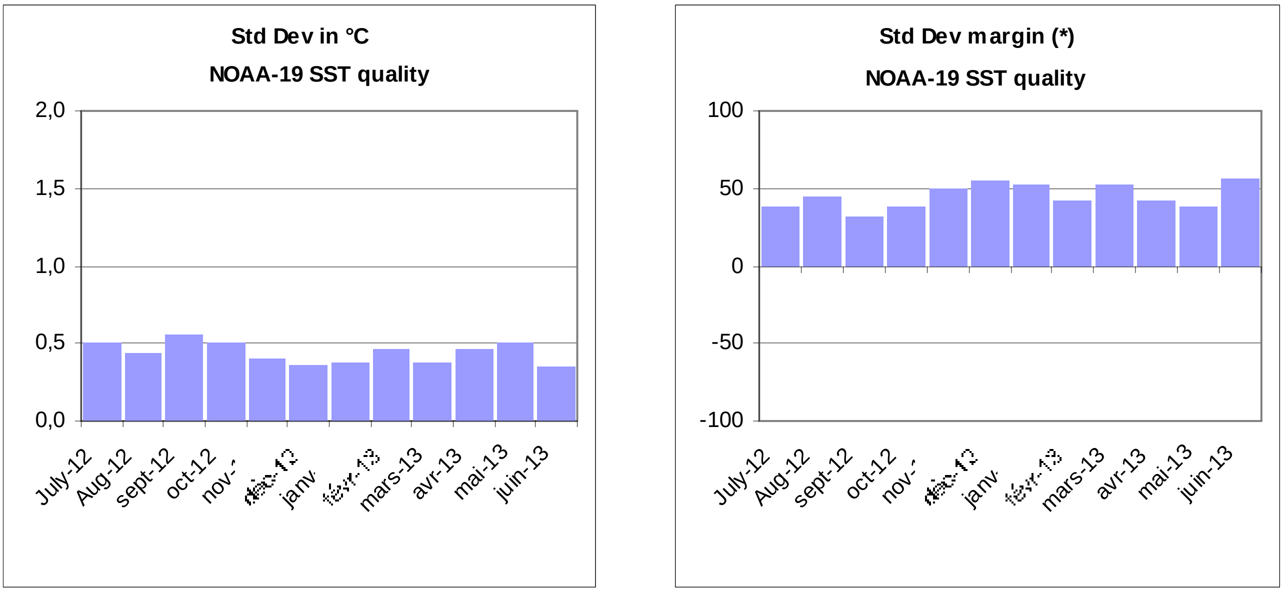


Figure 28 : Left: NOAA-19 NAR SST Standard deviation. Right NOAA-19 NAR SST Standard deviation Margin.

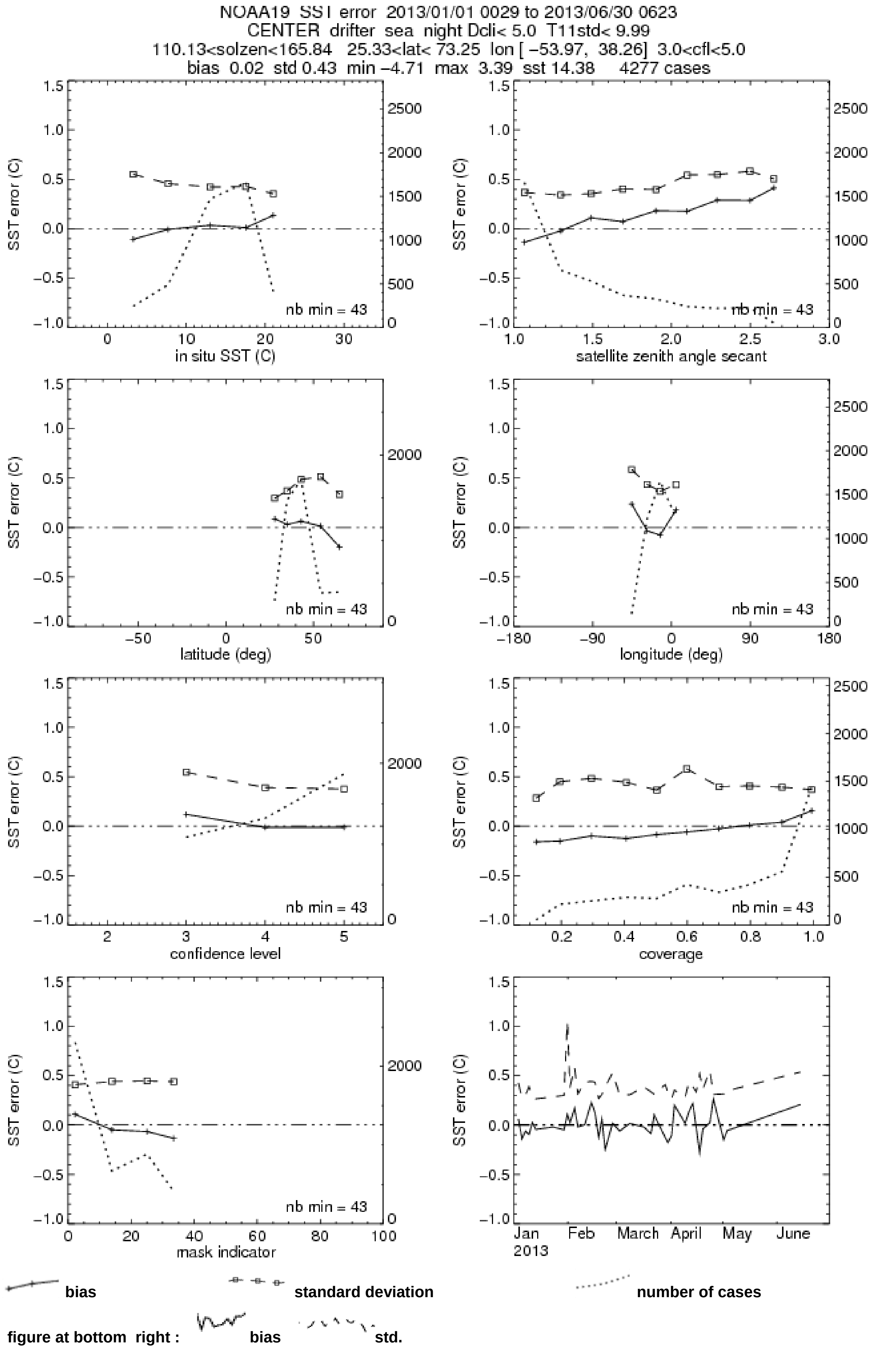


Figure 29 : Complementary validation statistics on NOAA-19 NAR SST.

5.1.3.3 Metop NAR SST quality

The following maps indicate the locations of buoys for each month.

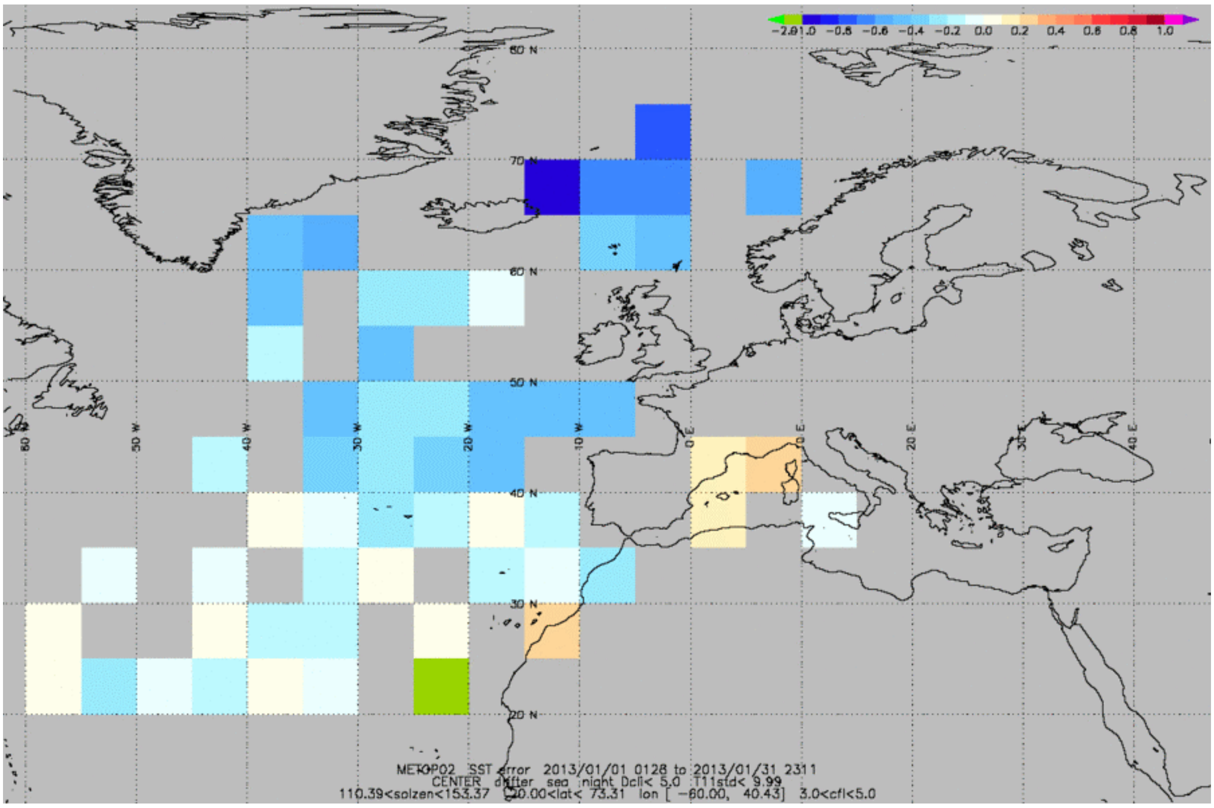


Figure 30 : Location of buoys for Metop-A NAR SST validation in JANUARY 2013, for 3, 4, 5 quality indexes and by night.

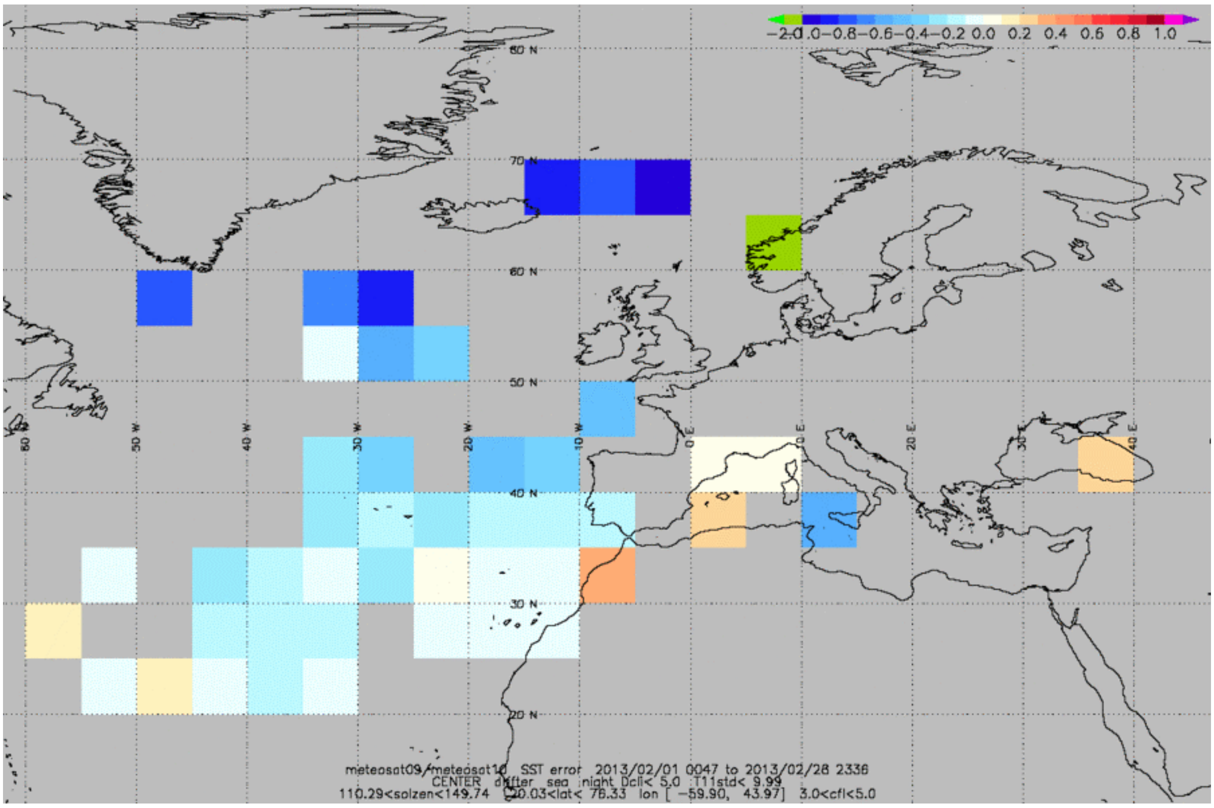


Figure 31 : Location of buoys for Metop-A NAR SST validation in FEBRUARY 2013, for 3, 4, 5 quality indexes and by night

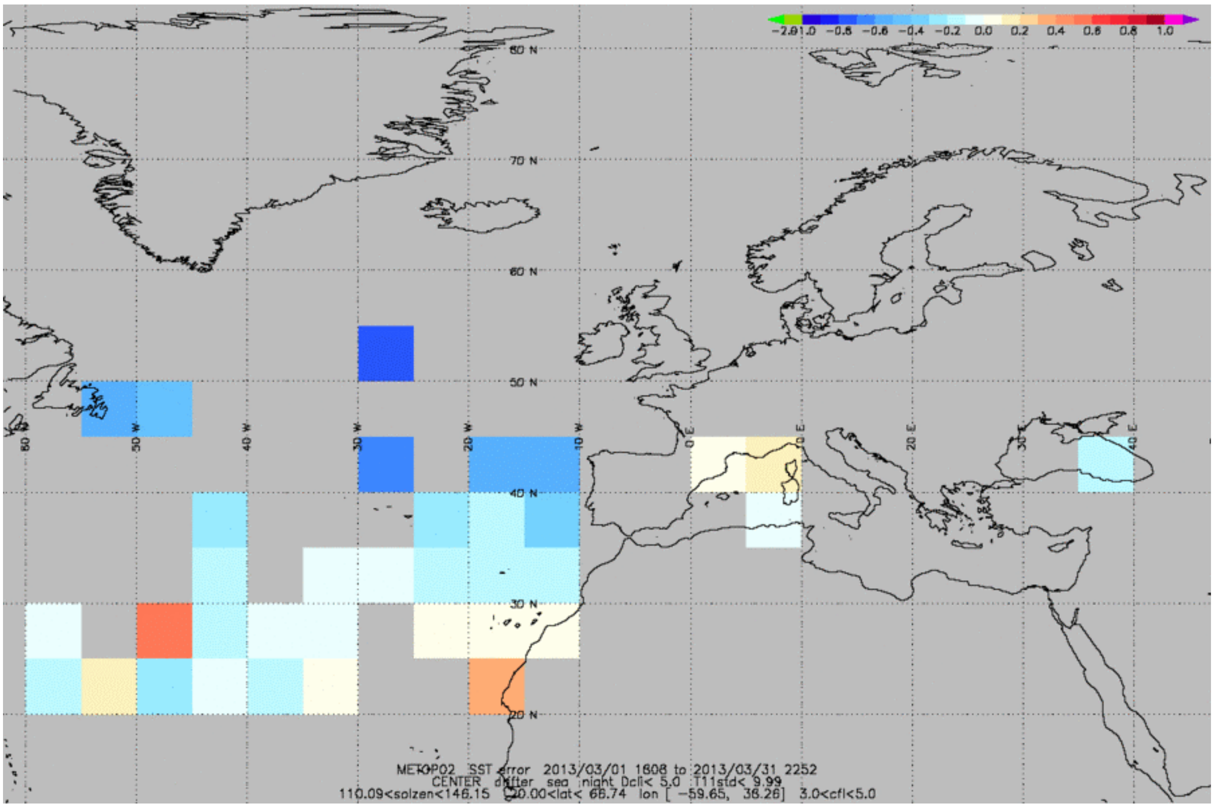


Figure 32 : Location of buoys for Metop-A NAR SST validation in MARCH 2013, for 3, 4, 5 quality indexes and by night.

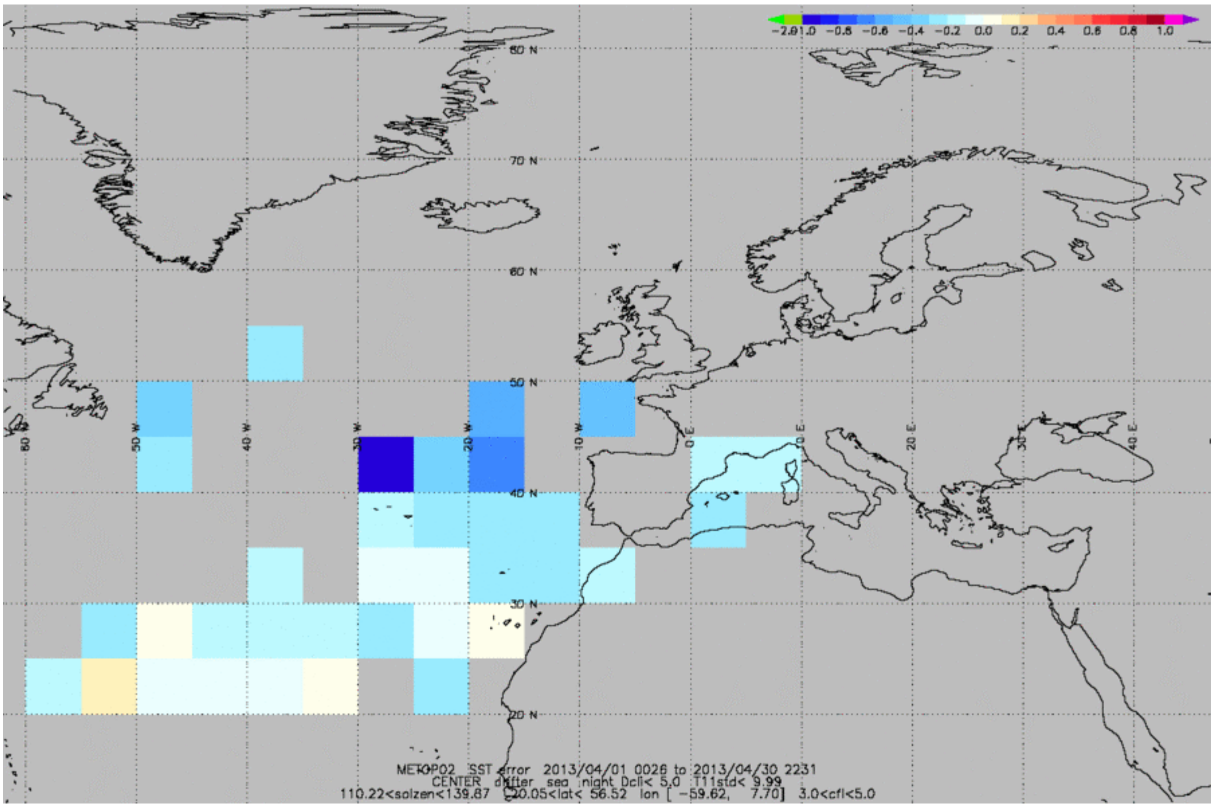


Figure 33 : Location of buoys for Metop-A NAR SST validation in APRIL 2013, for 3, 4, 5 quality indexes and by night.

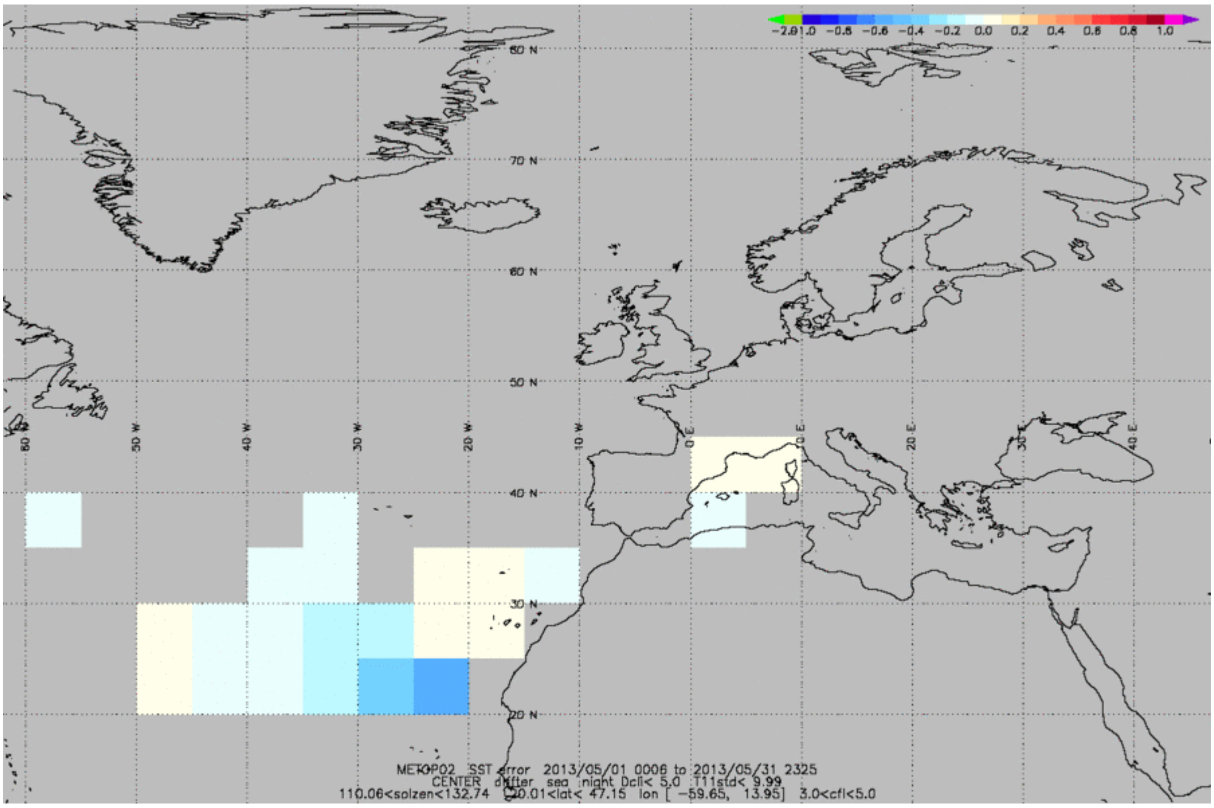


Figure 34 : Location of buoys for Metop-A NAR SST validation in MAY 2013, for 3, 4, 5 quality indexes and by night.

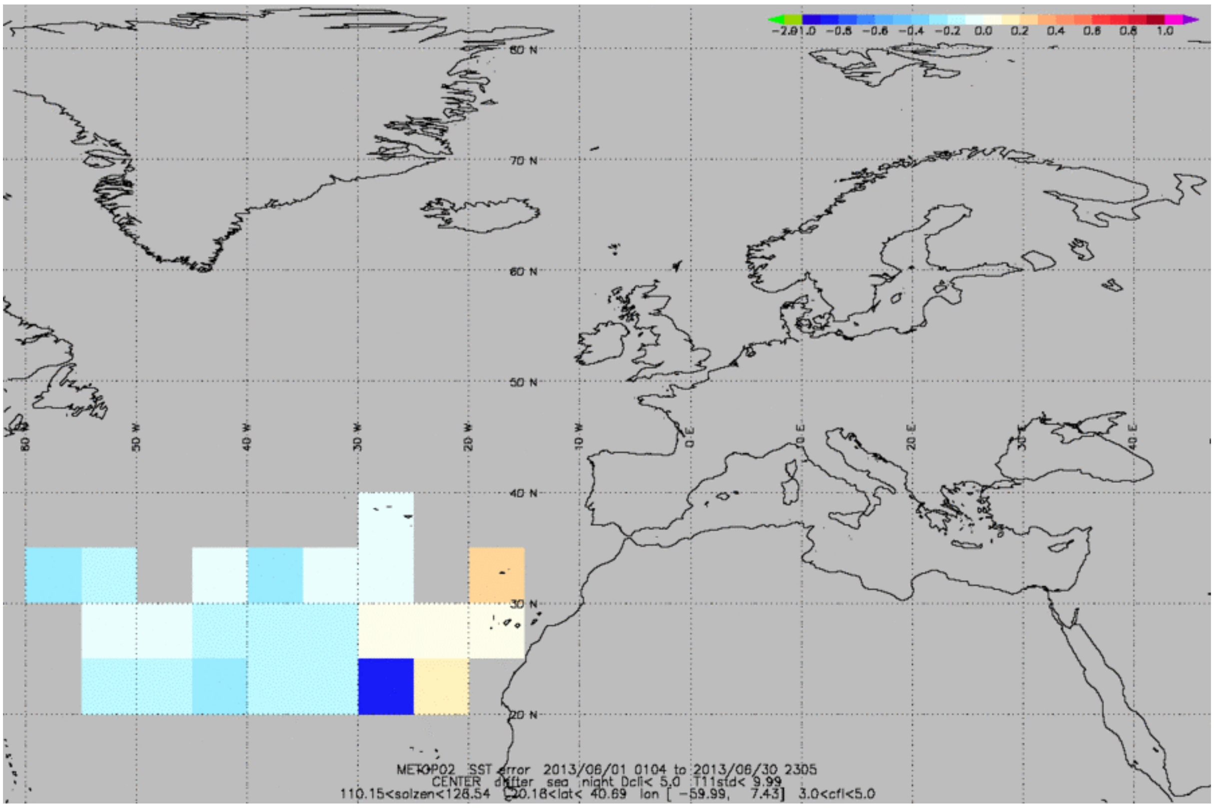


Figure 35 : Location of buoys for Metop-A NAR SST validation in JUNE 2013, for 3, 4, 5 quality indexes and by night.

The following table provides Metop-A -derived SST quality results over the reporting period.

Metop-A NAR SST quality results over 1st half 2013							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (*)
Jan. 2013	1010	-0.140	0.5	72.00	0.40	0.8	50.00
Feb. 2013	868	-0.190	0.5	62.00	0.42	0.8	47.50
Mar. 2013	1106	-0.090	0.5	82.00	0.39	0.8	51.25
Apr. 2013	1029	-0.150	0.5	70.00	0.32	0.8	60.00
May 2013	1156	-0.080	0.5	84.00	0.32	0.8	60.00
Jun. 2013	720	-0.130	0.5	74.00	0.38	0.8	52.50

table 8 : Quality results for Metop-A NAR SST over 1st half 2013, for 3, 4, 5 quality indexes and by night.

(*)Bias Margin = 100 * (1-(|Bias / Bias Req|))
(*)Std Dev margin = 100 * (1-(Std Dev / Std Dev Req))
100 refers then to a perfect product. 0 to a quality just as required. without margin.
A negative result indicates that the product quality does not fulfill the requirement.

Comments : Quality results are good and quite stable.

The following graphs illustrate the evolution of Metop-A NAR SST quality results over the past 6 months.

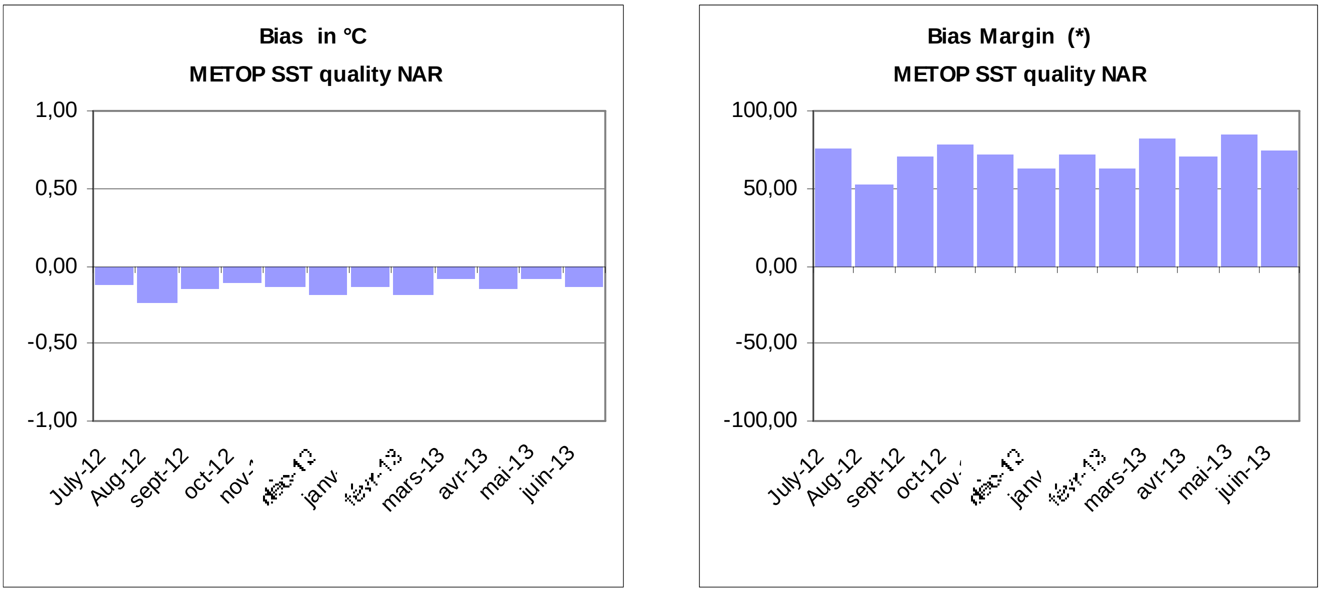


Figure 36 : Left: Metop-A NAR SST Bias. Right: Metop-A NAR SST Bias Margin.

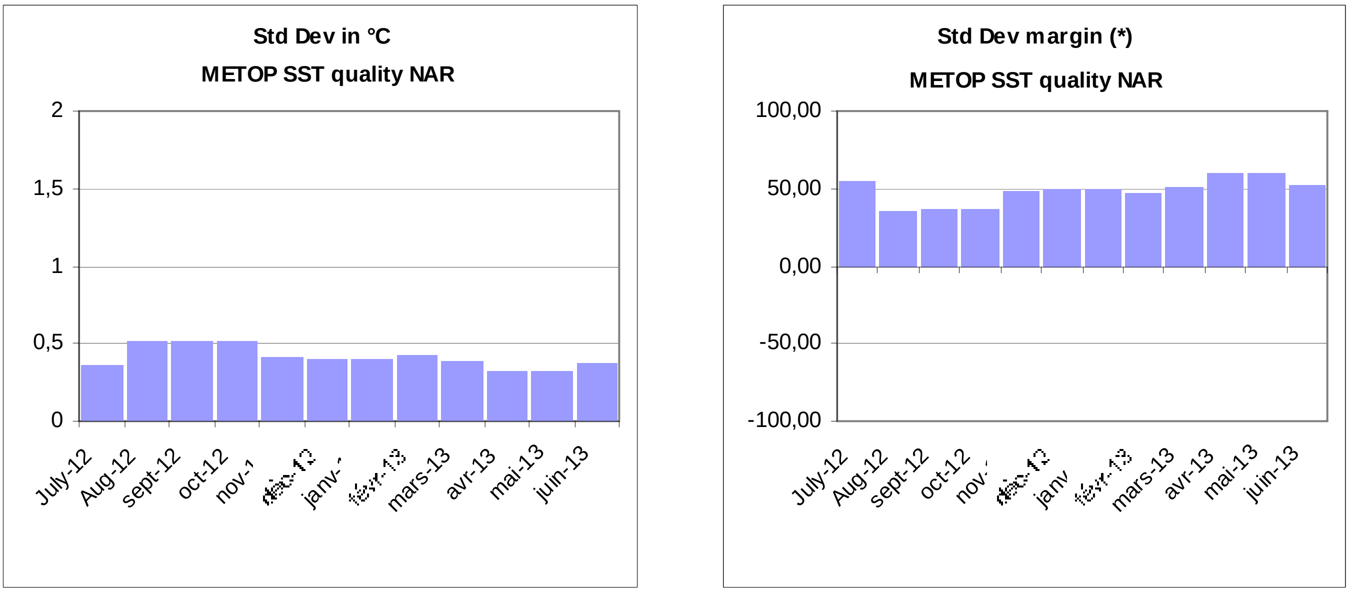


Figure 37 : Left: Metop-A NAR SST Standard deviation. Right: Metop-A NAR SST Standard deviation Margin.

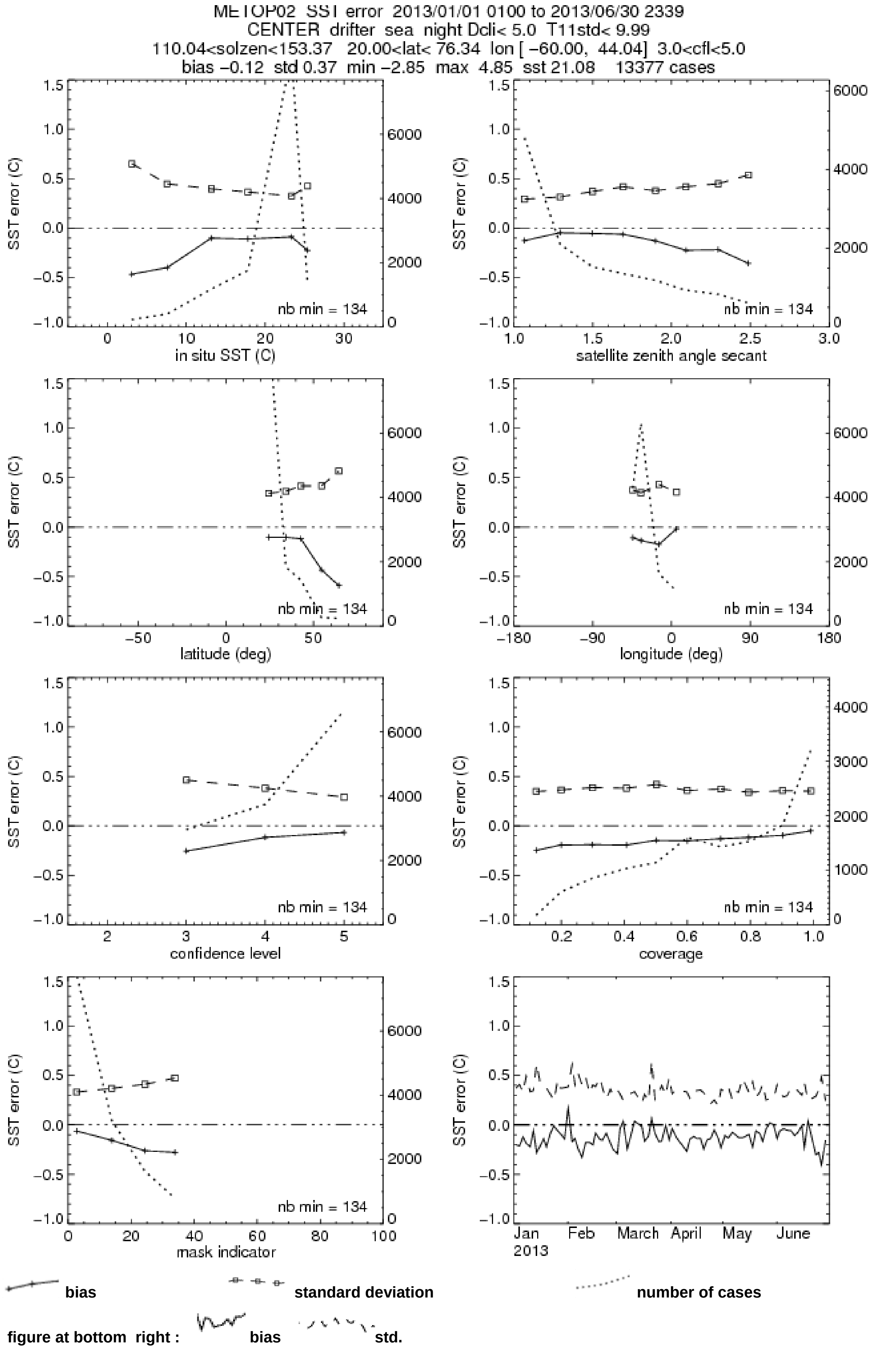


Figure 38 : Complementary validation statistics on Metop NAR SST.

5.1.4 GLB and MGR SST quality

The OSI SAF SST products on global coverage (GLB SST and MGR SST) are based on Metop/AVHRR data, currently Metop-A.

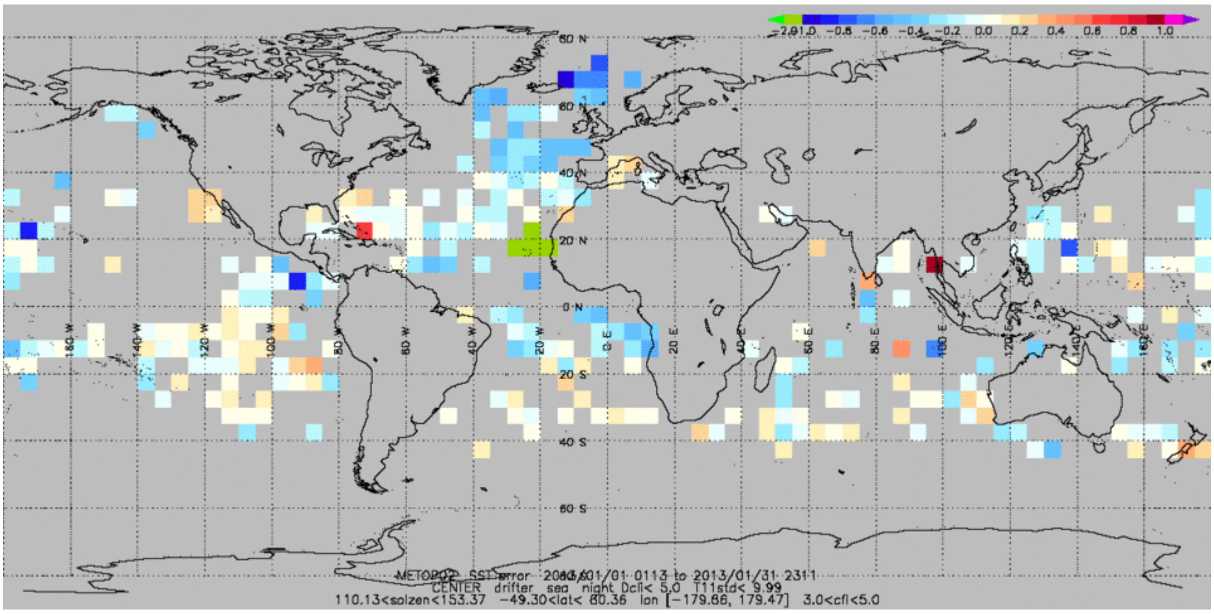


Figure 39 : Location of buoys for global Metop-A SST validation in JANUARY 2013, for 3, 4, 5 quality indexes and by night.

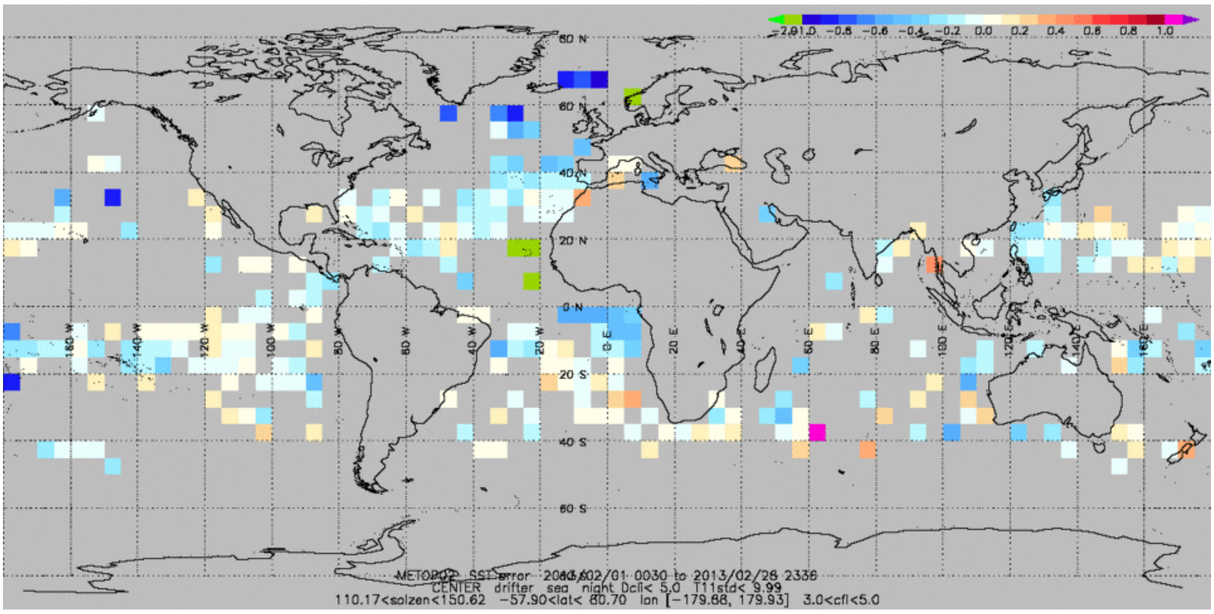


Figure 40 : Location of buoys for global Metop-A SST validation in FEBRUARY 2013, for 3, 4, 5 quality indexes and by night.

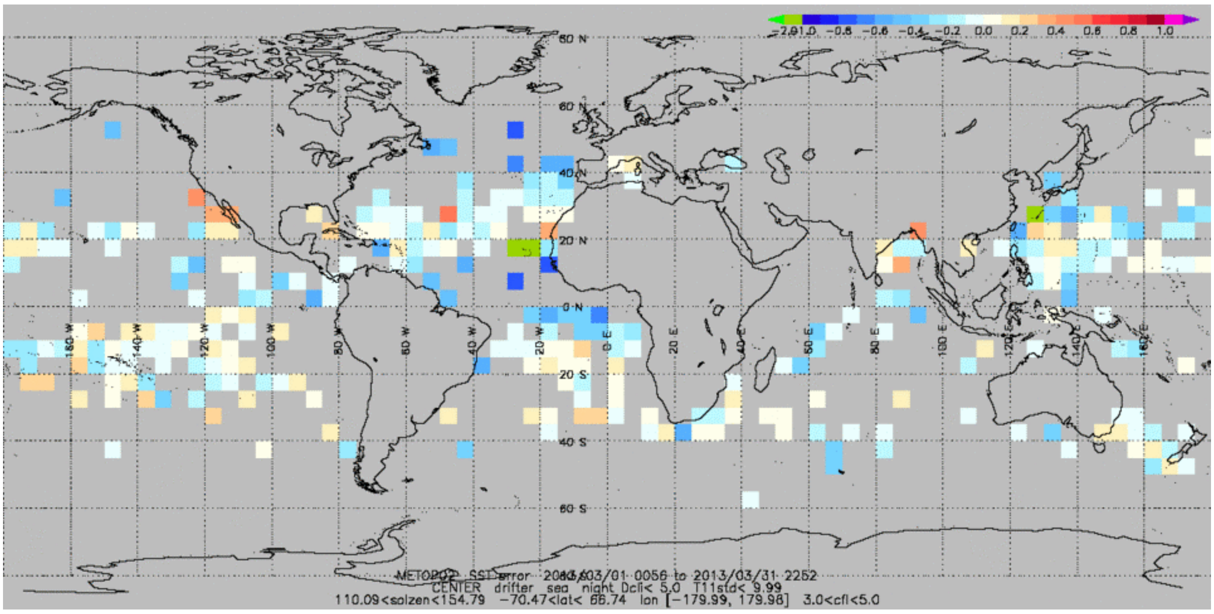


Figure 41 : Location of buoys for global Metop-A SST validation in MARCH 2013, for 3, 4, 5 quality indexes and by night.

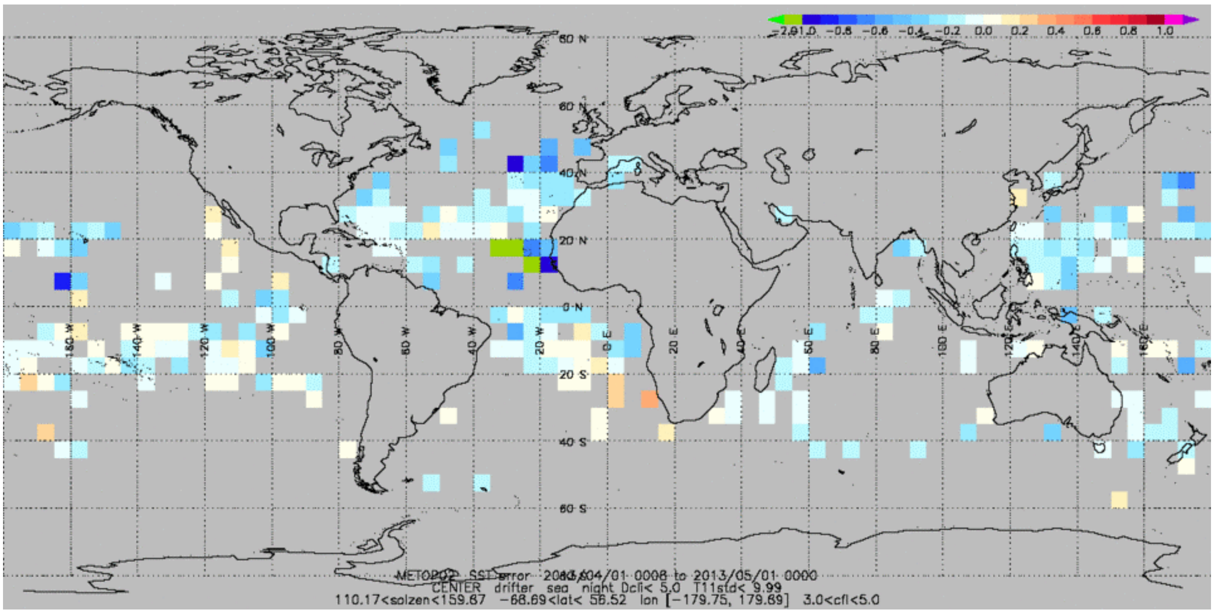


Figure 42 : Location of buoys for global Metop-A SST validation in APRIL 2013, for 3, 4, 5 quality indexes and by night.

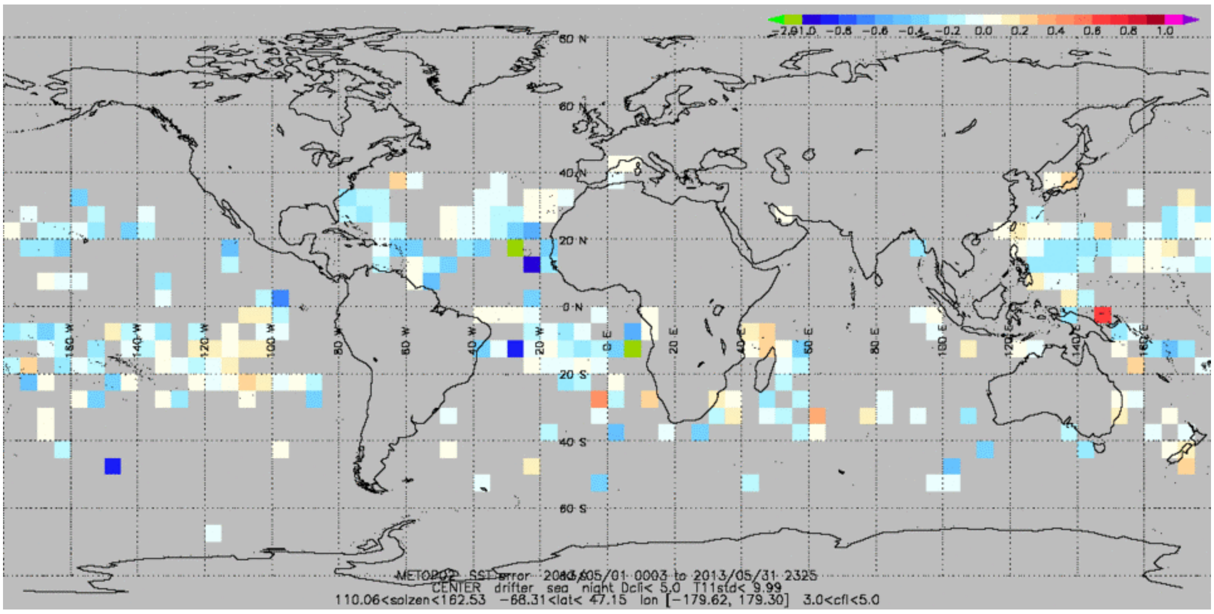


Figure 43 : Location of buoys for global Metop-A SST validation in MAY 2013, for 3, 4, 5 quality indexes and by night.

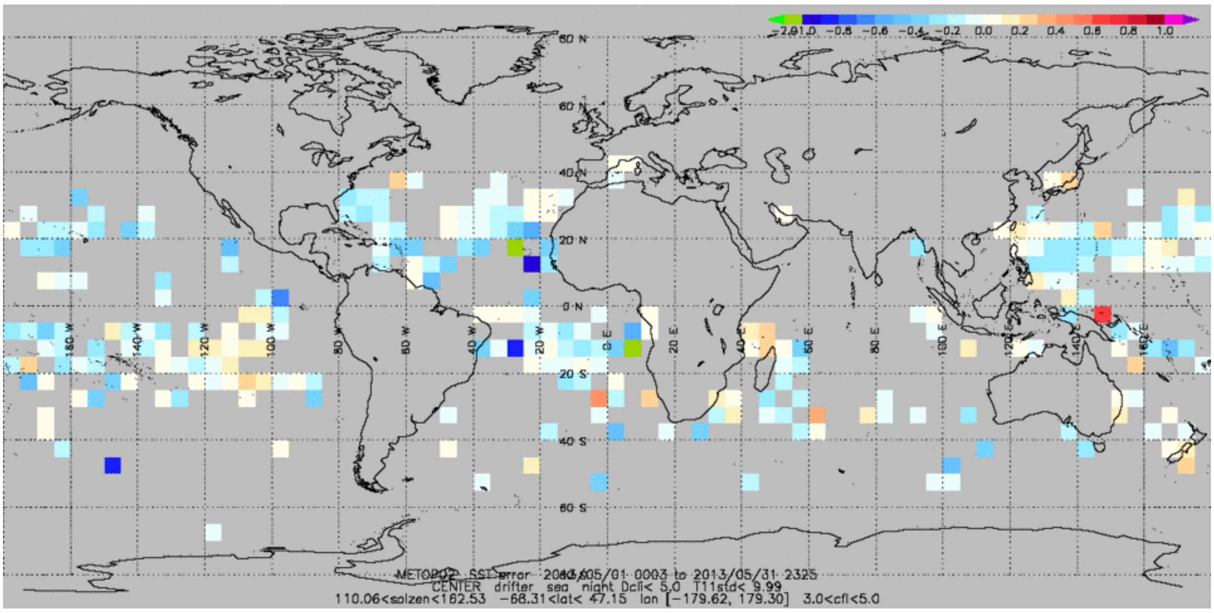


Figure 44 : Location of buoys for global Metop-A SST validation in JUNE 2013, for 3, 4, 5 quality indexes and by night.

The following table provides the METOP-derived SST quality results over the reporting period.

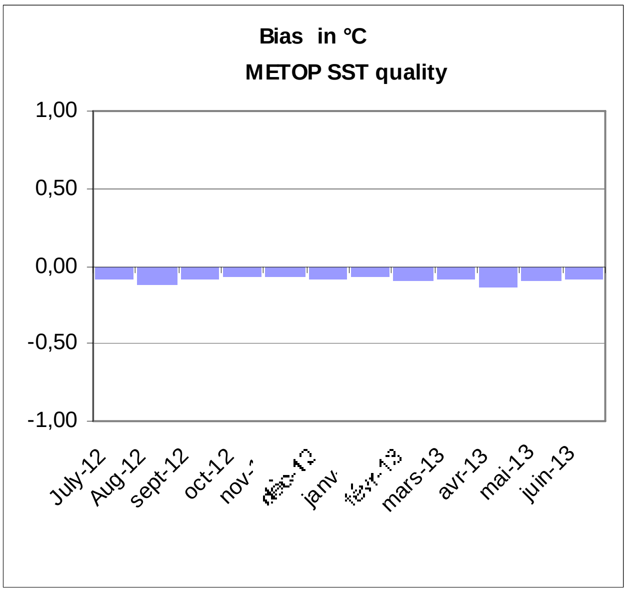
Global Metop-A SST quality results over 1st half 2013							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (*)
Jan. 2013	4700	-0.070	0.5	86.00	0.46	0.8	42.50
Feb. 2013	4510	-0.100	0.5	80.00	0.42	0.8	47.50
Mar. 2013	5029	-0.080	0.5	84.00	0.43	0.8	46.25
Apr. 2013	4826	-0.130	0.5	74.00	0.39	0.8	51.25
May 2013	5159	-0.100	0.5	80.00	0.40	0.8	50.00
Jun. 2013	3970	-0.090	0.5	82.00	0.42	0.8	47.50

table 9 : Quality results for global METOP SST over 1st half 2013, for 3,4,5 quality indexes and by night.

(*)Bias Margin = 100 * (1-(|Bias / Bias Req|))
(*)Std Dev margin = 100 * (1-(Std Dev / Std Dev Req))
100 refers then to a perfect product. 0 to a quality just as required. without margin.
A negative result indicates that the product quality does not fulfill the requirement.

Comments : Quality results are good and quite stable.

The following graphs illustrate the evolution of global METOP SST quality results over the past 6 months.



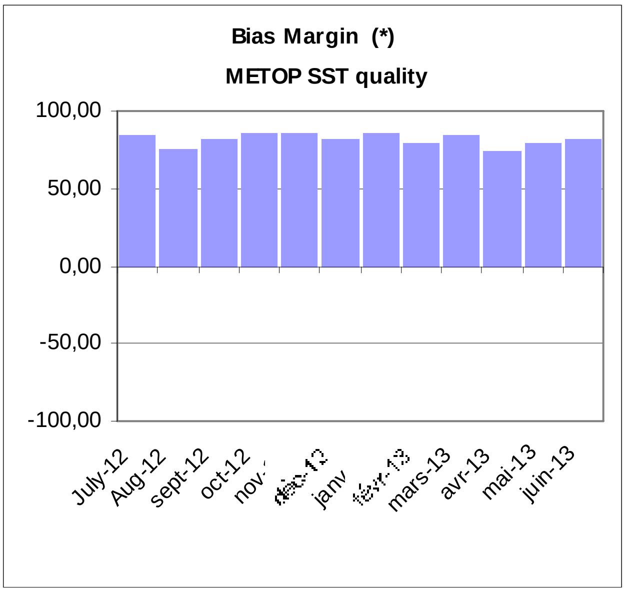


Figure 45 : Left: global Metop-A SST Bias. Right: global Metop-A SST Bias Margin.

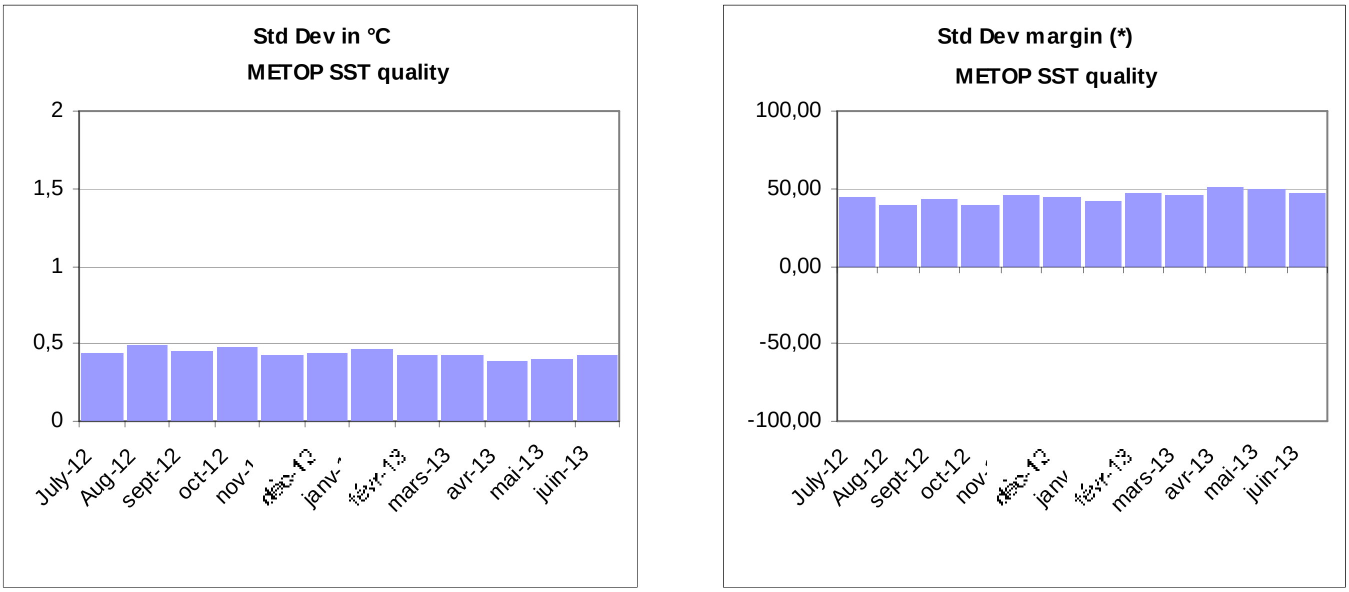


Figure 46 : Left: global Metop-A SST Standard deviation. Right: global Metop-A SST Standard deviation Margin.

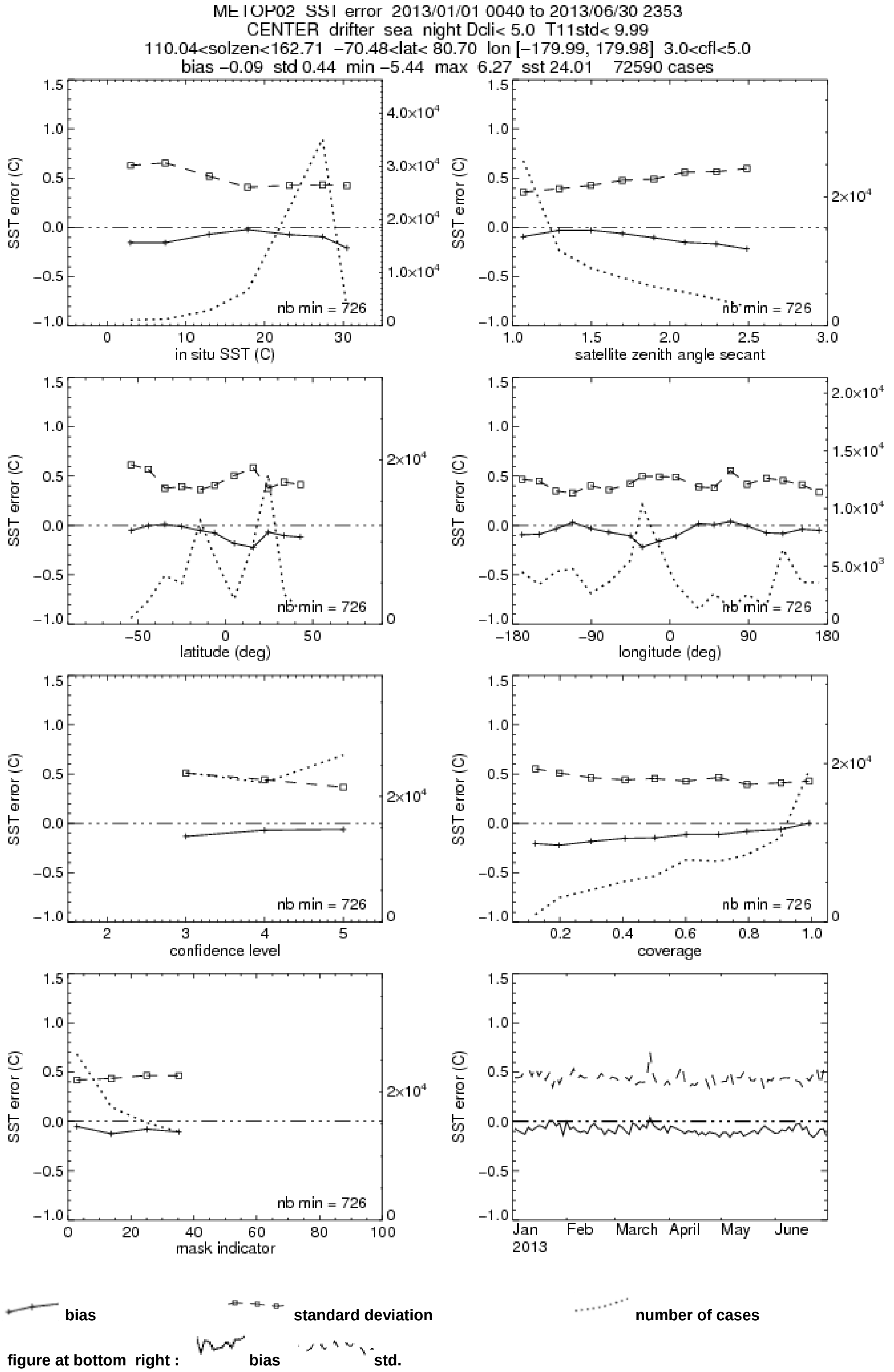


Figure 47 : Complementary validation statistics on Metop GLB SST.

5.1.5 AHL SST quality

The Atlantic High Latitude SST (AHL SST) is derived from polar satellites data, currently AVHRR on NOAA-18, NOAA-19 and METOP-A.

The following table provides the AVHRR-derived AHL SST quality results over the reporting period.

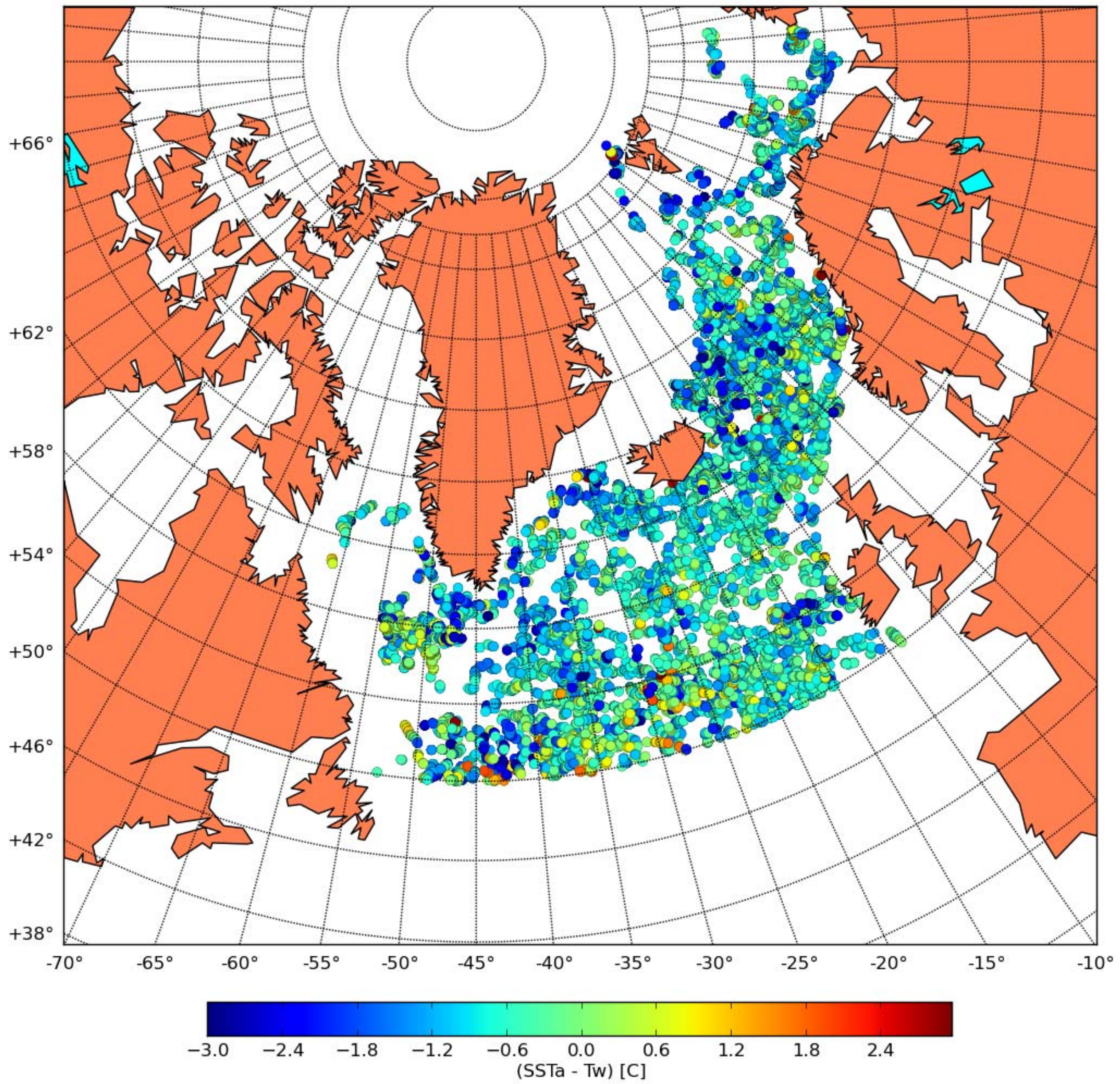


Figure 48 : Location of buoys for AHL SST validation in January to June 2013, for 3, 4, 5 quality indexes.

AHL AVHRR SST quality results over 1st half 2013, nighttime							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (*)
Jan. 2013	1184	-0.639	0.5	-27.8	0.711	0.8	11.2
Feb. 2013	706	-0.665	0.5	-33	0.753	0.8	5.9
Mar. 2013	811	-0.586	0.5	-17.2	0.739	0.8	7.6
Apr. 2013	1051	-0.648	0.5	-29.6	0.721	0.8	9.8
May. 2013	995	-0.502	0.5	-0.4	0.782	0.8	2.3
Jun. 2013	1048	-0.396	0.5	20.7	0.779	0.8	2.6
AHL AVHRR SST quality results over 1st half 2013, daytime							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (*)
Jan. 2013	1224	-0.591	0.5	-18.2	0.692	0.8	13.5
Feb. 2013	725	-0.49	0.5	1.9	0.729	0.8	8.8
Mar. 2013	886	-0.352	0.5	29.6	0.653	0.8	18.4
Apr. 2013	1036	-0.43	0.5	13.9	0.534	0.8	33.2
May. 2013	1076	-0.217	0.5	56.5	0.604	0.8	24.5
Jun. 2013	1208	-0.206	0.5	58.7	0.613	0.8	23.4

table 10 : **Quality results for AHL AVHRR SST over 1st half 2013, for 3,4,5 quality indexes, by night and by day.**

(*)Bias Margin = 100 * (1-(|Bias / Bias Req|))
(*)Std Dev margin = 100 * (1-(Std Dev / Std Dev Req))
100 refers then to a perfect product. 0 to a quality just as required. without margin.
A negative result indicates that the product quality does not fulfill the requirement.

Comments: The nighttime results are for the AHL 12hourly product centered at 00UTC. The results are outside the requirement on bias for several of the months, showing a general cold bias. The day time product (centered at 12UTC) shows better results and are always within the requirements (except for bias in January). This difference between night and day might be because of cloud masking issues. Cloud masks are usually less accurate at nighttime, and undetected clouds will give a systematic cold bias in the SST product.

5.2 Radiative Fluxes quality

5.2.1 DLI quality

DLI products are constituted of the geostationary products (METEOSAT DLI and GOES-E DLI) and the polar ones (AHL DLI). DLI values are required to have the following accuracy when compared to land pyrgeometer measurements :

- monthly relative bias less than 5%,
- monthly difference standard deviation less than 10%.

The match-up data base the statistics are based on is continuously enriched, so that, for the same period, results may evolve depending on the date when the statistics were calculated.

5.2.1.1 METEOSAT and GOES-E DLI quality

The list of pyrgeometer stations used for validating the geostationary DLI products is available on the OSI SAF Web Site from the following page:
http://www.osi-saf.org/voir_images.php?image1=/images/flx_map_stations_2b.gif

The following table provides the geostationary DLI quality results over the reporting period.

Geostationary METEOSAT & GOES-E DLI quality results over 1st half 2013								
Month	Number of cases	Mean DLI in Wm^{-2}	Bias in %	Bias Req In %	Bias Marg in %(*)	Std Dev In %	Std Dev Req In %	Std Dev margin (*)
Jan. 2013	5598	262.58	-4.330	5	13.40	8.30	10	16.98
Feb. 2013	4169	264.56	-3.013	5	39.75	7.54	10	24.55
Mar. 2013	4573	274.06	-2.499	5	50.01	7.28	10	27.21
Apr. 2013	4453	303.06	-1.920	5	61.59	5.65	10	43.48
May 2013	3344	333.32	-1.539	5	69.22	4.87	10	51.28
Jun. 2013	3751	367.63	-0.868	5	82.65	4.14	10	58.60

table 11 : Geostationary DLI quality results over 1st half 2013.

(*)Bias Margin = 100 * (1-(|Bias / Bias Req|))
(*)Std Dev margin = 100 * (1-(Std Dev / Std Dev Req))
100 refers then to a perfect product. 0 to a quality just as required. without margin.
A negative result indicates that the product quality does not fulfill the requirement.

Comments : Quality results are good, quite stable during the second part of the concerned period. Even if the performance in the beginning of the period is less good, results are compatible with requirements.

The following graphs illustrate the evolution of Geostationary DLI quality over the past 6 months.

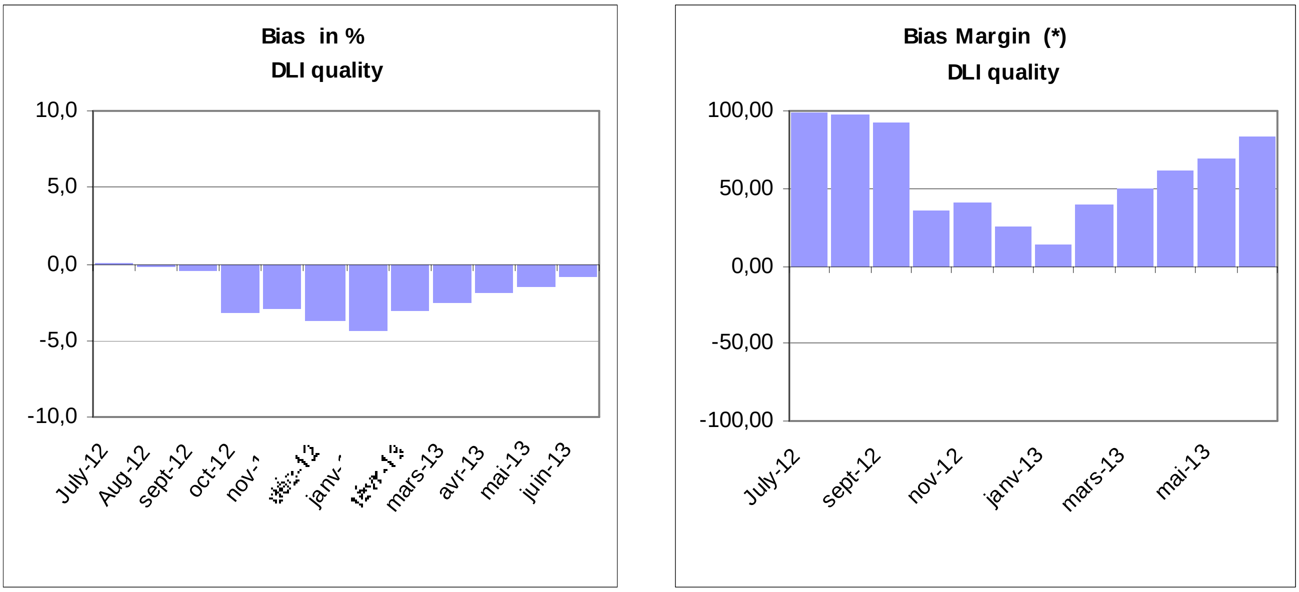


Figure 49 : Left: Geostationary DLI Bias. Right Geostationary DLI Bias Margin .

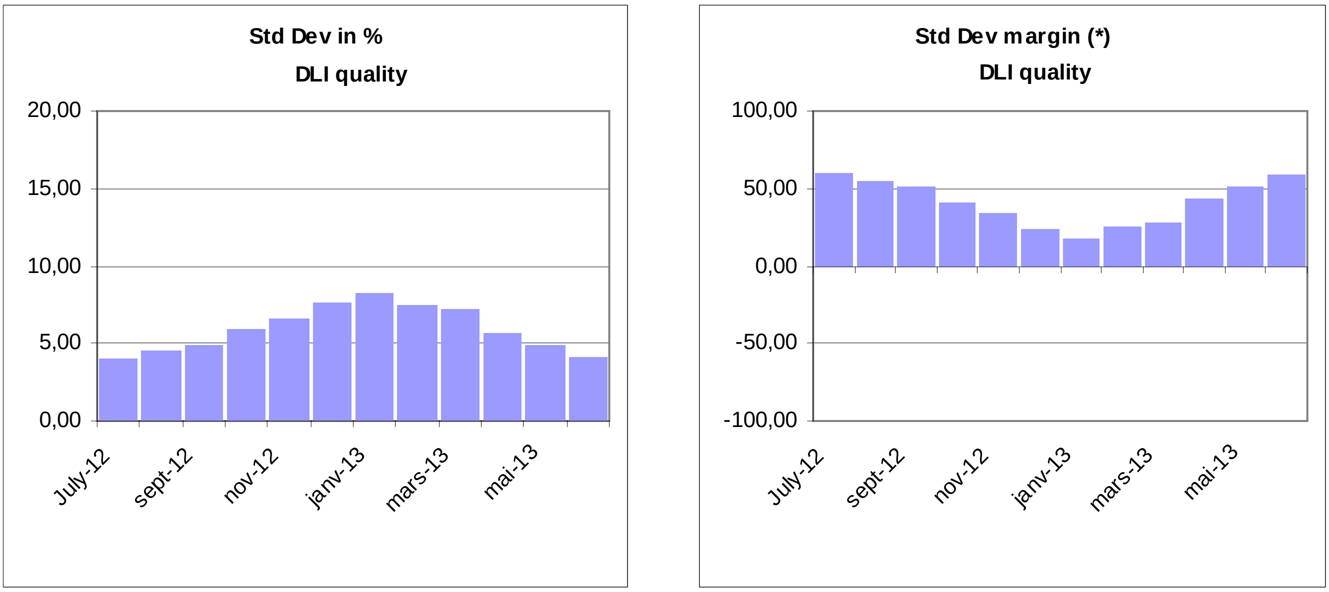


Figure 50 : Left: Geostationary DLI Standard deviation. Right DLI Geostationary Standard deviation Margin.

5.2.1.2 AHL DLI quality

The pyrgeometer stations used for validation of the AHL DLI product are selected stations from Table 1. Specifically the following stations are currently used.

Annex A Ekofisk
Annex B Jan Mayen
Annex C Bjørnøya
Annex D Hopen

These stations are briefly described at http://nowcasting.met.no/validering/flukser/. A map illustrating the locations is provided in figure 53 : where the stations used for SSI validation is also shown. More information on the stations is provided in 5.2.2.2.

The following table provides the AHL DLI quality results over the reporting period.

AHL DLI quality results over 1st half 2013								
Month	Number of cases	Mean DLI in Wm^{-2}	Bias in %	Bias Req In %	Bias Marg in %(*)	Std Dev In %	Std Dev Req In %	Std Dev margin (*) in %
Jan. 2013	123	276.43	2.09	5.0	58.2	4.53	10.0	54.7
Feb. 2013	97	269.23	2.05	5.0	59	5.21	10.0	47.9
Mar. 2013	86	236.27	4.51	5.0	9.8	6.23	10.0	37.7
Apr. 2013	60	273.59	0.46	5.0	90.8	5.25	10.0	47.5
May. 2013	93	302.24	5.41	5.0	-8.2	3.69	10.0	63.1
Jun. 2013	87	316.22	5.76	5.0	-15.2	3.94	10.0	60.6

table 12 : AHL DLI quality results over 1st half 2013.

(*)Bias Margin = 100 * (1-(|Bias / Bias Req|))
(*)Std Dev margin = 100 * (1-(Std Dev / Std Dev Req))
100 refers then to a perfect product. 0 to a quality just as required. without margin.
A negative result indicates that the product quality does not fulfill the requirement.

Comments : The pyrgeometer at Jan Mayen stopped working in February. The reason is yet not known, but may be connected with some work on the sensors (new sensors fitted). In March, the sensor at Hopen also failed, but this recovered. The reason for the requirement not being met in May and June is due to insufficient quality at the Arctic stations. The requirement is met for all months at Ekofisk where the maximum relative bias was 3.22% in May.

5.2.2 SSI quality

SSI products are constituted of the geostationary products (METEOSAT SSI and GOES-E SSI) and polar ones (AHL SSI). SSI values are required to have the following accuracy when compared to land pyranometer measurements :

- monthly relative bias less than 10%,
- monthly difference standard deviation less than 30%.

The match-up data base the statistics are based on is continuously enriched, so that, for the same period, results may evolve depending on the date when the statistics were calculated.

5.2.2.1 METEOSAT and GOES-E SSI quality

The list of pyranometer stations used for validating the geostationary SSI products is available on the OSI SAF Web Site from the following page:
http://www.osi-saf.org/voir_images.php?image1=/images/flx_map_stations_2b.gif

The following table provides the geostationary SSI quality results over the reporting period.

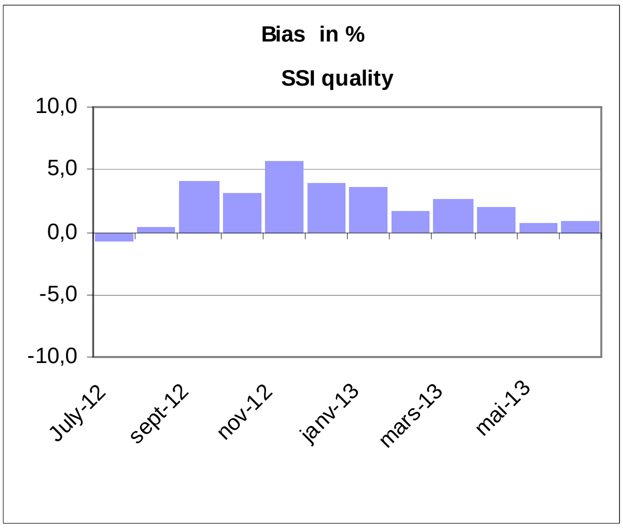
Geostationary METEOSAT & GOES-E SSI quality results over 1st half 2013								
Month	Number of cases	Mean SSI in Wm^{-2}	Bias in %	Bias Req In %	Bias Marg in %(*)	Std Dev In %	Std Dev Req In %	Std Dev margin (*)
Jan. 2013	6182	312.60	3.57	10	64.30	3.57	10	64.30
Feb. 2013	5289	343.85	1.71	10	82.90	1.71	10	82.90
Mar. 2013	6550	389.64	2.59	10	74.10	2.59	10	74.10
Apr. 2013	6914	423.12	1.98	10	80.22	1.98	10	80.22
May 2013	6136	425.61	0.74	10	92.62	0.74	10	92.62
Jun. 2013	6878	462.35	0.91	10	90.87	0.91	10	90.87

table 13 : Geostationary SSI quality results over 1st half 2013.

(*)Bias Margin = 100 * (1-(|Bias / Bias Req|))
(*)Std Dev margin = 100 * (1-(Std Dev / Std Dev Req))
100 refers then to a perfect product. 0 to a quality just as required. without margin.
A negative result indicates that the product quality does not fulfill the requirement.

Comments : Quality results are good and quite stable.

The following graphs illustrate the evolution of Geostationary SSI quality over the past 6 months.



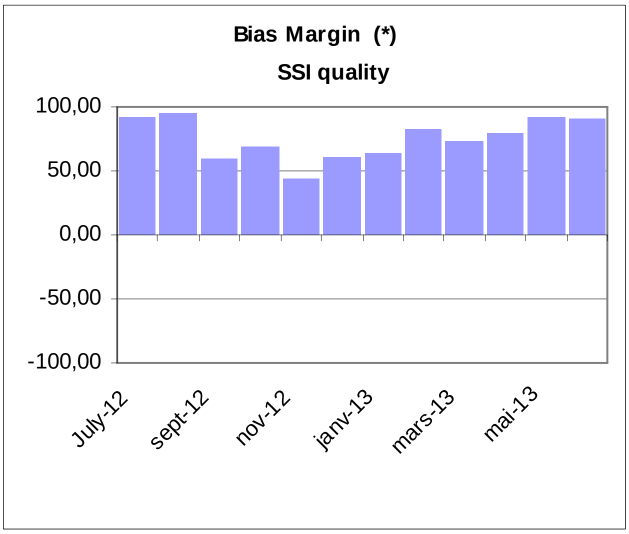
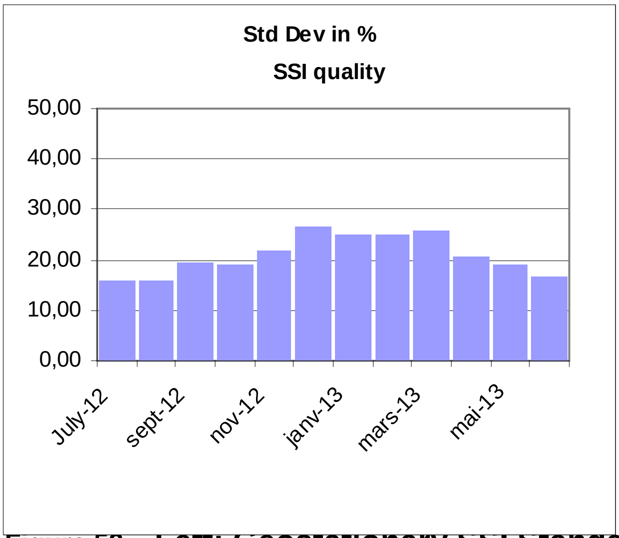


Figure 51 : Left: Geostationary SSI Bias. Right Geostationary SSI Bias Margin.



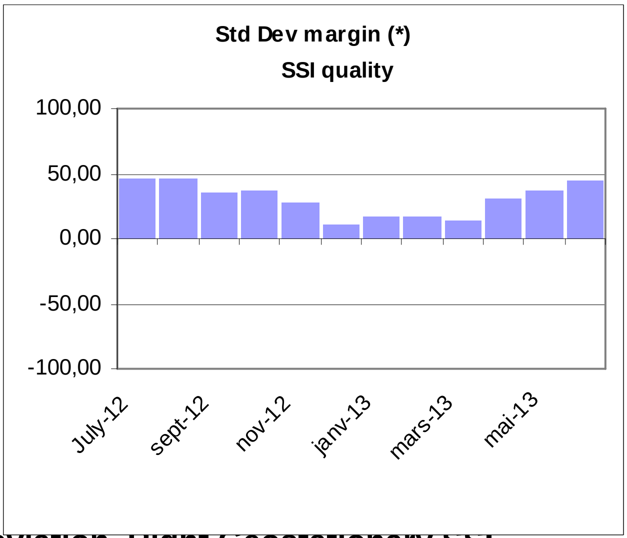


Figure 52 : Left: Geostationary SSI Standard deviation. Right Geostationary SSI Standard deviation Margin.

5.2.2.2 AHL SSI quality

The pyranometer stations used for validation of the AHL SSI product are shown in the following table.

Station	StId	Latitude	Longitude	Status
Tjøtta	76530	65.83°N	12.43°E	In use
Vågønes	82260	67.28°N	14.47°E	Not used currently
Holt	90400	69.67°N	18.93°E	Not used currently
Apelsvoll	11500	60.70°N	10.87°E	In use, under examination due to shadow effects.
Løken	23500	61.12°N	9.07°E	Not used currently
Landvik	38140	58.33°N	8.52°E	In use
Særheim	44300	58.78°N	5.68°E	In use
Fureneset	56420	61.30°N	5.05°E	In use
Kvithamar	69150	63.50°N	10.87°E	Not used currently
Jan_Mayen	99950	70.93°N	-8.67°E	In use, Arctic station with snow on ground much of the year, volcanic ash deteriorates instruments in periods.
Bjørnøya	99710	74.52°N	19.02°E	In use, Arctic station with snow on ground much of the year.
Hopen	99720	76.50°N	25.07°E	In use, Arctic station

Station	StId	Latitude	Longitude	Status
				with snow on ground much of the year.
Ekofisk	76920	56.50°N	3.2°E	In use, shadow effects at certain directions.

table 14 : ***Validation stations that are currently used for AHL radiative fluxes validation.***

Locations of these stations are provided in the illustration below (figure 53). The map illustrates whether stations are used for SSI or DLI validation. As readily can be seen, the map contains more stations than actually used (see the list above). The reason for this is that some stations have characteristics which makes them unsuitable for validation of daily SSI due to e.g. shadow effects or other surrounding characteristics. Furthermore, some of the stations listed are briefly described at http://nowcasting.met.no/validering/flukser/.

The stations used in this validation is owned and operated by the Norwegian Meteorological Institute, University of Bergen, Geophysical Institute *and* Biofork.

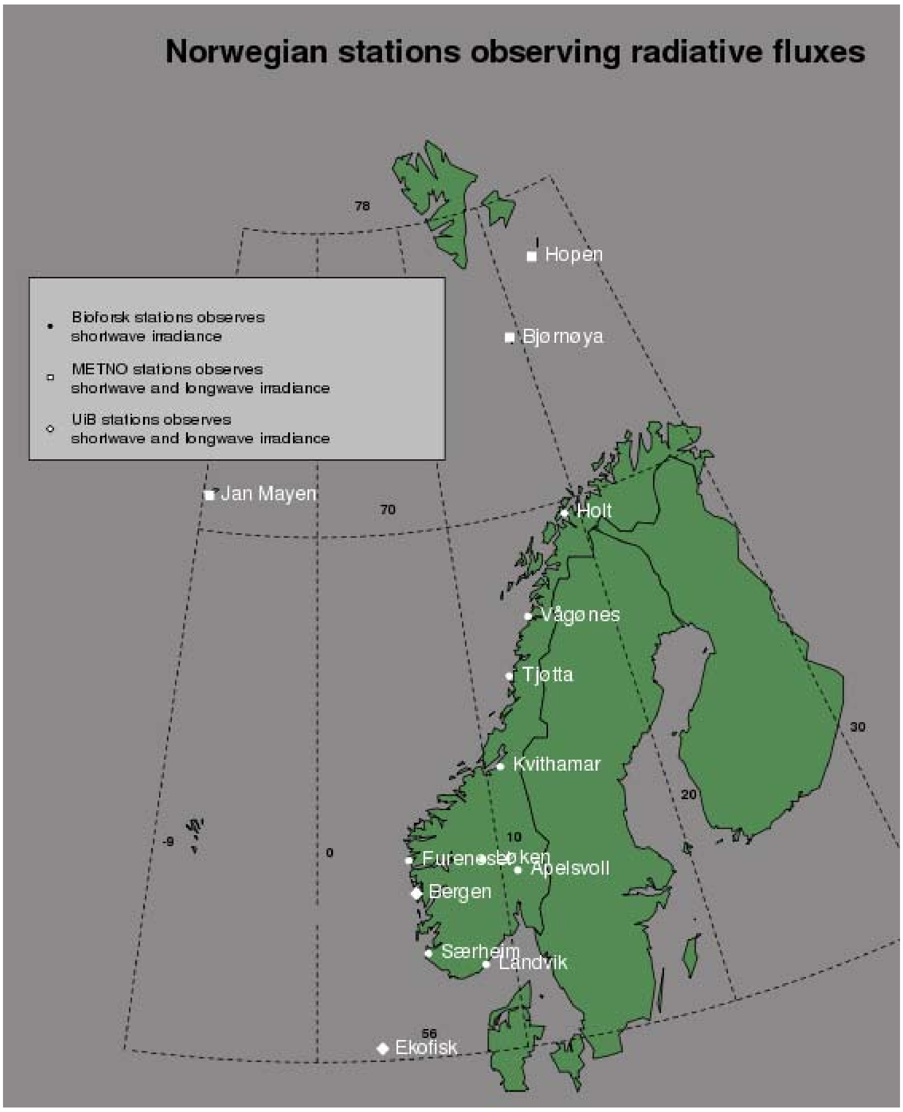


Figure 53 : Map of stations available for validation purposes of AHL radiative fluxes. Only a subset of these stations are used due to station characteristics when validation satellite remote sensing products.

The following table provides the AHL SSI quality results over the reporting period.

AHL SSI quality results over 1st half 2013										
Month	Number of cases	Mean SSI in Wm^{-2}	Bias in Wm^{-2}	Bias in %	Bias Req in %	Bias Marg in %(*)	Std Dev in Wm^{-2}	Std Dev in %	Std Dev Req in %	Std Dev margin (*) in %
Jan. 2013	279	7.5	0.58	35.02	10.0	-250.2	4.04	25.53	30.0	14.9
Feb. 2013	252	28.2	4.66	27.02	10.0	-170.2	11.62	51.87	30.0	-72.9
Mar. 2013	212	81.08	13.51	24.8	10.0	-148	16.04	25.62	30.0	14.6
Apr. 2013	198	147.91	14.44	13.34	10.0	-33.4	22.32	15.51	30.0	48.3
May 2013	244	157.8	2.52	5.4	10.0	46	25.27	16.38	30.0	45.4
Jun. 2013	205	199.9	-2.25	9.54	10.0	4.6	29.85	15.00	30.0	50

table 15 : AHLSSI quality results over 1st half 2013.

(*)Bias Margin = 100 * (1-(|Bias / Bias Req|))
(*)Std Dev margin = 100 * (1-(Std Dev / Std Dev Req))
100 refers then to a perfect product. 0 to a quality just as required. without margin.
A negative result indicates that the product quality does not fulfill the requirement.

Comments : The stability of some of the validation stations has been poor this spring. Station Tjøtta has not delivered data since March and for some other stations there have been irregular service as well. Furthermore, the collection of data from Bioforsk stations have changed during the spring but is yet not fully implemented in the OSISAF validation scheme. The new data collection system will hopefully improve the regularity of some stations. The validation stations and scheme is being evaluated as part of this transition.

The requirement is being met in May and June. For earlier months it is being met at individual stations depending on the snow cover for each station. Ekofisk and stations along the southern and western coast Norway do usually have no or less snow cover and do thus perform better

It is expected that the stations used for validation will change for the next report due to an assessment of the quality of each station that is being prepared now.

5.3 Sea Ice quality

5.3.1 Validation results for the global sea ice concentration product

The OSI SAF sea ice concentration product is validated against navigational ice charts, as these are believed to be the best independent source of reference data currently available. These navigational ice charts originates from the operational ice charting divisions at DMI, MET Norway and National Ice Center. The ice charts are primarily based on SAR (Radarsat and Envisat) data, together with AVHRR and MODIS data in several cases. The validation results are shown separately for the three different sets of ice charts.

For the validation at the Northern Hemisphere, performed twice a week, the concentration product is required to have a bias and standard deviation less than 10% ice concentration on an annual basis. For the biweekly validation at the Southern Hemisphere the concentration product is required to have a bias and standard deviation less than 15% ice concentration on an annual basis.

For each ice chart concentration level the deviation between ice chart concentration and OSISAF ice concentration is calculated. Afterwards deviations are grouped into categories, i.e. ±10% and ±20%. Furthermore the bias and standard deviation is calculated for each concentration level. The bias and standard deviation are reported for ice (> 0% ice concentration), for water (0% ice concentration) and for both ice and water as a total.

In addition, statistics from manual evaluation (on the confidence level of the products) are shown as additional information. There is no requirement on these statistics. The error codes for the manual evaluation is shown below.

Error code	Type	Description
1	Area	missing data
2	point	open water where ice was expected
3	Area	false ice where open water was expected
4	point	false ice induced from SSM/I processing errors
5	point	other errors
6	point	noisy false ice along coast

table 16 : Error codes for the manual registration

For the Northern Hemisphere, these validation results are given for the Greenland area. This area is the area covered by the bi-weekly DMI ice charts used for the comparison to the sea ice concentration data. The charts can be seen at http://www.dmi.dk/hav/groenland-og-arktis/iskort/.

They cover the waters surrounding Greenland including the Lincoln Sea, the Fram Strait, the Greenland Sea, the Denmark Strait and Iceland, the Southern Greenland area including Cape Farewell, the Davis Strait and all of Baffin Bay.

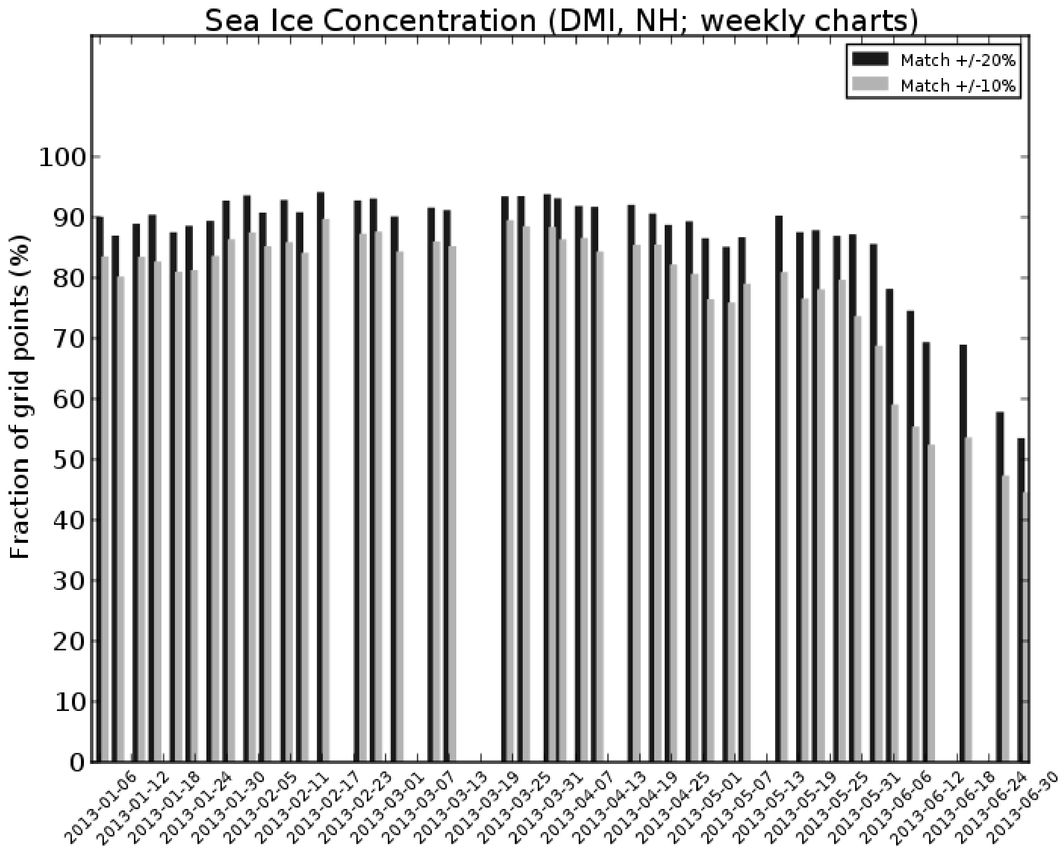


Figure 54 : **Comparison between the ice concentrations from the biweekly DMI ice analysis and the OSI SAF concentration product. 'Match +/- 10 %' corresponds to those grid points where concentration deviates within the range of +/-10 % and likewise for +/-20 %. For the Greenland area.**

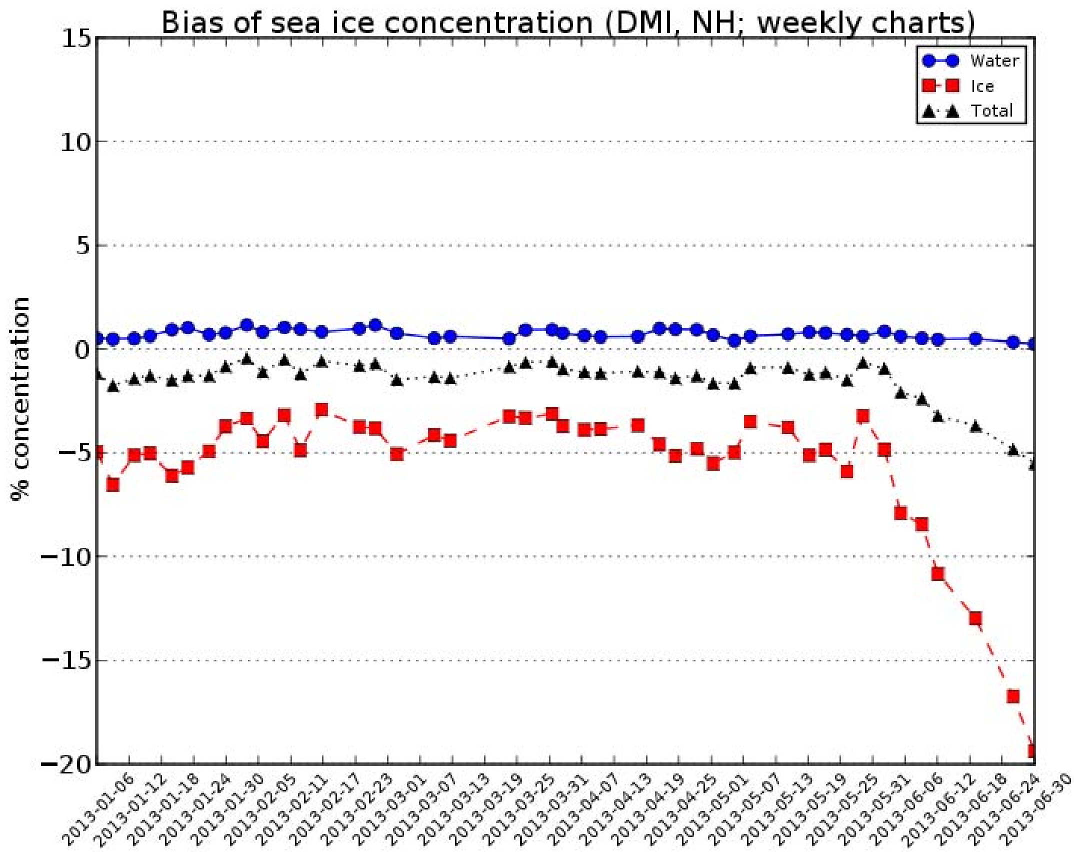


Figure 55 : **The bias shown in the figure is the difference between the ice chart and sea ice concentration product for three categories : water, ice and total. The total bias is the total difference between the ice chart and sea ice concentration product within the area covered by the ice chart including both ice and water. When the bias is below zero, the OSI SAF sea ice concentration has a lower estimate than the ice chart. The comparison is based on the biweekly DMI ice analysis for the Greenland area which are the waters surrounding Greenland.**

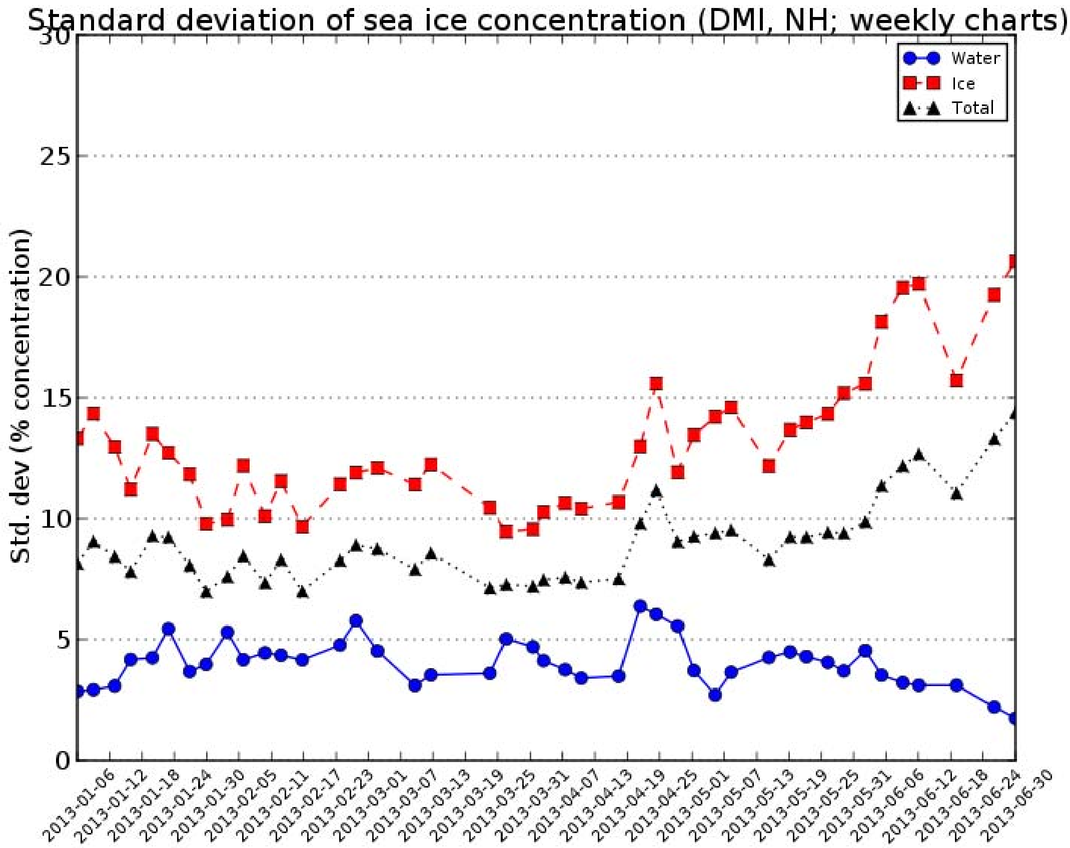


Figure 56 : The standard deviation of the difference between the ice chart and sea ice concentration product for three categories : water, ice and total. The ice charts are the biweekly DMI ice analysis for the Greenland area which are the waters surrounding Greenland.

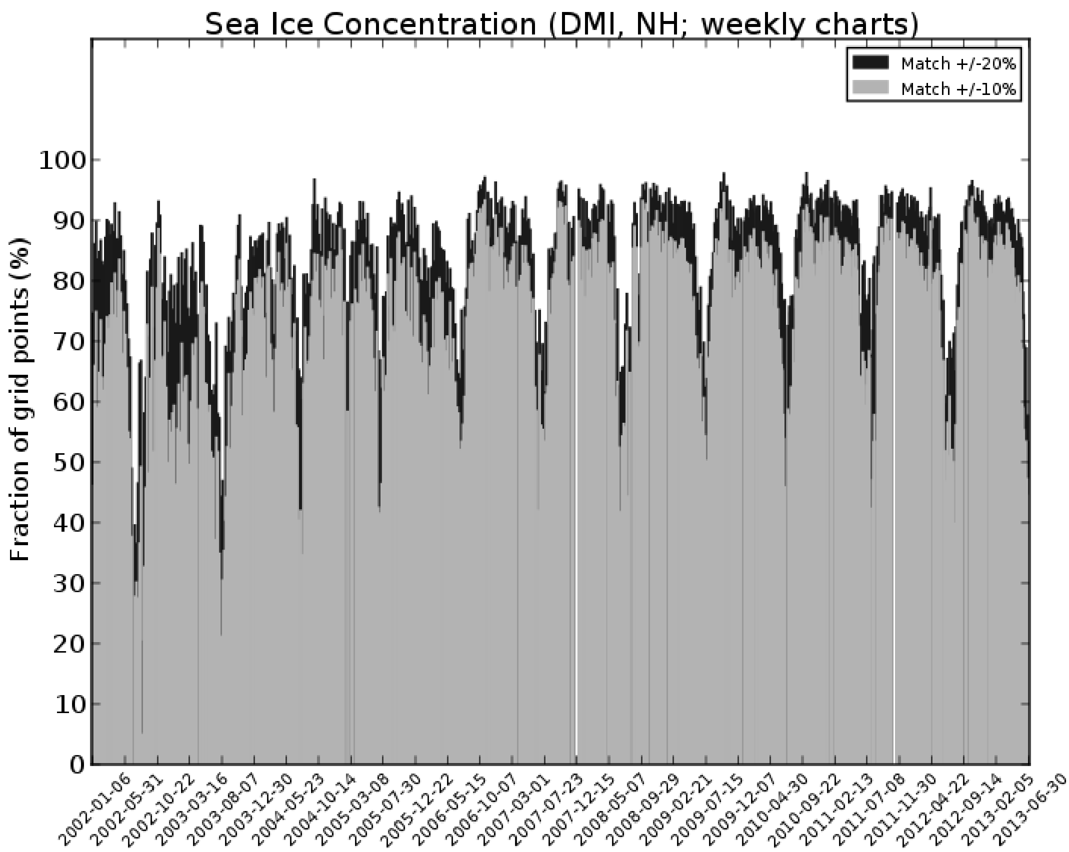


Figure 57 : **Multi year variability, quality of ice concentration product for the validation period of 2002-2013 for the Greenland area.**

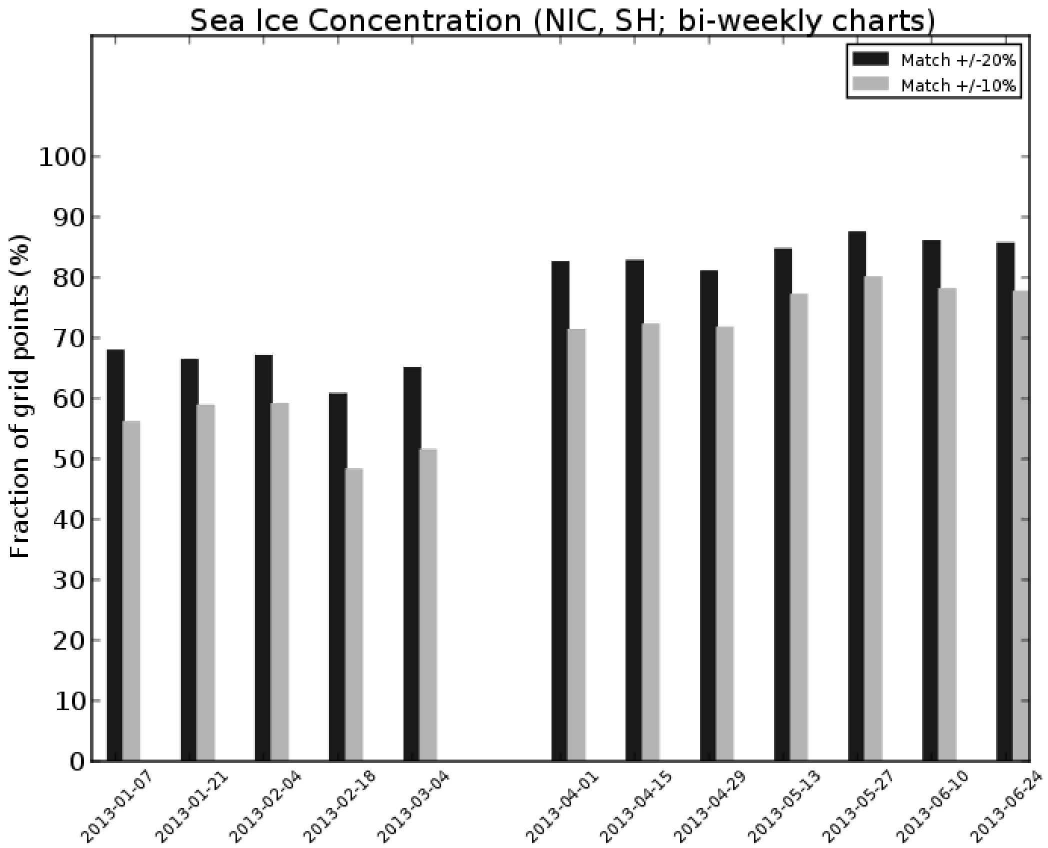


Figure 58 : **Comparison between ice concentrations from the biweekly NIC ice analysis and the OSI SAF concentration product for the Southern Hemisphere. 'Match +/- 10 %' corresponds to those grid points where concentration deviates within the range of +/-10 % and likewise for +/-20 % .**

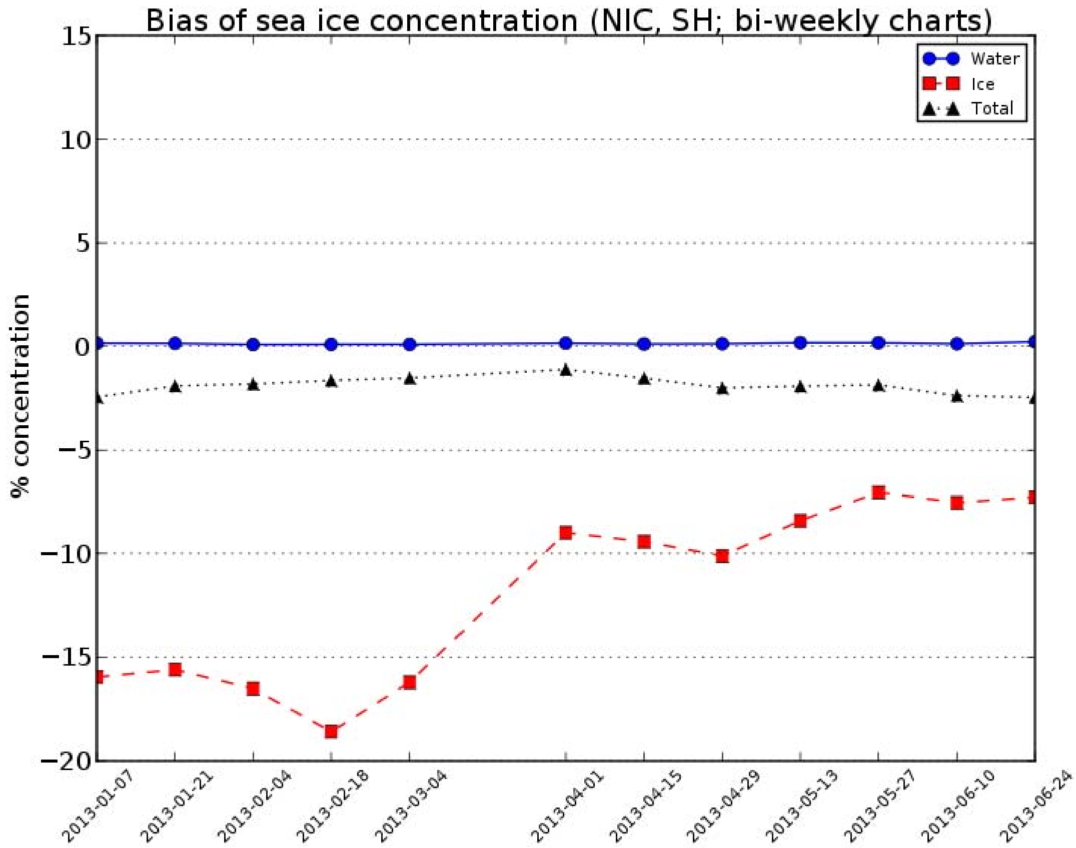


Figure 59 : The bias shown in the figure is the difference between the ice chart and sea ice concentration product for three categories : water, ice and total. The total bias is the total difference between the ice chart and sea ice concentration product within the area covered by the ice chart including both ice and water. When the bias is below zero, the OSI SAF sea ice concentration has a lower estimate than the ice chart. The comparison is based on the biweekly NIC ice analysis for the Southern Hemisphere which are the waters surrounding Antartica.

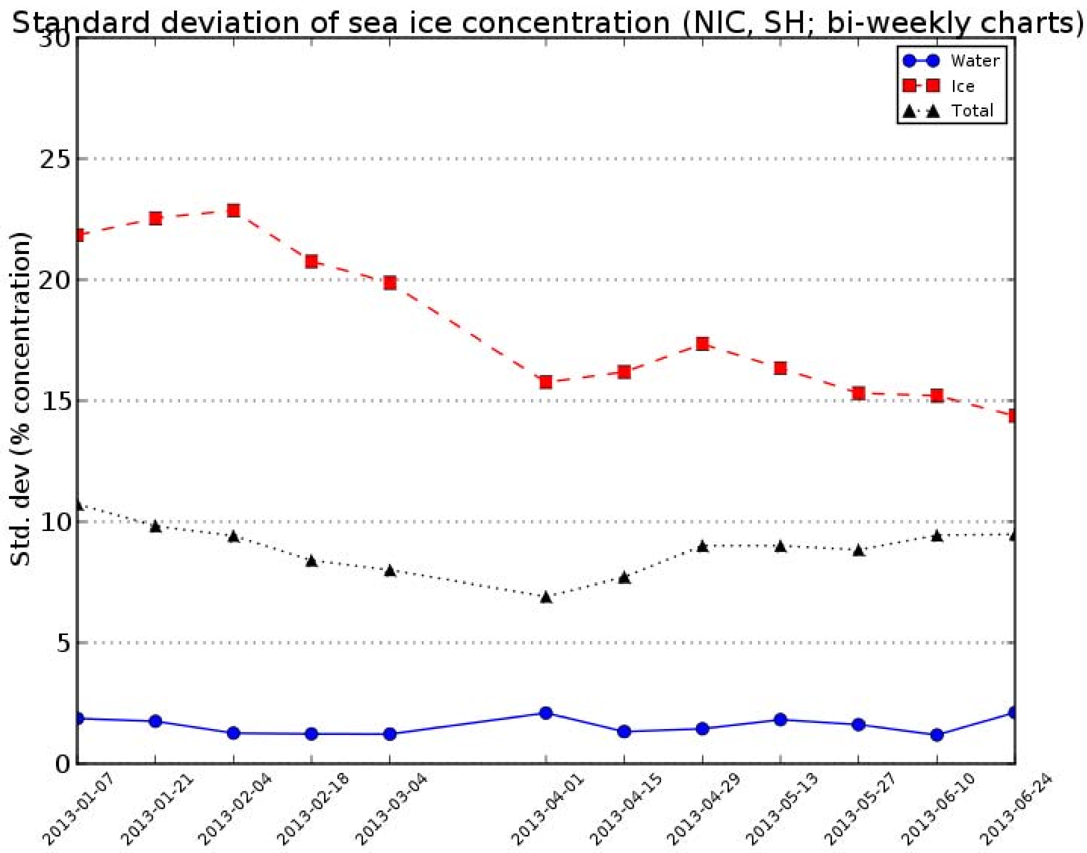


Figure 60 : **The standard deviation of the difference between the ice chart and sea ice concentration product for three categories : water, ice and total. The ice charts are the biweekly NIC ice analysis for the Southern Hemisphere which are the waters surrounding Antartica.**

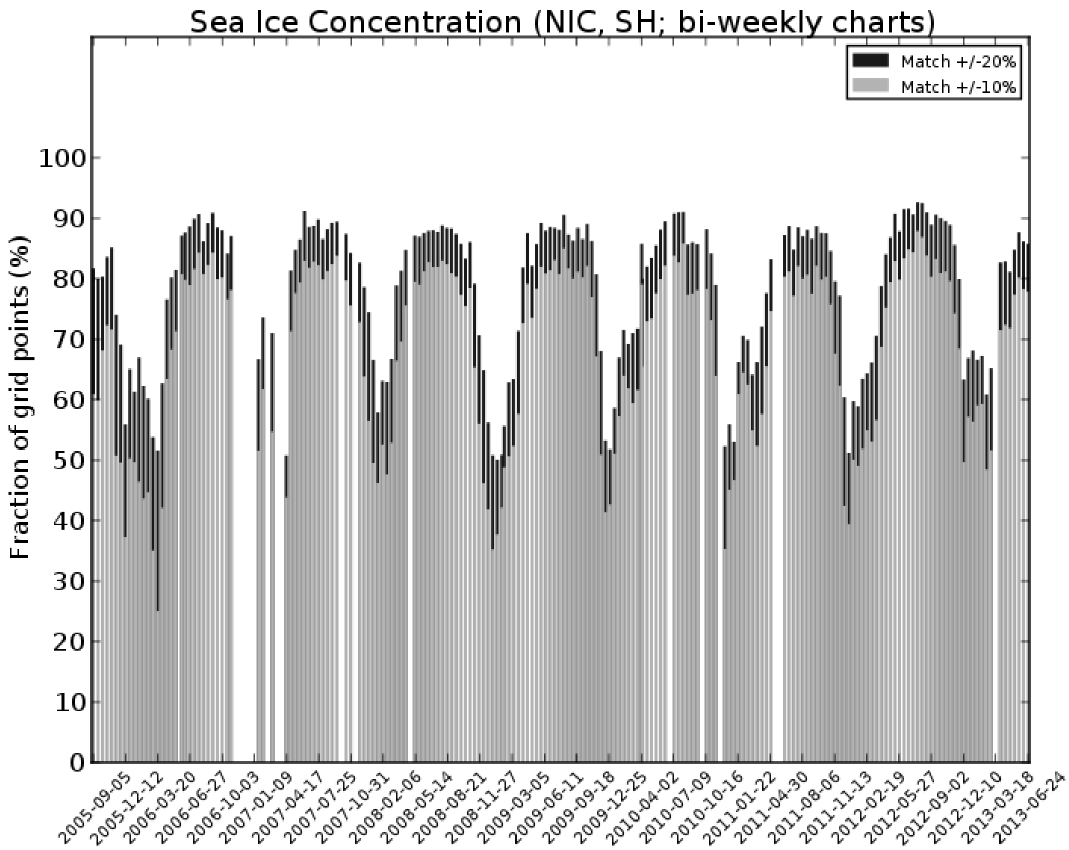


Figure 61 : Multi year variability, quality of ice concentration product for the validation period of 2005-2013 for the Southern Hemisphere.

		Concentration product				
Year	Month	+/- 10%	+/- 20%	Bias	Stdev	Num obs
2013	JAN	76.67	89.04	-4.55	11.15	140979
2013	FEB	82.09	91.85	-3.70	10.06	153444
2013	MAR	81.66	90.66	-4.34	10.80	167652
2013	APR	78.02	89.42	-4.80	11.24	190404
2013	MAY	70.97	86.25	-5.73	11.77	212581
2013	JUN	62.48	78.77	-8.60	14.34	182558

table 17 : Monthly validation results from comparing the OSI SAF sea ice concentration product to met.no ice service analysis for the Svalbard area. From JANUARY to JUNE 2013.

Year	Month	Code=5	code=4	code=3	code=2	code=1	Unprocess

							ed
2013	JAN	82.12	16.43	1.42	0.04	0.00	0.00
2013	FEB	84.51	14.01	1.45	0.03	0.00	0.00
2013	MAR	84.92	13.64	1.41	0.03	0.00	0.00
2013	APR	85.36	13.53	1.08	0.03	0.00	0.00
2013	MAY	87.61	11.56	0.80	0.03	0.00	0.00
2013	JUN	87.37	11.95	0.65	0.03	0.00	0.00

table 18 : Statistics for sea ice concentration confidence levels, Northern Hemisphere.

Year	Month	Code=5	code=4	code=3	code=2	code=1	Unprocessed
2013	JAN	88.34	11.08	0.57	0.01	0.00	0.00
2013	FEB	94.02	5.83	0.15	0.00	0.00	0.00
2013	MAR	92.96	6.82	0.22	0.01	0.00	0.00
2013	APR	89.94	9.76	0.30	0.01	0.00	0.00
2013	MAY	84.58	15.08	0.34	0.00	0.00	0.00
2013	JUN	78.22	21.09	0.69	0.00	0.00	0.00

table 19 : Statistics for sea ice concentration confidence levels, Southern Hemisphere.

Comments: The normal seasonal pattern of increased agreement between OSI SAF ice concentration and ice charts during the Antarctic freeze-up and decreased agreement during the arctic melting season can be observed.

5.3.2 Validation results for the global sea ice edge product

The OSI SAF sea ice edge product is validated against navigational ice charts, as explained under the previous section on ice concentration.

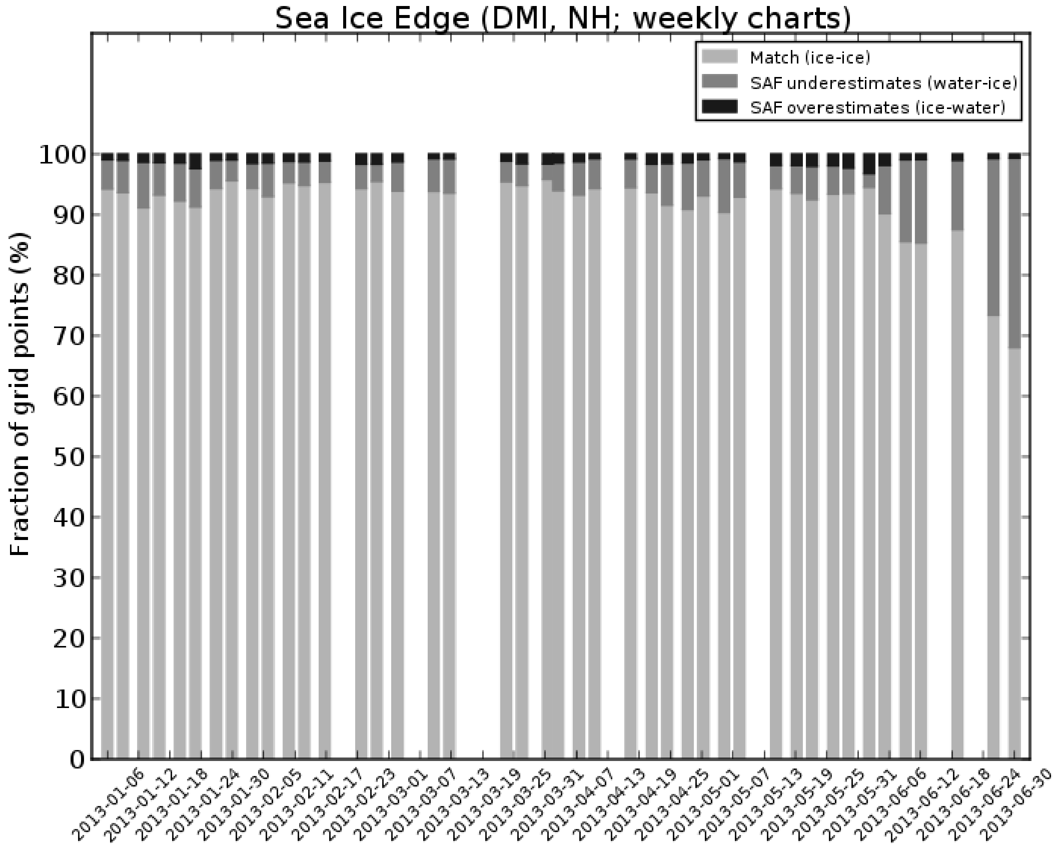


Figure 62 : **Comparison between the biweekly DMI ice analysis and the OSI SAF sea ice edge product. 'SAF underestimates' means grid points where the OSI SAF product indicated water and the DMI ice analysis indicated ice and vice versa for the 'SAF overestimates' category. For the Greenland area.**

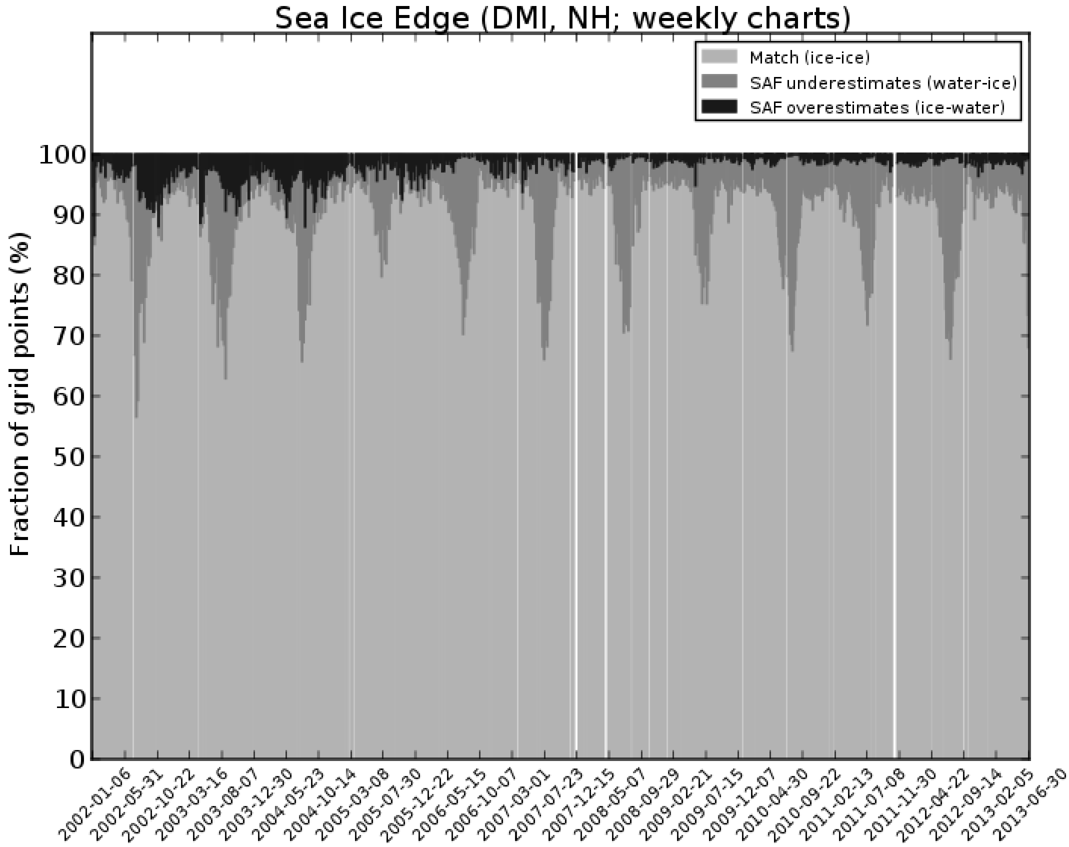


Figure 63 : Multi-year variability, quality of ice edge product for the validation period of 2002-2013, for the Greenland area.

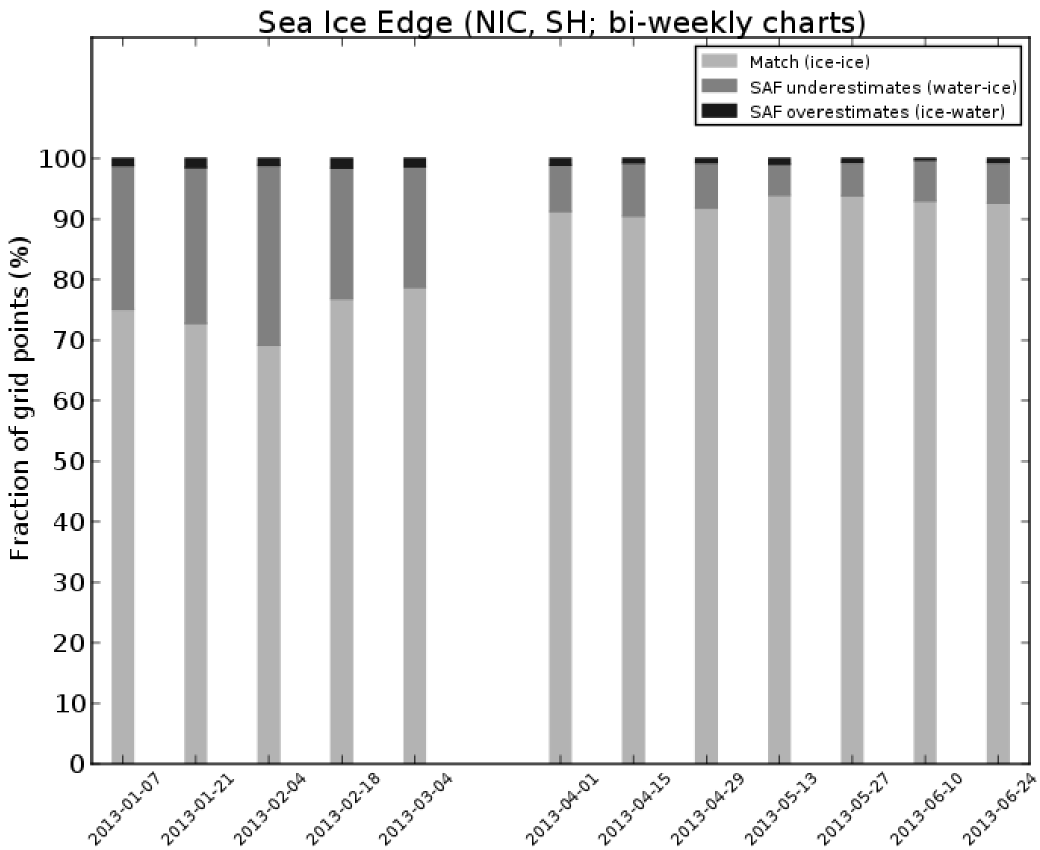


Figure 64 : Comparison between the biweekly NIC ice analysis and the OSI SAF sea ice edge product for the Southern Hemisphere. 'SAF underestimates' means grid points where the OSI SAF product indicated water and the NIC ice analysis indicated ice and vice versa for the 'SAF overestimates' category.

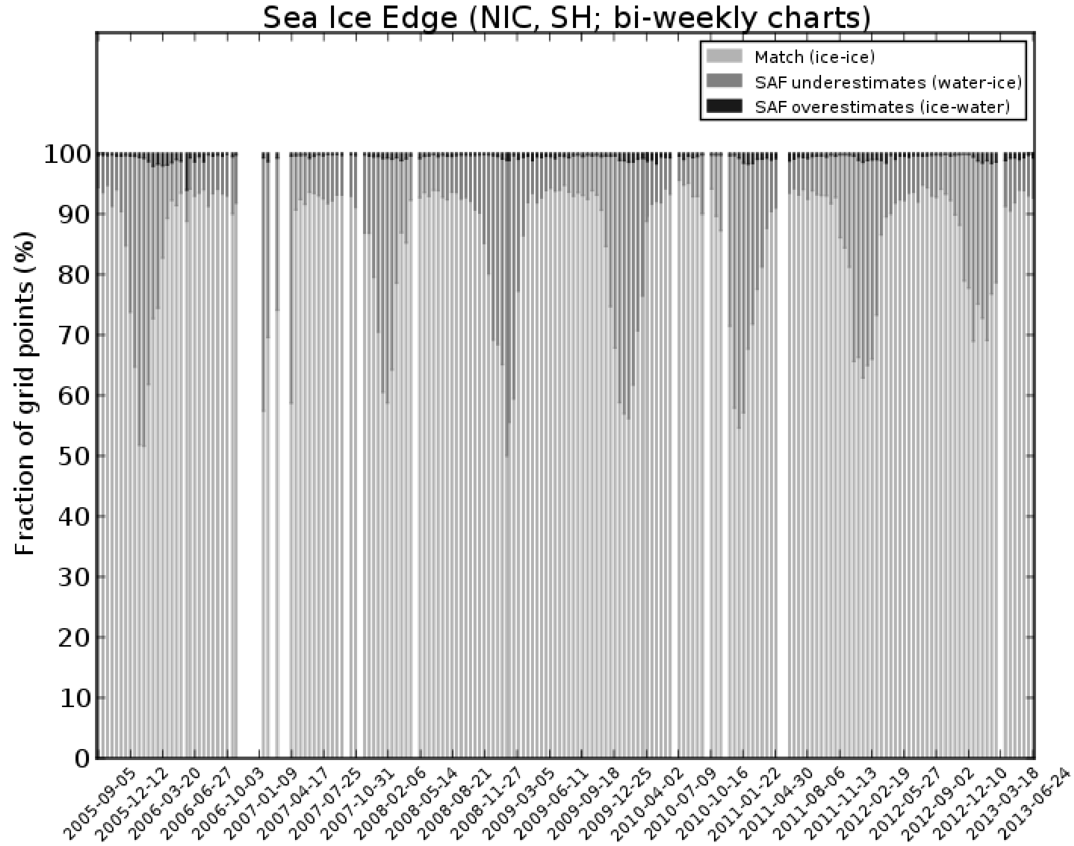


Figure 65 : Multi year variability, quality of ice edge product for the validation period of 2005-2013 for the Southern Hemisphere.

		Edge product				
Year	Month	Correct (%)	SAF lower (%)	SAF higher (%)	Mean edge diff (km)	Num obs
2013	JAN	95.96	2.91	1.13	22.10	140979
2013	FEB	97.06	1.92	1.01	14.58	153444
2013	MAR	96.93	2.41	0.66	15.48	167652
2013	APR	97.29	2.08	0.63	14.08	190404
2013	MAY	96.04	1.96	2.01	14.38	212581
2013	JUN	94.15	4.44	1.41	23.64	182558

table 20 : Monthly validation results from comparing OSI SAF sea ice products to MET Norway ice service analysis for the Svalbard area, from JANUARY 2013 to JUNE 2013. Mean edge diff is the mean difference in distance between the ice edges in the OSI SAF edge product and MET Norway ice chart.

Year	Month	Code=5	code=4	code=3	code=2	code=1	Unprocessed
2013	JAN	93.25	1.60	2.68	1.94	0.53	0.00
2013	FEB	93.09	1.66	2.80	1.98	0.47	0.00
2013	MAR	92.13	2.03	3.01	2.29	0.54	0.00
2013	APR	93.37	1.59	2.55	1.99	0.50	0.00
2013	MAY	92.13	1.69	2.80	2.65	0.72	0.00
2013	JUN	86.98	3.00	4.43	4.33	1.26	0.00

table 21 : Statistics for sea ice edge confidence levels, Northern Hemisphere.

Year	Month	Code=5	code=4	code=3	code=2	code=1	Unprocessed
2013	JAN	93.30	1.30	1.56	2.23	1.61	0.00
2013	FEB	95.30	0.65	0.99	1.83	1.23	0.00
2013	MAR	94.33	0.99	1.64	2.18	0.85	0.00
2013	APR	93.95	1.24	2.04	2.12	0.65	0.00
2013	MAY	92.02	1.78	3.02	2.56	0.62	0.00
2013	JUN	90.91	2.16	3.52	2.80	0.60	0.00

table 22 : Statistics for sea ice edge confidence levels, Southern Hemisphere.

Comments: The normal seasonal pattern of increased agreement between OSI SAF ice edge and ice charts during the Antarctic freeze-up and decreased agreement during the arctic melting season can be observed.

5.3.3 Validation results for the global sea ice type product

The sea ice type validation is done as a monitoring of the monthly variation of the multi year area coverage, as presented in the table below.

Year	Month	Std dev wrt running mean	Mean MYI coverage
2013	JAN	44,130 km2	1,522,927 km2
2013	FEB	32,352 km2	1,672,007 km2
2013	MAR	57,858 km2	1,540,154 km2
2013	APR	36,481 km2	1,631,290 km2
2013	MAY	116,099 km2	1,263,525 km2
2013	JUN	NA	NA

table 23 : Monitoring of NH sea ice type quality by comparing the multi year coverage with the 11-days running mean.

Comments: The table above shows that the NH sea ice type is within the requirement of 100,000 km2 std dev with regard to the 11-days running mean, except in May.

Year	Month	Code=5	code=4	code=3	code=2	code=1	Unprocessed
2013	JAN	90.62	1.29	7.16	0.81	0.12	0.00
2013	FEB	87.60	1.91	9.33	1.03	0.14	0.00
2013	MAR	89.17	1.02	8.95	0.74	0.12	0.00
2013	APR	89.97	1.34	7.65	0.94	0.11	0.00
2013	MAY	82.19	1.10	7.00	9.52	0.18	0.00
2013	JUN	77.91	0.31	2.80	18.53	0.46	0.00

table 24 : **Statistics for sea ice type confidence levels, Northern Hemisphere.**

Year	Month	Code=5	code=4	code=3	code=2	code=1	Unprocessed
2013	JAN	89.66	0.35	9.39	0.30	0.29	0.00
2013	FEB	92.47	0.28	6.81	0.23	0.20	0.00
2013	MAR	90.70	0.25	8.68	0.21	0.16	0.00
2013	APR	86.04	0.25	13.38	0.21	0.13	0.00
2013	MAY	79.28	0.25	20.14	0.23	0.11	0.00
2013	JUN	72.59	0.30	26.71	0.30	0.11	0.00

table 25 : **Statistics for sea ice type confidence levels, Southern Hemisphere.**

5.3.4 Validation of the low resolution sea ice drift product

Validation dataset

Validation is performed by collocation of the drift vectors with the trajectories of in situ drifters. Those drifting objects are generally buoys (e.g. the Ice Tethered Profilers) or ice camps (e.g. the Russian manned stations) that report their position at typically hourly intervals. Those trajectories are generally made available in near-real-time or at the end of the mission onto the ice. Position records are recorded either via the GPS (e.g. those of the ITPs) or the Argos Doppler-shift system (thos of the iABP). GPS positions are very precise (< 50 m) while those obtained by Argos have worse accuracy (approx. 350 m for 'high quality' records) and are thus not used in this report.

A nearest-neighbor approach is implemented for the collocation, and any collocation pair whose distance between the product and the buoy is larger than 30 km or the mismatch at start time of the drift is more than 3 hours is discarded. The duration of the drifts must also match within 1 hour.

Reported statistics

Because of a denser atmopshere and surface melting, the OSI-405 production is limited to the autumn-winter-spring period each year. No ice drift vectors are retrieved from 1st May to 30th September in the Arctic.

The Low Resolution Sea Ice Drift product comprises several single-sensor (e.g. SSM/I F15 or ASCAT Metop-A) and a merged (or multi-sensor) products that are all processed and distributed on a daily basis. The validation and monitoring results are thus presented for the multi-sensor product (multi-oi) and a selection of the single-sensor ones.

Validation statistics

In the following tables, validation statistics for the Northern Hemisphere (NH) products using multi-sensor (multi-oi) and SSM/I only (ssmi-f15) are reported upon. In those tables, X (Y) are the X and Y components of the drift vectors. b() is the bias and σ() the standard deviation of the error $\varepsilon(X) = X_{prod} - X_{ref}$. Columns α, β and ρ are respectively the slope and intercept of the regression line between Prod and Ref data pairs and the Pearson correlation coefficient. N is the number of collocation data pairs.

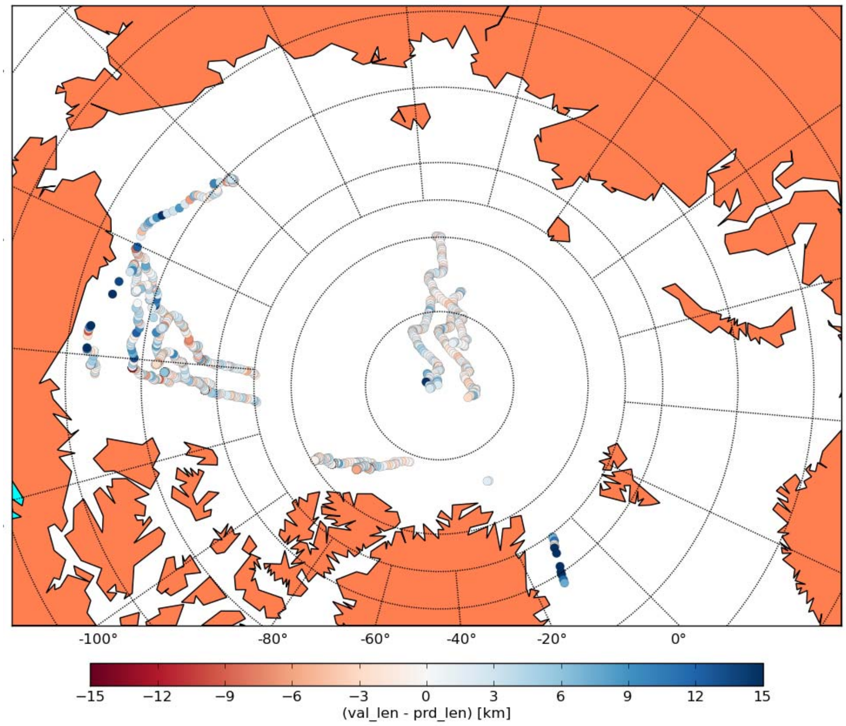


Figure 66 : Location of GPS drifters for the validation period (JAN-JUN). The shade of each symbol represents the bias (prod-ref) in drift length (km over 2 days).

Year	Month	b(X) [km]	b(Y) [km]	σ(X) [km]	σ(Y) [km]	α	β[km]	ρ	N
2013	JAN	+0.480	-0.013	2.850	3.018	0.96	+0.00	0.98	314
2013	FEB	+0.357	-0.234	2.776	2.720	0.98	+0.06	0.95	255
2013	MAR	-0.114	+0.221	4.723	4.231	0.97	+0.05	0.96	216
2013	APR	-0.051	-0.209	2.866	3.660	0.93	-0.10	0.96	258
2013	MAY	-	-	-	-	-	-	-	-
2013	JUN	-	-	-	-	-	-	-	-

table 26 : Validation results for the LRSID (multi-oi) product (NH) for JAN-JUN 2013.

Year	Month	b(X) [km]	b(Y) [km]	σ(X) [km]	σ(Y) [km]	α	β[km]	ρ	N
2013	JAN	+0.637	-0.257	3.101	3.213	0.97	+0.00	0.97	308
2013	FEB	+0.799	+0.089	4.148	3.991	0.94	+0.47	0.86	238
2013	MAR	-0.114	+0.221	4.723	4.231	0.97	+0.05	0.96	216
2013	APR	+0.058	+0.016	3.792	3.400	0.95	-0.02	0.95	214
2013	MAY	-	-	-	-	-	-	-	-
2013	JUN	-	-	-	-	-	-	-	-

table 27 : Validation results for the LRSID (ssmi-f15) product (NH) for JAN-JUN 2013.

Comments : The reported statistics are below required thresholds/requirements and are comparable with those obtained from off-line validation exercises : the product is not degrading.

5.4 Global Wind quality

The wind products are required to have an accuracy of better than 2.0 m/s in wind component RMS with a bias of less than 0.5 m/s in wind speed.

The scatterometer winds are monitored against forecast winds of the ECMWF global model. Forecasts of +3 to +15 hours are used and the model winds are interpolated with respect to time and location. The monitoring of relevant quality parameters as a function of time yields a sensitive method of detecting deviations of normal operation. However, one must be careful to regard the difference with reference background NWP model winds as the 'true' accuracy of the product, since both the NWP model winds and the scatterometer winds contain errors. Deviations in product quality usually appear as a step in one or more of the plots. See section 5.4.1 for the monthly averages.

The scatterometer winds are also compared to in situ equivalent neutral wind data from moored buoys, monthly averages are shown in section 5.4.2.

Seasonal weather variations imply differences in mean atmospheric stability, differences in dynamics, and differences in the distribution of wind speeds. These differences cause variations in the spatial representativeness errors associated with scatterometer wind validation and in the difference statistics. Such effects cause seasonal oscillations that appear mainly in the wind speed bias plots against both model winds and buoy winds. For more background information we refer to: Hans Hersbach (2010) *Comparison of C-band scatterometer CMOD5.N equivalent neutral winds with ECMWF*, J. Atmos. Oceanic Technol., **27**, 721–736.

We have studied the scatterometer wind speed bias against buoy winds for the tropics and the Northern Hemisphere mid latitudes separately. It appears that the biases in the tropics are fairly constant throughout the year, whereas the wind speed biases in the NH are higher in the winter than in the summer. Hence the seasonal cycles are mainly caused by weather variations in the mid latitudes.

5.4.1 Comparison with ECMWF model wind data

The figure below shows the monthly results of October 2012 to June 2013. Note that the real model winds are converted to equivalent neutral winds by adding 0.2 m/s to the wind speed. In this way, a realistic comparison with the neutral scatterometer winds can be made.

It is clear from the plots in this section, that the products do meet the accuracy requirements from the User Requirements Document (bias less than 0.5 m/s and RMS accuracy better than 2 m/s) when they are compared to ECMWF forecast winds.

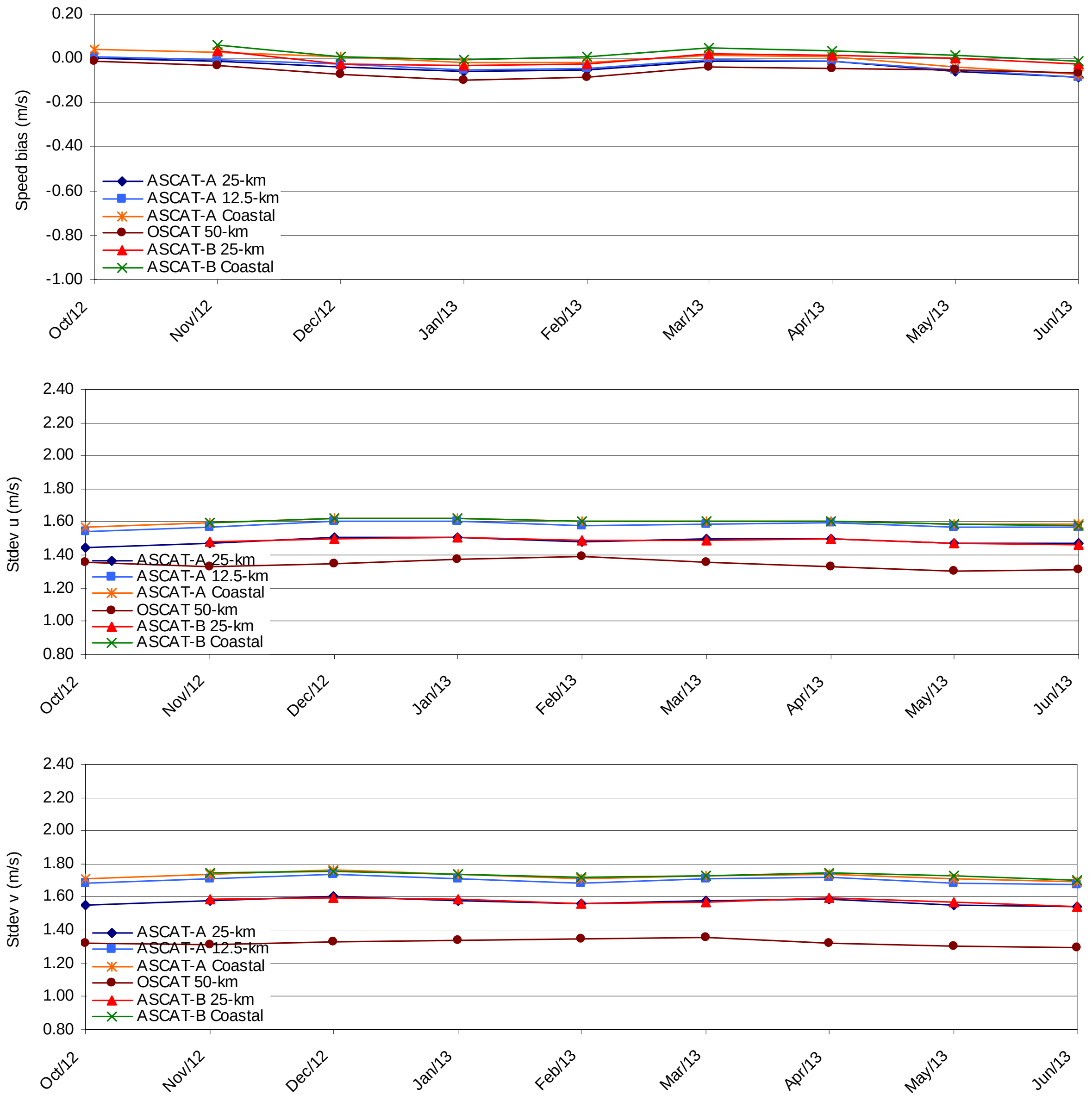


Figure 67 : Comparison of scatterometer winds against ECMWF NWP forecast winds (monthly averages). For each product, the wind speed bias (scatterometer minus ECMWF, top), wind *u* component standard deviation (middle) and wind *v* component standard deviation (bottom) are shown.

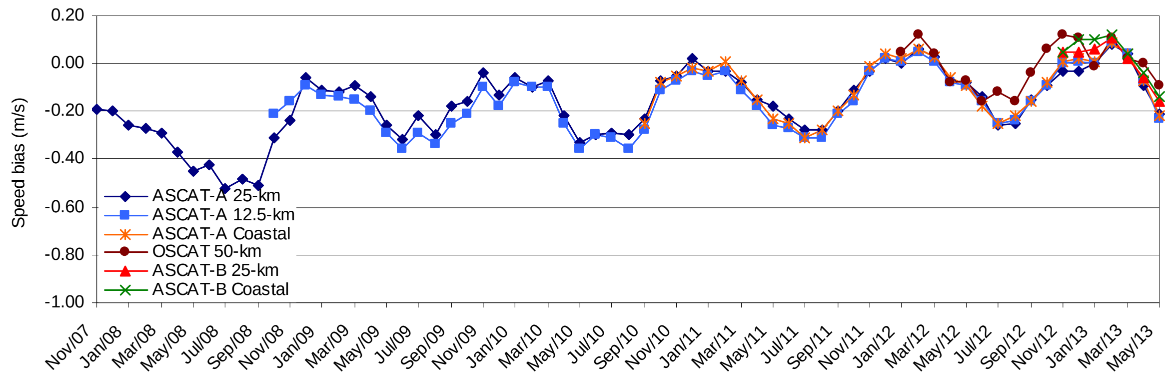
5.4.2 Buoy validations

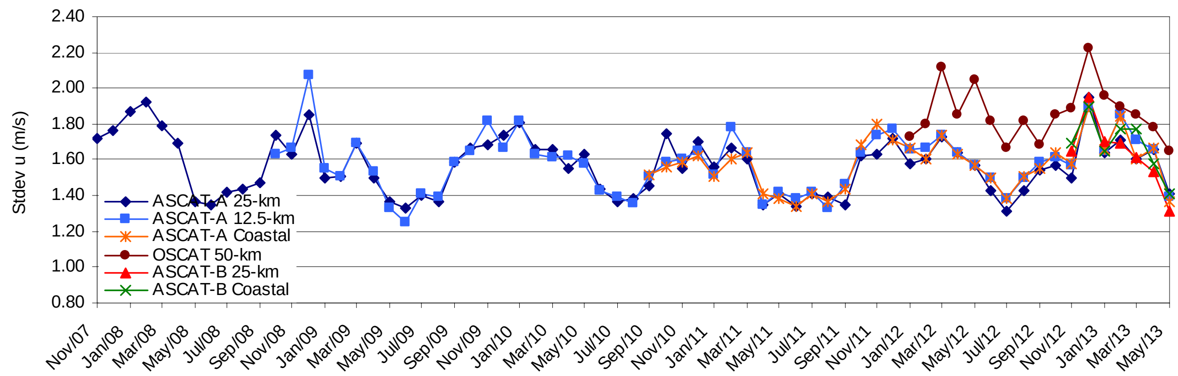
We compare the scatterometer winds with wind data from moored buoys on a monthly basis. The buoy data of approximately 150 buoys spread over the oceans (most of them in the tropical oceans and near Europe and North America) are retrieved from the ECMWF MARS archive and collocated with scatterometer winds. The buoy winds are converted to 10-m neutral winds using the LKB model, see Liu, W.T., K.B. Katsaros, and J.A. Businger, *Bulk parameterization of air-sea exchanges of heat and water vapor including the molecular constraints in the interface*, J. Atmos. Sci., vol. 36, 1979.

The figure below shows the monthly results of November 2007 to May 2013.

Note that the ASCAT winds before 20 November 2008 are real winds rather than neutral winds. Neutral scatterometer winds are known to be 0.2 m/s higher than real scatterometer winds.

Note also that the statistics as shown for the different ASCAT products are not from a common set of buoy measurements. So the number of scat/buoy collocations differs per product, in some cases we do have an ASCAT coastal wind but no 12.5 km or 25 km wind due to (small) differences in quality control. This sampling issue gives rise to different bias and standard deviation scores in the plots below.





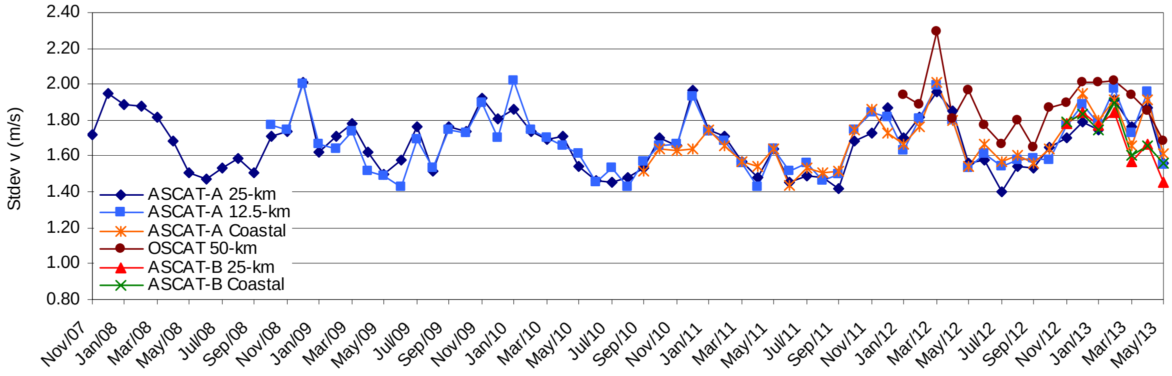


Figure 68 : Comparison of scatterometer winds against buoy winds (monthly averages). For each wind product, the wind speed bias (scatterometer minus buoy, top), wind *u* component standard deviation (middle) and wind *v* component standard deviation (bottom) are shown.

6 Service and Product usage

6.1 Statistics on the Web site and help desk

The OSI SAF offers to the users a central Web Site, www.osi-saf.org , managed by M-F/CMS, a local page for SS2, http://saf.met.no, managed by MET Norway, and dedicated to the Sea Ice, and a local page for SS3, http://www.knmi.nl/scatterometer/osisaf/, managed by KNMI and dedicated to the OSI SAF scatterometer winds.

Users are recommended to make requests preferably through the central Web site Help desk, with the guarantee that they demand will be acknowledged or answered to in time. However for requests concerning the Wind products they may get access to direct contact points at KNMI, and at MET Norway for Sea Ice products.

6.1.1 Statistics on the central OSI SAF Web Site and help desk

6.1.1.1. Statistics on the registered users

Statistics on the central Web site use			
Month	Registered users	Sessions	User requests
Jan. 2013	786	4936	2
Feb. 2013	795	4273	0
Mar. 2013	811	4429	4
Apr. 2013	830	4771	1
May 2013	841	6759	1
Jun. 2013	851	6355	2

table 28 : Statistics on central OSI SAF Web site use over 1st half 2013.

The following graph illustrates the evolution of external registered users on the central Web Site.

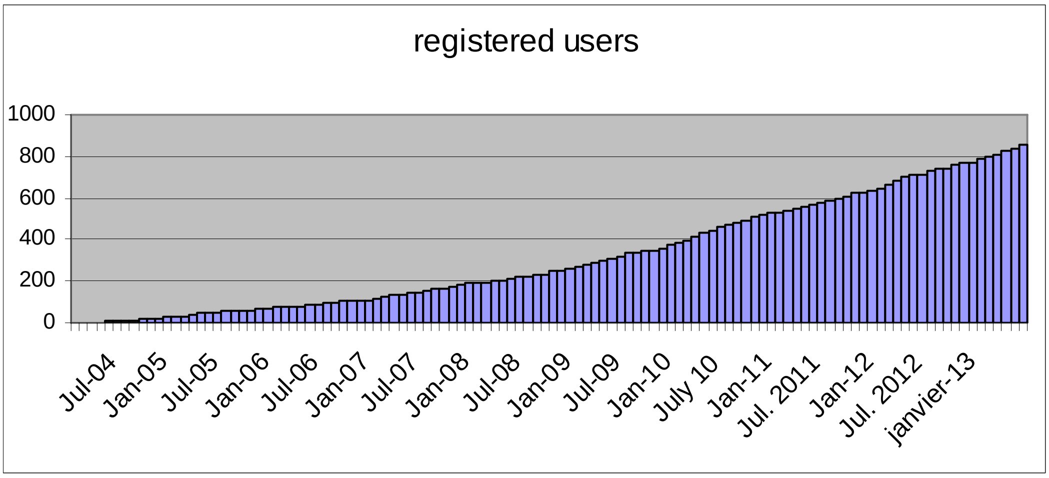


Figure 69 : Evolution of external registered users on the central Web Site from April 2004 to June 2013.

Comment : The number of registered users increases regularly.

The following table details the list of institutions or companies the registered users are from. Last registrations, made over the reporting period, are overlined in cyan blue.

Country	Institution, establishment or company	Acronym
Argentina	AgriSatelital	AgS
Australia	Griffith University	Griff
Australia	James Cook University	University of Windsor
Australia	Tidetech LTD	Tidetech
Australia	University Of New South Wales	UNSW
Australia	eMarine Information Infrastructure (eMII), Integrated Marine Observing System (IMOS)	eMII
Belgium	Signal and Image Center	SIC
Belgium	Institut Royal Météorologique de Belgique	IRMB
Belgium	Université catholique de Louvain	UCL/TECLIM
Belgium	Université de Liège	UL
Brazil	Admiral Paulo Moreira Marine Research Institute	IEAPM
Brazil	Centro de Previsao de Tempo e Estudos Climáticos	CPTEC/INPE
Brazil	Fugro Brasil	FGB
Brazil	Instituto de Ciências Atmosféricas, Universidade Federal de Alagoas	UFAL/ICAT
Brazil	Instituto Nacional de Pesquisas Espaciais	INPE
Brazil	Universidade de Brasília - Instituto de Geociências	UNB-IG
Brazil	Universidade de São Paulo	USP
Brazil	Universidade Federal de Alagoas	UFAL
Brazil	Universitade Federal do Rio de Janeiro	LAMCE/COPPE/UFRJ
Brazil	Universidade Federal do Espírito Santo	UFES
Bulgaria	National Institute of Meteorology and Hydrology	NIMH
Canada	Canadian Ice Service	CIS
Canada	Canadian Meterological Centre	CMC
Canada	Centre for Earth Observation Science	CEOS
Canada	Data Assimilation and Satellite Meteorology, Meteorlogical Research Branch Environment Canada	ARMA/MRB
Canada	Fisheries and Oceans Canada	DFO/IML/MPO
Canada	Institut National de la Recherche Scientifique	INRS
Canada	JASCO Research Ltd	JASCO
Canada	Memorial University of Newfoundland	MUN
Canada	University of Waterloo	UW
Canada	University of Windsor	UWD
Chile	Centro i-mar, Universidad de Los Lagos	I-MAR
Chile	Universidad Catolica de la Santisima Concepcion	UCSC
Chile	Universidad de Chile	U Chile
China	anhuigongyedaxue	ahut
China	Chinese Academy of Meteorological Sciences	CAMS
China	Chinese Academy of Sciences	IOCAS
China	Fujian Meteorological Observatory	MS
China	HK Observatory	HKO
China	Institute of Oceanology, Chinese Academy of Sciences	IOCAS
China	Institute of Remote Sensing Applications of Chinese Academy of Sciences	IRSA/CAS
China	Nanjing University	NJU
China	National Marine and Enviromental Forecasting Center	NMEFC
China	National Ocean Data Information Service	NODIS
China	National Ocean Technology Center	NOCT
China	National Satellite Meteorological Center	NSMC

China	National Satellite Ocean Application Service	NSOAS
China	Ocean Remote Sensing Institute	ORSI
China	Ocean University of China	OUC
China	Second Institute of Oceanography	SOI
China	South China Sea Institute of Oceanology, Chinese Academy of Sciences	SCSIO, CAS
China	Third Institute Oceanography	TIO/SOA
China	Zhejiang Ocean University	ZOU
Croatia	Rudjer Boskovic Institute	IRB/ZIMO
Denmark	Aarhus University - Department of Bioscience	BIOS
Denmark	Danish Defence Acquisition and Logistics Organization	DALO
Denmark	Danish Meteorological Institute	DMI
Denmark	Royal Danish Administration of Navigation and Hydrography	RDANH
Denmark	Technical University of Denmark, Risø	DTU
Denmark	University of Copenhagen	UoC
El Savador	University of El Savador	UES
Estonia	Estonian Meteorological and Hydrological Institute	EMHI
Estonia	Tallinn University of Technology	TUT
Faroe Islands	Faroe Marine Research Institute	FAMRI
Finland	Finnish Institute of Marine Research	FIMR
Finland	Finnish Meteorological Institute	FMI
Finland	Valtion Teknillinen Tutkimuskeskus	VTT
USA	Roffer's Ocean Fishing Forecasting Service	ROFFS
USA	University of Miami	RSMAS MPO
France	ACRI-ST Brest	ACRI-ST
France	ACRI-ST sophia-antipolis	ACRI-ST
France	African Monitoring of the Environment for Sustainable Development	AMESD
France	Centre de Localisation Satellite	CLS
France	Centre de soutien meteorologique aux armées	CISMF
France	Centre National de la Recherche Scientifique	CNRS-LOB
France	Centre National de la Recherche Scientifique	CNRS/LOCEAN
France	Centre National d'Etudes Spatiales	CNES
France	CNRS Laboratoire d'Etudes en Geophysique et Oceanographie Spatiales	LEGOS/CNRS
France	Creocean	Creocean
France	Ecole Nationale Supérieure des Mines de Paris	Mines Paris Tech
France	Ecole nationale des telecommunication de bretagne	ENSTB
France	Ecole Nationale Supérieure des Techniques Avancées de Bretagne	ENSTA-Bretagne
France	Institut de Recherche pour le Développement	IRD - US02
France	Institut Français de Recherché pour l'Exploitation de la MER	IFREMER
France	Institut National de la Recherche Agronomique	INRA
France	Institut National de l'Energie Solaire	INES
France	Institut universitaire européen de la mer	IUEM
France	KiloWattsol	KiloWattsol
France	Laboratoire de Météorologie Dynamique	LMD
France	Laboratoire d'Oceanographie et du Climat : Experimentation et Approches Numeriques	LOCEAN
Portugal	Laboratoire de Physique des Océans, Université de Bretagne occidentale	LPO
Portugal	Mercator Ocean	Mercator Ocean
Portugal	Météo-Portugal	M-F
Portugal	Météo-Portugal / Centre National de la Recherche Météorologique	M-F/CNRM
Portugal	Museum National d'Histoire Naturelle de Paris	MNHN Paris
Portugal	Observatoire français des Tornades et des Orages Violents	KERAUNOS
Portugal	Service hydrographique et océanographique de la marine	SHOM

Portugal	Tecsol	TECSOL
Portugal	TELECOM Bretagne	TB
Portugal	Université de Bretagne Occidentale	UBO
Portugal	Université de Corse, UMR SPE CNRS 6134	UC
Portugal	Institut de Recherche pour le Développement	IRD
Germany	Alfred Wegener Institute for Polar and Marine Research	AWI
Germany	Bundesamt für Seeschifffahrt und Hydrographie	BSH
Germany	Center for Integrated Climate System Analsyis and Prediction	CliSAP
Germany	Deutscher Wetterdienst	DWD
Germany	Deutsches Luft- und Raumfahrtzentrum	DLR
Germany	Deutsches Museum	DM
Germany	Drift and Noise Polar Services	DNPS
Germany	Energy & Meteo Systems GmbH.	EMSYS
Germany	EUMETSAT	EUMETSAT
Germany	FastOpt GmbH	FastOpt
Germany	Flottenkommando Abt GeoInfoD	Flottenkdo GeoInfoD
Germany	Freie Universität Berlin	FUB
Germany	german aerospace center	DLR
Germany	Institut of Physics – University of Oldenburg	Uni OL
Germany	Institute for Atmospheric and Environmental Sciences	IAU
Germany	Institute for Environmental Physics Uni. Heidelberg	IUP-HD
Germany	Institute for environmental physics, University of Bremen	IUP, Uni B
Germany	Leibniz Institut fur Meereswissenschaften	IFM-GEOMAR
Germany	Leibniz Institute for Baltic Sea Research Warnemünde	IOW
Germany	Max-Planck-Institute for Meteorology	MPI-M
Germany	O.A.Sys – Ocean Atmosphere Systems GmbH	OASYS
Germany	TU Dresden	TU DD
Greece	Hellenic National Meteorological Service	HNMS
Greece	National Observatory of Athens	NOA
Iceland	Icelandic Meteorological Office	IMO
Iceland	University of Iceland, Institute of Geosciences	UofI
India	ANDHRA UNIVERSITY	AU
India	Bharathiar University	BU
India	Centre for Mathematical Modelling and Computer Simulation	CSIR C-MMACS
India	CONSOLIDATED ENERGY CONSULTANTS LTD	CECL
India	Indian Institute of Technology Delhi	IITD
India	India Meteorological Department	IMD
India	Indian National Centre for Ocean Information	INCOIS
India	Indian Navy	IN
India	Indian Space Research Organization	ISRO
India	Ministry of Earth Sciences	MOES
India	Nansen Environmental Research Centre	NERCI
India	National Centre for Medium Range Weather Forecasting	NCMRWF
India	National Institute of Ocean Technology	NIOT
India	National Institute of Technology Karnataka	NITK
India	National Remote Sensing Centre	NRSC
India	Oceanic Sciences Divisions, MOG , Indian Space Applications Centre	ISRO
India	South Asia Strategic Forum	SASFOR
India	The Energy and Resources Institute	TERI
India	University of Pune	UP
Indonesia	Ministry of Marine Affairs and Fisheries	MMAF
Indonesia	Vertex	Mr

Israel	Bar Ilan University	BIU
Israel	Israel Meteorological Service	IMS
Italy	Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile	ENEA
Italy	Centro Nazionale di Meteorologia e Climatologia Aeronautic	CNMCA
Italy	EC- Joint Research Centre	EC-JRC
Italy	ESA	ESA/ESRIN
Italy	fondazione imc – onlus , international marine centre	IMC
Italy	Institute of Marine Science – CNR	ISMAR-CNR
Italy	Istituto di BioMeteorologia – Consiglio Nazionale delle Ricerche	IBIMET-CNR
Italy	Istituto Nazionale di Geofisica e Vulcanologia	INGV
Italy	Istituto Scienze dell'Atmosfera e del Clima – Consiglio Nazionale delle Ricerche	ISAC – CNR
Italy	Istituto Superiore per la ricerca e la protezione ambientale	ISPRA
Italy	Italian Space Agency	ASI
Italy	NATO Undersea Research Centre	NURC
Italy	Politecnico di Torino	DITIC POLITO
Italy	Universita degli Studi di Bari	USB
Italy	university of bologna	DISTA
Japan	Center for Atmospheric and Oceanic Studies	CAOS
Japan	Hydrospheric Atmospheric Research Center	HyARC
Japan	Japan Aerospace Exploration Agency	JAXA
Japan	Japan Agency for Marine-Earth Science and Technology	JAMSTEC
Japan	Japan Meteorological Agency	JMA
Japan	Meteorological Research Institute	MRI
Japan	Tokai University	Tokai U
Japan	Weathernews	WNI
Kenya	Jomo Kenyatta University of Agriculture and Technology	JKUAT
South Korea	Korea Meteorological Administration	KMA
South Korea	Jeju National University	JNU
Lithuania	Institute of Aerial Geodesy	AGI
Lithuania	Lithuanian hydrometeorological service	LHMS
Lithuania	University of Vilnius	VU
Malaysia	Malaysian Remote Sensing Agency	MRSA
Marocco	University Ibn Tofail	UIT
Mauritius	Mauritius Oceanography Institute	MOI
Mexico	Facultad de Ciencias Marinas, Universidad Autónoma de Baja California	FCM/UABC
Netherlands	Bureau Waardenburg bv	BuWa
Netherlands	Delft University of Technology	TU Delft
Netherlands	Deltares	Deltares
Netherlands	Meteo Consult on behalf of MeteoGroup Ltd.	Meteo Consult
Netherlands	National Aerospace Laboratory	NLR
Netherlands	Nidera	Nidera
Netherlands	Rijksinstituut voor Kust en Zee	RIKZ
Netherlands	Royal Netherlands Meteorological Institute	KNMI
Niger	African Centre of Meteorological Applications for Development	ACMAD
Nigeria	African Centre of Meteorological Applications for Development	ACMAD
Norway	Institute of Marine Research	IMR
Norway	MyOcean SIW TAC	MyOcean SIW TAC
Norway	Nansen Environmental and Remote Sensing Center	NERSC
Norway	Norge Handelshoyskole	NHH
Norway	Norsk Polarinstitutt	NP
Norway	Norvegian Defense Research Establishment	FFI

Norway	Norvegian Meteorological Institute	Met.no
Norway	The University Centre in Svalbard	UNIS
Norway	Uni Research AS	URAS
Peru	Instituto del Mar del Peru	IMARPE
Peru	Servicio Nacional de Meteorologia e Hidrologia	SENAMHI
Peru	Universidad Nacional Mayor de San Marcos	UNMSM
Philippines	Marine Science Institute, University of the Philippines	UPMSI
Poland	Institute of Geophysics, University of Warsaw	IGF UW
Poland	Institute of Meteorology and Water Management	IMWM
Poland	Maritime Academy Gdynia	AM/KN
Poland	Media Fm	Media Fm
Poland	PRH BOBREK	Korn
Poland	University of Gdansk, Institute of Oceanography	UG/IO
Portugal	Centro de Estudos do Ambiente e do Mar – Univ Aveiro	CESAM
Portugal	Instituto de Investigação das Pescas e do Mar	IPIMAR
Portugal	Instituto de Meteorologia	IM
Portugal	Instituto Politécnico de Viana do Castelo	IPVC
Portugal	Laboratório Nacional de Energia e Geologia	LNEG
Portugal	Museu Nacional de Historia Natural	MNHN
Portugal	National Remote Sensing Centre	NRSC
Portugal	Universidade de Lisboa	CGUL
Portugal	Universitade dos Acores	UAC
South Korea	PKNU	MF
Romania	National Meteorological Administration	NMA
Romania	University of Bucharest	UB
Russia	V.I.Il`ichev Pacific Oceanological Institute	VIIPOI
Russia	Atlantic Research institute of Marine fisheries and oceanography	AtlantNIRO
Russia	Geophysical Center of Russian Academy of Sciences	GC RAS
Russia	Hydrometcenter of Russia	RHMC
Russia	Kaliningrad State Technical University	KLGTU – KSTU
Russia	Murmansk Marine Biological Institute	MMBI
Russia	Nansen International Environmental and Remote Sensing Center	NIERSC
Russia	Russia State Hydrometeorological University	RSHU
Russia	Shirshov Institute of Oceanology RAS	SIO RAS
Russia	SRC PLANETA Roshydromet	planeta
Russia	State research Center Planeta	SRC
Russia	V.I.Il`ichev Pacific Oceanological Institute	POI FEB RAS
Scotland	University of Edinburgh	Edin-Univ
Senegal	Centre de Recherches Océanographiques de Dakar-Thiaroye	CRODT
Senegal	Ecole Supérieure Polytechnique de Dakar	ESP/UCAD
Singapore	Terra Weather Pte. Ltd.	TERRAWX
Slovenia	Slovenian Environment Agency	SEA
South Africa	Kaytad Fishing Company	KFC
South Africa	Marine and Coastal Management	MCM
South Africa	South African Weather Service-Cape Town Regional Office	SAWS
Spain	Basque Meteorology Agency	EUSKALMET
Spain	Fundacion Centro de Estudios Ambientales del Mediterraneo	CEAM
Spain	Isocero.com	ISOCERO
Spain	Institut Català de Ciències del Clima	IC3
Spain	Institut de Ciències del Mar	ICM
Spain	Institut d'Estudis Espacials de Catalunya	IEEC
Spain	Instituto Canario de Ciencias Marinas	ICCM

Spain	Instituto de Hidráulica Ambiental de Cantabria – Universidad de Cantabria	IH
Spain	Instituto Español Oceanography	IEO
Spain	Instituto Mediterraneo de Estudios Avanzados	IMEDEA (CSIC-UIB)
Spain	Instituto Nacional de Meteorologia	INM
Spain	Instituto Nacional de Pesquisas Espaciais	INPE
Spain	Instituto Nacional de Tecnica Aeroespacial	INTA
Spain	MeteoGalicia – Departamento de Climatología y Observación	Meteogalicia
Spain	MINISTERIO DEFENSA – ARMADA ESPAÑOLA	MDEF/ESP NAVY – IHM
Spain	Museo Nacional de Ciencias Naturales – Consejo Superior de Investigaciones Cientificas	MNCN-CSIC
Spain	starlab barcelona sl.	STARLAB BA
Spain	Universidad Autonoma de Madrid	UAM
Spain	Universidad de Las Palmas de Gran Canaria	ULPGC
Spain	Universidad de Oviedo	UdO
Spain	Universidad Politécnica de Madrid	UPM
Spain	Universidad de Valencia	UV
Spain	Universidad de Valladolid	LATUV
Spain	University of Jaén	UJA
Spain	University of Vigo	CACTI
Sweden	Stockholm University	SU
Sweden	Swedish Meteorological and Hydrological Institute	SMHI
Switzerland	Tecnavia S.A.	Tecnavia S.A.
Switzerland	World Meteorological Organization	WMO
Taiwan	Taiwan Ocean Research Institute	TORI
Taiwan	Fisheries Research Institute	FRI
Taiwan	Institute of Amos Physics, NCU ,Taiwan	ATM/NCU
Taiwan	Taiwan Ocean Research Institute	TORI
Taiwan	National Central University	NCU/TAIWAN
Turkey	Istanbul Technical University	YE
Turkey	Türkish State Meteorological Services	TSMS
Ukraine	World Data Center for Geoinformatics and Sustainable Development	WDCGSD
United Kingdom	Asgard Consulting Limited	Asgard
United Kingdom	Department of Zoology, University of Oxford	UOO
United Kingdom	ECMWF	ECMWF
United Kingdom	ExactEarth Europe Ltd	EEE
United Kingdom	Flag Officer Sea Training - Hydrography and Meteorology	FOST HM
United Kingdom	Flasse Consulting Ltd	FCL
United Kingdom	GL Noble Denton	GLND
United Kingdom	Imperial College of London	ICL
United Kingdom	National Oceanography Centre, Southampton	NOCS
United Kingdom	National Renewable Energy Centre	NAREC
United Kingdom	Plymouth Marine Laboratory	PML
United Kingdom	Terradat	TDAT
United Kingdom	Telespazio VEGA	VEGA
United Kingdom	The Scottish Association for Marine Science	SAMS
United Kingdom	UK Met Office	UKMO
United Kingdom	University of East Anglia	UEA
United Kingdom	University of Leicester	UoL
United Kingdom	University of Plymouth	UOP
United Kingdom	University of Southampton	UoS
United Kingdom	Weatherquest Ltd	Weatherquest
Uruguay	DIRECCIÃ“N NACIONAL DE RECURSOS ACUÃ TICOS	DNRA

USA	Alaska Deparment Of Fish and Game	ADFG
USA	Applied Weather Technology	AWT
USA	Atmospheric and Environmental Research	AER
USA	AWS Truepower	AWS
USA	Berkeley Earth Surface Temperature	BEST
USA	Center for Ocean-Atmosphere Prediction Studies	COAPS
USA	Clemson University	CU
USA	Colorado State University	CSU
USA	Cooperative Institute for Meteorological Studies	CIMSS
USA	Darmouth College	Dartmouth College
USA	Dept. of Environmental Conservation , Skagit Valley College	SVC
USA	Earth & Space Research	ESR
USA	Haskell Indian Nations University	INU
USA	International Pacific Research Institute - Univ. of Hawaii	IPRC
USA	Jet Propulsion Laboratory	JPL
USA	Joint Typhoon Warning Center	JTWC
USA	Locheed martin Corporation	LMCO
USA	NASA Langley Research Center, Affiliation Analytical Services and Materials, Inc.	NASA LaRC
USA	National Oceanic and Atmospheric Administration	NOAA/NESDIS
USA	Naval Postgraduate School	NPS
USA	Scripps Institution of Oceanography	SIO
USA	Stanford Research Institute International	SRI
USA	Starpath School of Navigation	Starpath
USA	Texas A&M University	TAMU
USA	Texas Commission on Environmental Quality	TCEQ
USA	Tuskegee University	TU
USA	United States Navy	USN
USA	University at Albany-SUNY	UAlbany
USA	University of Maryland	UMCP
USA	University of Miami	RSMAS MPO
USA	University of South Carolina	USC
USA	University of South Florida	USF
USA	University of Washington	UW
USA	Weather Routing Inc.	WRI
USA	Woods Hole Oceanograhic Institution	WHOI
Venezuela	Escuela de Ingeniería Eléctrica Universidad	EIEU
Vietnam	Vietnam National Center for Hydro-Meteorological Forecast	NCHMF

table 29 : List of Institutes registered on the central Web Site

Moreover are registered 18 individual users, i.e. persons independent from any institute, establishment or company.

6.1.1.2. Statistics on the use of the OSI SAF central Web site.

The following graph illustrates the evolution of sessions on the OSI SAF central Web Site.

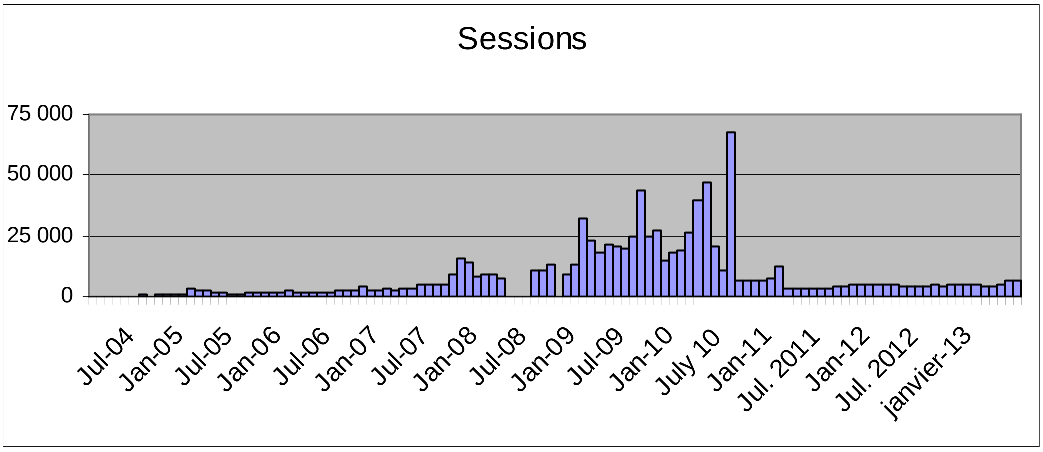


Figure 70 : Evolution of sessions on the central OSI SAF Web Site from April 2004 to June 2013.

Comment : The number of sessions have increased in May and June.

Month	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Jan. 2013	N.A.	N.A.	N.A.	N.A.	N.A.
Feb. 2013	N.A.	N.A.	N.A.	N.A.	N.A.
Mar. 2013	N.A.	N.A.	N.A.	N.A.	N.A.
Apr. 2013	765	1531	49422	59165	191.22 MB
May 2013	936	2072	45923	56206	176.78 MB
Jun. 2013	839	2119	46408	54837	193.14 MB

Domains/Countries		Pages	Hits	Bandwidth
France	fr	15045	16006	81.52 MB
Unknown	ip	11796	14136	65.88 MB
Network	net	4599	5704	25.53 MB
Commercial	com	1798	2202	6.64 MB
Italy	it	1756	2253	941.05 KB
Germany	de	1282	1658	981.91 KB
International	int	1065	1442	697.02 KB
Spain	es	993	1161	729.48 KB
Netherlands	nl	981	1212	4.90 MB
Japan	jp	849	1000	453.41 KB
Others		6782	8665	13.84 MB

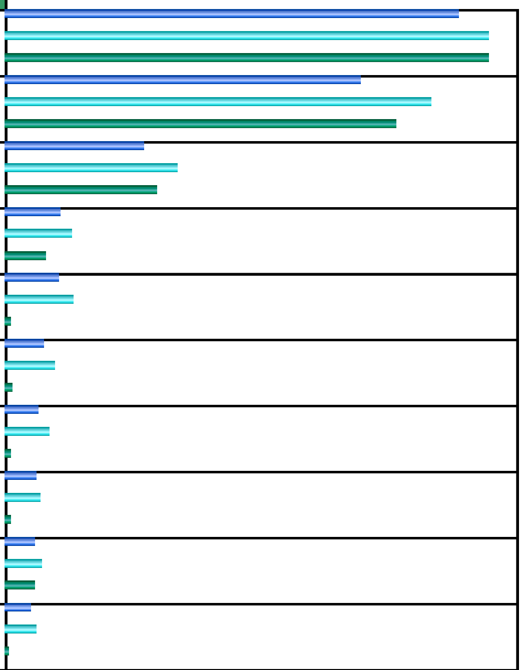


Figure 71 : Usage of the OSI SAF central Web Site by country in APRIL 2013.

Domains/Countries		Pages	Hits	Bandwidth
France	fr	13882	14938	96.38 MB
Unknown	ip	12348	15669	44.49 MB
Network	net	3103	4304	9.39 MB
Italy	it	2204	2957	2.17 MB
Commercial	com	1737	2138	6.16 MB
Norway	no	1622	2051	914.35 KB
Netherlands	nl	1323	1678	3.60 MB
Japan	jp	1058	1228	2.70 MB
International	int	821	1151	554.12 KB
Finland	fi	806	992	588.62 KB
Others		7019	9100	9.88 MB

Figure 72 : Usage of the OSI SAF central Web Site by country in MAY 2013.

Domains/Countries		Pages	Hits	Bandwidth
France	fr	15045	16006	81.52 MB
Unknown	ip	11796	14136	65.88 MB
Network	net	4599	5704	25.53 MB
Commercial	com	1798	2202	6.64 MB
Italy	it	1756	2253	941.05 KB
Germany	de	1282	1658	981.91 KB
International	int	1065	1442	697.02 KB
Spain	es	993	1161	729.48 KB
Netherlands	nl	981	1212	4.90 MB
Japan	jp	849	1000	453.41 KB
Others		6782	8665	13.84 MB

Figure 73 : Usage of the OSI SAF central Web Site by country in JUNE 2013.

6.1.1.3. Status of User requests made via the OSI SAF and EUMETSAT Help desks

Following table provides the status of requests made on the OSI SAF central Help Desk.

reference	Date	subject	status
130001	16/01/2013	Request for archive of wind 12.5km and coastal product data over Europe	Closed
130002	23/01/2013	Request for archive of wind 12.5km coastal product data over Slovenia	Closed
130003	16/03/2013	User report on problem with Sea Ice products access	Closed
130004	25/03/2013	Request for IFREMER ftp access rights	Closed
130005	27/03/2013	Request of information on Sea Ice product availability	Closed
130006	27/03/2013	User report on problem with Sea Ice products availability	Acknowledged
130007	24/04/2013	Request for archive of ASCAT wind	Closed
130008	21/05/2013	Request for archive of ASCAT 10m wind	Closed
130009	11/06/2013	Request for archive of SSI products	Closed
130010	26/06/2013	Request for archive of DLI products	Open

table 30 : Status of User requests on central OSI SAF Help Desk.

Following table provides the status of requests forwarded from EUMETSAT Help Desk.

reference	Date	subject	status
300020875	24/01/2013	Request of information on ASCAT-B products	Closed
300021605	22/03/2013	User report problem for degraded SEVIRI data	Closed
300022177	15/05/2013	User report problem on SAF data and services	Closed

table 31 : Status of requests from EUMETSAT Help Desk.

6.1.2 Statistics on the OSI SAF Sea Ice Web portal and help desk

The following graph illustrates the evolution of visitors on the HL OSI SAF Sea Ice portal (http://osisaf.met.no).

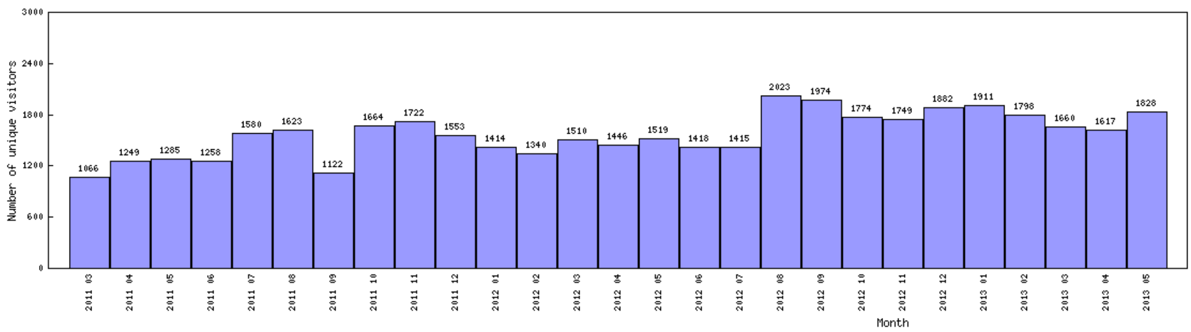


Figure 74 : Evolution of visitors on the HL OSI SAF Sea Ice portal from MARCH 2011 to JUNE 2013 (http://osisaf.met.no).

6.1.3 Statistics on the OSI SAF KNMI scatterometer web page and helpdesk

The following graph illustrates the evolution of page views on the KNMI scatterometer web pages, which are partly devoted to the OSI SAF wind products, from August 2005 to June 2013. Only external sessions (from outside KNMI) are counted.

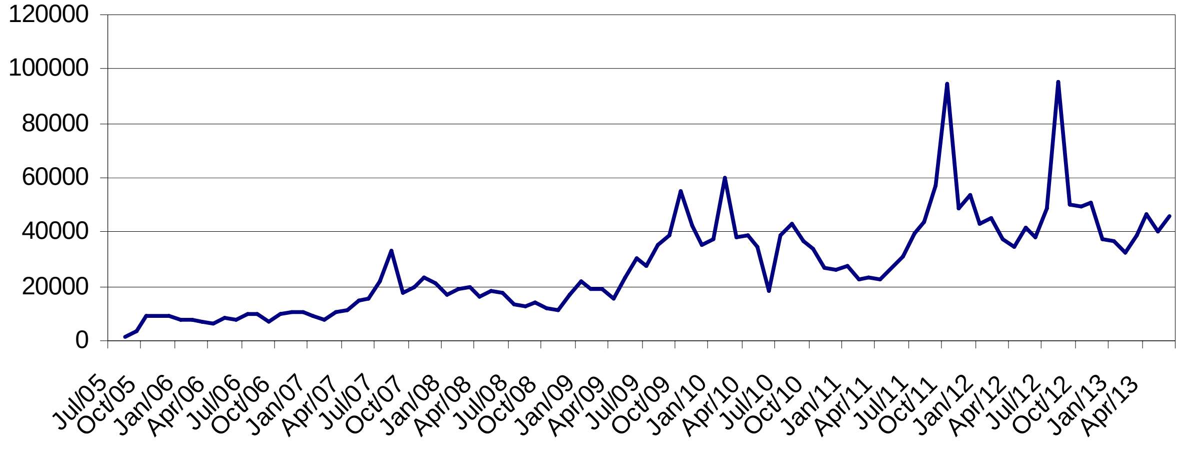


Figure 75 : **Number of page views on KNMI scatterometer website per month.**

At scat@knmi.nl, 102 Emails from 40 different addresses were received in the period Jan-Mar 2013, requesting wind data, processing software, and other support. For Apr-Jun 2013 an additional 105 Emails from 36 different addresses were received. This includes requests in the OSI SAF, the NWP SAF, and the EARS project. The total number of enquiries in this half year was 86, and 57 of them were identified as OSI SAF enquiries. All requests were acknowledged or answered within three working days.

The following table gives the list of the registered wind users at KNMI.

Entity	**Shortened name**	**Country**
Environment Canada		Canada
Koninklijk Nederlands Meteorologisch Instituut	KNMI	Netherlands
Centre Mediterrani d'Investigacions Marines I Ambientals	CMIMA-CSIC	Spain
Italian Air Force Weather Service		Italy
Norwegian Meteorological Institute	Met.no	Norway
BMT Argoss		Netherlands
Danish Meteorological Institute	DMI	Denmark
Jet Propulsion Laboratory	JPL	U.S.A.
EUMETSAT		Germany
Institute of Meteorology and Water Management Poland	IMGW	Poland
University of Concepcion CHILE		Chile
Turkish State Meteorological Services		Turkey
National Centre for Medium Range Weather Forecasting India		India
Nanjing University		China
Indian National Centre for Ocean Information Service	INCOIS	India

Entity	Shortened name	Country
Rudjer Boskovic Institute / Center for Marine Research		Croatia
Consiglio Nazionale delle Ricerche – ISAC Laboratorio		Italy
Ifremer		France
NOAA/NESDIS		U.S.A.
MetService		New Zealand
UAE Met. Department		United Arab Erimates
The Ohio State University, Dept. of Electrical Eng.		U.S.A.
University of Wisconsin-Madison		U.S.A.
BYU Center for Remote Sensing, Brigham Young University		U.S.A.
Woods Hole Oceanographic Institution		U.S.A.
Remote Sensing Systems		U.S.A.
Institute of Low Temperature Science, Hokkaido University		Japan
Center for Atmospheric and Oceanic Studies, Tohoku University		Japan
Naval Research Laboratory	NRL	U.S.A.
ComSine Ltd		U.K.
Met Office		U.K.
Meteorology and Oceanography Group, Space Applications Centre, ISRO		India
Numerical Prediction Division, Japan Meteorological Agency		Japan
The First Institute of Oceanography	FIO	China
PO.DAAC Data Engineering Team		U.S.A.
ECMWF		U.K.
Satellite Observing Systems		U.K.
Météo France	M-F	France
School of Marine Science and Technology, Tokai University		Japan
Northwest Research Associates		U.S.A.
University of Washington		U.S.A.
Naval Hydrographic Service, Ministry of Defence		Argentina
Swedish Meteorological and Hydrological Institute	SMHI	Sweden
Chalmers University of Technology		Sweden
Typhoon Research Department, Meteorological Research Institute		Japan
Gujarat University		India
Consiglio Nazionale delle Ricerche	CNR	Italy
Oceanweather Inc.		U.S.A.
Ocean University of China		China
Nanjing University of China		China
Hydrometeorological Research Center of Russia		Russia
Meteorology Scientific Institution of ShanDong Province		China
VisioTerra		France
China Meteorological Administration	CMA	China
Institut de Recherche pour le Développement	IRD	France
Weathernews Inc		Japan
NECTEC		Thailand
University of Ioannina		Greece
Bermuda Weather Service		Bermuda
Chinese Academy of Sciences		China
Naval Postgraduate School		U.S.A.
University of Hawaii		U.S.A.

Entity	Shortened name	Country
Chinese Culture University		Taiwan
Federal University of Rio de Janeiro		Brazil
Flanders Marine Institute		Belgium
V. I. Il`ichev Pacific Oceanological Institute		Russia
Jet Propulsion Laboratory	JPL	U.S.A.
NASA		U.S.A.
National Center for Atmospheric Research	NCAR	U.S.A.
Chinese Academy of Meteorology Science		China
Weather Routing, Inc.	WRI	U.S.A.
Instituto Oceanográfico de la Armada		Equador
Leibniz Institute for Baltic Sea Research		Germany
Nansen Environmental and Remote Sensing Center		Norway
UNMSM		Peru
Centro de Estudos do Ambiente e do Mar		Portugal
Andhra University, Visakhapatnam		India
Unidad de Tecnología Marina (UTM – CSIC)		Spain
MyOcean Sea Ice Wind TAC (Ifremer)		France
Jeju National University		Korea
Weather Data Marine Ltd.		U.K.
Admiral Paulo Moreira Marine Research Institute		Brazil
IMEDEA (UIB-CSIC)		Spain
Hong Kong Observatory		Hong Kong
Observatoire Midi-Pyrenees		France
Tidetech		Australia
Weatherguy.com		U.S.A.
Marine Data Literacy		U.S.A.
Hong Kong University of Science and Technology		Hong Kong
Environmental Agency of the Republic of Slovenia		Slovenia
Fisheries and Sea Research Institute		Portugal
National Meteorological Center		China
National Oceanography Centre, Southampton		U.K.
National Taiwan University		Taiwan
Florida State University		U.S.A.
Charles Sturt University, Wagga Wagga		Australia
Marine and Coastal Management		South Africa
Gent University		Belgium
Department of Meteorology		Sri-Lanka
Gwangju Institute of Science & Technology		South Korea
University of Hamburg		Germany
University of Las Palmas de Gran Canaria		Spain
The Third Institute of Oceanography		China
South China Sea Institute of Oceanology		China
Environmental Research Institute, University College Cork		Ireland
Shan dong meteorologic bureau		China
RPS MetOcean Pty Ltd		Australia
APL-UW		China
Korea Ocean Research and Development Institute		Korea
XMU		China
Collecte Localisation Satellites	CLS	France
Instituto de Meteorologia		Portugal
ISRO - NRSC		India
ACMAD		Niger
UTL-Technical University of Lisbon		Portugal

Entity	Shortened name	Country
Bureau of Meteorology		Australia
CPTEC - INPE		Brazil
StormGeo AS		Norway
21 independent users (not affiliated to an organization)		

table 32 : **List of registered Wind users at KNMI.**

6.2 Statistics on the FTP sites use

6.2.1 Statistics on the SS1 ftp sites use

SST and Fluxes products are available on IFREMER FTP server. Most of SST products are also available at the PODAAC. Although outside the OSI SAF the PODAAC kindly provides the OSI SAF with statistics on the downloading of the OSI SAF products on their server.

6.2.1.1 Statistics on the IFREMER FTP server use

Number of OSI SAF products downloaded on IFREMER FTP server over 1st half 2013						
	Jan. 2013	Feb. 2013	Mar. 2013	Apr. 2013	May 2013	Jun. 2013
SST MAP +LML	31	184	1755	2043	630	2178
SSI MAP +LML	3	522	4126	2646	1133	321
DLI MAP +LML	159	2476	1985	3571	862	435
METEOSAT SST	4313	4579	4870	6050	9146	4257
GOES-E SST	1767	1888	2125	3277	3477	1439
METEOSAT SSI	2	3	1	0	11	736
GOES-E SSI	35	28	29	26	23	21
METEOSAT DLI	116	1636	10562	14976	6875	49
GOES-E DLI	109	0	0	3	0	0
NARSST	6979	3753	4917	7780	5691	4419
MGR SST	240207	179975	197438	214473	199651	228195
GBL SST	10141	415	551	575	957	860

table 33 : **Number of OSI SAF products downloaded on IFREMER FTP server over 1st half 2013.**

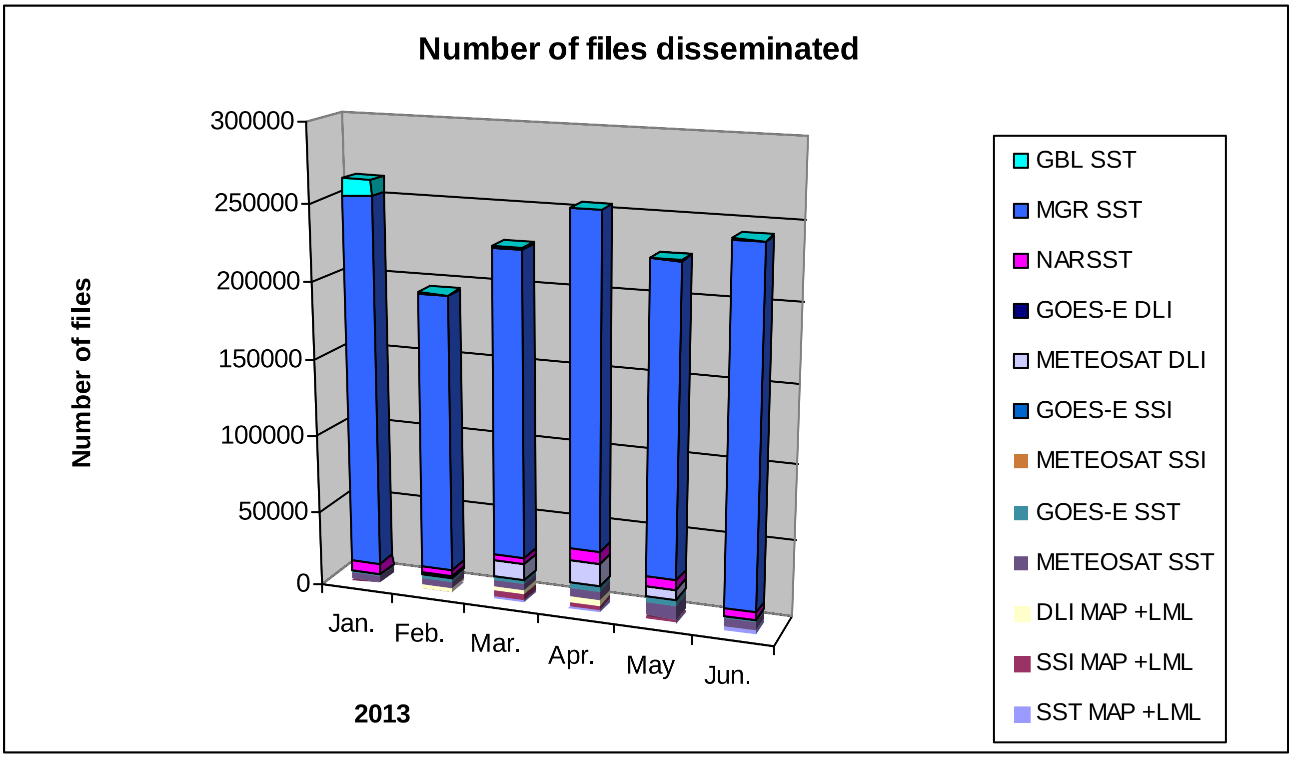


Figure 76 : **Number of OSI SAF products downloaded on IFREMER FTP server over 1st half 2013.**

Volume of data downloaded by country (in Mb)						
	Jan. 2013	Feb. 2013	Mar. 2013	Apr. 2013	May 2013	Jun. 2013
Denmark	0	0	0	0	0	0
Italy	3758	4608	6083	8100	5161	4147
France	0	858	1044	0	0	0
Netherlands	0	0	0	0	0	0
Spain	0	0	0	0	0	0
Russian Federation	0	0	0	18022	8100	1454
Belgium	3195	3000	3523	3717	4024	0
Poland	0	0	0	0	0	0
Inconnu	3645	2990	7895	744	796	1208
Network	0	0	23	0	0	0
Commercial	652	6840	7025	15391	4454	3953
Others	3587	1313	1718	1232	1355	5243

table 34 : **Volume of Data downloaded by country (in Mb) from IFREMER ftp server over 1st half 2013.**

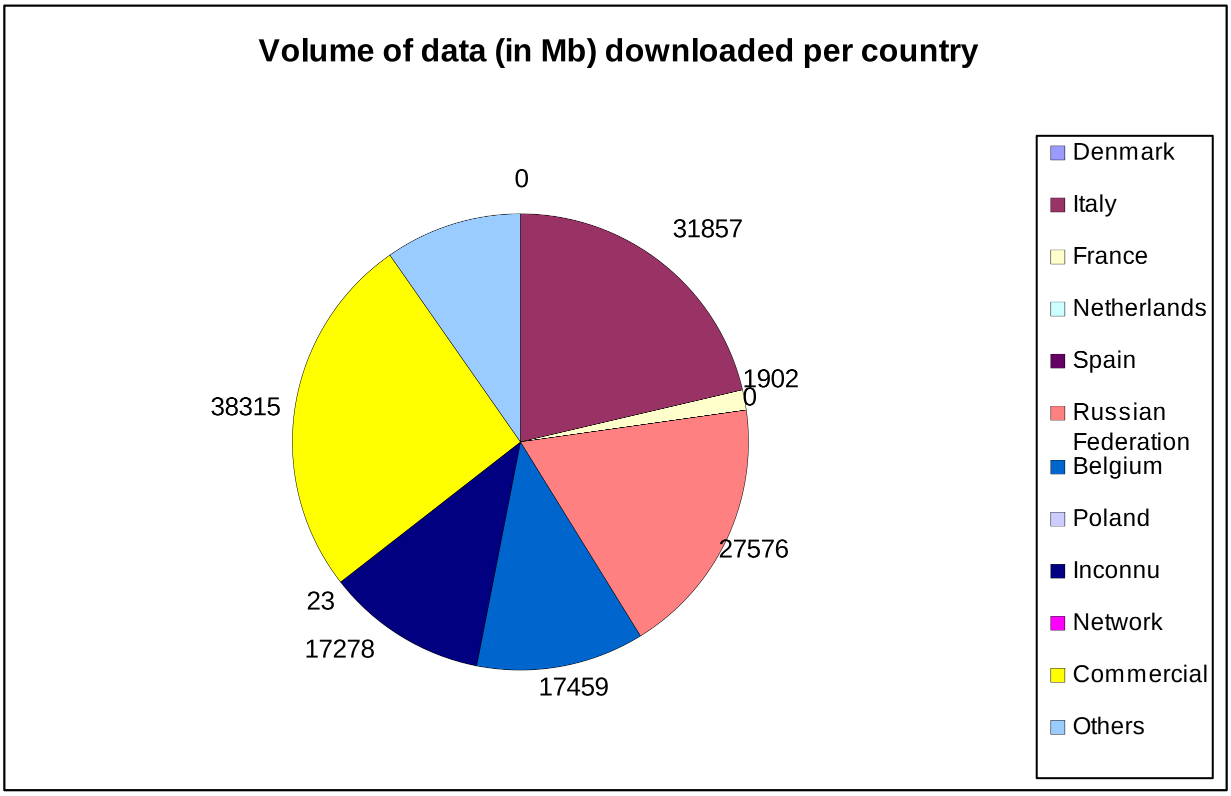


Figure 77 : Volume of Data downloaded by country (in Mb) from IFREMER ftp server over 1st half 2013.

6.2.1.2 Statistics on the PODAAC FTP server use

Currently NAR SST, GLB SST, MGR SST and METEOSAT SST are archived at the PODAAC.

OSI SAF product	Number of Users	GB	Number of files
MGR SST	77	85,9	42442
GLB SST	87	10,6	3459
NOAA-17 NAR SST	2	0	2
NOAA-18 NAR SST	39	2	276
NOAA-19 NAR SST	46	0	2023
Metop-A NAR SST	47	0	396
METEOSAT SST	32	0	101
Total	330	99	48699

table 35 : Statistics of the OSI SAF products downloaded on the PODAAC FTP server in JANUARY 2013.

OSI SAF product	Number of Users	GB	Number of files
MGR SST	19	68,1	94340
GLB SST	53	54,3	9735
NOAA-17 NAR SST			
NOAA-18 NAR SST	3	0	3
NOAA-19 NAR SST	47	0	430
Metop-A NAR SST	22	0	33
METEOSAT SST	1	0	1
Total	145	122	104542

table 36 : Statistics of the OSI SAF products downloaded on the PODAAC FTP server in FEBRUARY 2013.

OSI SAF product	Number of Users	GB	Number of files
MGR SST	76	93,6	127549
GLB SST	82	69,4	11337
NOAA-17 NAR SST	1	0	1
NOAA-18 NAR SST	14	0	17
NOAA-19 NAR SST	43	0	2308
Metop-A NAR SST	49	0	217
METEOSAT SST	20	0	21
Total	285	163	141450

table 37 : Statistics of the OSI SAF products downloaded on the PODAAC FTP server in MARCH 2013.

OSI SAF product	Number of Users	GB	Number of files
MGR SST	82	286,6	234189
GLB SST	71	0	1052
NOAA-17 NAR SST	6	0	7
NOAA-18 NAR SST	36	0,1	70
NOAA-19 NAR SST	35	0	1301
Metop-A NAR SST	50	0	1164
METEOSAT SST	36	0	143
Total	316	287	237926

table 38 : Statistics of the OSI SAF products downloaded on the PODAAC FTP server in APRIL 2013.

OSI SAF product	Number of Users	GB	Number of files
MGR SST	89	1558,3	1306330
GLB SST	76	0	392
NOAA-17 NAR SST	1	0	1
NOAA-18 NAR SST	14	0	18
NOAA-19 NAR SST	47	0	821
Metop-A NAR SST	84	0	4781
METEOSAT SST	27	0	34
Total	338	1558	1312377

table 39 : Statistics of the OSI SAF products downloaded on the PODAAC FTP server in MAY 2013.

OSI SAF product	Number of Users	GB	Number of files
MGR SST	136	470,4	380012
GLB SST	103	89,4	13787
NOAA-17 NAR SST	4	0	6
NOAA-18 NAR SST	56	0	201
NOAA-19 NAR SST	60	21,5	10997
Metop-A NAR SST	89	29,3	13728
METEOSAT SST	62	0	225
Total	510	611	418956

table 40 : Statistics of the OSI SAF products downloaded on the PODAAC FTP server in JUNE 2013.

6.2.2 Statistics on the SS2 ftp site use

The number of downloads of Sea Ice products from the OSI SAF Sea Ice FTP server are given in table below. The numbers include the ice concentration, ice edge and ice type product for each product area in GRIB and HDF5 format.

Month	Operational				Reprocessed Ice Conc
	Ice Conc	Ice Drift	Ice Edge	Ice Type	
Jan. 2013	28792	2542	5088	6287	20555
Feb. 2013	103382	3378	3655	11891	134310
Mar. 2013	12844	6122	4810	26447	105299
Apr. 2013	28784	6647	4518	13252	11099
May 2013	22431	2332	6114	43937	77264
Jun. 2013	24779	899	3608	7691	17712

table 41 : Number of products downloaded from OSI SAF Sea Ice FTP server (ftp://osisaf.met.no).

The next figure shows the downloads sorted on domains.

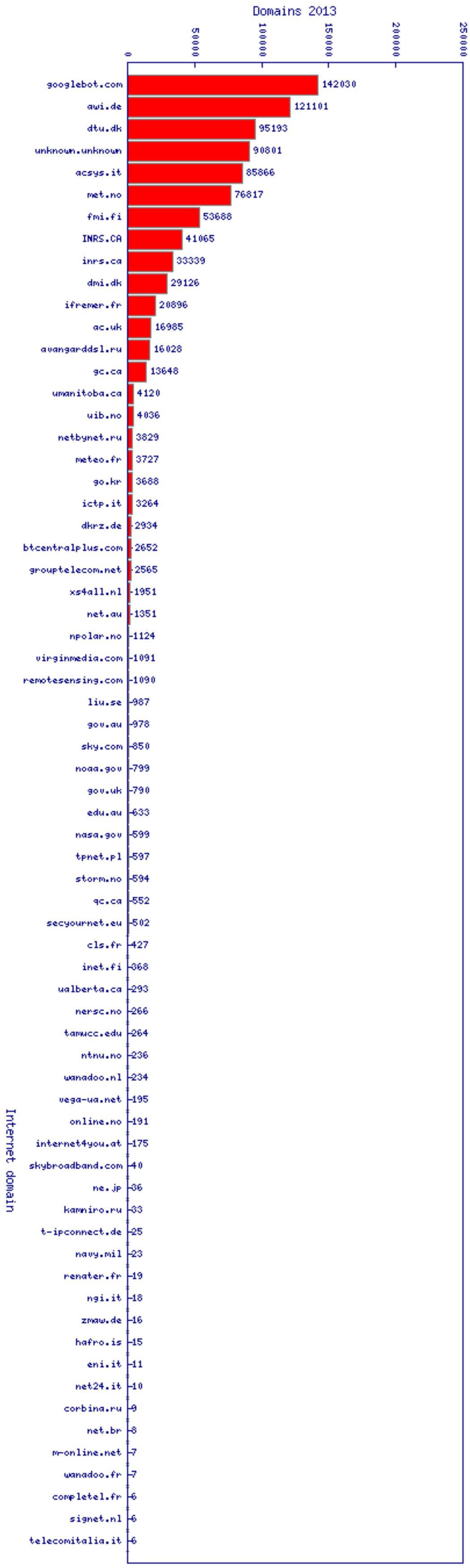


Figure 78 : FTP downloads of sea ice products (more than 5) sorted on domains for 2013.

6.2.3 Statistics on the SS3 ftp site use

KNMI keeps statistics of the retrieval of wind products of its FTP server. The table below shows the number of downloads per product file in near-real time. Note that the BUFR products are also disseminated through EUMETCast.

We also receive statistics from PO.DAAC on the number of downloads of the historic ASCAT wind products in NetCDF format from their archive, these statistics are also shown in the table. Since PO.DAAC contains the complete archive of ASCAT data since the beginning of their dissemination, we assume that most of these users are using the data for climate studies.

We did not receive any requests to provide archived SeaWinds data during the reporting period.

OSI SAF product	Number of downloads per file on KNMI FTP (BUFR	Number of downloads per file on KNMI FTP (NetCDF)	Number of downloads from PO.DAAC archive
ASCAT-A 25km	24	26	204,579 files by 151 users (Jan-Mar) 392,088 files by 152 users (Apr-Jun)
ASCAT-A 12.5km	23	26	339,478 files by 268 users (Jan-Mar) 434,090 files by 328 users (Apr-Jun)
ASCAT-A Coastal	7	20	51,731 files by 130 users (Jan-Mar) 157,335 files by 128 users (Apr-Jun)
ASCAT-B 25km	11	12	
ASCAT-B Coastal	8	7	
OSCAT 50km	16	15	

table 42 : **Statistics of the OSI SAF products downloaded on the KNMI FTP server and from PO.DAAC.**

6.3 Statistics from EUMETSAT Central facilities

6.3.1 Users from EUMETCast

Here below the list of the OSI SAF users identified by EUMETSAT for the distribution by EUMETCast. The table 43 shows the overall number of OSI SAF users by country at 13 August 2013. In clear green, the countries with the greatest numbers of users.

Country	EUMETCast users	Country	EUMETCast users

Algeria	3	Iran, Islamic Republic Of	2
Angola	2	Iraq	1
Argentina	1	Ireland	6
Armenia	1	Isle Of Man	1
Austria	17	Israel	6
Bahrain	1	Italy	243
Belgium	8	Jordan	1
Benin	1	Kazakhstan	1
Bosnia And Herzegovina	1	Kenya	9
Botswana	3	Kuwait	1
Brazil	37	Latvia	1
Bulgaria	1	Lebanon	2
Burkina Faso	2	Lesotho	2
Burundi	2	Liberia	2
Cameroon	2	Libyan Arab Jamahiriya	1
Canada	1	Lithuania	1
Cape Verde	2	Luxembourg	1
Central African Republic	2	Macedonia	1
Chad	3	Madagascar	3
China	2	Malawi	2
Comoros	2	Mali	2
Congo	2	Malta	2
Democratic Republic Of The Congo	4	Martinique	1
Cote D'Ivoire	4	Mauritania	2
Croatia	2	Mauritius	7
Cyprus	1	Moldova, Republic Of	1
Czech Republic	13	Morocco	4
Denmark	4	Mozambique	4
Djibouti	2	Namibia	5
Dominican Republic	1	Netherlands	27
Egypt	3	Niger	6
El Salvador	1	Nigeria	3
Equatorial Guinea	2	Norway	4
Eritrea	2	Oman	1
Estonia	3	Peru	1
Ethiopia	5	Poland	8
Finland	5	Portugal	5
France	45	Qatar	2
Gabon	2	Reunion	1
Gambia	2	Romania	4
Germany	90	Russian Federation	5
Ghana	6	Rwanda	5
Greece	9	San Marino	1
Guinea	2	Sao Tome & Principe	2
Guinea-Bissau	2	Saudi Arabia	2
Haiti	1	Senegal	6
Hungary	6	Serbia	3
Iceland	1	Seychelles	2
India	1	Sierra Leone	2

Country	EUMETCast users
Slovakia	4
Slovenia	1
Somalia	1
South Africa	20
Spain	43
Sudan	3
Swaziland	2
Sweden	3
Switzerland	12
Syrian Arab Republic	1
Tanzania, United Republic Of	3
Togo	2
Tunisia	2
Turkey	4
Uganda	3
Ukraine	2
United Arab Emirates	5
United Kingdom	115
United States	6
Uzbekistan	1
Viet Nam	1
Yemen	1
Zambia	2
Zimbabwe	2

table 43 : Overall number of EUMETCast users by country at 13 August 2013.

6.3.2 Users and retrievals from UMARF

Orders Summary over the 1st half 2013

The table 44 below lists the persons who download data from the EUMETSAT Data Center and the volume of the downloaded data in megabytes (MB) by month. In yellow, the users who have downloaded more than 1GB of data at least during a month.

User ID	January	February	March	April	May	June	TOTAL(MB)
dfr_dede	7						7
cyn713	1262						1262
thomas2	25567					10604	36171
daweilee	183			17808			17991
maxvaleri	32						32
hsolomon		199					199
enorasis		123					123
moller2431		1769					1769
StefanS		958					958
SonsolesR		2					2
youme_zx			6689				6689
chakravart			23497				23497
boubrahmi			26				26
loewalex			7				7
aandres			12				12
lapismet			9340				9340
vdarende			1				1
eunsangcho			3				3
UBIMET			14		4		18
gedmor			47	5			52
mowwind1				22976	2826		25802
haoyue				171			171
jichengliu				136			136
benedicto				25			25
kharia				15			15
meadowdog				23	131	671	825
ndris				3118			3118
YESUBABUV					18		18
ydzhang					5712	4228	9940
lpetronzio					9		9
juliafiga					2486		2486
oohernan					1277		1277
guifayin					130	45	175
leeCS2012					3		3
3vg2013						81	81
vyesubabu						2889	2889
panegrossi						34	34
lynn422						8953	8953
EglitisP						6060	6060
TOTAL (MB)	**27051**	**3051**	**39636**	**44277**	**12596**	**33565**	**160176**

table 44 : Volume of data downloaded (in MB) by users and by month from UMARF over 1st half 2013.

Ingestion Summary over the 1st half 2013

The next tables list the expected and real received volume of OSI SAF products data as well as the received and missing percentage of data by month over the period. In red, there was clearly an outage of products as well under the OSI SAF monthly target performance of 95%. In orange, the performance even below the target remains acceptable.

January 2013

Products	Expected	Received	% Received	Missing	% Missing
ASCAT 12.5km Wind	441	440	99.77%	1	0.23%
ASCAT 25km Wind	441	440	99.77%	1	0.23%
ASCAT Coastal Wind	0			0	0.00%
AHL Downward Longwave Irradiance	31	31	100.00%	0	0.00%
Global Sea Ice Concentration	62	62	100.00%	0	0.00%
Daily Downward Longwave Irradiance	62	62	100.00%	0	0.00%
Global Sea Ice Drift	62	57	91.94%	5	8.06%
Daily Surface Solar Irradiance	62	62	100.00%	0	0.00%
Global Sea Ice Edge	62	62	100.00%	0	0.00%
Hourly Downward Longwave Irradiance	1488	1486	99.87%	2	0.13%
Hourly Surface Solar Irradiance	1488	1486	99.87%	2	0.13%
Hourly Sea Surface Temperature	1488	1482	99.60%	6	0.40%
Global Sea Ice Type	62	62	100.00%	0	0.00%
AHL Surface Solar Irradiance	31	31	100.00%	0	0.00%
AHL Sea Surface Temperature	62	62	100.00%	0	0.00%
Global Sea Surface Temperature	62	61	98.39%	1	1.61%
NAR Sea Surface Temperature	124	124	100.00%	0	0.00%
TOTAL	6028	6010	99.70%	18	0.30%

table 45 : Expected and real received (plus % received/missing) volume of OSI SAF products data in JANUARY 2013.

February 2013					
Products	**Expected**	**Received**	**% Received**	**Missing**	**% Missing**
ASCAT 12.5km Wind	399	398	99.75%	1	0.25%
ASCAT 25km Wind	399	398	99.75%	1	0.25%
ASCAT Coastal Wind	0			0	0.00%
AHL Downward Longwave Irradiance	28	28	100.00%	0	0.00%
Global Sea Ice Concentration	56	42	75.00%	14	23.21%
Daily Downward Longwave Irradiance	56	56	100.00%	0	0.00%
Global Sea Ice Drift	56	43	76.79%	13	25.00%
Daily Surface Solar Irradiance	56	56	100.00%	0	0.00%
Global Sea Ice Edge	56	42	75.00%	14	25.00%
Hourly Downward Longwave Irradiance	1344	1344	100.00%	0	0.00%
Hourly Surface Solar Irradiance	1344	1344	100.00%	0	0.00%
Hourly Sea Surface Temperature	1344	1344	99.93%	1	0.07%
Global Sea Ice Type	56	42	75.00%	14	25.00%
AHL Surface Solar Irradiance	28	28	100.00%	0	0.00%
AHL Sea Surface Temperature	56	56	100.00%	0	0.00%
Global Sea Surface Temperature	56	56	100.00%	0	0.00%
NAR Sea Surface Temperature	112	112	100.00%	0	0.00%
TOTAL	5446	5388	98.93%	58	1.07%

table 46 : Expected and real received (plus % received/missing) volume of OSI SAF products data in FEBRUARY 2013.

March 2013

Products	Expected	Received	% Received	Missing	% Missing
ASCAT 12.5km Wind	441	430	97.51%	11	2.49%
ASCAT 25km Wind	441	430	97.51%	11	2.49%
ASCAT Coastal Wind	2	2	100.00%	0	0.00%
AHL Downward Longwave Irradiance	31	30	96.77%	1	3.23%
Global Sea Ice Concentration	62	58	93.55%	4	6.45%
Daily Downward Longwave Irradiance	62	58	93.55%	4	6.45%
Global Sea Ice Drift	62	54	87.10%	8	12.90%
Daily Surface Solar Irradiance	62	58	93.55%	4	6.45%
Global Sea Ice Edge	62	58	93.55%	4	6.45%
Hourly Downward Longwave Irradiance	1488	1411	94.83%	77	5.17%
Hourly Surface Solar Irradiance	1488	1422	95.56%	66	4.44%
Hourly Sea Surface Temperature	1488	1417	95.23%	71	4.77%
Global Sea Ice Type	62	58	93.55%	4	6.45%
AHL Surface Solar Irradiance	31	30	96.77%	1	3.23%
AHL Sea Surface Temperature	62	57	91.94%	5	8.06%
Global Sea Surface Temperature	62	57	91.94%	5	8.06%
NAR Sea Surface Temperature	124	117	94.35%	7	5.65%
TOTAL	6030	5747	95.31%	283	4.69%

table 47 : **Expected and real received (plus % received/missing) volume of OSI SAF products data in MARCH 2013.**

	April 2013				
Products	**Expected**	**Received**	**% Received**	**Missing**	**% Missing**
ASCAT 12.5km Wind	418	417	99.76%	1	0.27%
ASCAT 25km Wind	418	418	100.00%	0	0.00%
ASCAT Coastal Wind	418	182	43.54%	236	56.46%
AHL Downward Longwave Irradiance	30	28	93.33%	2	6.67%
Global Sea Ice Concentration	60	58	96.67%	2	3.33%
Daily Downward Longwave Irradiance	60	60	100.00%	0	0.00%
Global Sea Ice Drift	60	55	91.67%	5	8.33%
Daily Surface Solar Irradiance	60	60	100.00%	0	0.00%
Global Sea Ice Edge	60	58	96.67%	2	3.33%
Hourly Downward Longwave Irradiance	1440	1440	100.00%	0	0.00%
Hourly Surface Solar Irradiance	1440	1440	100.00%	0	0.00%
Hourly Sea Surface Temperature	1440	1440	100.00%	0	0.00%
Global Sea Ice Type	60	58	96.67%	2	3.33%
AHL Surface Solar Irradiance	30	28	93.33%	2	6.67%
AHL Sea Surface Temperature	60	56	93.33%	4	6.67%
Global Sea Surface Temperature	60	60	100.00%	0	0.00%
NAR Sea Surface Temperature	120	120	100.00%	0	0.00%
TOTAL	6234	5978	95.89%	256	4.11%

table 48 : **Expected and real received (plus % received/missing) volume of OSI SAF products data in APRIL 2013.**

May 2013

Products	Expected	Received	% Received	Missing	% Missing
ASCAT 12.5km Wind	439	422	96.13%	17	3.87%
ASCAT 25km Wind	439	439	100.00%	0	0.00%
ASCAT Coastal Wind	439	383	87.24%	56	12.76%
AHL Downward Longwave Irradiance	31	28	90.32%	3	9.68%
Global Sea Ice Concentration	62	62	100.00%	0	0.00%
Daily Downward Longwave Irradiance	62	53	85.48%	9	14.52%
Global Sea Ice Drift	62	62	100.00%	0	0.00%
Daily Surface Solar Irradiance	62	53	85.48%	9	14.52%
Global Sea Ice Edge	62	62	100.00%	0	0.00%
Hourly Downward Longwave Irradiance	1488	1252	84.14%	236	15.86%
Hourly Surface Solar Irradiance	1488	1252	84.14%	236	15.86%
Hourly Sea Surface Temperature	1488	1251	84.07%	237	15.93%
Global Sea Ice Type	62	62	100.00%	0	0.00%
AHL Surface Solar Irradiance	31	28	90.32%	3	9.68%
AHL Sea Surface Temperature	62	56	90.32%	6	9.68%
Global Sea Surface Temperature	62	62	100.00%	0	0.00%
NAR Sea Surface Temperature	124	124	100.00%	0	0.00%
TOTAL	6463	5651	87.44%	812	2.56%

table 49 : Expected and real received (plus % received/missing) volume of OSI SAF products data in MAY 2013.

	June 2013				
Products	**Expected**	**Received**	**% Received**	**Missing**	**% Missing**
ASCAT 12.5km Wind	426	426	100.00%	0	0.00%
ASCAT 25km Wind	852	819	96.13%	33	3.87%
ASCAT Coastal Wind	852	819	96.13%	33	3.87%
AHL Downward Longwave Irradiance	30	29	96.67%	1	3.33%
Global Sea Ice Concentration	60	60	100.00%	0	0.00%
Daily Downward Longwave Irradiance	60	55	91.67%	5	8.33%
Global Sea Ice Drift	60	60	100.00%	0	0.00%
Daily Surface Solar Irradiance	60	55	91.67%	5	8.33%
Global Sea Ice Edge	60	60	100.00%	0	0.00%
Hourly Downward Longwave Irradiance	1440	1305	90.63%	135	9.37%
Hourly Surface Solar Irradiance	1440	1305	90.63%	135	9.37%
Hourly Sea Surface Temperature	1440	1304	90.56%	136	9.44%
Global Sea Ice Type	60	60	100.00%	0	0.00%
AHL Surface Solar Irradiance	30	26	86.67%	4	13.33%
AHL Sea Surface Temperature	60	58	96.67%	2	3.33%
Global Sea Surface Temperature	60	60	100.00%	0	0.00%
NAR Sea Surface Temperature	120	120	100.00%	0	0.00%
TOTAL	7110	6621	93.12%	489	6.88%

table 50 : Expected and real received (plus % received/missing) volume of OSI SAF products data in JUNE 2013.

7 Training

OSI SAF has provided scatterometer wind training in Kaliningrad in April 2013 and this training material has also been used by IFREMER in a training in St. Petersburg; http://www.knmi.nl/publications/fulltexts/scat_intro.pdf.

8 Documentation update

The following table provides the list of documents modified during the reporting period, as well as new documents made available to users. Last version of documents and new documents are available on the central Web Site (www.osi-saf.org).

Name of the Document	Reference	Latest versions	date
OSI SAF CDOP-2 Product Requirement Document	SAF/OSI/CDOP2/M-F/MGT/PL/001	2.2	February 2013
Geostationary Radiative Flux Product User Manual	SAF/OSI/CDOP/M-F/TEC/MA/ 182	1.3	April 2013
OSI SAF Quarterly Operations Report for 1st quarter 2012	SAF/CDOP2/M-F/ TEC/RP/321	1.2	April 2013
OSI SAF Quarterly Operations Report for 2nd quarter 2012	SAF/CDOP2/M-F/ TEC/RP/322	1.1	April 2013
OSI SAF Quarterly Operations Report for 3rd quarter 2012	SAF/CDOP2/M-F/ TEC/RP/323	1.1	April 2013
OSI SAF Half-Yearly Operations Report for 2nd half 2012	SAF/CDOP2/M-F/ TEC/RP/324	1.1	April 2013
Ascat Product Manual	SAF/OSI/CDOP/KNMI/TEC/MA/126	1.13	May 2013
Oceansat-2 Wind Product User Manual	SAF/OSI/CDOP2/KNMI/TEC/MA/140	1.3	June 2013
Low Earth Orbiter Sea Surface Temperature Product User Manual	SAF/OSI/CDOP/M-F/TEC/MA/127	2.3	June 2013

table 51 : Documentation updates.

Recent publications

Anderson, C., Figa, J., Bonekamp, H., Wilson, J., Verspeek, J., Stoffelen, A. and Portabella, M., *Validation of Backscatter Measurements from the Advanced Scatterometer on MetOp-A,* J. Atm. Oceanic Technol., 2012, 29, 77-88.

Belmonte, M., Verspeek, J., Verhoef, A. and Stoffelen, A., *Bayesian sea ice detection with the Advanced Scatterometer,* IEEE Transactions on Geoscience and Remote Sensing, 2012, 50, 7, 2649-2657, doi:10.1109/TGRS.2011.2182356.

Le Borgne, P., Legendre, G. and Péré, S., *Comparison of MSG/SEVIRI and drifting buoy derived diurnal warming estimates*, Remote Sensing of Environment, Volume 124, 2012, pages 622 – 626.

Lin, W., M. Portabella, A. Stoffelen and A. Verhoef, *On the characteristics of ASCAT wind direction ambiguities*, Atmospheric Measurement Techniques, 2013, 6, 1053-1060, doi:10.5194/amt-6-1053-2013

Lydersen, C., Freitas, C., Wiig, Ø., Bachmann, L., Heide-Jorgensen, M.P., Swift, R. and Kovacs, K.M., Lost Highway Not Forgotten: Satellite Tracking of a Bowhead Whale (Balaena mysticetus) from the Critically Endangered Spitsbergen Stock, ARCTIC, VOL. 65, NO. 1 (MARCH 2012) P. 76 – 86.

Portabella, M., Stoffelen, A., Lin, W., Turiel, A., Verhoef, A., Verspeek, J. and Ballabrera-Poy, J., *Rain Effects on ASCAT-Retrieved Winds: Toward an Improved Quality Control*, IEEE Transactions on Geoscience and Remote Sensing, 2012, 50, 7, 2495-2506, doi:10.1109/TGRS.2012.2185933.

Portabella, M., Stoffelen, A., Verhoef, A. and Verspeek, J., *A new method for improving ASCAT wind quality control*, IEEE Gosci. Remote Sensing Letters, 2012, 9, 4, 579-583, doi:10.1109/LGRS.2011.2175435.

Verhoef, A., Portabella, M. and Stoffelen, A., *High-resolution ASCAT scatterometer winds near the coast*, IEEE Transactions on Geoscience and Remote Sensing, 2012, 50, 7, 2481-2487, doi:10.1109/TGRS.2011.2175001.

Verspeek, J., Stoffelen, A., Verhoef, A. and Portabella, M., *Improved ASCAT Wind Retrieval Using NWP Ocean Calibration*, IEEE Transactions on Geoscience and Remote Sensing, 50, 2012, 7, 2488-2494, doi:10.1109/TGRS.2011.2180730.

Vogelzang, J. and Stoffelen, A., *NWP Model Error Structure Functions obtained from Scatterometer Winds*, IEEE Transactions on Geoscience and Remote Sensing, 2012, 50, 7, 2525-2533, doi:10.1109/TGRS.2011.2168407.