The EUMETSAT Network of Satellite Application Facilities

OSI SAF Ocean and Sea Ice

OSI SAF CDOP2

—

HALF-YEARLY OPERATIONS REPORT

—

2nd half 2014

—

12 November 2015

–

version 1.1

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

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1 Introduction

1.1 Scope of the document

The present report covers from the 1st of July to the 31th of December 2014.

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

- Low and Mid latitude (LML) Centre (Sub-System 1, SS1), under M-F responsibility, processes and distributes the SST and Radiative Fluxes products covering LML, North Atlantic Regional (NAR) and Global areas. IFREMER contributes to the products distribution and archiving,

- High Latitude (HL) Centre (Sub-System 2, SS2), under MET Norway responsibility with the co-operation of DMI, processes and distributes the Global Sea Ice products, the High Latitude SST and the High Latitude Radiative Fluxes,

- Wind Centre (Sub-System 3, SS3), under KNMI responsibility, processes and distributes 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

1.3 Reference and applicable documents

1.3.1 Applicable documents

[AD-1] : Service Specification Document, SESP, version 2.3

1.3.2 Reference documents

[RD-1] : Low Earth Orbiter Sea Surface Temperature Product User Manual.

[RD-2] : Atlantic High Latitude L3 Sea Surface Temperature Product User Manual.

[RD-3] : Geostationary Sea Surface Temperature Product User Manual.

[RD-4] : Atlantic High Latitude Radiative Fluxes Product User Manual.

[RD-5] : Geostationary Radiative Flux Product User Manual.

[RD-6] : OSI SAF Sea Ice Product User Manual.

[RD-7] : 50 Ghz Sea Ice Emissivity Product User Manual.

[RD-8] : Low Resolution Sea Ice Drift Product User Manual.

[RD-9] : Medium Resolution Sea Ice Drift Product User Manual.

[RD-10] : ASCAT Wind Product User 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 Service Specification Document [AD-1], 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.

Section 2.1 shows the measured availability on the local FTP servers.

Section 2.2 shows 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 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.

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	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
JUL. 2014	99.8	99.8	99.6	99.9	99.8	98.4	97.6	98.4	93.9	97.4	97.4	100	100	97.2	97.0	97.2	97.0	100	100	100	100
AUG. 2014	99.8	99.9	99.6	99.7	99.6	98.4	100	100	99.6	99.9	98.7	100	100	99.9	97.7	99.9	97.7	100	100	100	100
SEP. 2014	99.9	99.8	98.8	100	99.8	100	99.2	100	99.4	99.6	99.6	100	100	99.9	99.9	99.9	99.9	100	100	100	100
OCT. 2014	100	100	98.2	100	99.9	100	100	100	99.6	100	99.9	100	100	100	99.9	100	99.9	93.6	93.6	93.6	87.1
NOV. 2014	100	100	98.4	100	100	100	100	100	100	99.9	100	100	100	99.9	100	99.9	100	100	100	100	100
DEC. 2014	100	100	98.3	100	99.8	100	98.4	100	99.9	98.7	98.5	100	100	100	100	100	100	100	100	100	100

table 2 : **Percentage of OSI SAF products available on the FTP servers within the specified time over 2nd half 2014.**

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.

Comment : See anomaly details in section 3.

2.2 Availability via EUMETCast

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

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	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
JUL. 2014	99.8	99.8	99.6	99.9	99.8	100	100	100	98.3	99.9	99.9	96.8	100	100	99.7	100	99.7	100	100	100	100
AUG. 2014	99.8	99.9	99.6	99.7	99.6	98.4	100	100	99.9	100	98.7	100	100	99.9	98.8	100	98.8	100	100	100	100
SEP. 2014	99.9	99.8	98.8	100	99.8	100	100	100	99.4	99.6	99.6	100	100	99.7	99.7	99.7	99.7	96.7	96.7	96.7	96.7
OCT. 2014	100	100	98.2	100	99.9	100	100	100	98.3	99.9	99.9	100	100	100	99.7	100	99.7	93.6	93.6	93.6	87.1
NOV. 2014	100	100	98.4	100	100	100	100	100	100	99.9	100	100	100	100	100	100	100	100	100	100	100
DEC. 2014	100	100	98.3	100	99.8	100	98.4	100	100	98.5	98.8	100	100	99.7	99.7	99.7	99.7	100	100	100	100

table 3 : **Percentage of OSI SAF products delivered via EUMETCast within the specified time over 2nd half 2014.**

Comments: See details in section 3.

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

Processing problem (blocked process) from 2014/07/09 at 1800UTC to 2014/07/10 at 0500UTC, impacting Metop MGR SST in real time. Resumption after having killed the blocking Process Identifier. MGR SST archive on IFREMER ftp has been complete but with delay. Metop NAR and GLB SST uncomplete.

Transmission to IFREMER have been interrupted from 2014/07/18 at 0951UTC to 2014/07/19 at 0520UTC impacting all products, due to an outage in the Brest University where the server is hosted. Archive on IFREMER ftp has been complete but with delay.

No Metop MGR SST data available from 2014/07/24 at 1925UTC to 2014/07/25 at 0516UTC, due to a local reception problem with Metop data. Resumption after having killed the blocking ftp concerned. Metop NAR and GLB SST uncomplete during this period.

Due to an antenna failure, GOESE data were unavailable from 2000UTC on 2014/08/21 to 0300UTC on 2014/08/22. Resumption after having switched on the backup antenna.

3.2 At SS2

22.10.2014
Major data outage of SSMIS data from NOAA NESDIS, due to a hardware failure. This data outage lasted for three days, and affected the sea ice products. LR sea ice drift was affected a couple of extra days, as this products uses data two days apart. Users were informed with several service messages during the data outage.

20.09.2014
Sea ice products (except emissivity and MR ice drift) were half a minute delayed, which explains the numbers below 100% in table 2 and 3. Users were not informed.

3.3 At SS3

The ASCAT-B data have been unavailable on 8 August between 16:33 and 22:03 UTC sensing time for an unknown reason.

The ASCAT-B winds have been unavailable on 8 October between 12:48 and 16:57 UTC sensing time due to a Metop-B out of plane manoeuvre.

The ASCAT-B winds have been unavailable on 22 October between 11:24 and 15:30 UTC sensing time due to a Metop-B out of plane manoeuvre.

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

Planned network maintenance at IFREMER side, from 2014/07/30 at 2200UTC to 2014/07/31 at 0400UTC. All concerned products have been transmitted to IFREMER with delay.

Planned power outage at Lannion on 2014/09/09 from 0600UTC to 1200UTC. Some products missing.

Since 2014/11/20, the new IASI SST product is available on IFREMER ftp. The product is PDU based (480 files per day), in NETCDF-4 format GDSV2 with internal compression.

Eumetsat planned Meteosat-10 SEVIRI decontamination starting on 2014/12/02 at 0900UTC and ending on 2014/12/09 at 0900 UTC. However due to Meteosat-8 ground segment issue, Eumetsat switched back on Meteosat-10 earlier on 2014/12/08 at 0930 UTC. During this period, Meteosat SST and Fluxes have be based on Meteosat-8 data, with a value of the file quality level/index set to "0" (unknown quality) because the algorithm have not been tested with Meteosat-8 data.

4.2 At SS2

None to report.

4.3 At SS3

The 25-km and 50-km near-real time OSI SAF winds from RapidScat on the International Space Station are available to the users with in development status since 8 December 2014.

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 satellite.

Hourly SST values are required to have the following accuracy when compared to night time buoy measurements (see Service Specification Document [AD-1]) :

- 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).

According to GHRSST-PP project, for IR derived products, the normalized Proximity Confidence Value scale shows 6 values : 0: unprocessed, 1: cloudy, 2: bad, 3: suspect, 4: acceptable, 5: excellent. A quality level is provided at pixel level. 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.

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 (OSI-206) quality

The following maps indicate the mean night-time and day-time SST error with respect to buoys measurements for quality level 3,4,5 over the reporting period. Monthly maps are available on http://www.osi-saf.org/production/cms/validation_sst_geo.php.

The operational SST retrieval from MSG/SEVIRI and GOES-E updated chain validation report v1.1 (http://www.osi-saf.org/biblio/docs/ss1_geo_sst_val_rep_1_1.pdf) gives further details about the regional bias observed.

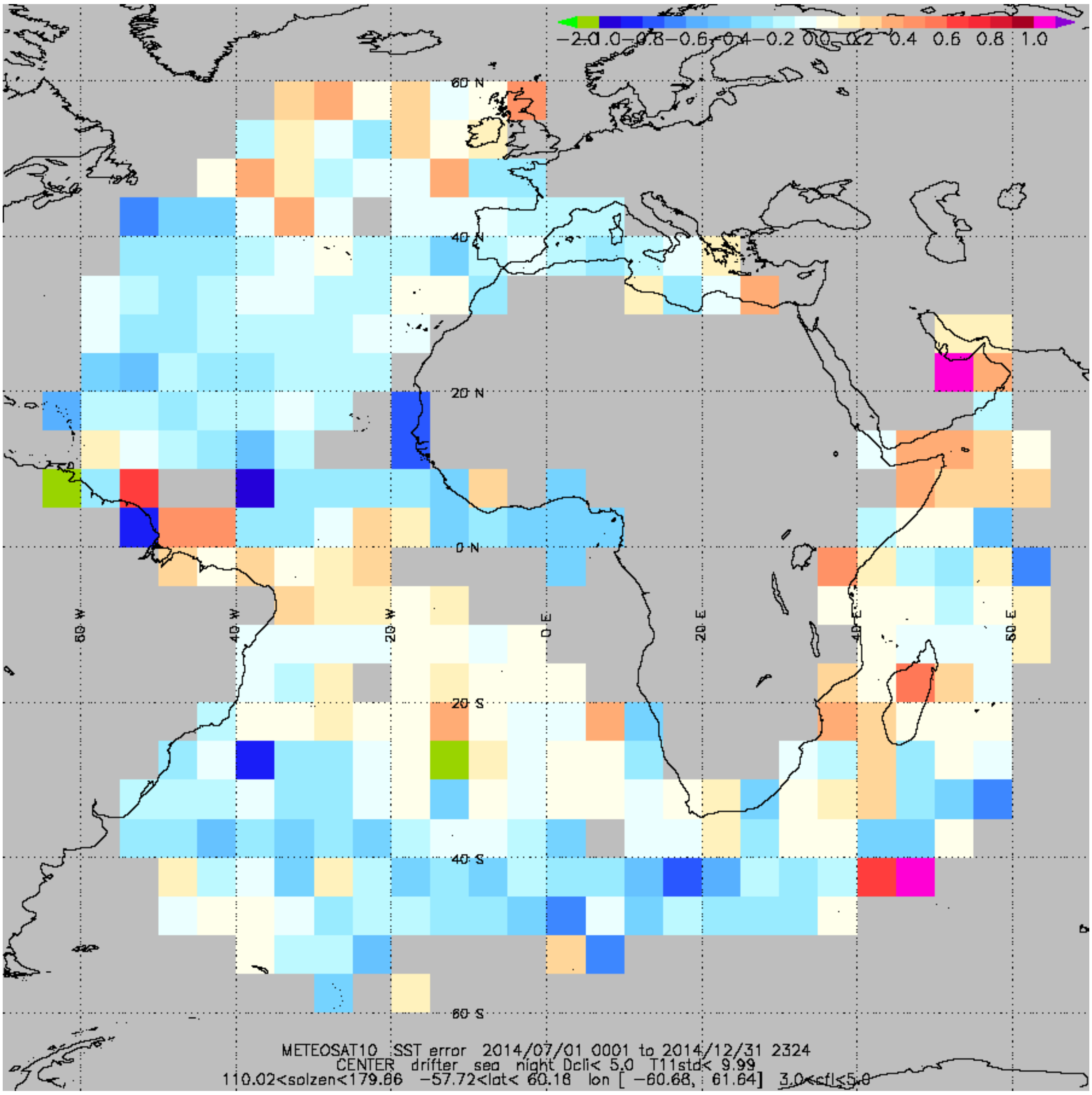


Figure 1 : mean METEOSAT <u>night</u>-time SST error with respect to buoys measurements for quality level 3,4,5

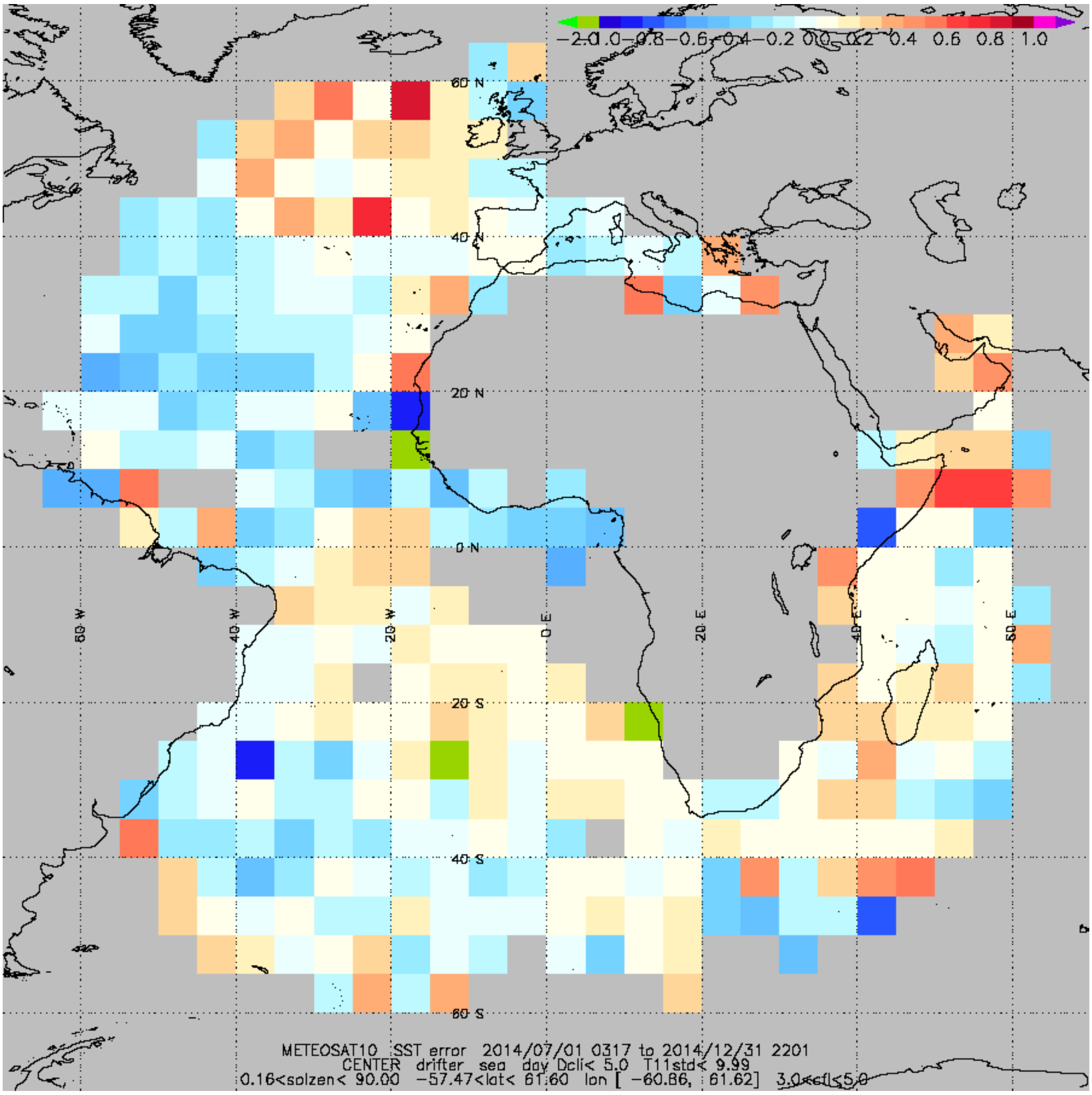


Figure 2 : mean METEOSAT day-time SST error with respect to buoys measurements for quality level 3,4,5

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

METEOSAT night-time SST quality results over 2nd half 2014							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (**)
JUL. 2014	17339	-0,10	0,5	80,00	0,56	1	44,00
AUG. 2014	20657	-0,22	0,5	56,00	0,61	1	39,00
SEP. 2014	17696	-0,12	0,5	76,00	0,59	1	41,00
OCT. 2014	17478	-0,08	0,5	84,00	0,57	1	43,00
NOV. 2014	13505	-0,09	0,5	82,00	0,58	1	42,00
DEC. 2014	10700	-0,09	0,5	82,00	0,57	1	43,00
METEOSAT day-time SST quality results over 2nd half 2014							
JUL. 2014	33762	-0,110	0,5	78,00	0,58	1	42,00
AUG. 2014	34061	-0,290	0,5	42,00	0,67	1	33,00
SEP. 2014	23522	-0,1	0,5	80,00	0,6	1	40,00
OCT. 2014	21822	-0,060	0,5	88,00	0,54	1	46,00
NOV. 2014	19777	-0,010	0,5	98,00	0,54	1	46,00
DEC. 2014	16232	-0,020	0,5	96,00	0,54	1	46,00

(*) 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.

table 4 : **METEOSAT SST quality results over 2nd half 2014, for 3, 4, 5 quality indexes.**

Comments: Overall quality results are good and quite stable.

The following graphs illustrate the evolution of METEOSAT-derived SST quality results over the past 12 months.

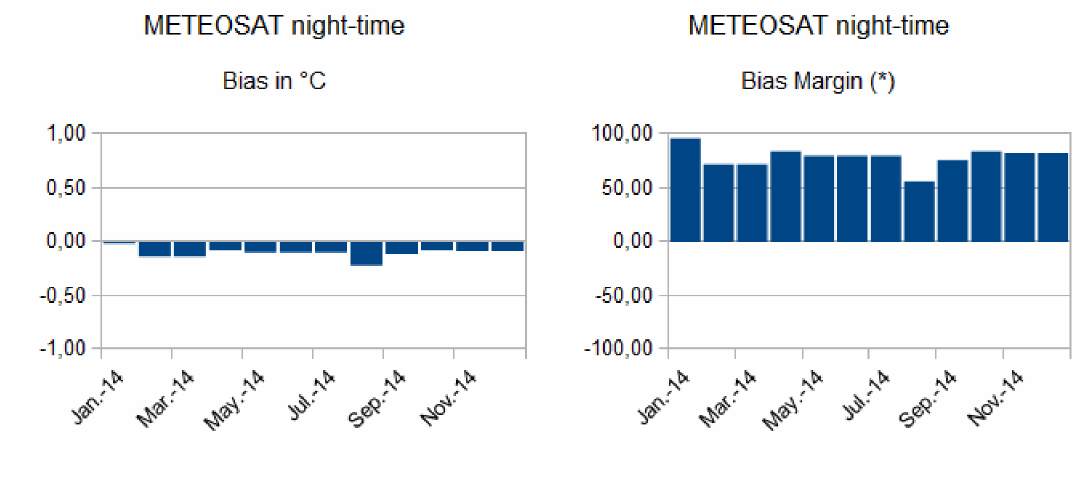


Figure 3 : Left: METEOSAT <u>night</u>-time SST Bias.
Right METEOSAT <u>night</u>-time SST Bias Margin

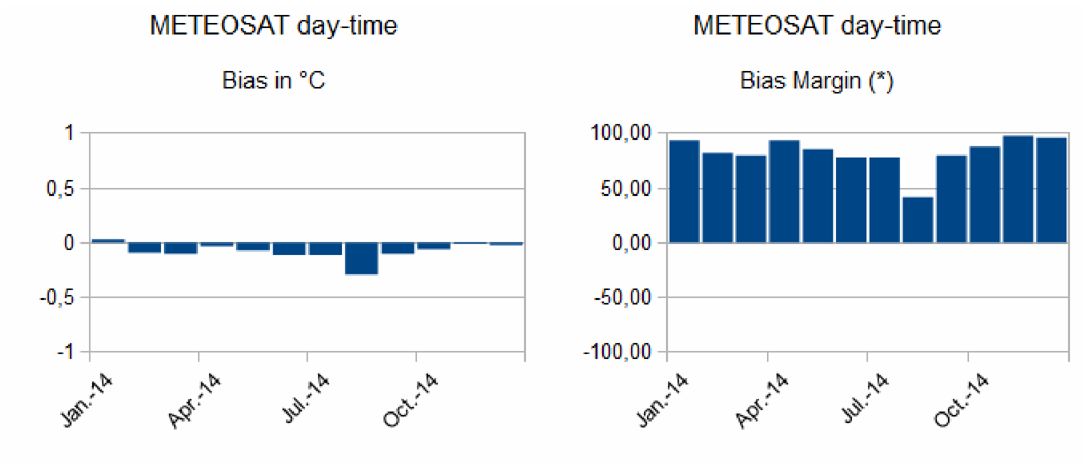


Figure 4 : Left: METEOSAT <u>day</u>-time SST Bias.
Right METEOSAT <u>day</u>-time SST Bias Margin

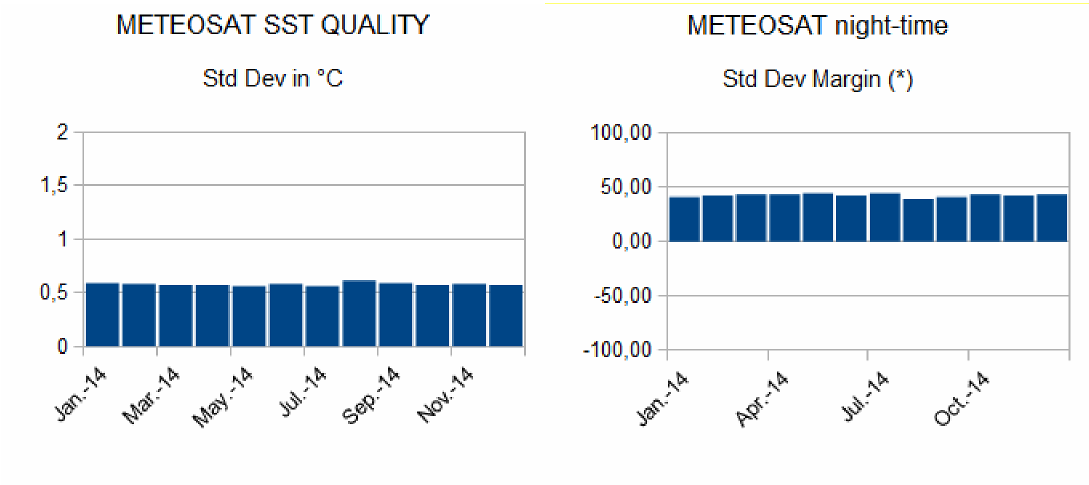


Figure 5 : Left: METEOSAT <u>night</u>-time SST Standard deviation.
Right METEOSAT <u>night</u>-time SST Standard deviation Margin.

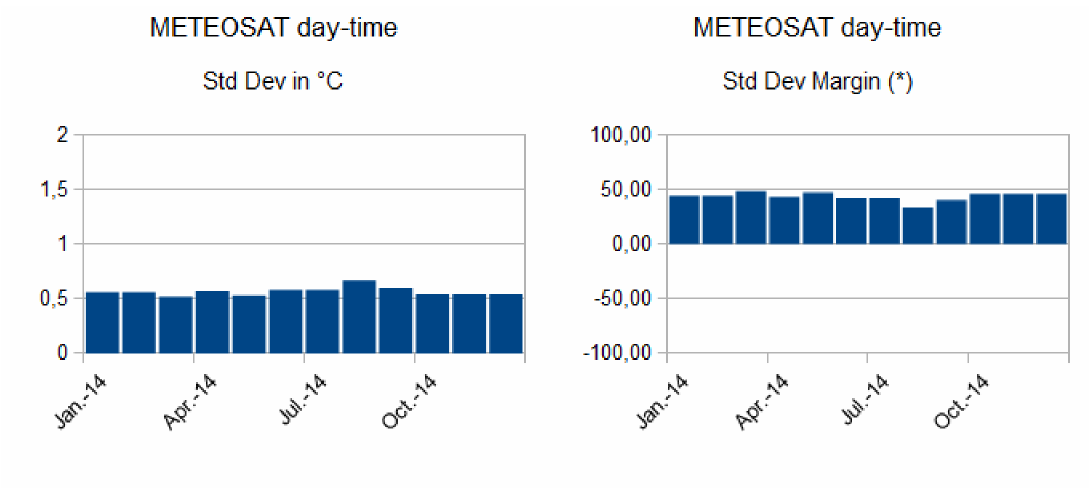


Figure 6 : Left: METEOSAT <u>day</u>-time SST Standard deviation.
Right METEOSAT <u>day</u>-time SST Standard deviation Margin.

Complementary quality assessment statistics on METEOSAT SST :

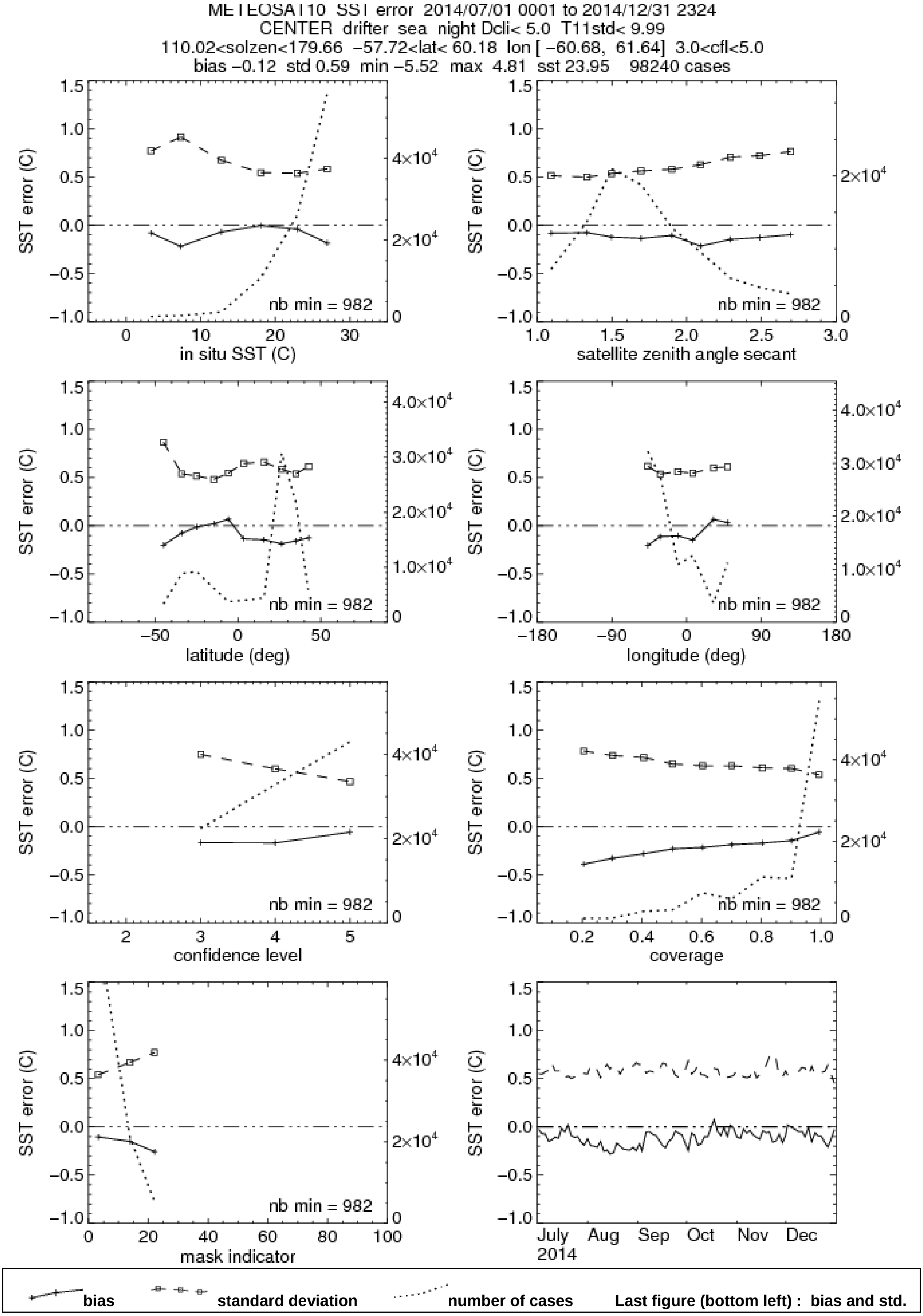


Figure 7 : Complementary quality assessment statistics on METEOSAT SST night-time.

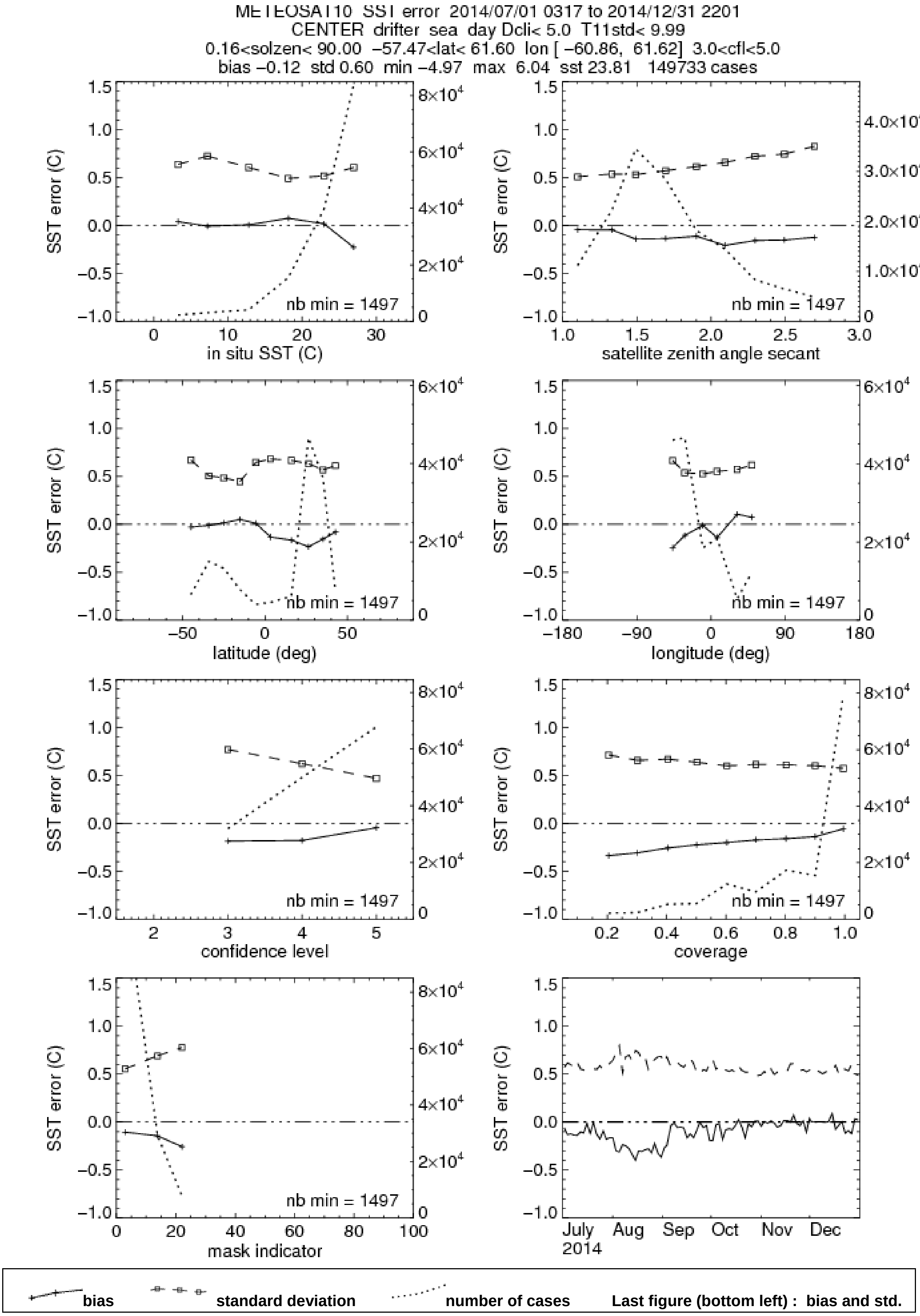


Figure 8 : Complementary quality assessment statistics on METEOSAT SST day-time.

5.1.2 GOES-E SST (OSI-207) quality

The following maps indicate the mean night-time SST error with respect to buoys measurements for quality level 3,4,5 over the reporting period. Monthly maps are available on http://www.osi-saf.org/production/cms/validation_sst_geo.php.

The operational SST retrieval from MSG/SEVIRI and GOES-E updated chain validation report v1.1 (http://www.osi-saf.org/biblio/docs/ss1_geo_sst_val_rep_1_1.pdf) gives further details about the regional bias observed.

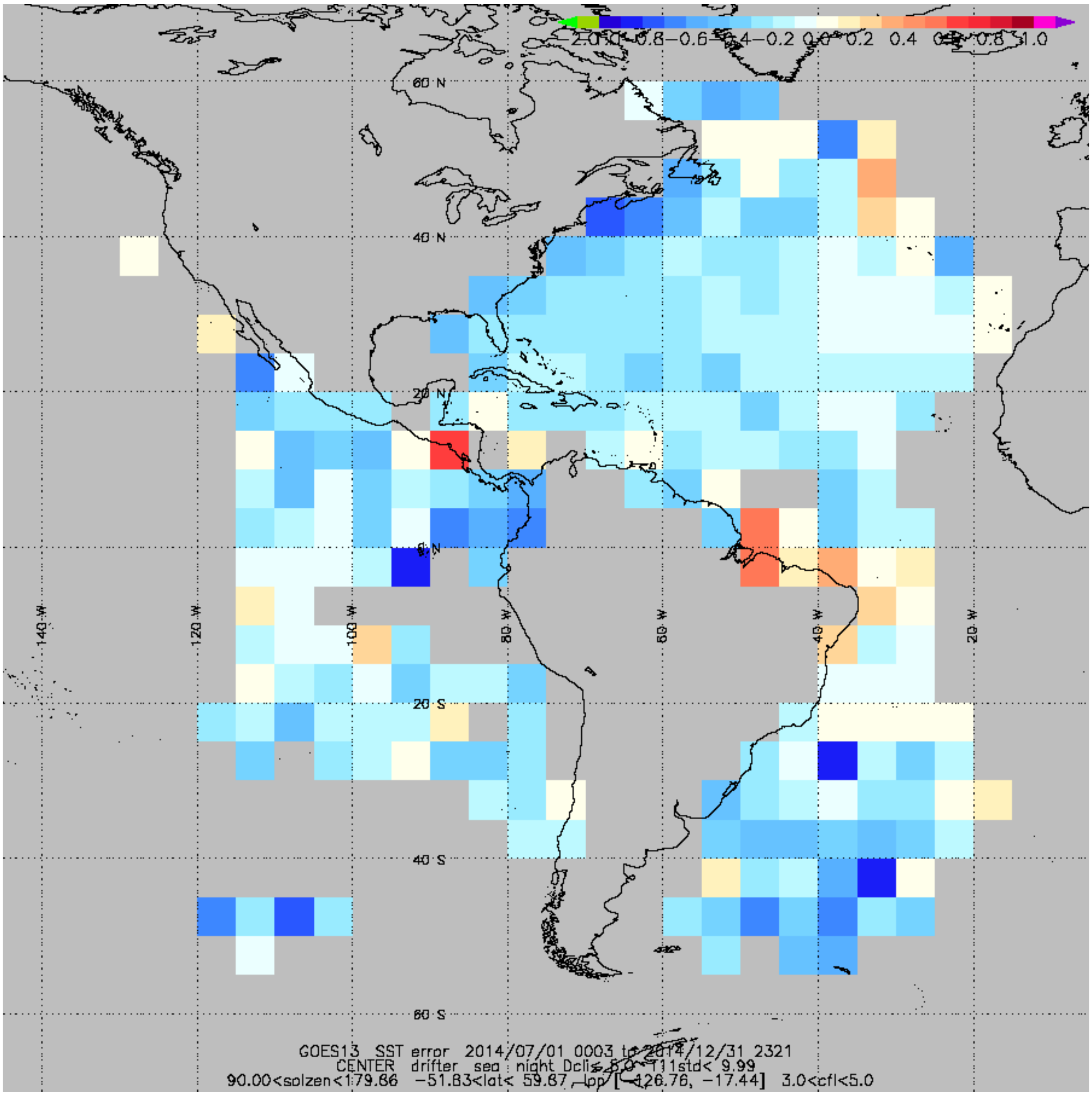


Figure 9 : mean GOES-E <u>night</u>-time SST error with respect to buoys measurements for quality level 3,4,5

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

GOES-E night-time SST quality results 2nd half 2014							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (**)
JUL. 2014	28711	-0,21	0,5	58	0,48	1	52
AUG. 2014	30434	-0,18	0,5	64	0,55	1	45
SEP. 2014	24100	-0,17	0,5	66	0,48	1	52
OCT. 2014	21590	-0,18	0,5	64	0,51	1	49
NOV. 2014	16814	-0,16	0,5	68	0,49	1	51
DEC. 2014	15682	-0,19	0,5	62	0,52	1	48

(*) 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.

table 5 : GOES-E SST quality results over 2nd half 2014, for 3, 4, 5 quality indexes

Comments: Overall quality results are good and quite stable.

The following graphs illustrate the evolution of GOES-E-derived SST quality results over the past 12 months.

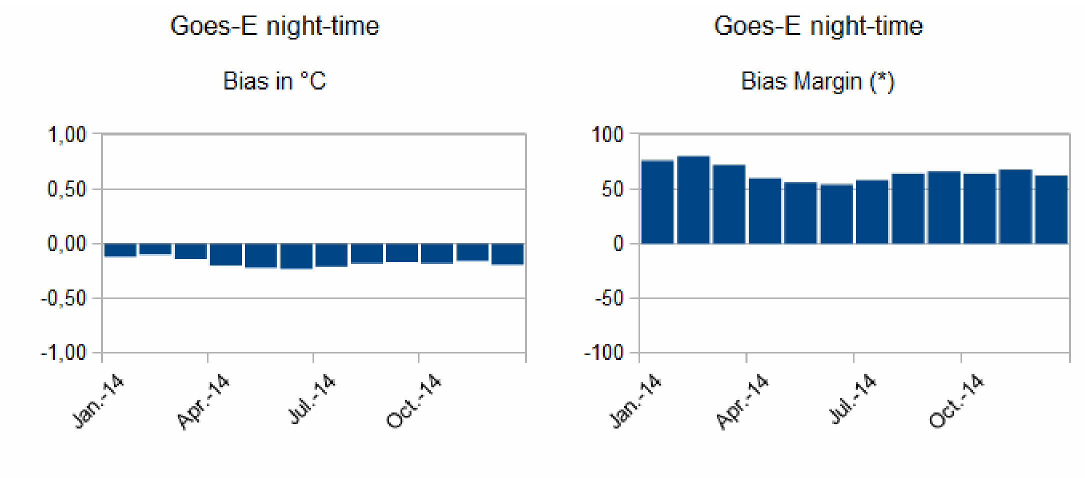


Figure 10 : Left: Goes-E night-time SST Bias.
Right: Goes-E night-time SST Bias Margin.

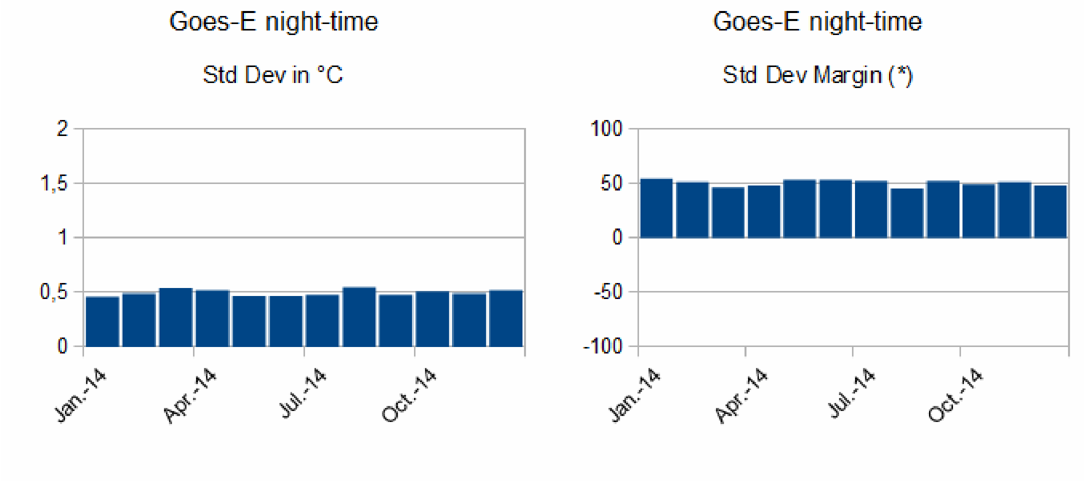


Figure 11 : Left: Goes-E night-time SST Standard deviation.
Right Goes-E night-time SST Standard deviation Margin.

Complementary quality assessment statistics on GOES-E SST :

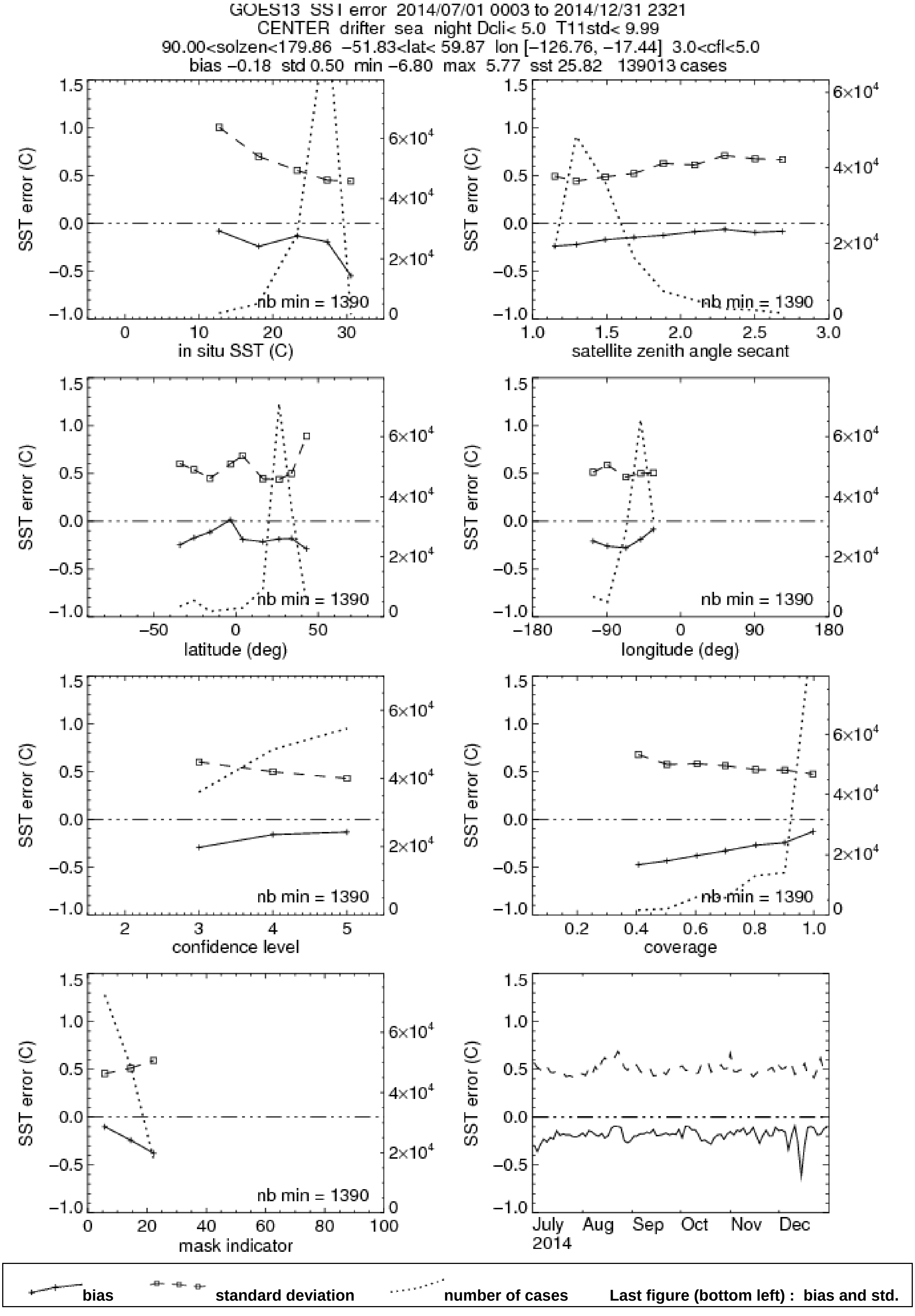


Figure 12 : Complementary quality assessment statistics on GOES-E SST.

5.1.3 NAR SST (OSI-202) quality

The operational NAR SST is processed for satellite/sensor, Metop/AVHRR and S-NPP/VIIRS.
Currently Metop-B and S-NPP 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 S-NPP and Metop satellite.

5.1.3.1 NPP NAR SST quality

The following maps indicate the mean night-time and day-time SST error with respect to buoys measurements for quality level 3,4,5 over the reporting period. Monthly maps are available on http://www.osi-saf.org/production/cms/validation_sst_leo.php.

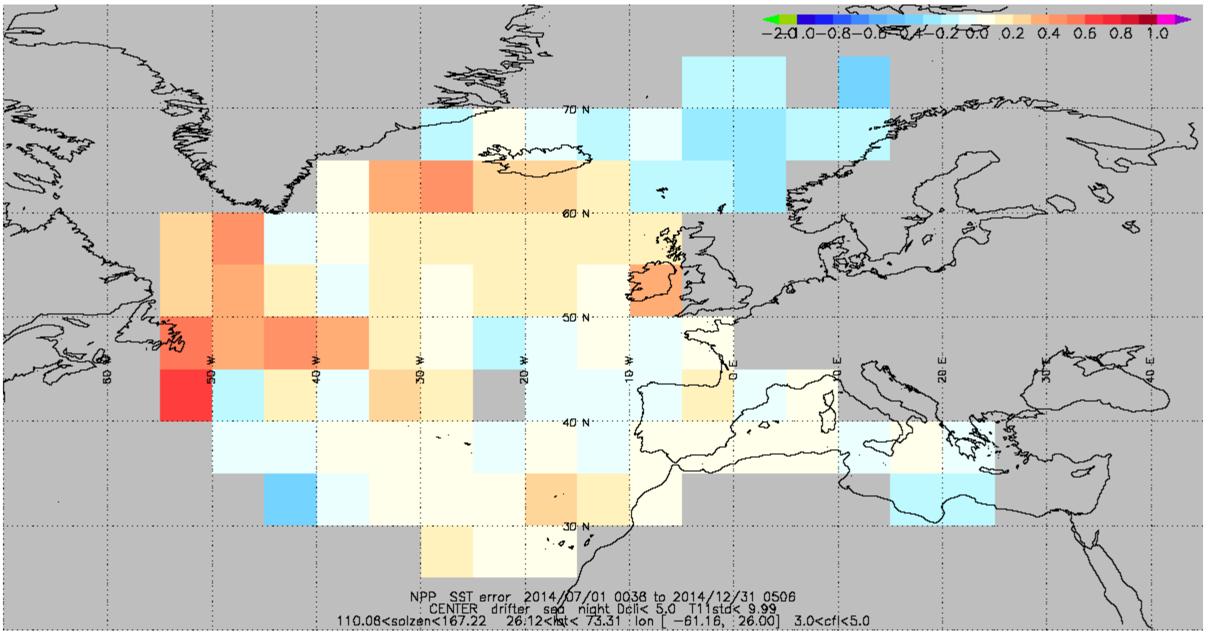


Figure 13 : mean NPP NAR night-time SST error with respect to buoys measurements for quality level 3,4,5

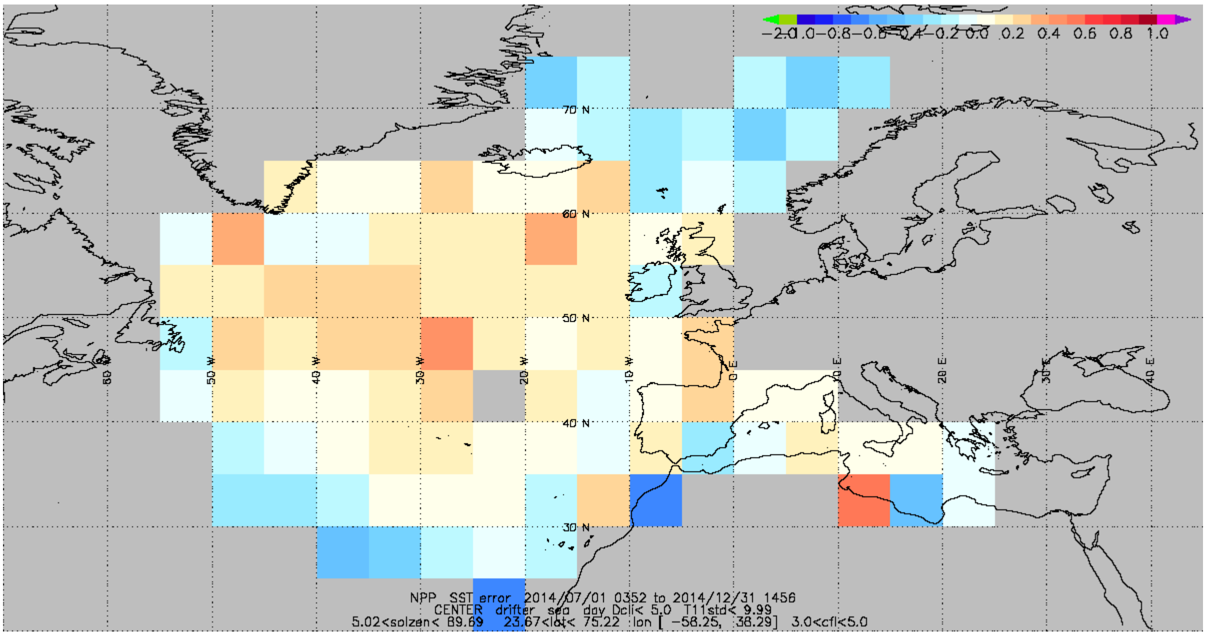


Figure 14 : mean NPP NAR <u>day</u>-time SST error with respect to buoys measurements for quality level 3,4,5

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

NPP NAR night-time SST quality results over 2nd half 2014							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (**)
JUL. 2014	694	0,06	0,5	88	0,35	0,8	56
AUG. 2014	767	0,03	0,5	94	0,34	0,8	58
SEP. 2014	675	0,01	0,5	98	0,38	0,8	53
OCT. 2014	840	0,02	0,5	96	0,41	0,8	49
NOV. 2014	573	0,03	0,5	94	0,42	0,8	48
DEC. 2014	464	0,14	0,5	72	0,29	0,8	64
NPP NAR day-time SST quality results over 2nd half 2014							
JUL. 2014	1524	-0,070	0,5	86,00	0,67	0,8	16,25
AUG. 2014	1452	-0,010	0,5	98,00	0,57	0,8	28,75
SEP. 2014	1141	0,03	0,5	94,00	0,59	0,8	26,25
OCT. 2014	982	0,060	0,5	88,00	0,51	0,8	36,25
NOV. 2014	609	0,140	0,5	72,00	0,46	0,8	42,50
DEC. 2014	387	0,120	0,5	76,00	0,49	0,8	38,75
(*) 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.							

table 6 : Quality results for NPP NAR SST over 2nd half 2014, for 3, 4, 5 quality indexes

Comments: Overall quality results are good and quite stable.

The following graphs illustrate the evolution of NPP NAR SST quality results over the past 12 months.

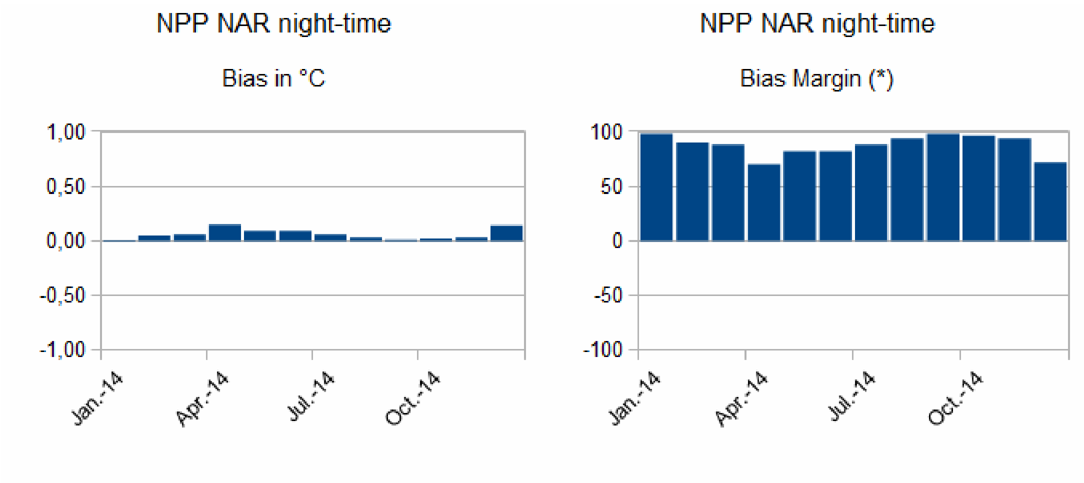


Figure 15 : Left: NPP NAR night-time SST Bias.
Right : NPP NAR night-time SST Bias Margin.

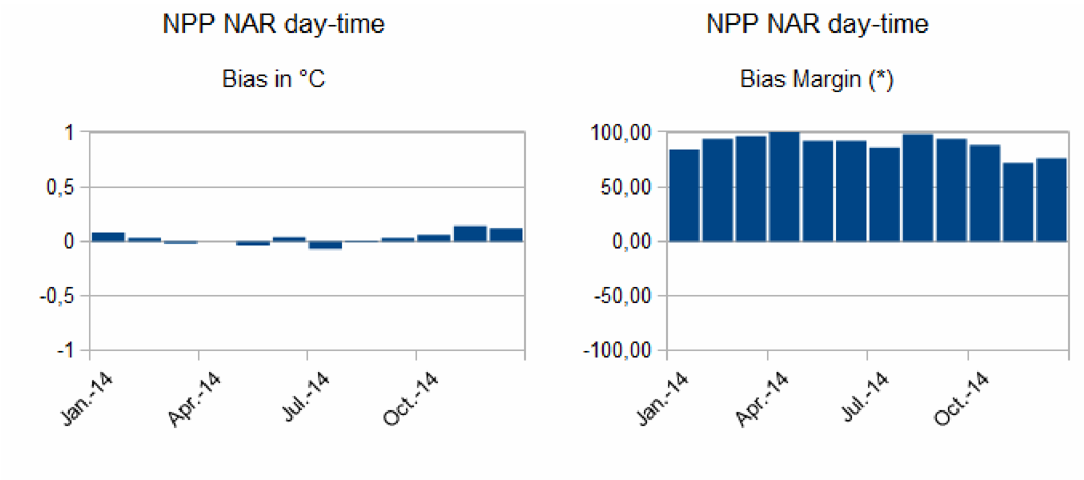


Figure 16 : Left: NPP NAR day-time SST Bias.
Right : NPP NAR day-time SST Bias Margin.

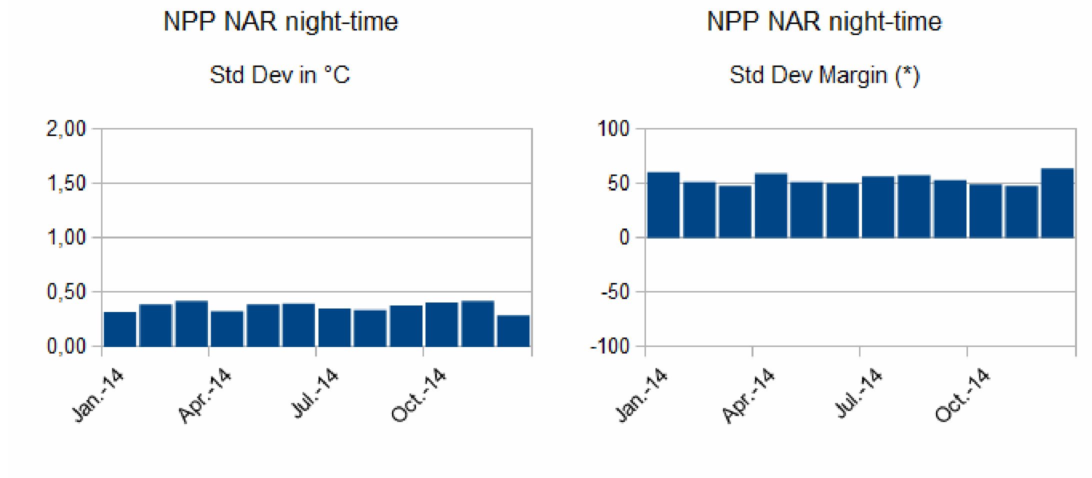


Figure 17 : Left: NPP NAR <u>night</u>-time SST Standard deviation.
Right : NPP NAR <u>night</u>-time SST Standard deviation Margin.

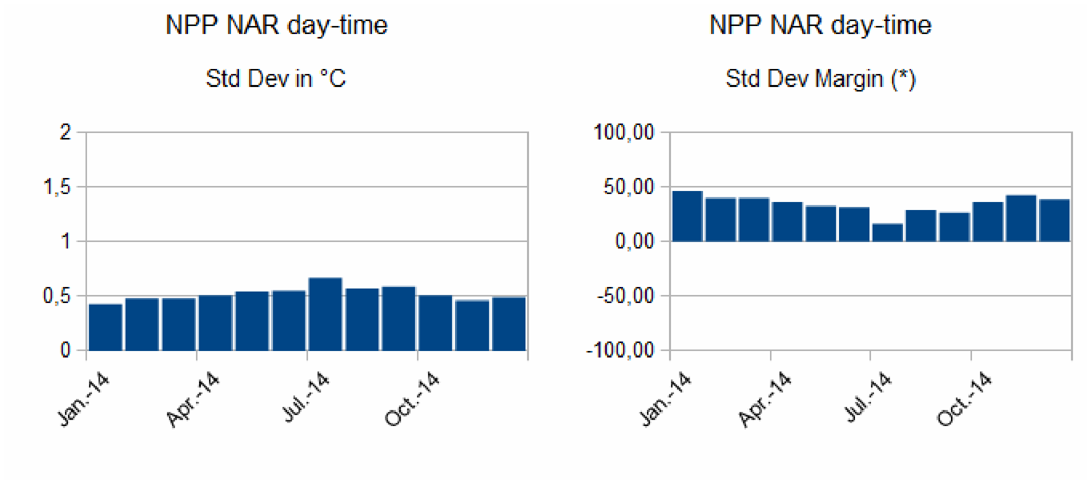


Figure 18 : Left: NPP NAR <u>day</u>-time SST Standard deviation.
Right : NPP NAR <u>day</u>-time SST Standard deviation Margin.

Complementary quality assessment statistics on NPP NAR SST :

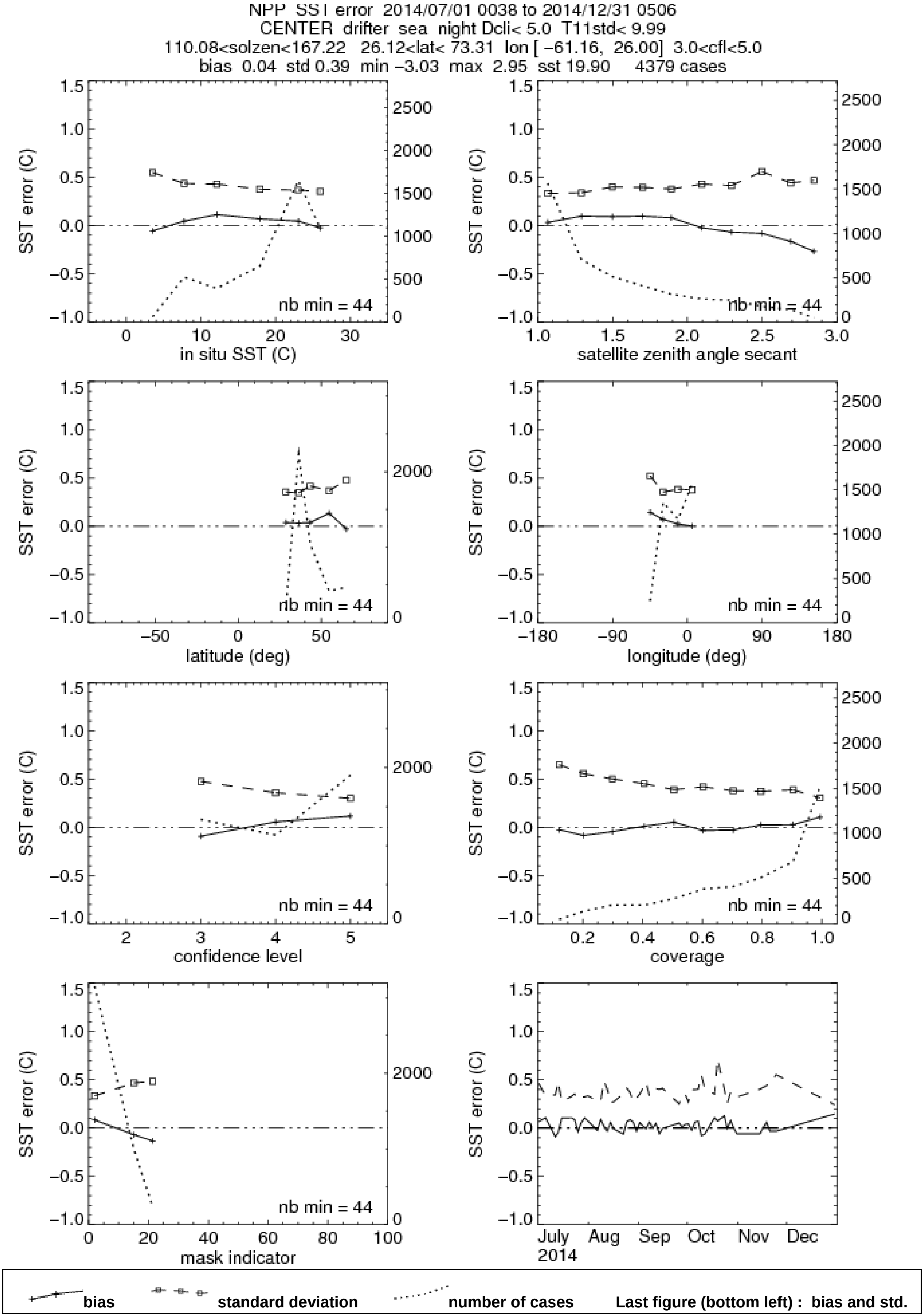


Figure 19 : Complementary quality assessment statistics on NPP NAR SST night-time.

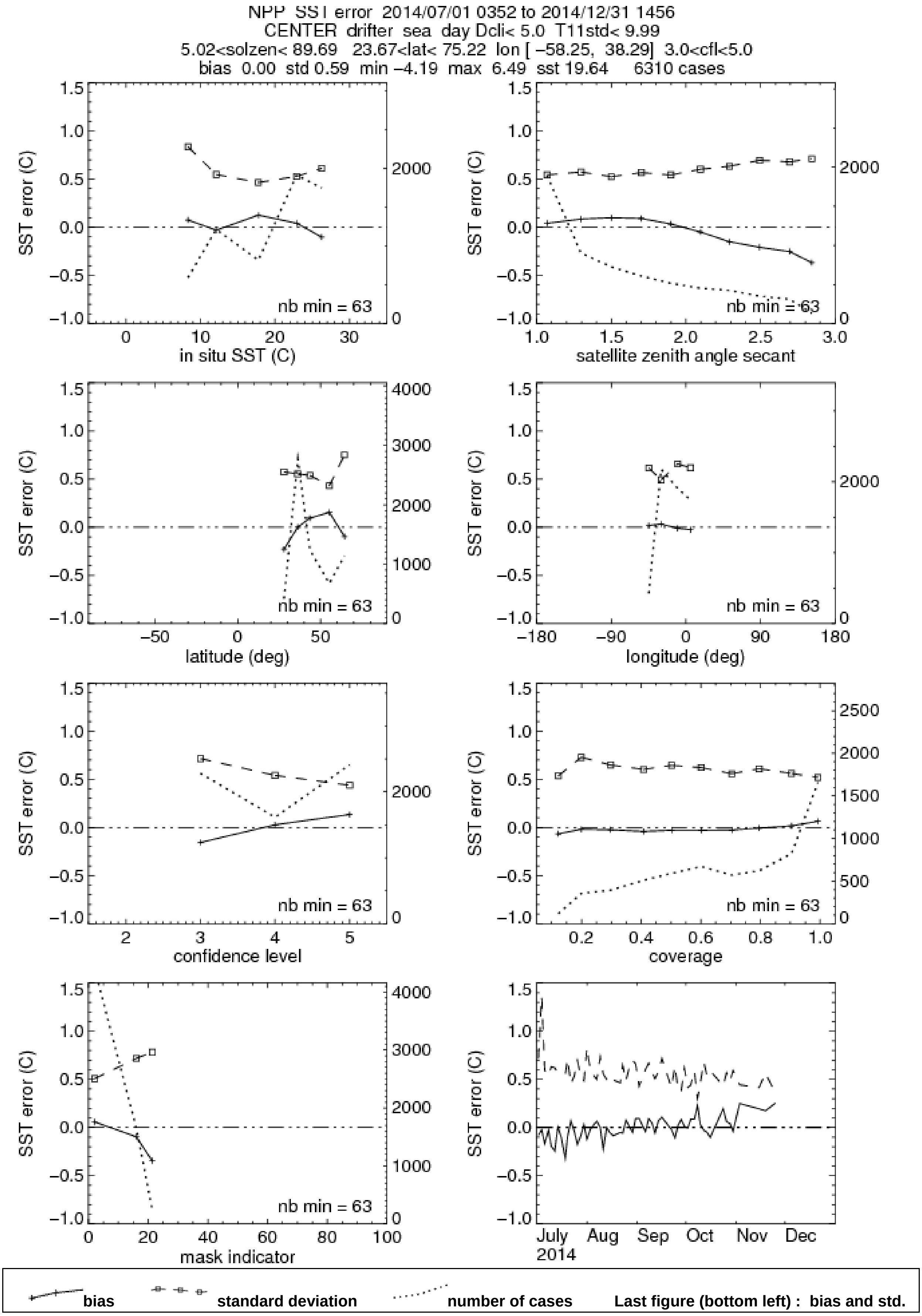


Figure 20 : Complementary quality assessment statistics on NPP NAR SST day-time.

5.1.3.2 Metop NAR SST quality

The following maps indicate the mean night-time and day-time SST error with respect to buoys measurements for quality level 3,4,5 over the reporting period. Monthly maps are available on http://www.osi-saf.org/production/cms/validation_sst_leo.php.

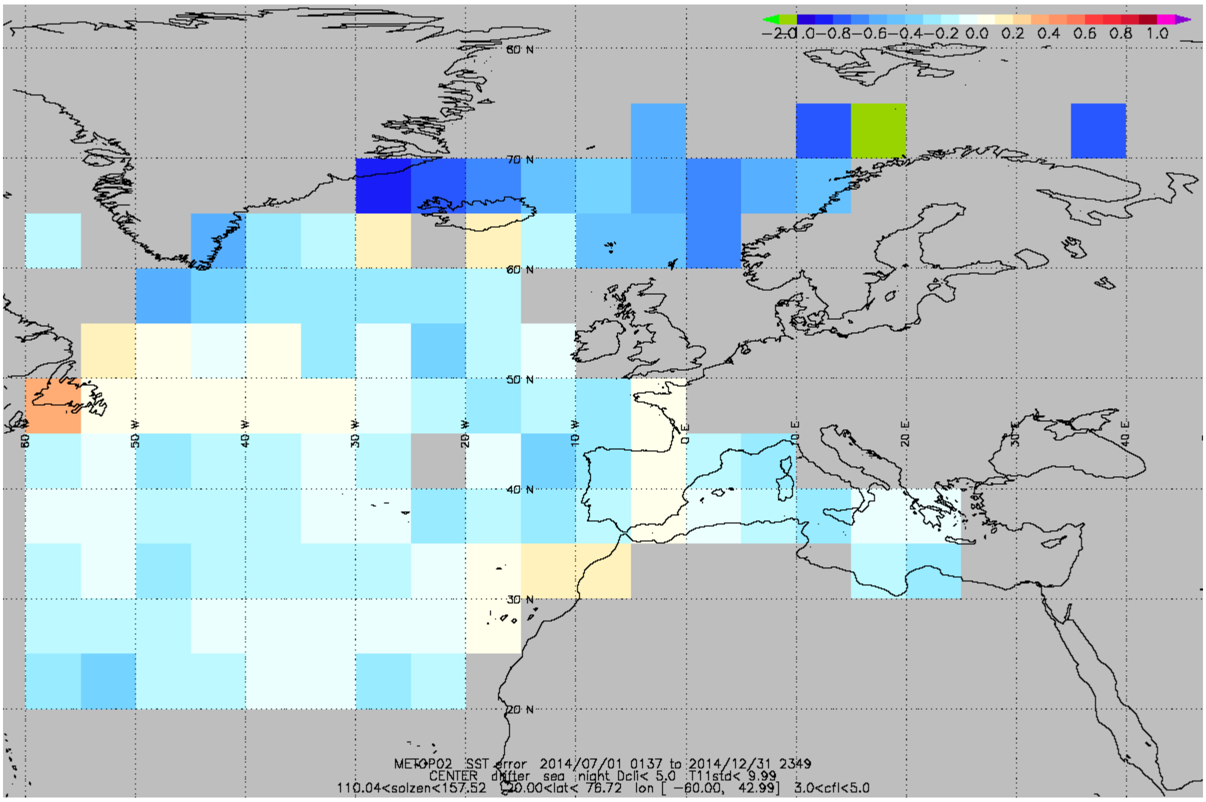


Figure 21 : mean Metop-A NAR night-time SST error with respect to buoys measurements for quality level 3,4,5

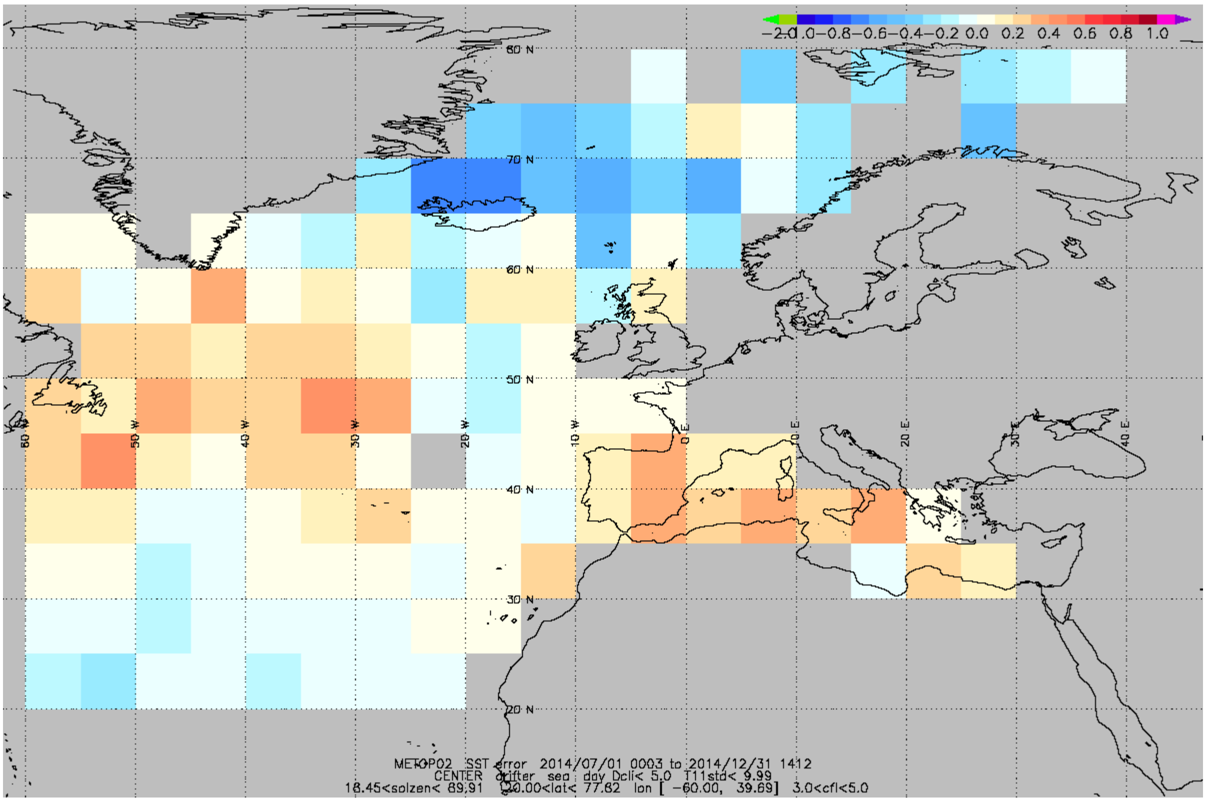


Figure 22 : mean Metop-A NAR day-time SST error with respect to buoys measurements for quality level 3,4,5

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

Metop-A NAR night-time SST quality results over 2nd half 2014							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (**)
JUL. 2014	1500	-0,04	0,5	92,00	0,35	0,8	56,25
AUG. 2014	2275	-0,18	0,5	64,00	0,40	0,8	50,00
SEP. 2014	2046	-0,15	0,5	70,00	0,37	0,8	53,75
OCT. 2014	1884	-0,12	0,5	76,00	0,40	0,8	50,00
NOV. 2014	1323	-0,16	0,5	68,00	0,43	0,8	46,25
DEC. 2014	1027	-0,16	0,5	68,00	0,37	0,8	53,75
Metop-A NAR day-time SST quality results over 2nd half 2014							
JUL. 2014	4212	0,010	0,5	98,00	0,72	0,8	10,00
AUG. 2014	3965	-0,100	0,5	80,00	0,63	0,8	21,25
SEP. 2014	2811	0	0,5	100,00	0,53	0,8	33,75
OCT. 2014	2200	-0,020	0,5	96,00	0,47	0,8	41,25
NOV. 2014	1473	0,020	0,5	96,00	0,53	0,8	33,75
DEC. 2014	980	0,080	0,5	84,00	0,43	0,8	46,25
(*) 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.							

table 7 : Quality results for Metop-A NAR SST over 2nd half 2014, for 3, 4, 5 quality indexes

Comments:

The following graphs illustrate the evolution of Metop-A NAR SST quality results over the past 12 months.

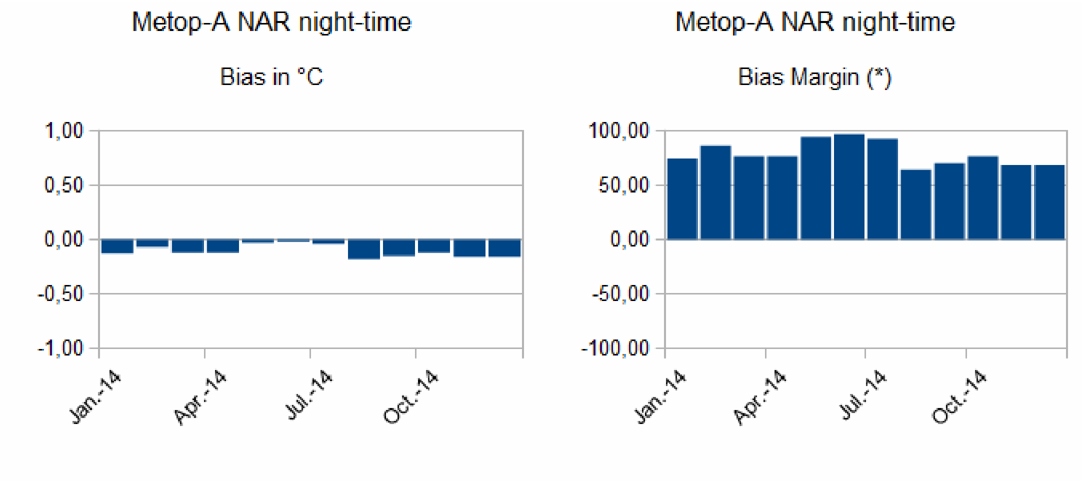


Figure 23 : Left: Metop-A NAR <u>night</u>-time SST Bias.
Right: Metop-A NAR <u>night</u>-time SST Bias Margin.

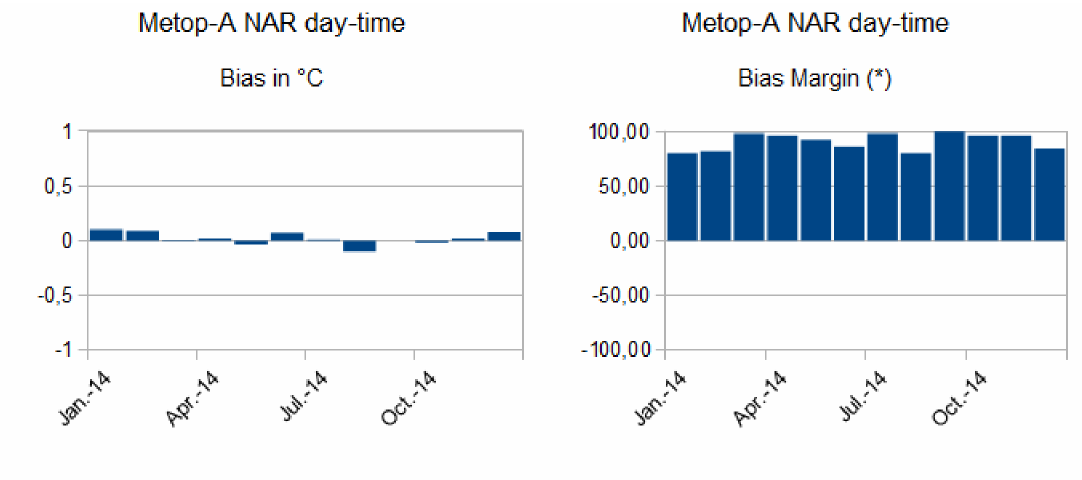


Figure 24 : Left: Metop-A NAR <u>day</u>-time SST Bias.
Right: Metop-A NAR <u>day</u>-time SST Bias Margin.

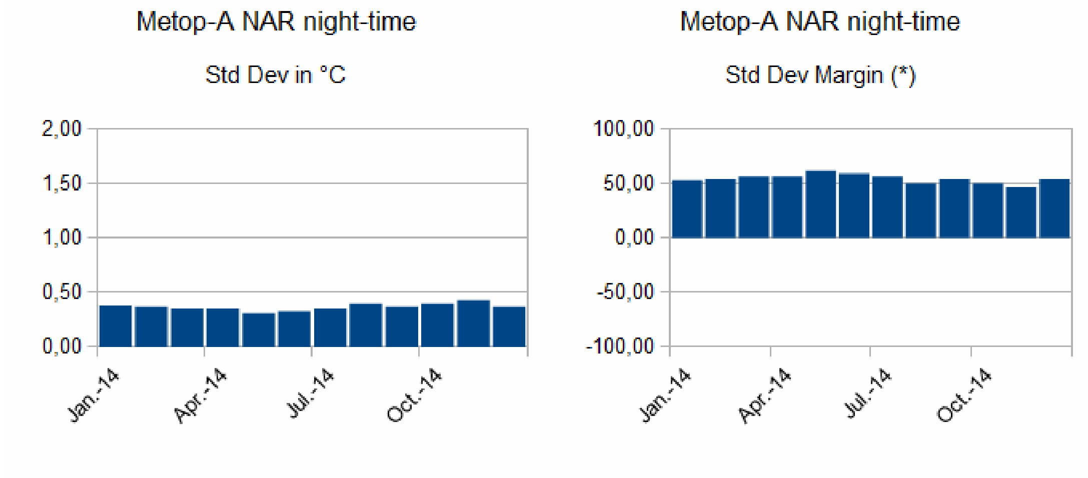


Figure 25 : Left: Metop-A NAR night-time SST Standard deviation. Right: Metop-A NAR night-time SST Standard deviation Margin.

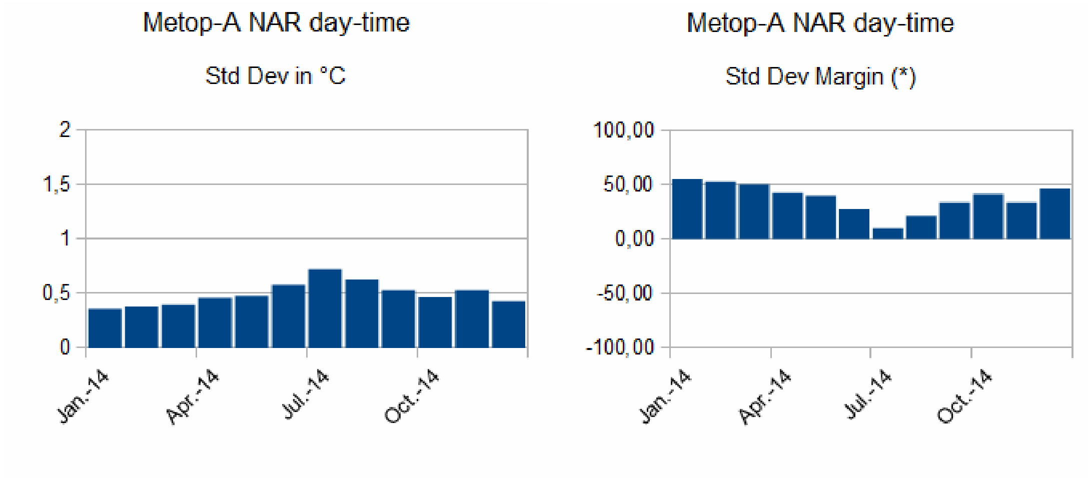


Figure 26 : Left: Metop-A NAR day-time SST Standard deviation. Right: Metop-A NAR day-time SST Standard deviation Margin.

Complementary quality assessment statistics on Metop NAR SST :

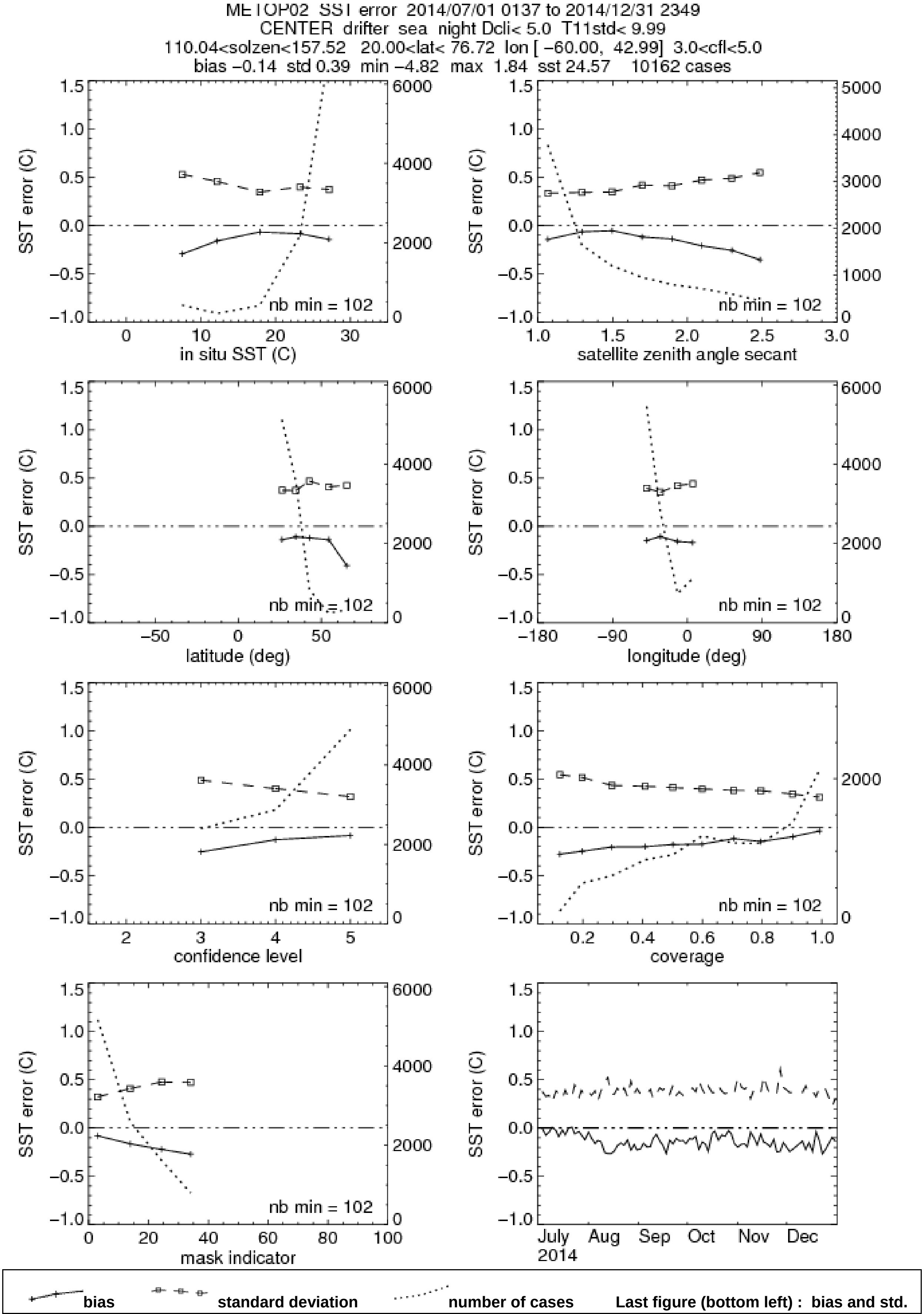


Figure 27 : Complementary quality assessment statistics on Metop NAR SST night-time.

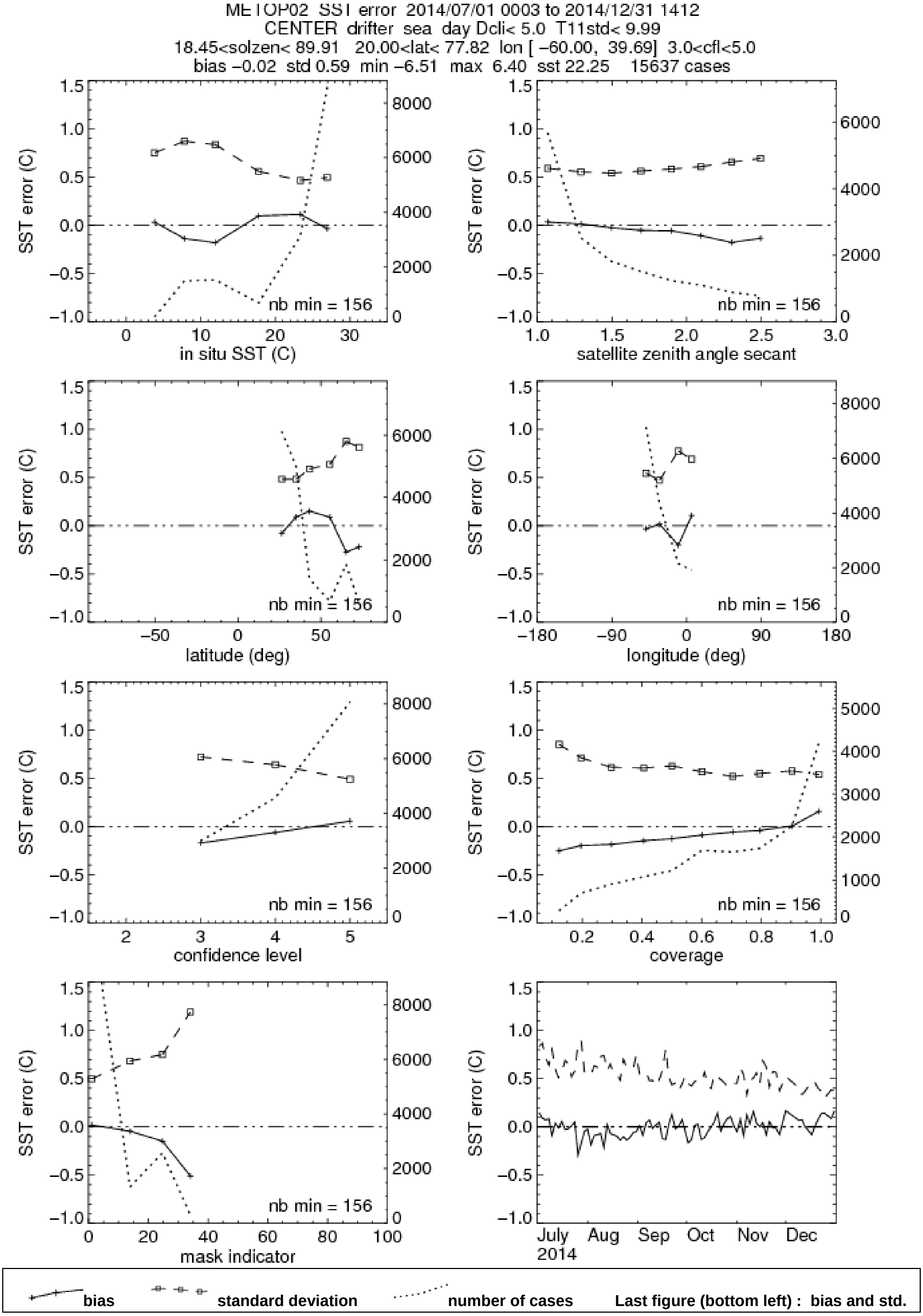


Figure 28 : Complementary quality assessment statistics on Metop NAR SST day-time.

5.1.4 GLB SST (OSI-201) and MGR SST (OSI-204) quality

The OSI SAF SST products on global coverage (GLB SST and MGR SST) are based on Metop/AVHRR data, currently Metop-A.
The following maps indicate the mean night-time and day-time SST error with respect to buoys measurements for quality level 3,4,5 over the reporting period. Monthly maps are available on http://www.osi-saf.org/production/cms/validation_sst_leo.php.

The validation Metop/AVHRR SST validation report v2.0 (http://www.osi-saf.org/biblio/docs/ss1_sst_metop_validation_report_2_0.pdf) gives further details about the regional bias observed and their origin.

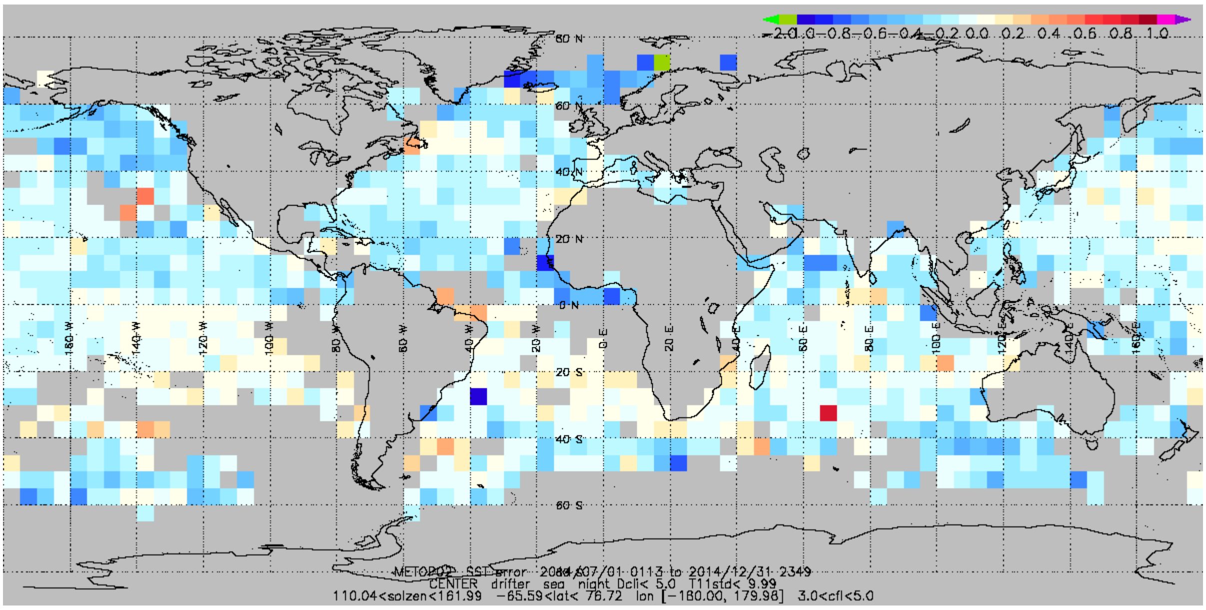


Figure 29 : mean Metop-A night-time SST error with respect to buoys measurements for quality level 3,4,5

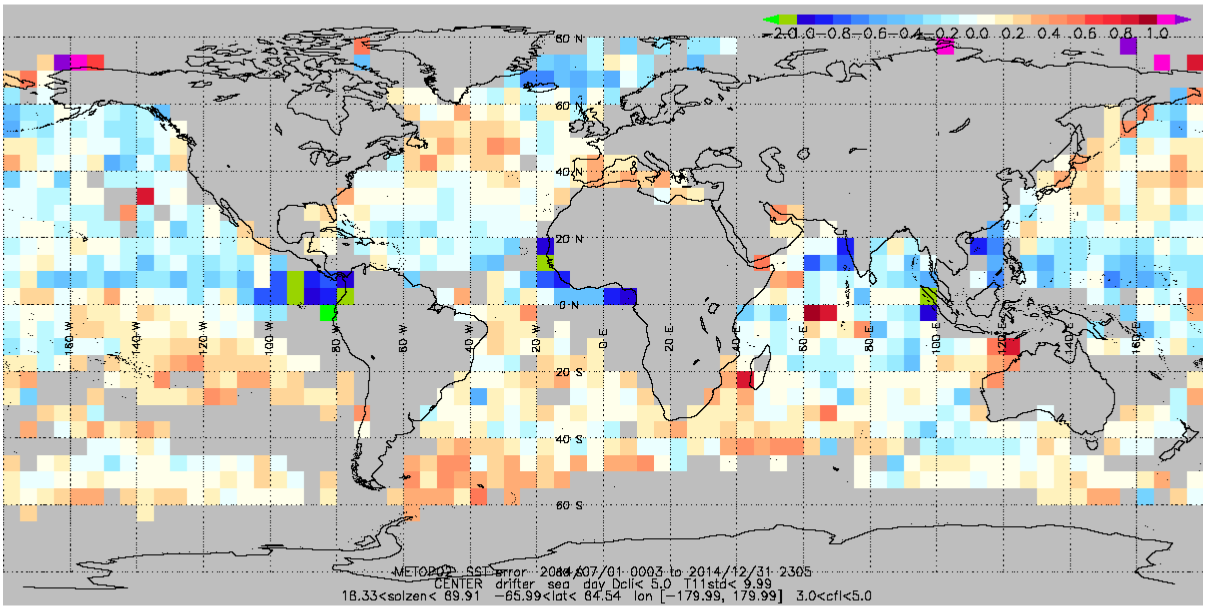


Figure 30 : mean Metop-A day-time SST error with respect to buoys measurements for quality level 3,4,5

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

Global Metop-A night-time SST quality results over 2nd half 2014							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (**)
JUL. 2014	6216	-0,10	0,5	80,00	0,44	0,8	45,00
AUG. 2014	7828	-0,13	0,5	74,00	0,43	0,8	46,25
SEP. 2014	7955	-0,12	0,5	76,00	0,41	0,8	48,75
OCT. 2014	8159	-0,10	0,5	80,00	0,42	0,8	47,50
NOV. 2014	7027	-0,10	0,5	80,00	0,41	0,8	48,75
DEC. 2014	6232	-0,12	0,5	76,00	0,41	0,8	48,75
Global Metop-A day-time SST quality results over 2nd half 2014							
JUL. 2014	9879	-0,050	0,5	90,00	0,71	0,8	11,25
AUG. 2014	10662	-0,050	0,5	90,00	0,66	0,8	17,50
SEP. 2014	9701	-0,02	0,5	96,00	0,53	0,8	33,75
OCT. 2014	9294	0,020	0,5	96,00	0,53	0,8	33,75
NOV. 2014	8276	0,050	0,5	90,00	0,54	0,8	32,50
DEC. 2014	7779	0,050	0,5	90,00	0,55	0,8	31,25
(*) 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.							

table 8 : Quality results for global METOP SST over 2nd half 2014, for 3,4,5 quality indexes

Comments: Overall quality results are good and quite stable.
However a strong negative bias can be seen on the day-time SST error map in the Eastern Equatorial Pacific. This is due to two factors: first a very small number of drifter measurements in the validation boxes; and high cloud coverage in the area. Undetected clouds (border of clouds, sub-pixel sized clouds or transparent clouds) are dragging SST retrievals down and their impact is highly visible because of the low number of drifters in the area. Also, this problem is apparent only during daytime which is possibly due to the periodicity of the cloud coverage.

The following graphs illustrate the evolution of global METOP SST quality results over the past 12 months.

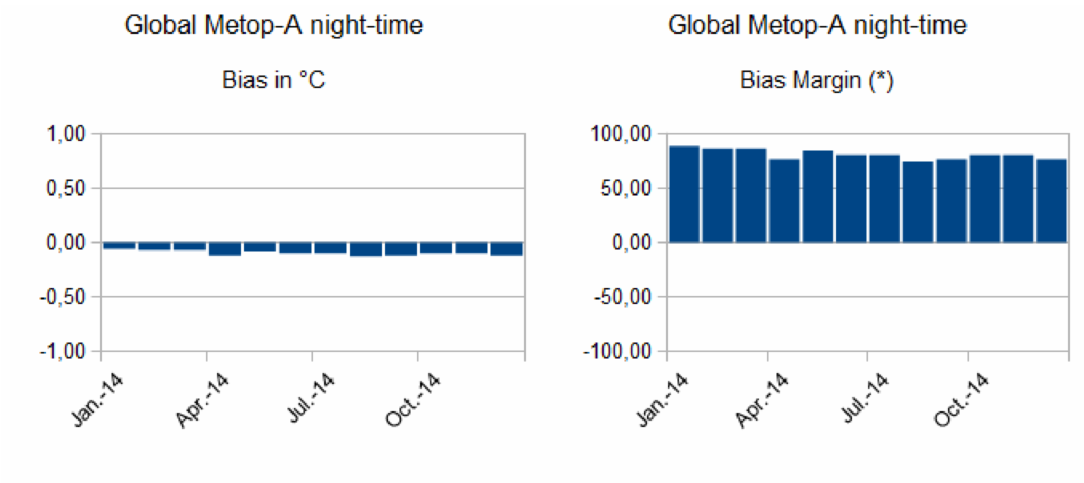


Figure 31 : Left : global Metop-A <u>night</u>-time SST Bias.
Right : global Metop-A <u>night</u>-time SST Bias Margin.

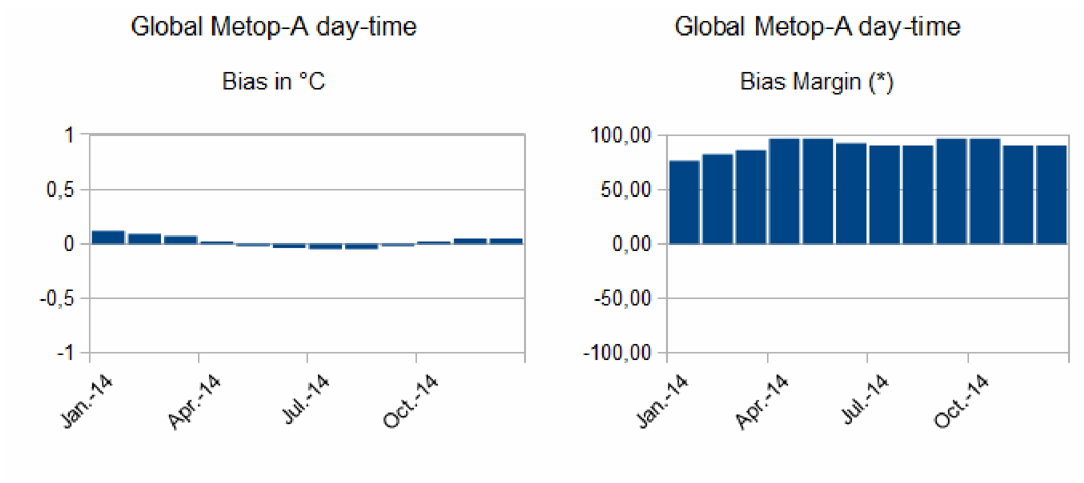


Figure 32 : Left : global Metop-A <u>day</u>-time SST Bias.
Right : global Metop-A <u>day</u>-time SST Bias Margin.

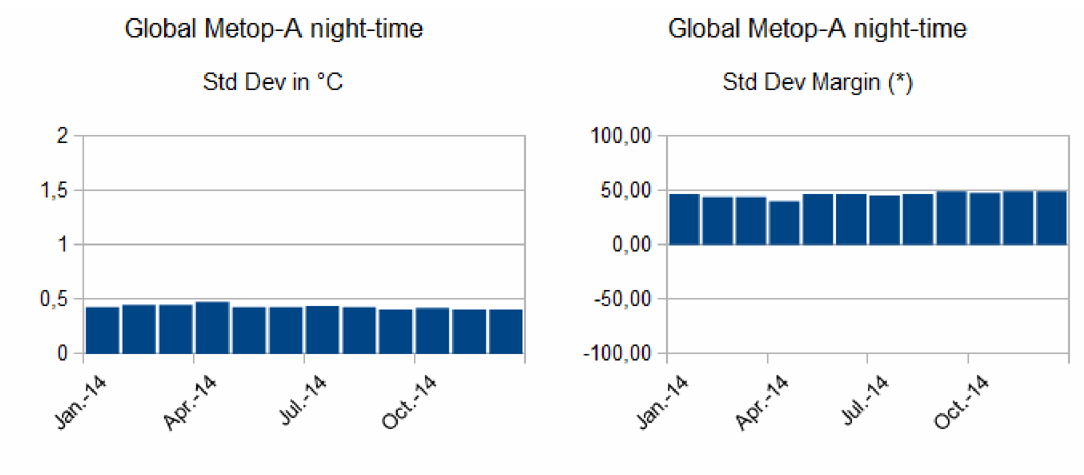


Figure 33 : Left: global Metop-A <u>night</u>-time SST Standard deviation.
Right: global Metop-A <u>night</u>-time SST Standard deviation Margin.

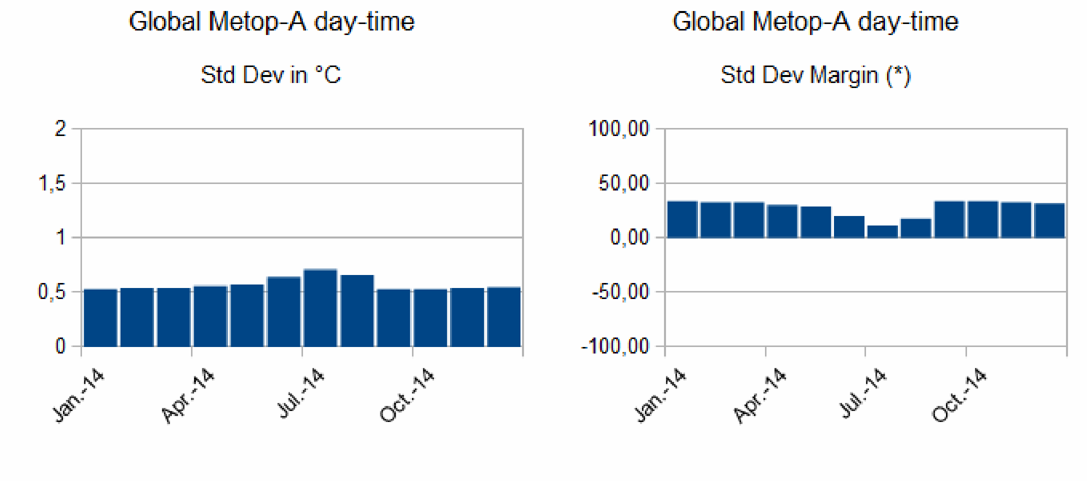


Figure 34 : Left: global Metop-A day-time SST Standard deviation. Right: global Metop-A day-time SST Standard deviation Margin.

Complementary quality assessment statistics on Metop GLB SST :

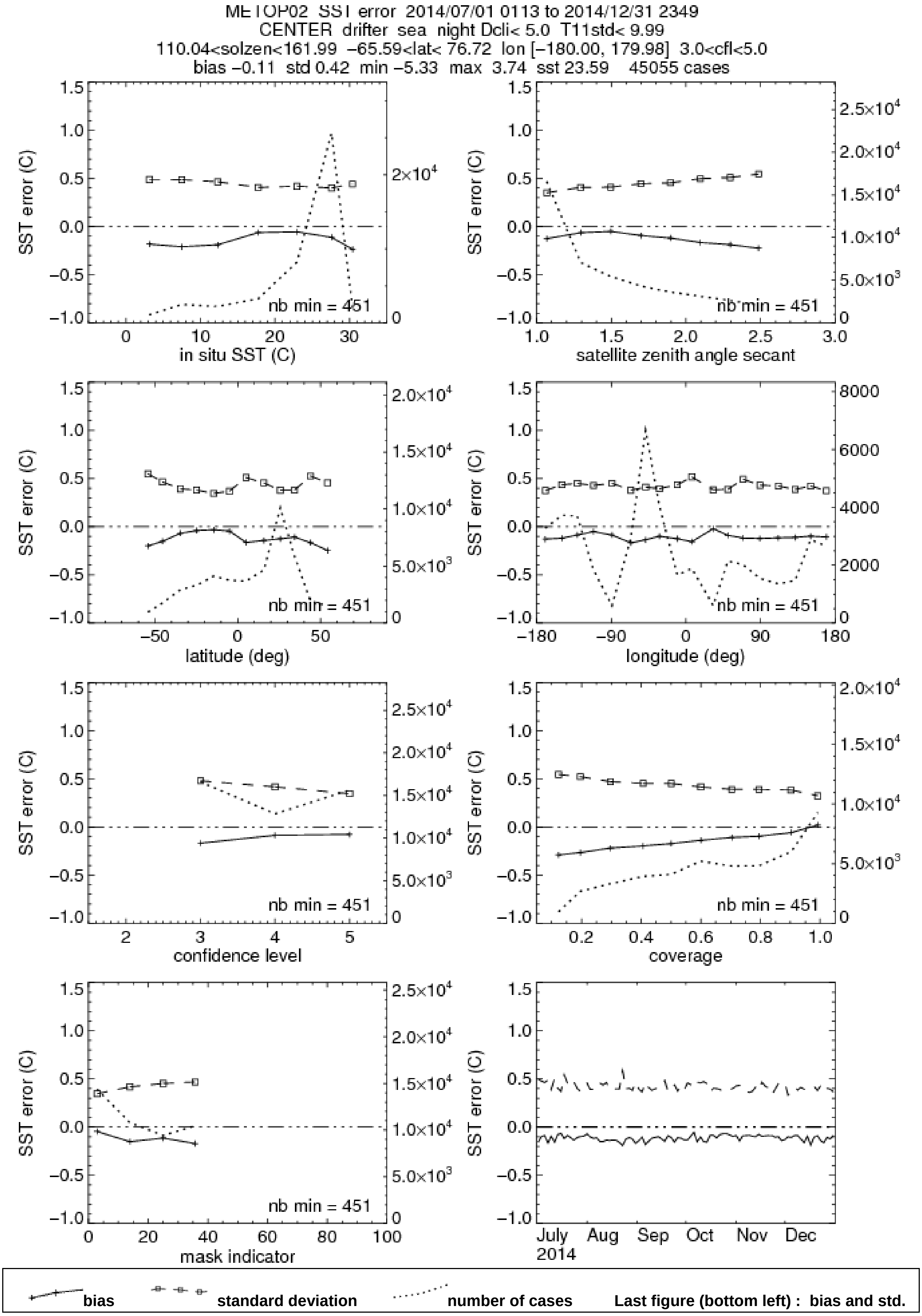
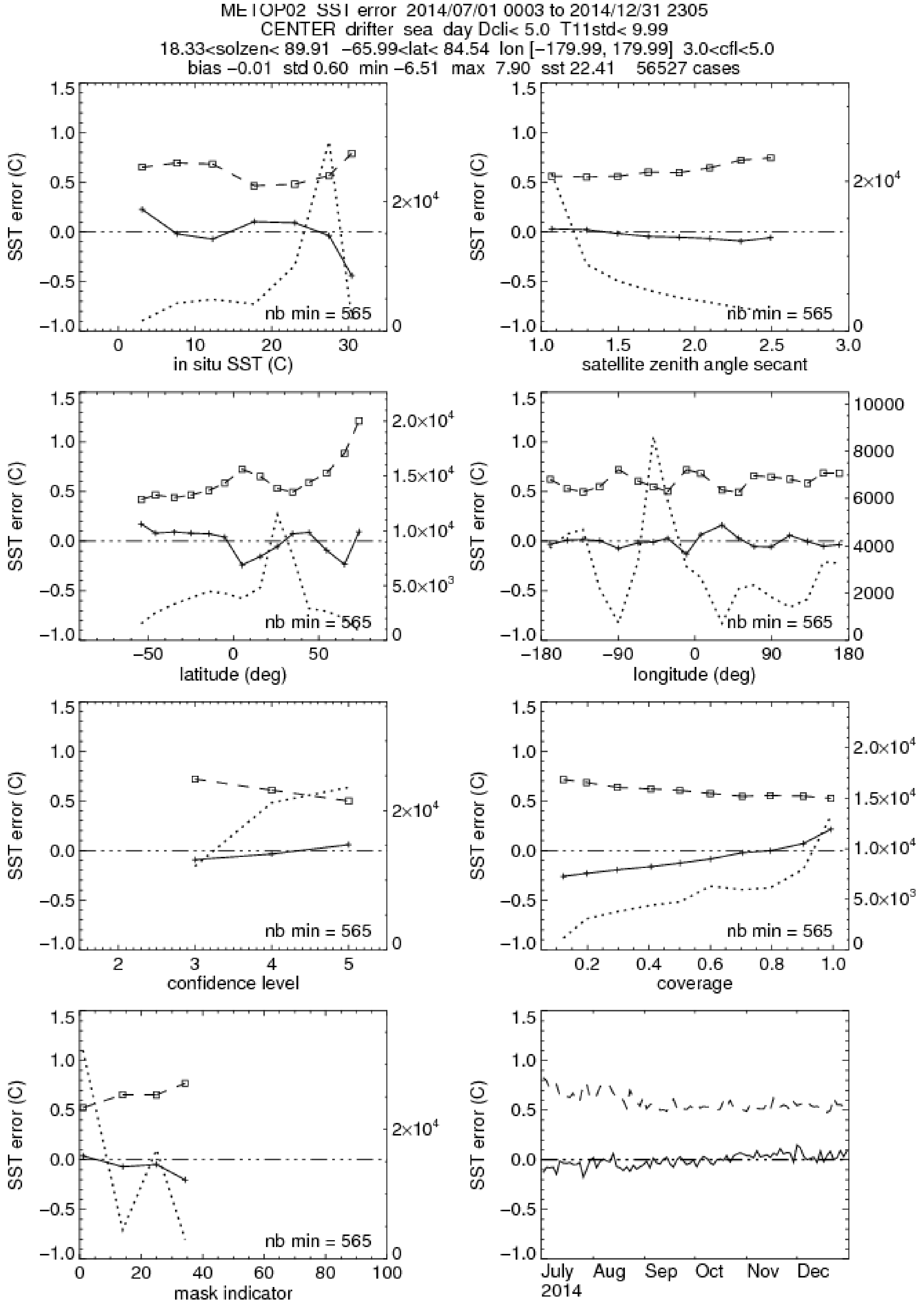


Figure 35 : Complementary quality assessment statistics on Metop GLB SST <u>night-time</u>.



bias standard deviation number of cases **Last figure (bottom left) : bias and std.**

Figure 36 : Complementary quality assessment statistics on Metop GLB SST day-time.

5.1.5 AHL SST (OSI-203) 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.

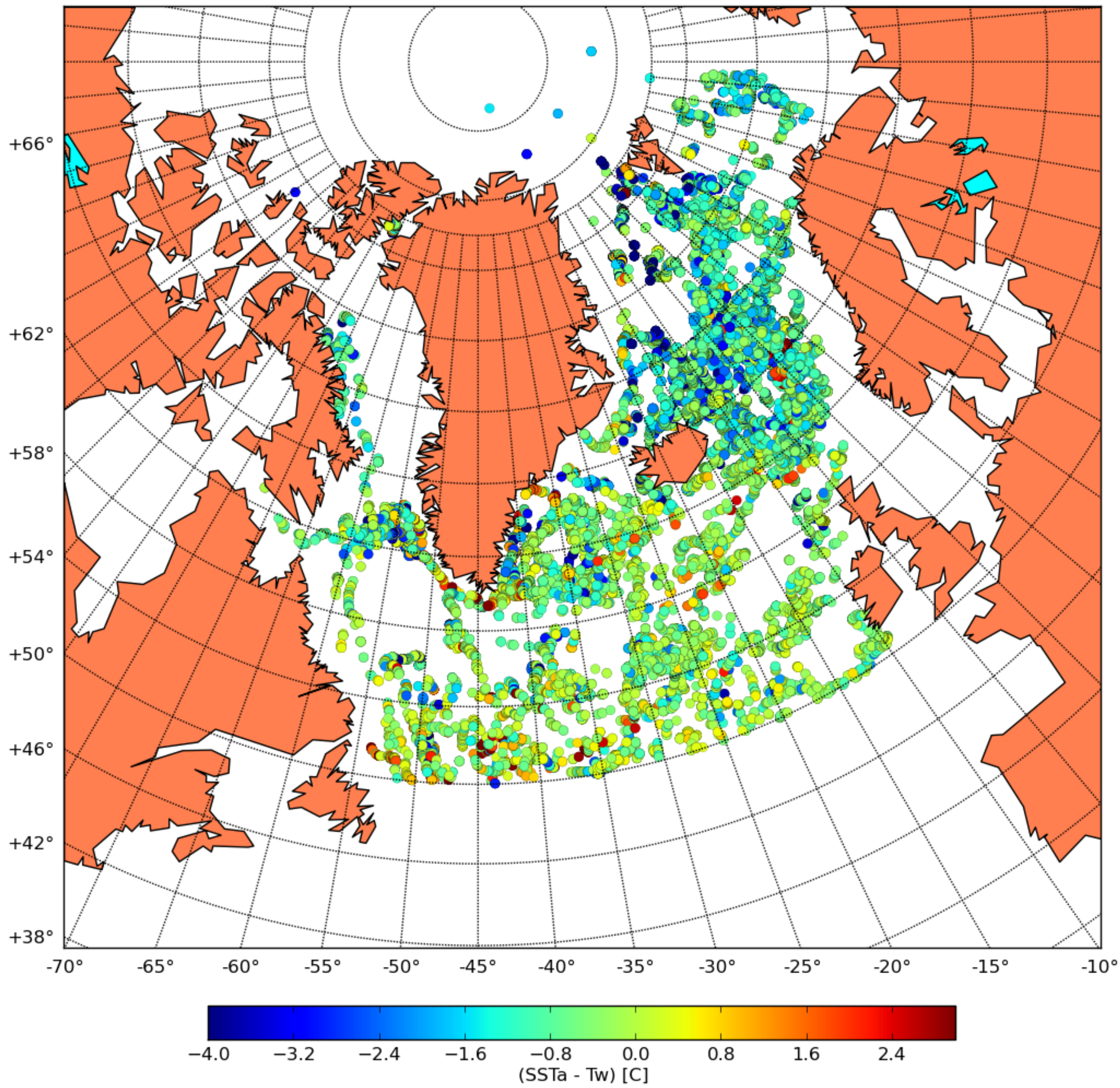


Figure 37 : JUL. to DEC. 2014 mean AHL night-time SST error with respect to buoys measurements for quality level 3,4,5

AHL AVHRR SST quality results over JAN. 2014 to DEC. 2014, night-time							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (**)
JAN. 2014	1342	-0.51	0.50	-2.11	0.65	0.80	18.44
FEB. 2014	494	-0.60	0.50	-20.60	0.75	0.80	6.28
MAR. 2014	1318	-0.56	0.50	-12.16	0.70	0.80	13.05
APR. 2014	1388	-0.55	0.50	-9.78	0.73	0.80	9.10
MAY 2014	1142	-0.56	0.50	-12.73	0.77	0.80	3.69
JUN. 2014	835	-0.55	0.50	-10.21	0.91	0.80	-13.16
JUL. 2014	1219	-0.41	0.50	18.65	1.06	0.80	-32.59
AUG. 2014	1606	-0.57	0.50	-13.27	1.02	0.80	-27.14
SEP. 2014	1743	-0.57	0.50	-14.37	0.86	0.80	-7.75
OCT. 2014	1668	-0.47	0.50	6.59	0.70	0.80	12.05
NOV. 2014	1294	-0.47	0.50	6.87	0.74	0.80	7.73
DEC. 2014	945	-0.58	0.50	-16.56	0.75	0.80	5.86
AHL AVHRR SST quality results over JAN. 2014 to DEC. 2014, day-time							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (**)
JAN. 2014	1486	-0.63	0.50	-25.28	0.72	0.80	10.57
FEB. 2014	407	-0.67	0.50	-33.52	0.84	0.80	-4.50
MAR. 2014	1153	-0.46	0.50	8.22	0.66	0.80	17.74
APR. 2014	1177	-0.34	0.50	31.88	0.59	0.80	26.42
MAY 2014	1203	-0.41	0.50	17.10	0.64	0.80	19.48
JUN. 2014	753	-0.35	0.50	30.99	0.65	0.80	18.44
JUL. 2014	1200	-0.20	0.50	60.38	0.82	0.80	-2.01
AUG. 2014	1477	-0.31	0.50	38.25	0.80	0.80	-0.55
SEP. 2014	1613	-0.34	0.50	31.55	0.67	0.80	16.06
OCT. 2014	1539	-0.47	0.50	5.64	0.73	0.80	8.71
NOV. 2014	1266	-0.56	0.50	-12.62	0.77	0.80	3.69
DEC. 2014	1019	-0.58	0.50	-15.89	0.74	0.80	7.34
(*) 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.							

table 9 : Quality results for AHL AVHRR SST over JAN. 2014 to DEC. 2014, for 3,4,5 quality indexes, by night and by day.

Comments:

The night time results are for the AHL 12 hourly product centered at 00 UTC. The results for second half of 2014 show a general cold bias, slightly below the requirement for some of the months. The standard deviation is within the requirement for the autumn and winter months, but not for the summer months. There are small differences between the day time and night time products, but the day time products show slightly better results, and are within requirements except a couple of months. Cloud masks are usually less accurate at nighttime, and undetected clouds will lead to a cold bias in the SST products.

These cold bias is probably mainly due to inadequate cloud and ice masking. The cloud mask in use is an old version of PPS, and the results are expected to improve when the newest version (PPS-2014) will be in use. Also an improved probabilistic cloud and ice masking will help. All these improvements will come with the new version of the AHL SST (OSI-203-b).

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 DLI (OSI-303) and GOES-E DLI (OSI-305) 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 2nd half 2014								
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 %
JUL. 2014	5188	368.17	-0.20	5.0	95.98	4.09	10.0	59.15
AUG. 2014	6225	368,26	-0.28	5.0	94.46	4.20	10.0	58.05
SEP. 2014	4979	345.86	-0.83	5.0	83.40	4.52	10.0	54.81
OCT. 2014	5482	320.46	-1.59	5.0	68.23	5.41	10.0	45.86
NOV. 2014	5035	285.42	-2.75	5.0	45.06	6.93	10.0	30.73
DEC. 2014	4860	287.67	-4.462	5.0	7.53	7.46	10.0	25.40

(*) 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.

table 10 : Geostationary DLI quality results over 2nd half 2014.

Comments: The negative DLI bias observed in December is typical of winter conditions. The formation of inversion layers during clear nights reduced the air temperature at 2 m compared to the atmospheric upper layer temperatures. The DLI algorithm only uses the 2m temperature, leading to an underestimation in such conditions.

The following graphs illustrate the evolution of Geostationary DLI quality over the past 12 months.

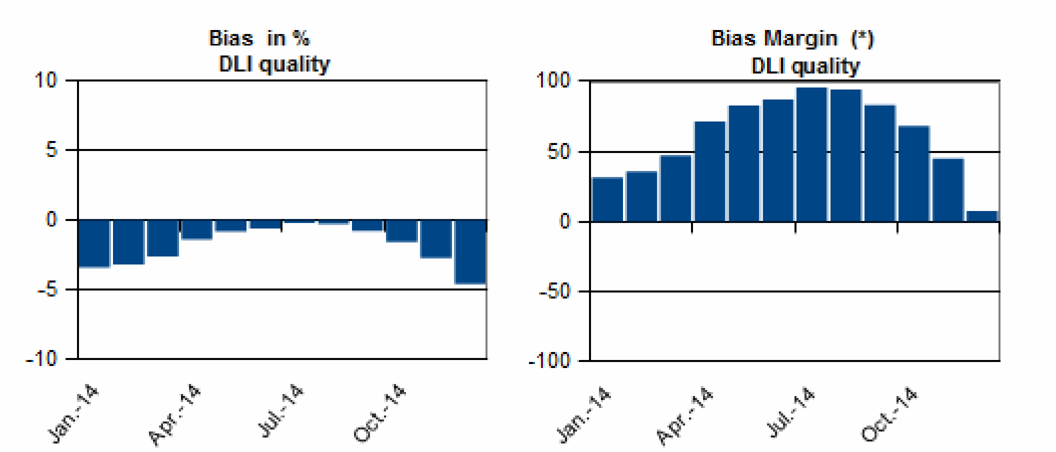


Figure 38 : Left: Geostationary DLI Bias. Right Geostationary DLI Bias Margin .

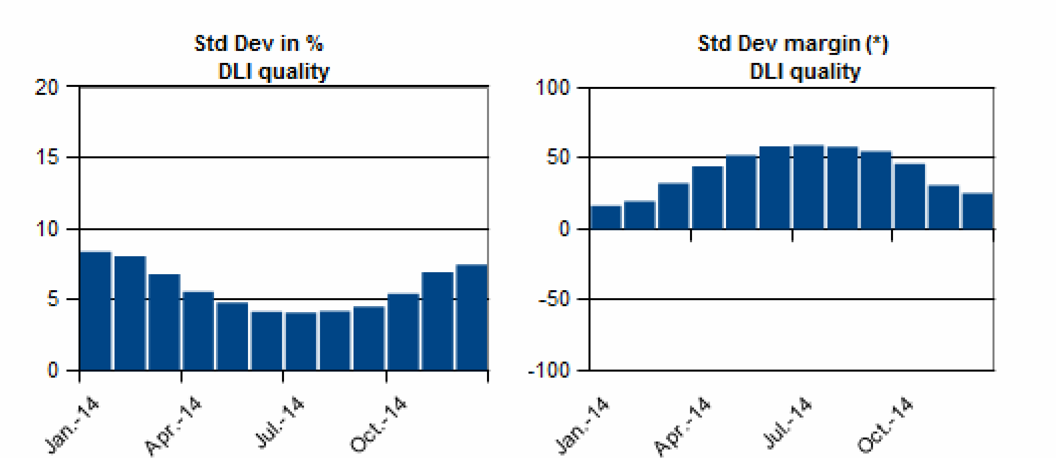


Figure 39 : Left: Geostationary DLI Standard deviation. Right DLI Geostationary Standard deviation Margin.

5.2.1.2 AHL DLI (OSI-301) quality

The pyrgeometer stations used for quality assessment of the AHL DLI product are are selected stations from Table 13. Specifically the following stations are currently used.

- Ekofisk
- Jan Mayen
- Bjørnøya
- Hopen
- Schleswig
- Hamburg-Fuhlsbuettel
- Sodankylä
- Kiruna
- Svenska Högarna
- Visby

These stations are briefly described at http://nowcasting.met.no/validering/flukser/. 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 JAN. 2014 to DEC. 2014								
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. 2014	124	277.07	2.93	5.0	41.4	5.28	10.0	47.2
FEB. 2014	112	290.59	3.20	5.0	36	4.44	10.0	55.6
MAR. 2014	124	274.09	1.61	5.0	67.8	4.83	10.0	51.7
APR. 2014	120	277.06	2.23	5.0	55.4	4.60	10.0	54
MAY 2014	90	296.39	2.04	5.0	59.2	4.14	10.0	58.6
JUN. 2014	116	321.76	3.24	5.0	35.2	3.73	10.0	62.7
JUL. 2014	341	346.38	4.49	5.0	10.2	3.03	10.0	69.7
AUG. 2014	296	336.82	4.24	5.0	15.2	3.17	10.0	68.3
SEP. 2014	291	317.36	2.48	5.0	50.4	4.58	10.0	54.2
OCT. 2014	310	308.89	1.46	5.0	70.8	4.82	10.0	51.8
NOV. 2014	290	294.37	2.96	5.0	40.8	4.79	10.0	52.1
DEC. 2014	300	277.05	2.97	5.0	40.6	5.54	10.0	44.6

(*) 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.

table 11 : AHL DLI quality results over JAN. 2014 to DEC. 2014.

Comments:
The requirement for this reporting period was met in all months for both bias and standard deviation. There seem to be tendency towards overestimating the DLI compared to observations on southern stations and underestimation on northern stations especially during summer months. This tendency is less evident in winter. Details are being examined and compared with cloud mask/cloud type validations.

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 SSI (OSI-304) and GOES-E SSI (OSI-306) 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 2nd half 2014										
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 %
JUL. 2014	8159	461.77	8.67	1.88	10.0	81.22	86.02	18.63	30.0	37,91
AUG. 2014	8781	448.18	3.34	0.75	10.0	92.55	84.39	18.83	30.0	37.24
SEP. 2014	7120	440.44	11.55	2.62	10.0	73.78	78.01	17.71	30.0	40.96
OCT. 2014	6811	382.16	15.68	4.10	10.0	58.97	83.55	21.86	30.0	27.12
NOV. 2014	5309	330.35	14.38	4.35	10.0	56.47	82.95	25.11	30.0	16.30
DEC. 2014	4341	321.25	22.06	6.87	10.0	31.33	85.43	26.59	30.0	11.36
(*) 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.										

table 12 : **Geostationary SSI quality results over 2nd half 2014.**

Comments: A positive SSI bias is observed in December, due to the stations located in Guyana and Carribean. It may correspond to a regional phenomenon or, more probably, to questionable data at some stations, especially Le Raizet (Guadeloupe island).

The following graphs illustrate the evolution of Geostationary SSI quality over the past 12 months.

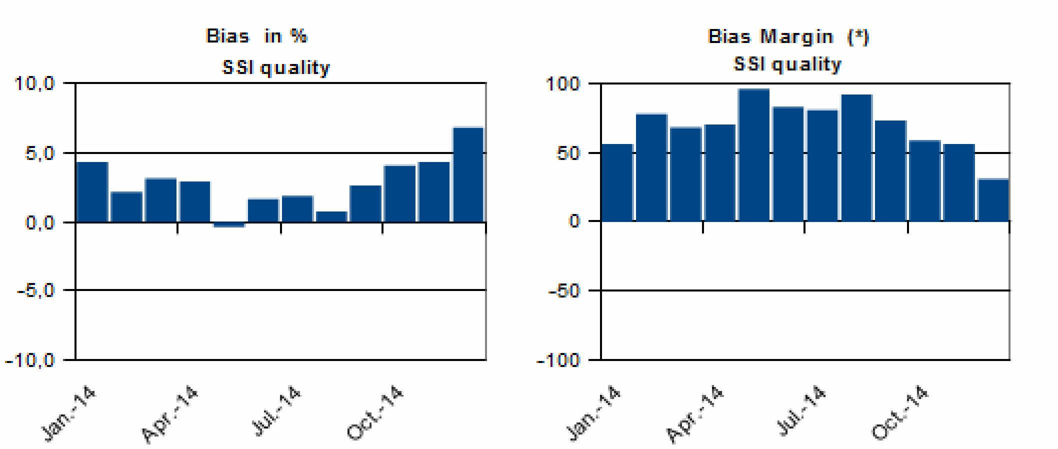


Figure 40 : **Left: Geostationary SSI Bias. Right Geostationary SSI Bias Margin.**

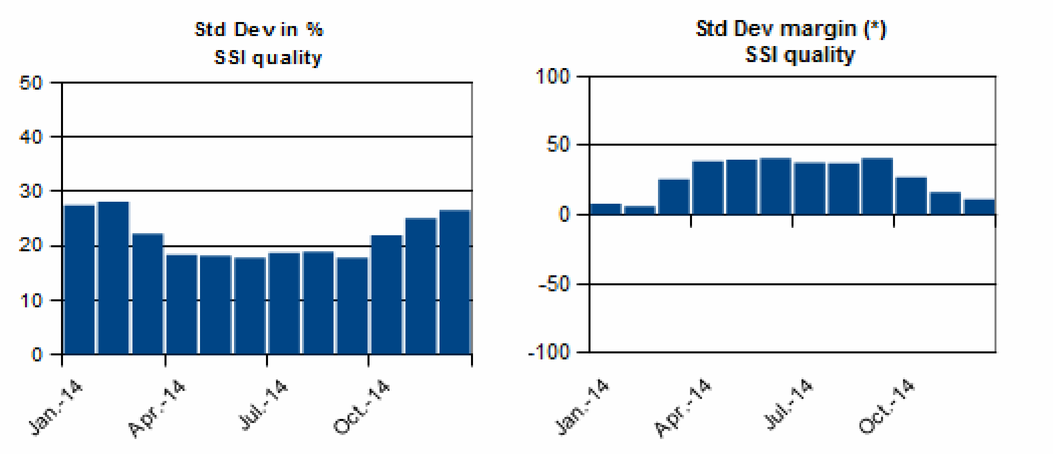


Figure 41 : Left: Geostationary SSI Standard deviation. Right Geostationary SSI Standard deviation Margin.

5.2.2.2 AHL SSI (OSI-302) quality

The pyranometer stations used for quality assessment of the AHL SSI and DLI products are shown in the following table.

Station	StId	Latitude	Longitude		Status
Apelsvoll	11500	60.70°N	10.87°E	SSI	In use, under examination due to shadow effects.
Løken	23500	61.12°N	9.07°E	SSI	Not used currently
Landvik	38140	58.33°N	8.52°E	SSI	In use
Særheim	44300	58.78°N	5.68°E	SSI	In use
Fureneset	56420	61.30°N	5.05°E	SSI	In use
Tjøtta	76530	65.83°N	12.43°E	SSI	In use
Ekofisk	76920	56.50°N	3.2°E	SSI, DLI	In use, minor shadow effects at certain directions.
Holt	90400	69.67°N	18.93°E	SSI	Not used currently
Bjørnøya	99710	74.52°N	19.02°E	SSI, DLI	In use, Arctic station with snow on ground much of the year.
Jan_Mayen	99950	70.93°N	-8.67°E	SSI, DLI	In use, Arctic station with snow on ground much of the year, volcanic ash deteriorates instruments in periods.
Schleswig	10035	54.53°N	9.55°E	SSI, DLI	In use
Hamburg-Fuhlsbuettel	10147	53.63°N	9.99°E	SSI, DLI	In use
Jokioinen	1201	60.81°N	23.501°E	SSI	In use
Sodankylä	7501	67.37°N	26.63°E	SSI, DLI	In use
Kiruna	02045	67.85°N	20.41°E	SSI, DLI	Only DLI used so far.
Visby	02091	57.68°N	18.35°E	SSI, DLI	Only DLI used so far.
Svenska Högarna	02492	59.45°N	19.51°E	SSI, DLI	Only DLI used so far.

table 13 : ***Validation stations that are currently used for AHL radiative fluxes quality assessment.***

The stations used in this validation is owned and operated by the Norwegian Meteorological Institute, University of Bergen, Geophysical Institute, Bioforsk, FMI and DWD. Data from DWD are extracted from WMO GTS, data from the other sources are received by email and direct connections. More stations are being considered for inclusion.
Ekofisk is still scheduled for removal as the platform is being phased out. However, it is still available and discussions on how to continue these measurements continue. It is however expected that this station will be unavailable for some periods when the platform is removed.

The pyranometer stations used for validation of the AHL SSI product are selected stations from table 14. There are some differences in the stations used for SSI validation compared to DLI. The reason for this is partly the observation programme at stations, but also that SSI validation is more sensitive to station characteristics than DLI.
The following stations are currently used:

- Apelsvoll
- Landvik
- Særheim
- Fureneset
- Tjøtta
- Ekofisk
- Jan Mayen
- Bjørnøya
- Schleswig
- Hamburg-Fuhlsbuettel
- Sodankylä
- Jokioinen

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

AHL SSI quality results over JAN. 2014 to DEC. 2014										
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. 2014	243	5.08	2.57	42.61	10.0	-326.1	5.40	68.73	30.0	-129.1
FEB. 2014	219	20.16	1.62	13.78	10.0	-37.8	7.62	37.02	30.0	-23.4
MAR. 2014	243	68.51	5.39	12.54	10.0	-25.4	12.46	18.94	30.0	36.87
APR. 2014	235	136.38	7.60	8.40	10.0	16	15.57	11.67	30.0	61.1
MAY 2014	215	198.49	13.31	8.37	10.0	16.3	23.06	11.69	30.0	61.03
JUN. 2014	232	223.48	2.55	6.53	10.0	34.7	28.05	12.86	30.0	57.13
JUL. 2014	367	209.54	6.97	8.20	10.0	18	26.08	13.84	30.0	53.87
AUG. 2014	346	152.11	5.72	8.58	10.0	14.2	24.39	16.27	30.0	45.77
SEP. 2014	325	94.02	1.56	8.85	10.0	11.5	15.18	16.84	30.0	43.87
OCT. 2014	336	36.39	0.47	9.52	10.0	4.8	9.83	32.34	30.0	-7.8
NOV. 2014	314	10.70	0.06	8.73	10.0	12.7	7.33	64	30.0	-113.33
DEC. 2014	330	4.47	1.39	10.21	10.0	-2.1	6.71	48.96	30.0	-63.2
(*) 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.										

table 14 : **AHLSSI quality results over JAN. 2014 to DEC. 2014**

Comments:
The validation requirements for this reporting period were met in all months except for December for the bias. For the standard deviation requirement, the requirement is not met in October through December. However, the insolation is very small in these months, with mean observed values ranging from 4.47 to 36.39. Details are being examined. Some main issues are relevant from examination of the results on individual stations. One is the effect of snow on the ground, another is related to the performance of the cloud mask/cloud type product used as input and the last is related to the handling of atmospheric water vapor and ozone in the processing. The first two issues are not independent and are also part of a dedicated development task, the latter is under revision with the transfer to processing in satellite projection.

5.3 Sea Ice quality

5.3.1 Global sea ice concentration (OSI-401) quality

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 (NIC). The ice charts are primarily based on SAR (Radarsat and Sentinel-1) data, together with AVHRR and MODIS data in several cases. The quality assessment results are shown separately for the three different sets of ice charts.

For the quality assessment 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 weekly quality assessment 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. We use conventional bias and standard deviations for all calculations.

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 are 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 15 : Error codes for the manual registration

For the Northern Hemisphere, these quality assessment results are given for the Greenland area. This area is the area covered by the Greenland overview ice charts made by DMI 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.

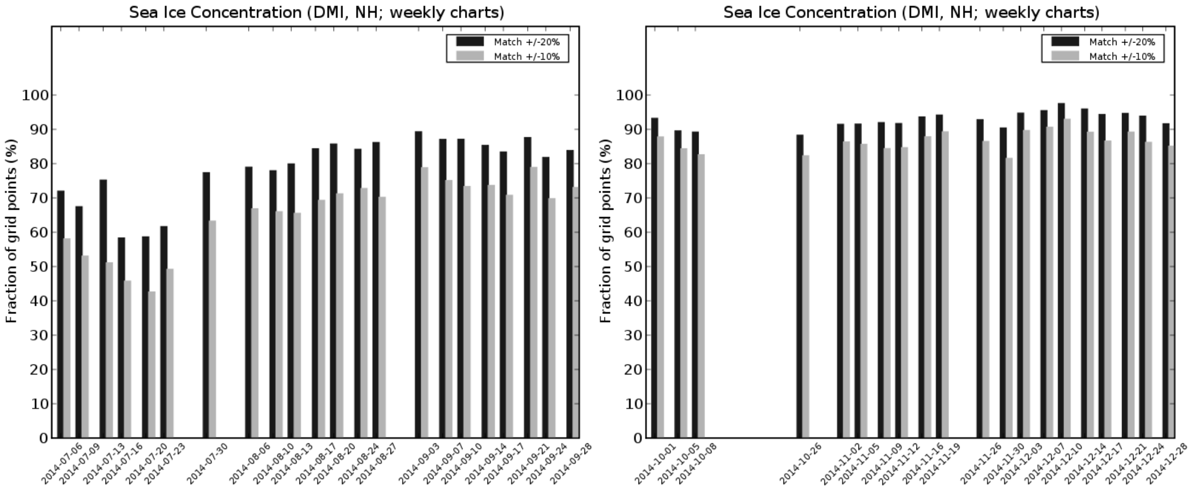


Figure 42 : Comparison of ice concentrations from the Greenland overview charts made by DMI and the OSI SAF concentration product. Northern hemisphere. 'Match +/- 10%' corresponds to those grid points where concentrations are within the range of +/- 10%, and likewise for +/-20%.

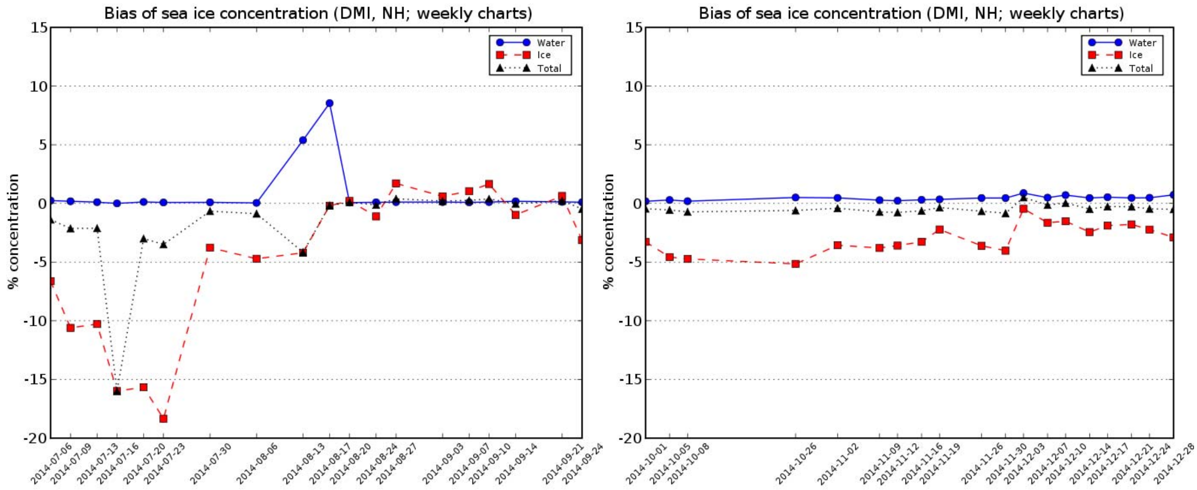


Figure 43 : Difference between ice concentrations from the Greenland overview charts made by DMI and OSI SAF concentration product for three categories: water, ice and total. The total difference is the difference between the ice analysis and sea ice concentration product within the area covered by the ice analysis including both ice and water. When the difference is below zero, the OSI SAF sea ice concentration has a lower estimate than the ice analysis. Northern hemisphere.

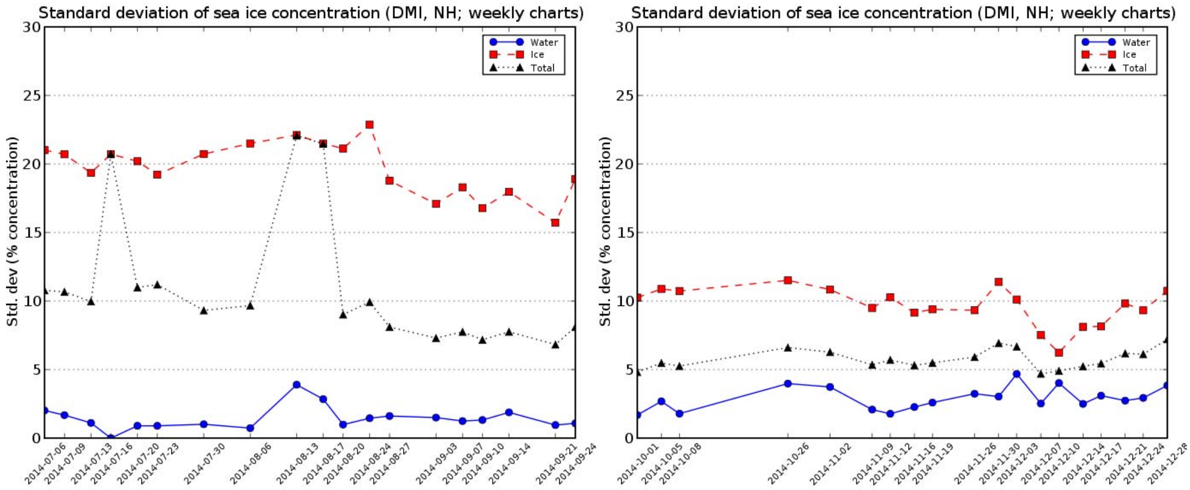


Figure 44 : Standard deviation of the difference in ice concentrations from the Greenland overview charts made by DMI and OSI SAF concentration product for three categories: water, ice and total. Northern hemisphere.

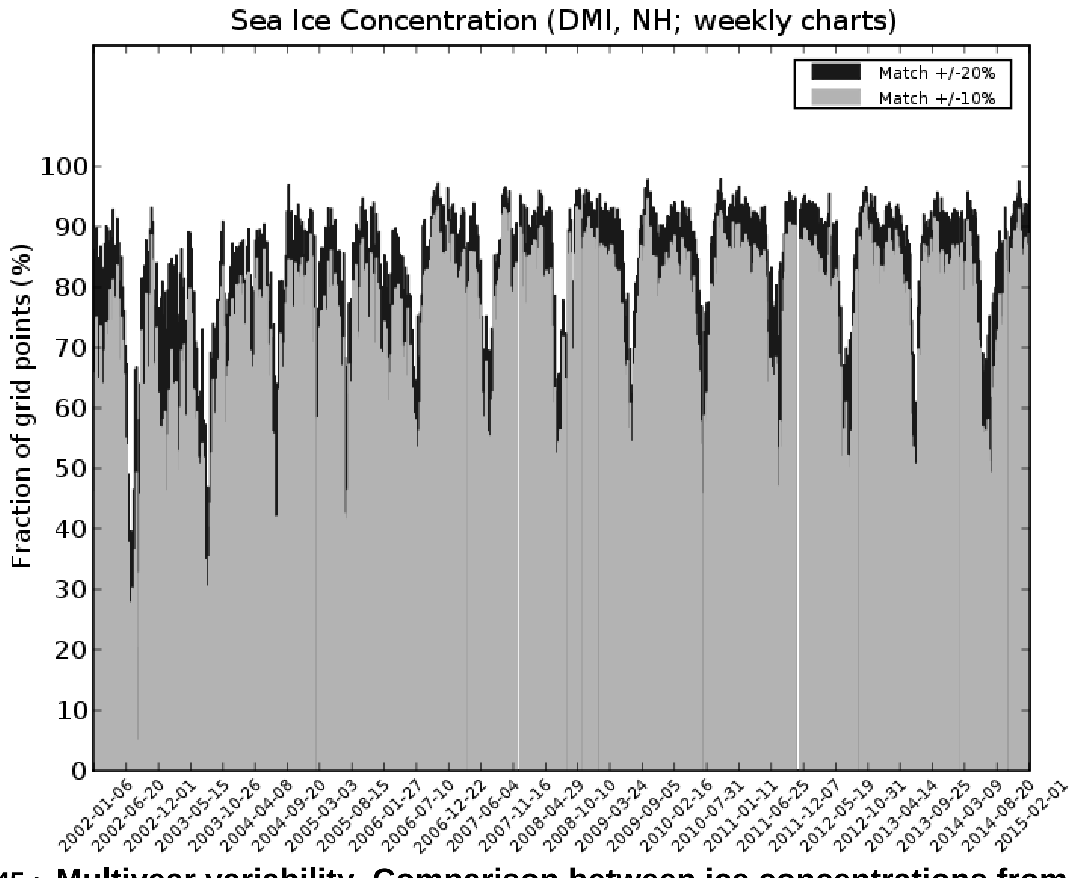


Figure 45 : Multiyear variability. Comparison between ice concentrations from the Greenland overview charts made by DMI and the OSI SAF concentration product. 'Match +/- 10%' corresponds to those grid points where concentrations are within the range of +/- 10%, and likewise for +/-20%. Northern hemisphere.

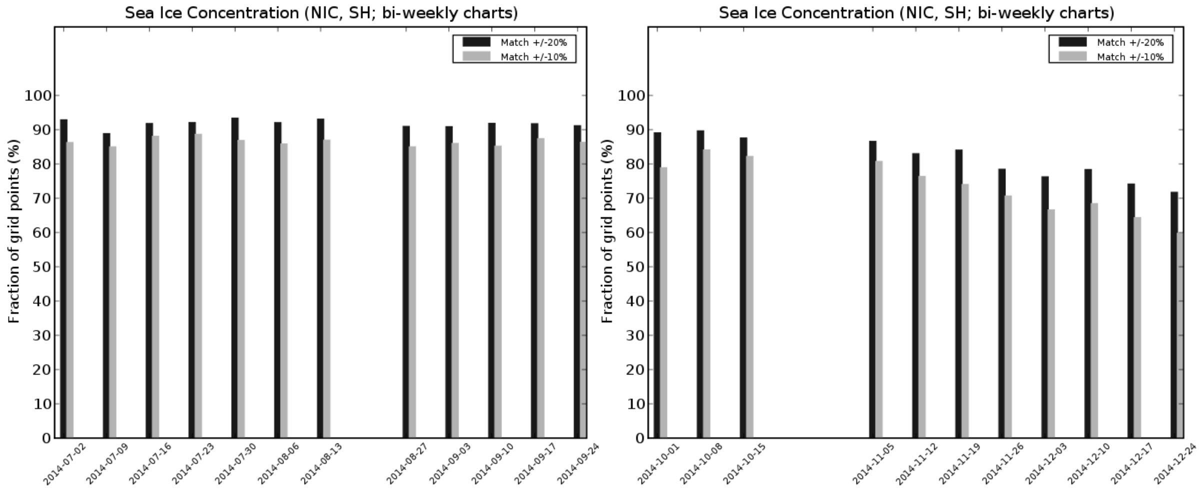


Figure 46 : Comparison between ice concentrations from the NIC ice analysis and the OSI SAF concentration product. 'Match +/- 10%' corresponds to those grid points where concentrations are within the range of +/-10%, and likewise for +/-20%. Southern hemisphere.

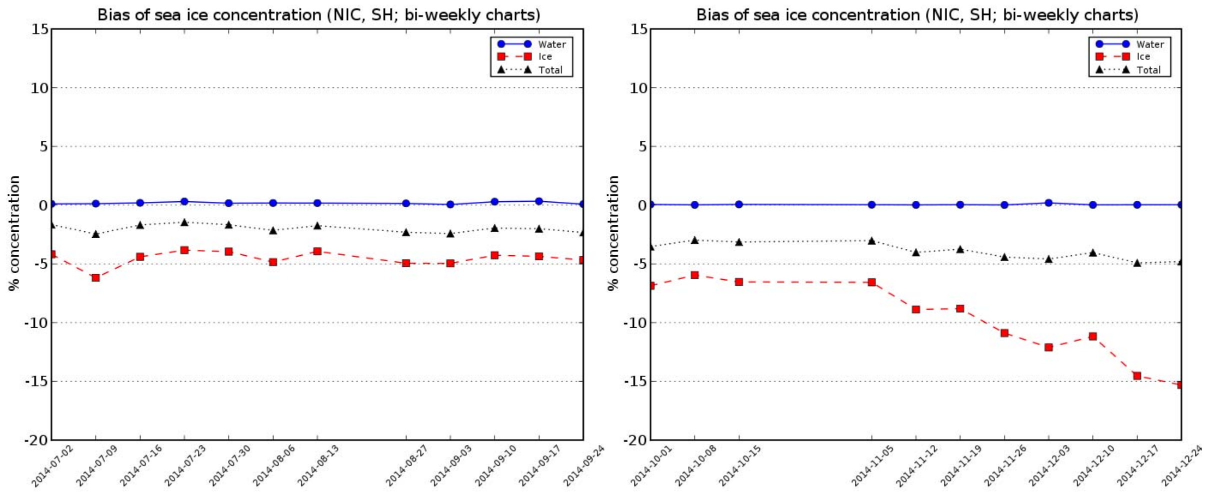


Figure 47 : Difference between the ice concentrations from the NIC ice analysis and OSI SAF concentration product for three categories: water, ice and total. The total difference is the difference between the ice analysis and sea ice concentration product within the area covered by the ice analysis including both ice and water. When the difference is below zero, the OSI SAF sea ice concentration has a lower estimate than the ice analysis. Southern hemisphere.

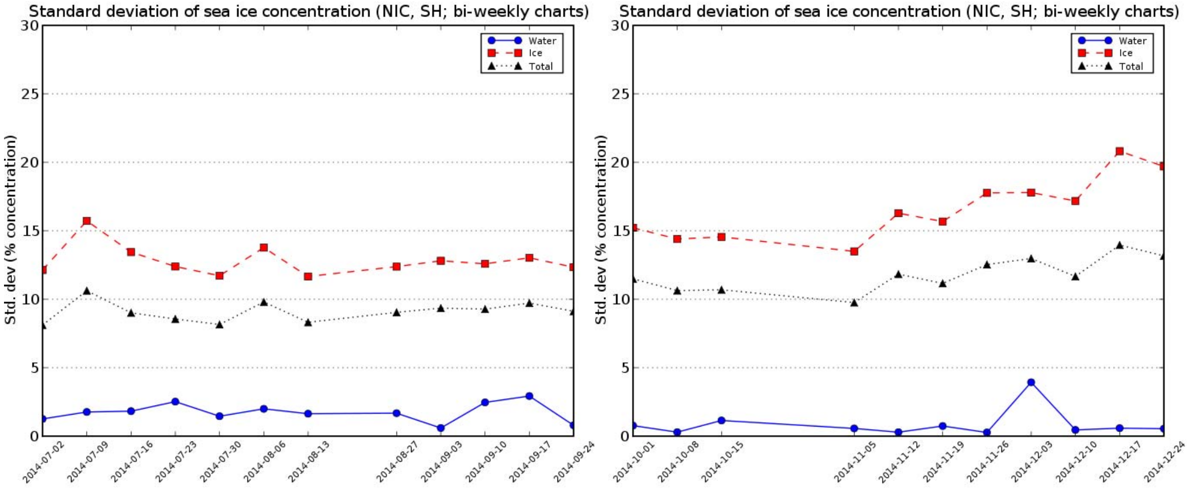


Figure 48 : Standard deviation of the difference in ice concentrations from the NIC ice analysis and OSI SAF concentration product for three categories: water, ice and total. Southern hemisphere.

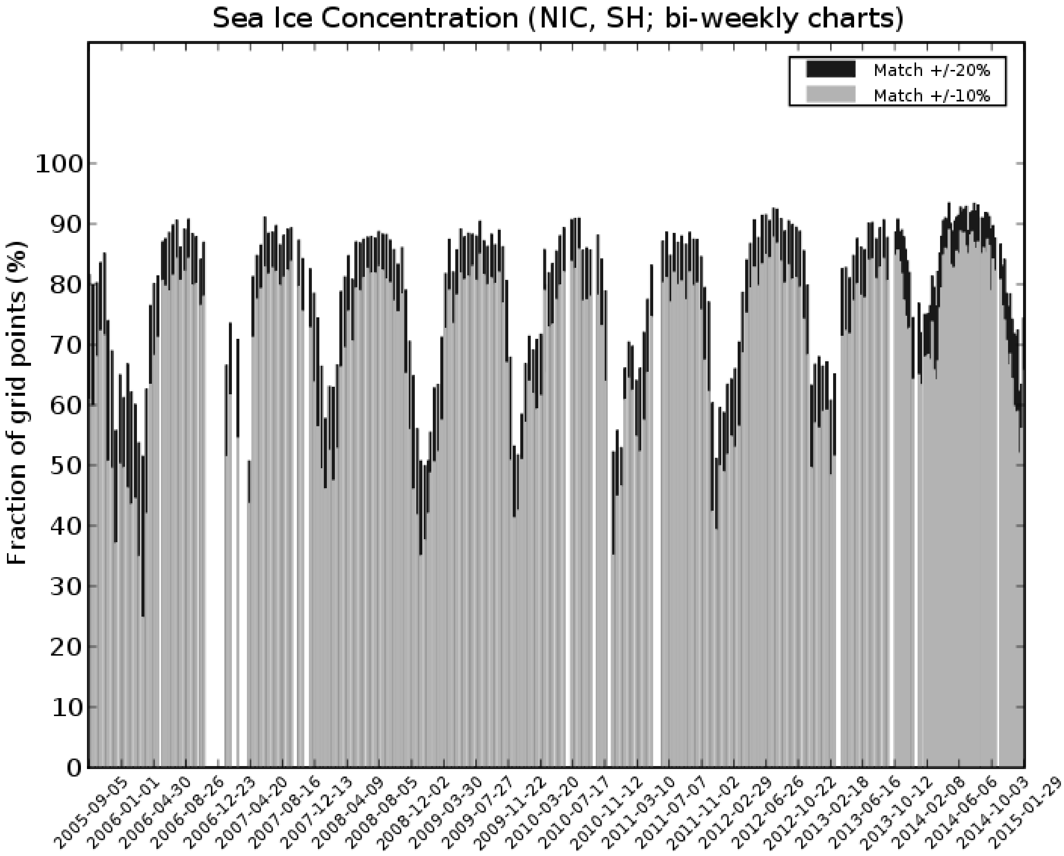


Figure 49 : Annual variability. Comparison between ice concentrations from the NIC ice analysis and the OSI SAF concentration product. 'Match +/- 10%' corresponds to those grid points where concentrations are within the range of +/- 10%, and likewise for +/-20%. Southern hemisphere.

Concentration product					
Month	+/- 10% [%]	+/- 20% [%]	Bias [%]	Stdev [%]	Num obs
JAN. 2014	79.84	90.18	-0.12	11.63	111164
FEB. 2014	80.12	89.60	-3.49	11.06	87794
MAR. 2014	78.47	89.89	-3.95	11.13	108620
APR. 2014	75.65	90.00	-4.87	10.83	151381
MAY 2014	69.96	84.77	-6.49	12.49	263397
JUN. 2014	59.07	72.80	-6.34	16.92	164794
JUL. 2014	70.29	85.89	-4.82	13.27	236916
AUG. 2014	76.49	87.38	-4.50	12.26	204740
SEP. 2014	71.32	83.19	-6.52	13.39	99234
OCT. 2014	81.06	91.28	-3.52	10.32	113121
NOV. 2014	77.15	89.70	-4.74	10.82	67801
DEC. 2014	78.95	89.49	-5.02	11.61	14696

table 16 : **Monthly quality assessment results from comparing the OSI SAF sea ice concentration product to MET Norway ice service analysis for the Svalbard area. From JAN. 2014 to DEC. 2014. First two columns shows how often there is agreement within 10 and 20% concentration.**

Based on the quality flags in the sea ice products, monthly statistics for the confidence levels are derived for each product type. Explanation (see Product User Manual for more details): Code 1-5 is given as fraction of total processed data (code 5+4+3+2+1 = 100%). 'Unprocessed' is given as fraction of total data (total data = processed data + unprocessed data).

Month	Code=5	code=4	code=3	code=2	code=1	Unprocessed
JUL. 2014	89.87	9.85	0.26	0.01	0.00	52.38
AUG. 2014	92.13	7.70	0.16	0.01	0.00	52.29
SEP. 2014	93.11	6.76	0.12	0.01	0.00	52.51
OCT. 2014	93.66	6.22	0.12	0.01	0.00	52.77
NOV. 2014	93.58	6.27	0.14	0.01	0.00	53.16
DEC. 2014	92.97	6.81	0.21	0.01	0.00	53.57

table 17 : **Statistics for sea ice concentration confidence levels, Code 0-5, Northern Hemisphere.**

Month	Code=5	code=4	code=3	code=2	code=1	Unprocessed
JUL. 2014	74.43	24.21	1.35	0.01	0.00	22.64
AUG. 2014	74.00	24.53	1.46	0.01	0.00	22.63
SEP. 2014	73.81	24.56	1.62	0.01	0.00	22.62
OCT. 2014	72.87	25.31	1.82	0.01	0.00	22.63
NOV. 2014	72.44	25.81	1.75	0.01	0.00	22.62
DEC. 2014	73.16	25.28	1.55	0.01	0.00	22.62

table 18 : **Statistics for sea ice concentration confidence levels, Code 0-5, Southern Hemisphere.**

Comments:

Figure 44 and Figure 48 provides the essential information on the compliance of the sea ice concentration product accuracy, showing the std.dev. of the difference in ice concentration between the OSI SAF product and the DMI ice analysis for NH and NIC ice analysis for SH, respectively. To fulfill the service specification of 10% yearly std.dev. for NH and 15% for the SH, the Total std.dev. (black curve) shall on average throughout the year be below 10% and 15%, respectively.

Table 17 and table 18 show that the quality of the OSI SAF ice concentration product is increasing in the Arctic freeze-up season and somewhat stable in the Antarctic melting season.

5.3.2 Global sea ice edge (OSI-402) quality

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

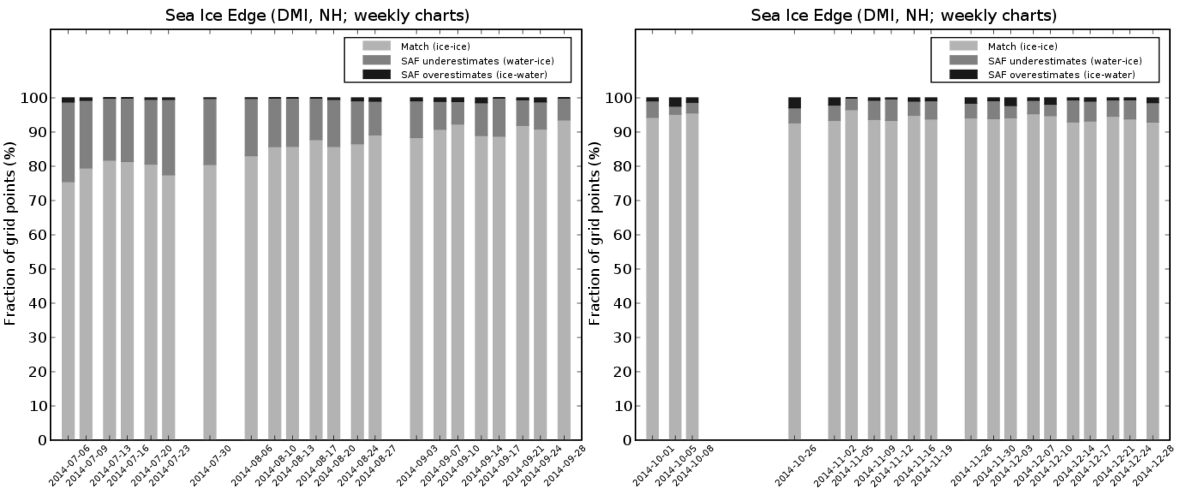


Figure 50 : Comparison between the Greenland overview charts made by DMI and the OSI SAF sea ice edge product. Northern hemisphere. 'SAF water – DMI ice' means grid points where the OSI SAF product indicated water and the DMI ice analysis indicated ice and vice versa for the 'SAF ice – DMI water' category.

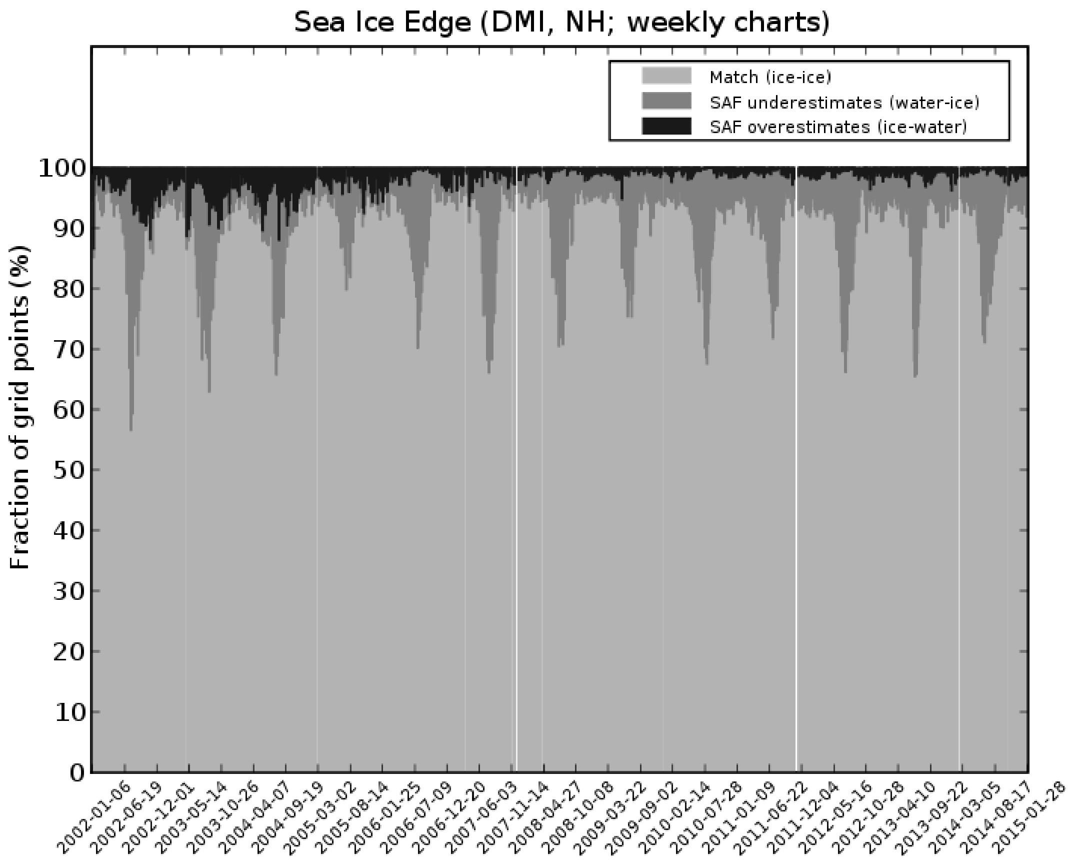


Figure 51 : Multiyear variability. Comparison between the Greenland overview charts made by DMI and the OSI SAF sea ice edge product. Northern hemisphere. 'SAF water – DMI ice' means grid points where the OSI SAF product indicated water and the DMI ice analysis indicated ice and vice versa for the 'SAF ice – DMI water' category.

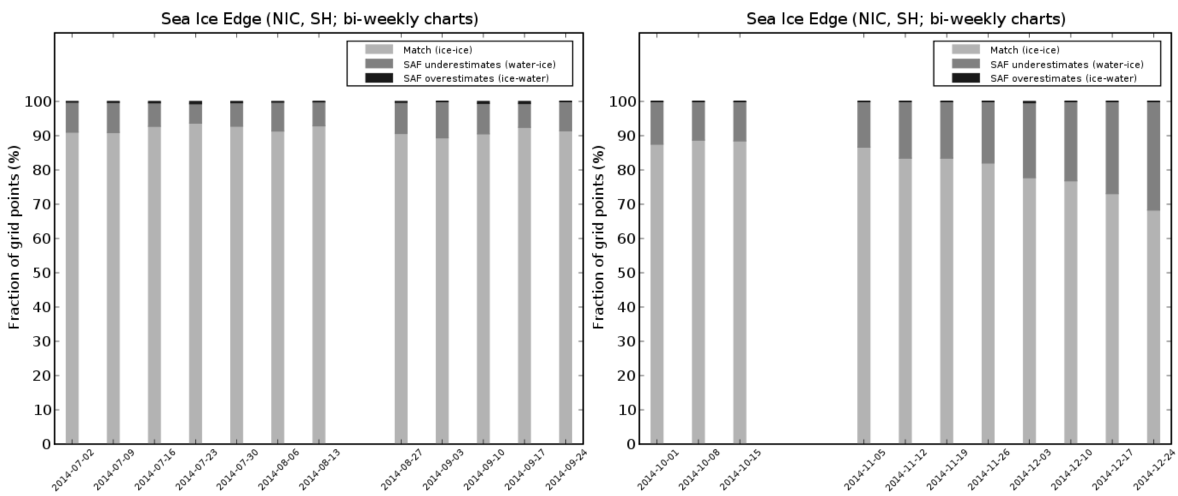


Figure 52 : Comparison between the NIC ice analysis and the OSI SAF sea ice edge product. Southern hemisphere. 'SAF water – NIC ice' means grid points where the OSI SAF product indicated water and the NIC ice analysis indicated ice and vice versa for the 'SAF ice – NIC water' category.

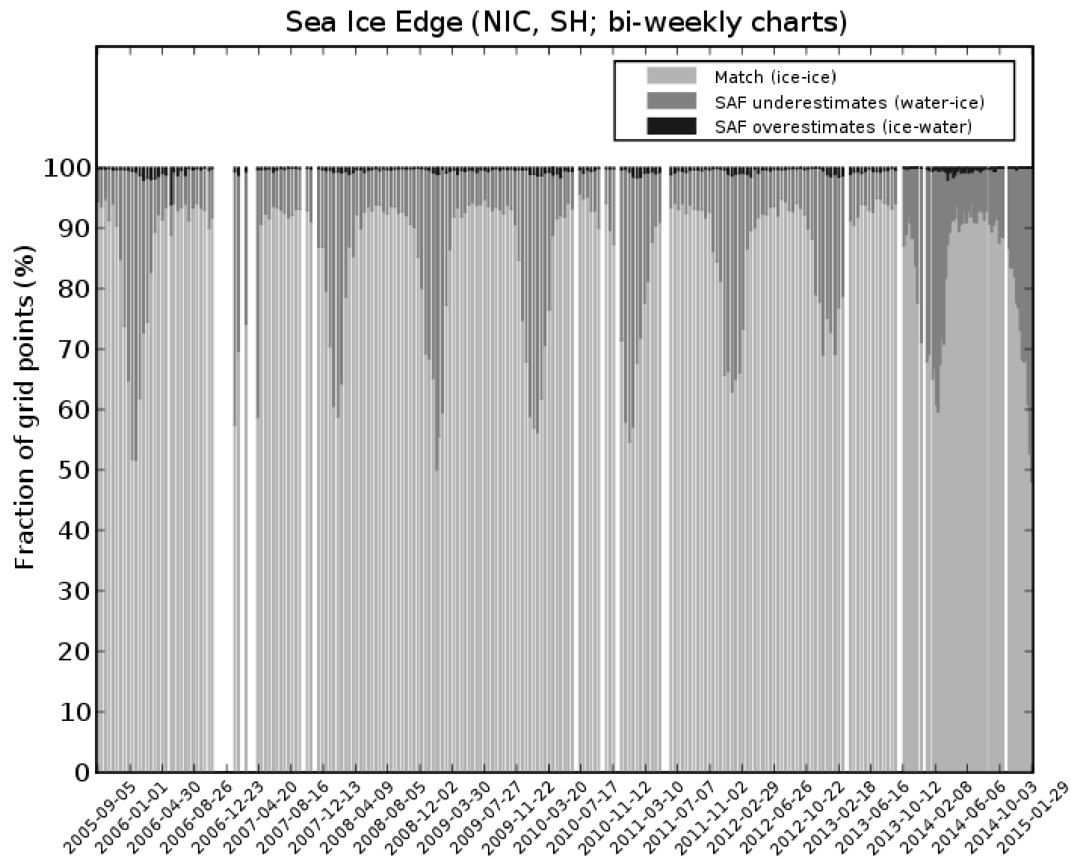


Figure 53 : Annual variability. Comparison between the NIC ice analysis and the OSI SAF sea ice edge product. Southern hemisphere. 'SAF water – NIC ice' means grid points where the OSI SAF product indicated water and the NIC ice analysis indicated ice and vice versa for the 'SAF ice – NIC water' category.

Comments: Figure 50 : to Figure 53 : show the normal seasonal pattern of increased agreement between OSI SAF ice edge product and DMI and NIC ice charts in the Arctic freeze-up season and a decrease in the Antarctic melting season.

Month	Correct (%)	SAF lower (%)	SAF higher (%)	Mean edge diff (km)	Num obs
JAN. 2014	96.46	1.69	1.84	11.65	106268
FEB. 2014	95.46	2.80	1.74	17.84	88132
MAR. 2014	95.94	2.70	1.35	16.42	109652
APR. 2014	97.21	1.87	0.92	14.47	153072
MAY 2014	96.23	2.73	1.04	23.22	267393
JUN. 2014	93.70	5.16	1.15	31.03	152978
JUL. 2014	94.01	2.07	3.92	21.78	239681
AUG. 2014	95.45	3.21	1.34	18.15	209888
SEP. 2014	95.67	2.40	1.92	12.64	100634
OCT. 2014	96.61	1.02	2.37	9.68	113582
NOV. 2014	96.90	1.66	1.45	9.43	67955
DEC. 2014	96.44	2.60	0.96	8.99	14758

table 19 : **Monthly quality assessment results from comparing OSI SAF sea ice products to MET Norway ice service analysis for the Svalbard area, from JAN. 2014 to DEC. 2014. Mean edge diff is the mean difference in distance between the ice edges in the OSI SAF edge product and MET Norway ice chart.**

Month	Code=5	code=4	code=3	code=2	code=1	Unprocessed
JUL. 2014	89.12	2.02	3.82	3.37	0.99	52.25
AUG. 2014	91.40	1.66	3.36	2.79	0.79	52.17
SEP. 2014	92.65	1.37	2.91	2.40	0.67	52.39
OCT. 2014	93.26	1.29	2.65	2.17	0.63	52.64
NOV. 2014	93.65	1.28	2.49	2.00	0.58	52.98
DEC. 2014	93.84	1.32	2.40	1.89	0.55	53.35

table 20 : **Statistics for sea ice edge confidence levels, Code 0-5, Northern Hemisphere.**

Month	Code=5	code=4	code=3	code=2	code=1	Unprocessed
JUL. 2014	90.04	2.48	3.83	3.09	0.56	22.54
AUG. 2014	89.01	2.66	4.14	3.54	0.65	22.53
SEP. 2014	87.91	2.84	4.50	3.99	0.76	22.52
OCT. 2014	87.07	2.96	4.69	4.39	0.89	22.53
NOV. 2014	86.44	3.00	4.75	4.71	1.09	22.52
DEC. 2014	85.82	3.07	4.73	5.02	1.35	22.52

table 21 : **Statistics for sea ice edge confidence levels, Code 0-5, Southern Hemisphere.**

Comments : Tables show the normal seasonal pattern of increased quality of the OSI SAF ice edge product in the Arctic freeze-up season and a decrease in the Antarctic melting season.

The yearly averaged edge difference is 16.3km (average of monthly values) and the target accuracy requirement of 20km edge difference is hence met. The monthly differences are actually below the yearly requirement all months except the months of May, June and July, when melting of snow and ice makes the product quality worse.

5.3.3 Global sea ice type (OSI-403) quality

The sea ice type quality assessment is done as a monitoring of the monthly variation of the multi year ice area coverage, as presented in the table below. The monthly standard deviation in the difference from the running mean of the multi year ice area coverage shall be below 100.000km2 to meet the target accuracy requirement.

Month	Std dev wrt running mean [km²]	Mean MYI coverage [km²]
JAN. 2014	46418	2559824
FEB. 2014	51085	2537192
MAR. 2014	43400	2307432
APR. 2014	68506	2427073
MAY 2014	-	-
JUN. 2014	-	-
JUL. 2014	-	-
AUG. 2014	-	-
SEP. 2014	-	-
OCT. 2014	52116	2379306
NOV. 2014	75178	2513468
DEC. 2014	65823	2434891

table 22 : Monitoring of NH sea ice type quality by comparing the multi year coverage with the 11-days running mean.

Comments :
The std dev with regard to the running mean is below the requirement of 100.000km2 for all the months where the product is delivered.

Month	Code=5	code=4	code=3	code=2	code=1	Unprocessed
JUL. 2014	83.97	0.31	0.66	14.75	0.30	52.25
AUG. 2014	85.62	0.32	0.56	13.20	0.30	52.17
SEP. 2014	88.05	0.42	0.72	10.59	0.23	52.39
OCT. 2014	90.22	0.56	0.92	8.10	0.20	52.64
NOV. 2014	91.41	0.64	1.13	6.64	0.18	52.98
DEC. 2014	91.59	0.80	1.77	5.68	0.16	53.35

table 22 : Statistics for sea ice type confidence levels, Northern Hemisphere.

Month	Code=5	code=4	code=3	code=2	code=1	Unprocessed
JUL. 2014	66.57	0.29	32.71	0.34	0.09	22.54
AUG. 2014	64.74	0.30	34.49	0.37	0.09	22.53
SEP. 2014	63.49	0.31	35.68	0.40	0.11	22.52
OCT. 2014	63.28	0.32	35.84	0.43	0.12	22.53
NOV. 2014	64.20	0.34	34.85	0.46	0.15	22.53
DEC. 2014	66.38	0.35	32.61	0.47	0.19	22.52

table 23 : Statistics for sea ice type confidence levels, Southern Hemisphere.

Comments : Tables show that the quality of the OSI SAF ice type product is increasing from July to December in the Arctic freeze-up season and is somewhat variable during the Antarctic melting season.

5.3.4 Low resolution sea ice drift (OSI-405) quality

Quality assessment dataset

Quality assessment 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 quality assessment and monitoring results are thus presented for the multi-sensor product (multi-oi) and a selection of the single-sensor ones.

Quality assessment statistics

In the following tables, quality assessment 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.

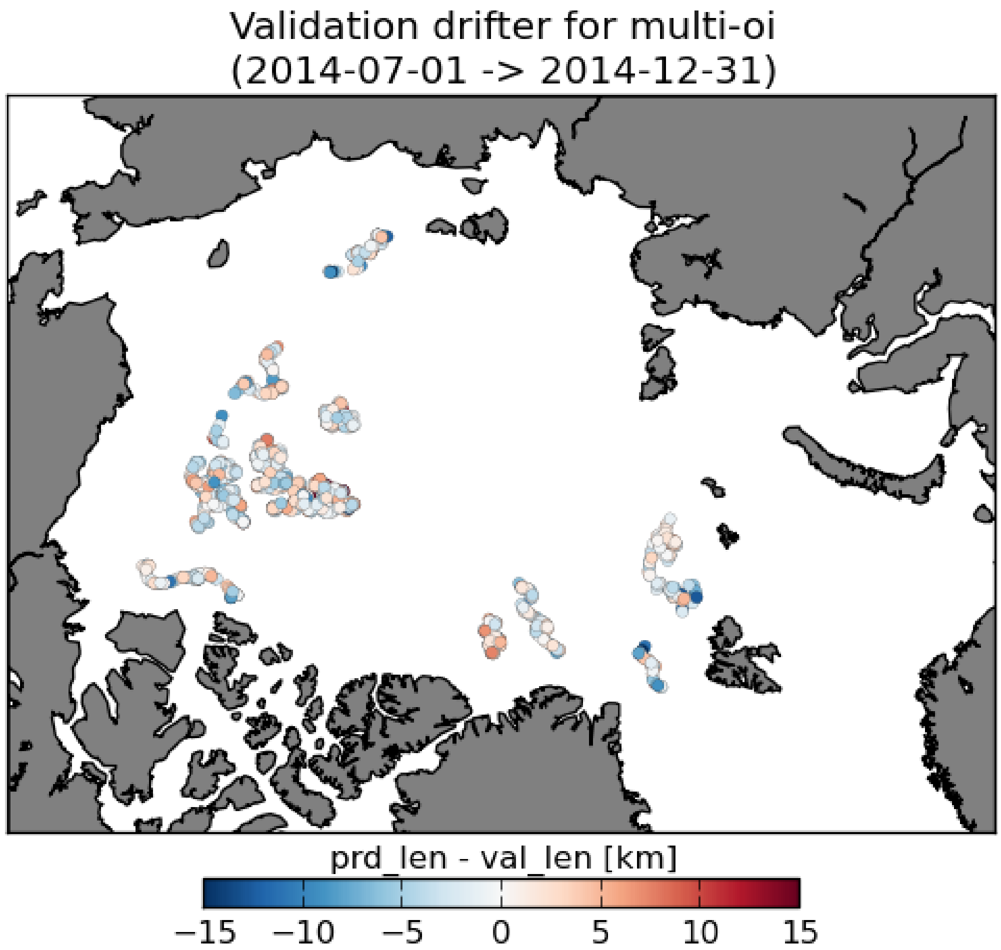


Figure 54 : **Location of GPS drifters for the quality assessment period (JULY 2014 to DEC. 2014). The shade of each symbol represents the bias (prod-ref) in drift length (km over 2 days).**

Month	b(X) [km]	b(Y) [km]	σ(X) [km]	σ(Y) [km]	α	β[km]	ρ	N
JAN. 2014	+0.404	+0.306	3.834	3.568	0.93	+0.151	0.96	328
FEB. 2014	+0.005	-0.325	3.138	3.322	0.94	-0.176	0.96	317
MAR. 2014	-0.120	-0.069	2.791	2.705	0.98	-0.057	0.96	427
APR. 2014	-0.339	-0.147	3.351	3.118	0.97	-0.099	0.96	514
MAY 2014	--	--	--	--	--	--	--	0
JUN. 2014	--	--	--	--	--	--	--	0
JUL. 2014	--	--	--	--	--	--	--	0
AUG. 2014	--	--	--	--	--	--	--	0
SEP. 2014	--	--	--	--	--	--	--	0
OCT. 2014	-0.225	+0.280	4.770	5.108	0.90	-0.148	0.93	413
NOV. 2014	+0.459	-0.101	3.508	3.463	0.95	+0.266	0.96	458
DEC. 2014	-0.187	-0.266	2.883	2.961	0.97	-0.243	0.97	477
Last 12 months	-0.022	-0.056	3.513	3.518	0.95	-0.006	0.96	2934

table 24 : **Quality assessment results for the LRSID (multi-oi) product (NH) for JAN. 2014 to DEC. 2014.**

Month	b(X) [km]	b(Y) [km]	σ(X) [km]	σ(Y) [km]	α	β[km]	ρ	N
JAN. 2014	+0.298	+0.180	4.273	3.894	0.94	+0.046	0.95	325
FEB. 2014	+0.022	-0.278	4.307	4.004	0.95	-0.121	0.94	306
MAR. 2014	-0.137	-0.119	3.312	2.911	0.99	-0.115	0.95	414
APR. 2014	-0.320	-0.035	4.054	3.868	0.98	-0.106	0.94	460
MAY 2014	--	--	--	--	--	--	--	0
JUN. 2014	--	--	--	--	--	--	--	0
JUL. 2014	--	--	--	--	--	--	--	0
AUG. 2014	--	--	--	--	--	--	--	0
SEP. 2014	--	--	--	--	--	--	--	0
OCT. 2014	-0.365	+0.315	4.795	5.090	0.93	-0.155	0.93	346
NOV. 2014	+0.506	-0.120	3.683	3.166	0.97	+0.245	0.96	419
DEC. 2014	-0.135	-0.148	3.427	3.189	0.98	-0.149	0.96	464
Last 12 months	-0.028	-0.037	3.963	3.733	0.96	-0.015	0.95	2734

table 25 : Quality assessment results for the LRSID (ssmis-f17) product (NH) for JAN. 2014 to DEC. 2014.

Comments:

The validation results in table 25 show that the LR sea ice drift is within the requirement of 5km displacement for each component (σ(x) and σ(y)) for the 12 last months.

5.4 Global Wind quality (OSI-102, OSI-103, OSI-104)

The wind products are required to have an accuracy of better than 2.0 m/s in wind component standard deviation 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 quality assessment 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 December 2014. 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 Service Specification Document [AD-1] (bias less than 0.5 m/s and wind component standard deviation accuracy better than 2 m/s) when they are compared to ECMWF forecast winds.

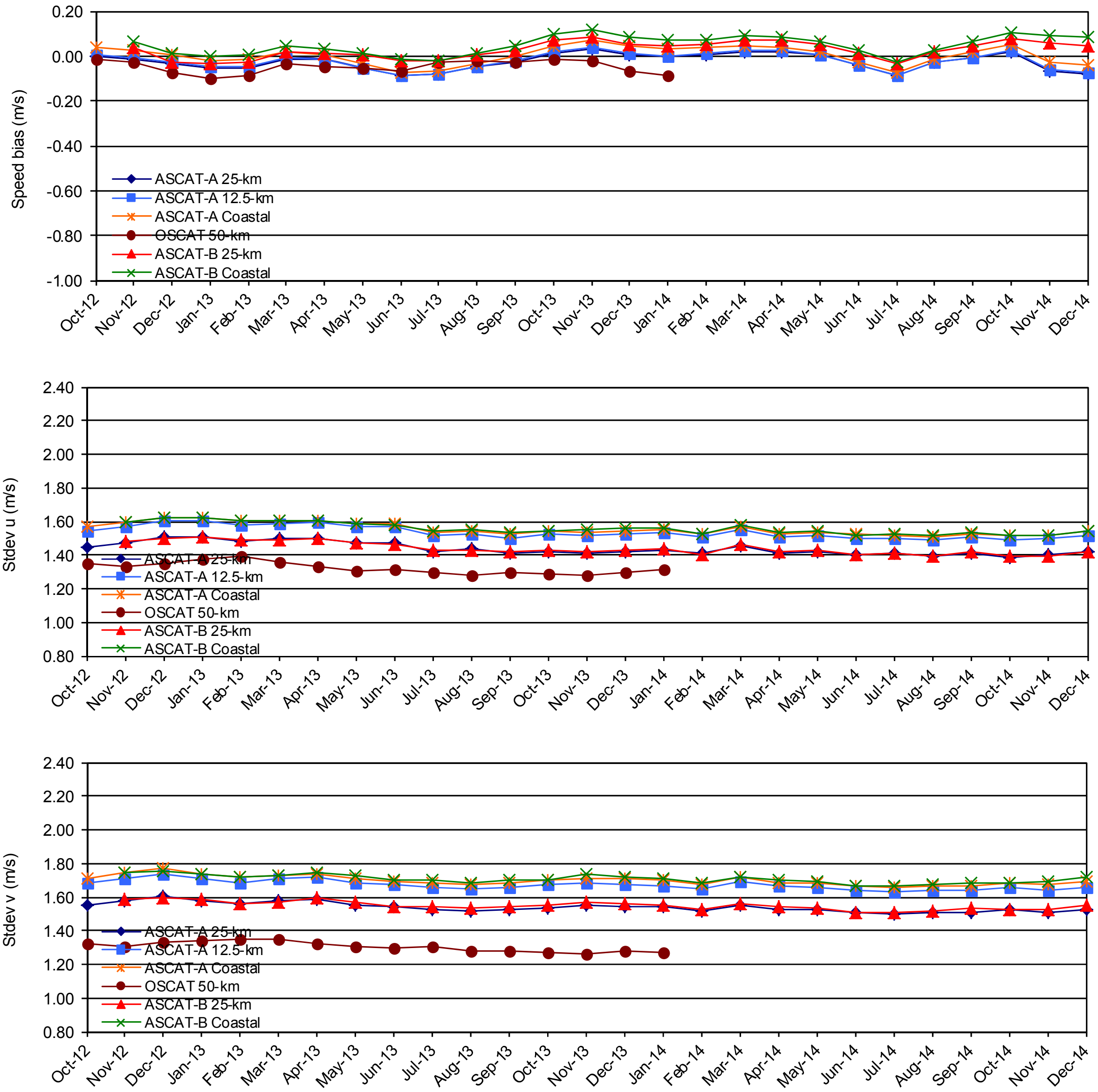


Figure 55 : Comparison of scatterometer winds against ECMWF NWP forecast winds (monthly averages). For each product, the wind speed bias (scatterometer minus ECMWF, top), wind *u* component standard deviation (middle) and wind *v* component standard deviation (bottom) are shown.

5.4.2 Comparison with buoys

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 December 2014.

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.

It is clear from the plots in this section, that the products do meet the accuracy requirements from the Service Specification Document [AD-1] (bias less than 0.5 m/s and wind component standard deviation accuracy better than 2 m/s) when they are compared to buoy winds.

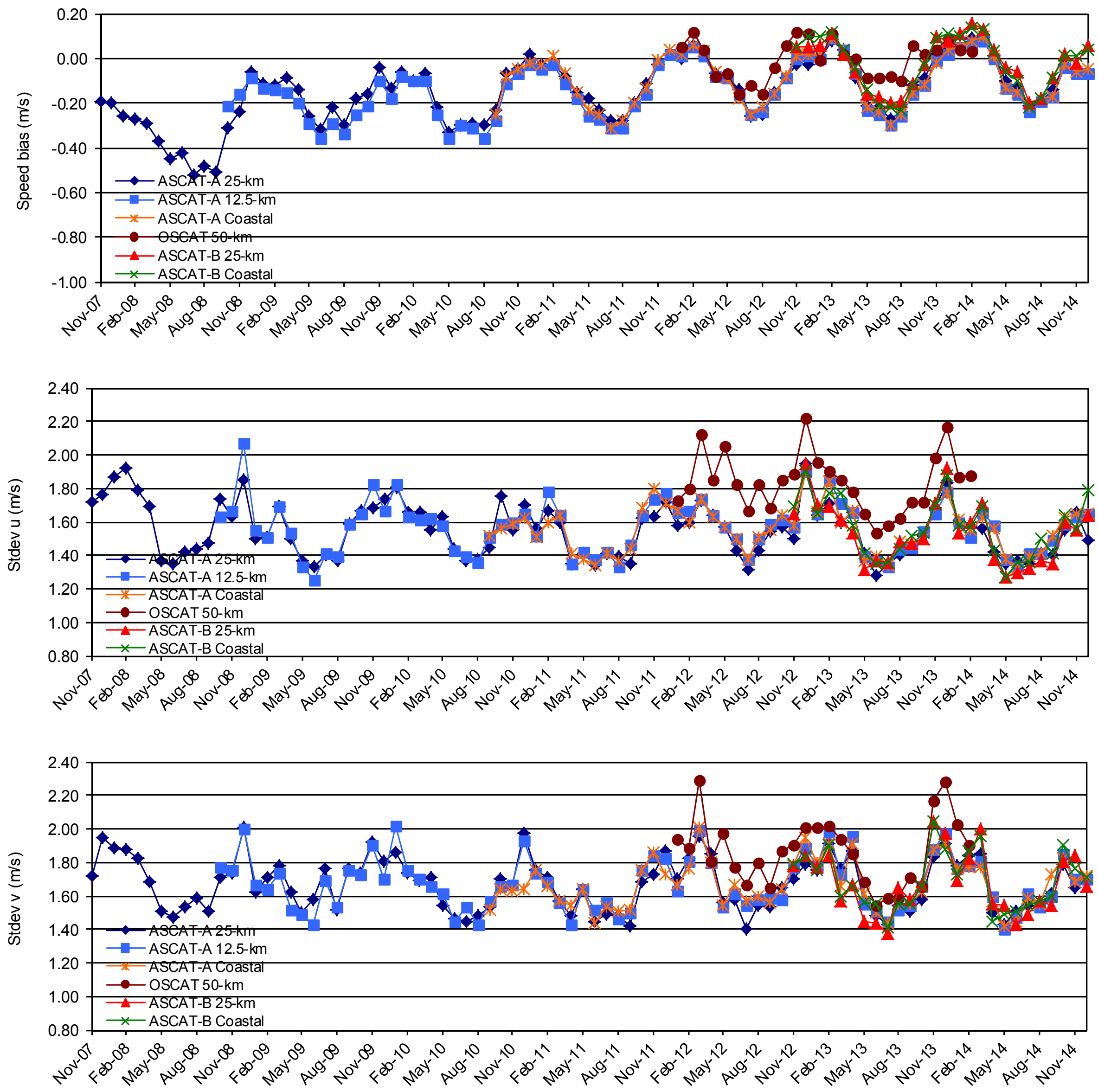


Figure 56 : Comparison of scatterometer winds against buoy winds (monthly averages). For each product, the wind speed bias (scatterometer minus buoy, top), wind *u* component standard deviation (middle) and wind *v* component standard deviation (bottom) are shown.

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 web site for SS2, http://osisaf.met.no/ , managed by MET Norway,
- a web site for SS3, http://www.knmi.nl/scatterometer/osisaf/, managed by KNMI.

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

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	Pages	User requests
JUL. 2014	1015	4337	46070	3
AUG. 2014	1022	5281	42699	4
SEP. 2014	1028	5262	43058	0
OCT. 2014	1042	4819	60318	7
NOV. 2014	1055	5034	52818	3
DEC. 2014	1063	4062	49243	1

table 26 : Statistics on central OSI SAF Web site use over 2nd half 2014.

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

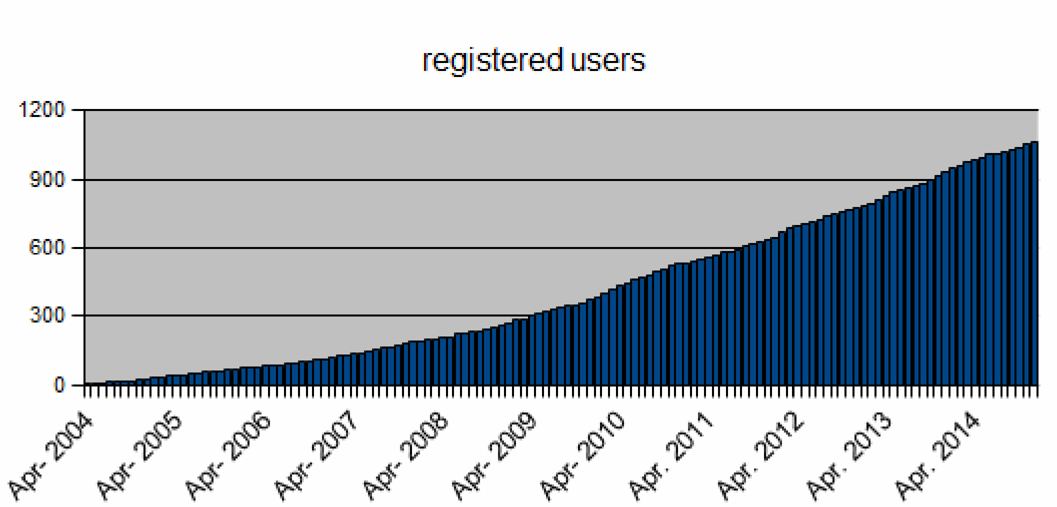


Figure 57 : Evolution of external registered users on the central Web Site from April 2004 to December 2014.

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	Bureau of Meteorology	BOM
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 Meteorological Centre	CMC
Canada	Centre for Earth Observation Science	CEOS
Canada	Data Assimilation and Satellite Meteorology, Meteorological Research Branch Environment Canada	ARMA/MRB
Canada	Fisheries and Oceans Canada	DFO/IML/MPO
Canada	Institut National de la Recherche Scientifique	INRS
Canada	Institut de Recherche et de Développement en Agroenvironnement	IRDA
Canada	JASCO Research Ltd	JASCO
Canada	Memorial University of Newfoundland	MUN
Canada	University of Waterloo	UW
Canada	University of Windsor	UWD
Chile	Centro de Estudios Avanzados en Zonas Aridas	CEAZA
Chile	Centro i-mar, Universidad de Los Lagos	I-MAR
Chile	Institut de Fomento Pesquero	IFOP
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	China Meteorological Agency	CMA
China	Chinese Academy of Sciences	IOCAS

China	Dalian Maritime University	DMU
China	First Institute of Oceanography, State Oceanic Administration	FIO
China	Fujian Meteorological Observatory	MS
China	HK Observatory	HKO
China	Hust University	
China	Institute of Oceanology, Chinese Academy of Sciences	IOCAS
China	Institute of Remote Sensing Applications of Chinese Academy of Sciences	IRSA/CAS
China	Institute of Tropical and Marine Meteorology	ITMM
China	Nanjing University of Information Science and Technology	NUIST
China	National Marine and Environmental 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	Shandong Meteorology Bureau	SDMB
China	Shanghai Ocean University	SHOU
China	South China Sea Institute of Oceanology, Chinese Academy of Sciences	SCSIO, CAS
China	Sun Yat-Sen University	SYSU
China	Third Institute Oceanography	TIO/SOA
China	Tianjin University	TJU
China	Zhejiang Ocean University	ZOU
Croatia	Rudjer Boskovic Institute	IRB/ZIMO
Denmark	Aarhus University - Department of Bioscience	BIOS
Denmark	Danish Defense 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
Denmark	DHI GRAS	DHI GRAS
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
France	ACRI-ST Brest	ACRI-ST
France	ACRI-ST sophia-antipolis	ACRI-ST
France	African Monitoring of the Environment for Sustainable Development	AMESD
France	Along-Track	Along-Track
France	ATMOSPHERE	ATMOSPHERE
France	Centre de Localisation Satellite	CLS
France	Centre de Soutien Météorologique aux Forces 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 Géophysique et Océanographie Spatiales	LEGOS/CNRS
France	Collecte Localisation Satellite	CLS
France	Creocean	Creocean
France	Ecole Nationale Supérieure des Mines de Paris	Mines Paris Tech
France	Ecole Nationale des Télécommunication de Bretagne	ENSTB
France	Ecole Nationale Supérieure des Techniques Avancées de Bretagne	ENSTA-Bretagne
France	Ecole Navale	ENGEP
France	Institut de Recherche pour le Développement	IRD
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'Océanographie et du Climat : Expérimentation et Approches Numériques	LOCEAN
France	Telespazio France	TelespazioFrance
France	Laboratoire de Physique des Océans, Université de Bretagne occidentale	LPO
France	Mercator Ocean	Mercator Ocean
France	Météo-France	M-F
France	Météo-France / Centre National de la Recherche Météorologique	M-F/CNRM
France	MeteoGroup	MG
France	Museum National d'Histoire Naturelle de Paris	MNHN Paris
France	Observatoire français des Tornades et des Orages Violents	KERAUNOS
France	Service Hydrographique et Océanographique de la Marine	SHOM
France	Tecsol	TECSOL
France	TELECOM Bretagne	TB
France	Université de Bretagne Occidentale	UBO
France	Université de Corse, UMR SPE CNRS 6134	UC
France	Université de Strasbourg	UDS
Gambia	Water Resources Department	WRD
Germany	Alfred Wegener Institute for Polar and Marine Research	AWI
Germany	Bundesamt für Seeschifffahrt und Hydrographie	BSH
Germany	Bundesanstalt für Gewässerkunde	BFG
Germany	Center for Integrated Climate System Analysis 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	EuroWind GmbH	EuroWind
Germany	FastOpt GmbH	FastOpt
Germany	Flottenkommando Abt GeoInfoD	Flottenkdo GeoInfoD
Germany	Freie Universität Berlin	FUB
Germany	German Aerospace Center	DLR
Germany	Institute 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
Germany	University of Hamburg	IFM/Hamburg
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	Anna University Chennai	GSK
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 Space Science and Technology	IIST
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	Naval Physical and Oceanographic Laboratory	NPOL
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	Bureau of Meteorology, Climatology and Geophysic Region IV Makassar	BMCGR
Indonesia	Maxxima	AIS
Indonesia	Ministry of Marine Affairs and Fisheries	MMAF
Indonesia	Vertex	Mr
Iran	hakim sabzevari university	HSU
Israel	Bar Ilan University	BIU
Israel	Israel Meteorological Service	IMS
Israel	The Hebrew University	HUJI
Italy	Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile	ENEA
Italy	Centro Euro-Mediterraneo sui Cambiamenti Climatici	CEMCC
Italy	Centro Nazionale di Meteorologia e Climatologia Aeronautic	CNMCA
Italy	EC- Joint Research Centre	EC-JRC
Italy	Epson Meteo Center	EMC
Italy	ESA	ESA/ESRIN

Italy	Fondazione imc – onlus , International Marine Centre	IMC
Italy	Institute of Marine Science – CNR	ISMAR-CNR
Italy	Instituto di BioMeteorologia – Consiglio Nazionale delle Ricerche	IBIMET-CNR
Italy	Instituto Nazionale di Geofisica e Vulcanologia	INGV
Italy	Instituto Scienze dell'Atmosfera e del Clima – Consiglio Nazionale delle Ricerche	ISAC – CNR
Italy	Instituto Superiore per la Ricerca e la Protezione Ambientale	ISRPA
Italy	National Aquatic Resources Research and Development Agency	CITS
Italy	Italian Space Agency	ASI
Italy	NATO Undersea Research Centre	NURC
Italy	Ocean Project	ASD
Italy	Politecnico di Milano	PoliMi
Italy	Politecnico di Torino	DITIC POLITO
Italy	Universita degli Studi di Bari	USB
Italy	university of bologna	DISTA
Iran	Atmospheric Science and Meteorological Research Center	ASMERC
Japan	Center for Atmospheric and Oceanic Studies	CAOS
Japan	Hokkaido University	HU
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
Latvia	Latvian Environment, Geology and Meteorology Centre	LEGMC
Lithuania	Institute of Aerial Geodesy	AGI
Lithuania	Lithuanian Hydrometeorological Service	LHMS
Lithuania	University of Vilnius	VU
Malaysia	Malaysian Remote Sensing Agency	MRSA
Malaysia	faculty of geoinformation and real estate	FGHT
Marocco	University Ibn Tofail	UIT
Mauritius	Mauritius Oceanography Institute	MOI
Mexico	Facultad de Ciencias Marinas, Universidad Autónoma de Baja California	FCM/UABC
Mexico	Instituto Oceanografico del Pacifico	IOP
Mexico	Universidad de Colima	UCOL
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
Netherlands	WaterInsight	WaterInsight
New Zealand	Meteorological Service of New Zealand	MetService
New Zealand	University of Canterbury	UC
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	Norwegian Defense Research Establishment	FFI
Norway	Norwegian Meteorological Institute	Met.no
Norway	Statoil ASA	
Norway	StormGeo AS	StormGeo
Norway	The University Centre in Svalbard	UNIS
Norway	University of Bergen	UiB
Norway	Uni Research AS	URAS
Oman	Directorate General of Meteorology and Air Navigation	DGMAN
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	UP-MSI
Philippines	Ateneo de Manila University	ADMU
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	Pomeranian University in S³upsk	AP
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
Romania	Mircea cel Batran Naval Academy	MBNA
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	Femco-West Ltd brach in Murmansk	FEMCO WEST
Russia	Geophysical Center of Russian Academy of Sciences	GC RAS
Russia	Institute of Ecology and Evolution, Russian Academy of Sciences	IEE RAS
Russia	Russia HycroMetCenter	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
Singapore	Nanyang Technological University	NG
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
South Korea	Korea Meteorological Administration	KMA
South Korea	Korea Ocean Research and Development Institute	KORDI
South Korea	Korea Ocean Satellite Center	KOSC
South Korea	Jeju National University	JNU
South Korea	NATIONAL INSTITUTE of METEOROLOGICAL RESEARCH	NIMR
South Korea	PKNU	MF
Spain	Basque Meteorology Agency	EUSKALMET
Spain	Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas	CIEMAT
Spain	Fundacion Centro de Estudios Ambientales del Mediterraneo	CEAM
Spain	Isocero.com	ISOCERO
Spain	Instituto Català de Ciències del Clima	IC3
Spain	Instituto de Ciències del Mar	ICM
Spain	Instituto 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 de Oceanografia	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	Mediterranean Institute for Advanced Studies	IMEDEA
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 the Basque Country - Department of Applied Physics II - EOLO Group	UPV/EHU
Spain	University of Vigo	CACTI
Spain	Vortex	VORTEX

Sri Lanka	Department of Meteorology	DOM
Sri Lanka	National Aquatic Resources Research and Development Agency	NARA
Sweden	Chalmers University of Technology	CHALMERS
Sweden	Department of Earth Science, Uppsala University	DES-UU
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	National Central University	NCU/TAIWAN
Taiwan	Taiwan Ocean Research Institute	TORI
Taiwan	Taiwan Typhoon and Flood Research Institute	TTFRI
Turkey	Istanbul Technical University	YE
Turkey	Türkish State Meteorological Services	TSMS
Ukraine	Marine Hydrophysical Institute	MHI
Ukraine	World Data Center for Geoinformatics and Sustainable Development	WDCGSD
United Arab Emirates	International Center for Biosaline Agriculture	ICBA
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	Exprodat	Exprodat
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 Bristol	UoB
United Kingdom	University of East Anglia	UEA
United Kingdom	University of Edinburgh	Edin-Univ
United Kingdom	University of Gloucestershire	Uglos
United Kingdom	University of Leeds	Leeds
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 ACUÃTICOS	DNRA
USA	Alaska Department 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	Colombia University	CU
USA	Colorado State University	CSU
USA	Cooperative Institute for Meteorological Studies	CIMSS
USA	Cooperative Institute for Research Environmental Sciences	CIRES
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	The John Hopkins University / Applied Physics Laboratory	JHU/APL
USA	Joint Typhoon Warning Center	JTWC
USA	Leidos	LEIDOS
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	National Oceanic and Atmospheric Administration	NOAA/NCDC
USA	National Oceanic and Atmospheric Administration	NOAA/NWS
USA	Naval Postgraduate School	NPS
USA	Ocean Weather Services	OWS
USA	Roffer's Ocean Fishing Forecasting Service	ROFFS
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	Vanderbilt University	VU
USA	Weather Routing Inc.	WRI
USA	Woods Hole Oceanographic Institution	WHOI
Venezuela	Escuela de Ingeniería Eléctrica Universidad	EIEU
Vietnam	Vietnam National Center for Hydro-Meteorological Forecast	NCHMF

table 27 : List of Institutes registered on the central Web Site

Moreover 10 new individual users, i.e. persons independent from any institute, establishment or company, registered on the period.

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

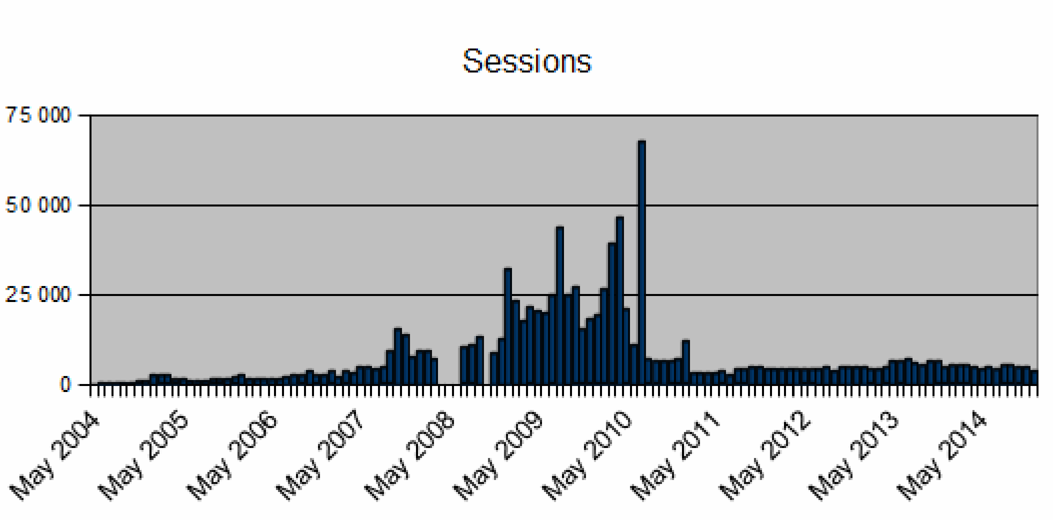


Figure 58 : **Evolution of sessions on the central OSI SAF Web Site from April 2004 to December 2014.**

Usage of the OSI SAF central Web Site by country (top 10) over 2nd half 2014 (pages views)							
Countries	**JUL. 2014**	**AUG. 2014**	**SEP. 2014**	**OCT. 2014**	**NOV. 2014**	**DEC. 2014**	**Total**
France	19142	18308	18321	28964	21107	21102	126944
Denmark	1850	286	479	1780	1470	1677	7542
Germany	1108	1007	437	2777	1139	519	6987
Italy	1936	723	976	1120	672	676	6103
Netherlands	830	443	877	1396	566	1008	5120
China	204	2349	1837	187	122	105	4804
Sweden	1326	1101	544	240	369	58	3638
Japan	314	364	439	703	217	1466	3503
United Kingdom	365	338	383	944	523	228	2781
Greece	496	456	114	682	619	316	2683

Figure 59 : **Usage of the OSI SAF central Web Site by country (top 10) over 2nd half 2014**

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
140014	04/07/2014	L2 SST product available from AVHRR onMetop-B satellite ?	closed
140015	16/07/2014	Looking for information on drifting icebergs	closed
140016	18/07/2014	Access request for Ifremer FTP server	closed
140017	13/08/2014	Request for archived wind products	closed
140018	26/08/2014	Access request for Ifremer FTP server	closed
140019	27/08/2014	How to extract DLI fluxes from GRIB file ?	closed
140020	30/08/2014	Online courses	closed
140021	30/08/2014	Online courses	closed
140022	08/10/2014	Which type of SST is SEVIRI SST ?	closed
140023	18/10/2014	No more access to Ifremer FTP server	closed
140024	21/10/2014	Test	closed
140025	22/10/2014	Test	closed
140026	24/10/2014	Two days data gap in sea ice concentration : will OSI SAF fill the gap ?	closed
140027	28/10/2014	Looking for MGR-SST product over Mediterranean Sea for a specific period	closed
140028	18/11/2014	Looking for the last 3 years of DLI	closed
140029	19/11/2014	Problem with Low Resolution Sea Ice Drift data	closed
140030	24/11/2014	Use and license fees for commercial use	closed
140031	12/12/2014	RapidSCAT data before 8 December 2014	closed

table 28 : 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
300026196	30/06/2014	Metop AVHRR Polar Winds	closed
300027694	24/11/2014	Use and license fees for commercial use	closed

table 29 : 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 OSI SAF High Latitude portal (http://osisaf.met.no/).

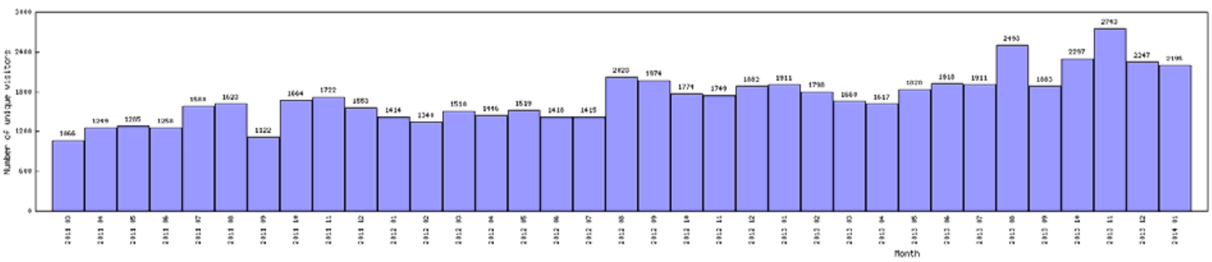


Figure 60 : Evolution of visitors on the HL OSI SAF Sea Ice portal from March 2011 to DEC. 2014 (http://osisaf.met.no).

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 December 2014. Only external sessions (from outside KNMI) are counted.

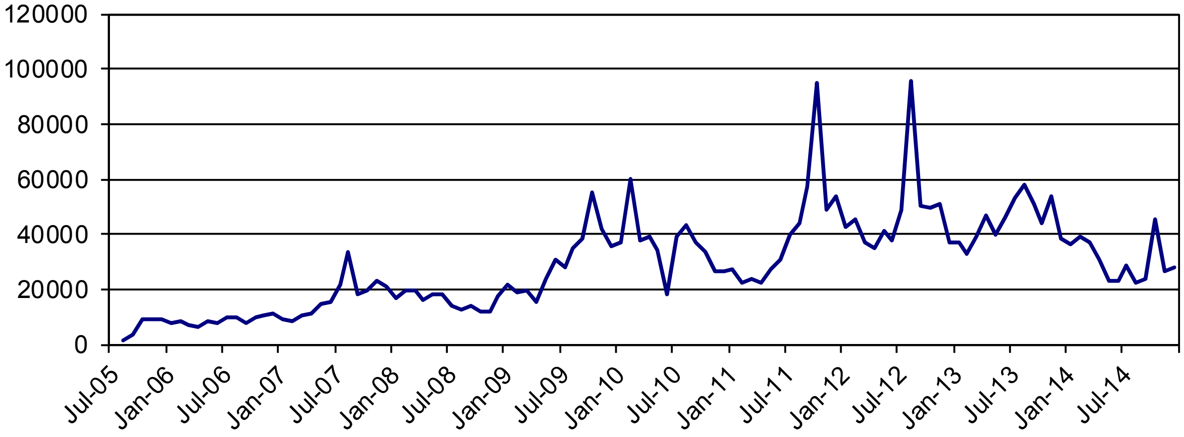


Figure 61 : Number of page views on KNMI scatterometer website per month.

At scat@knmi.nl, 51 Emails from 21 different addresses were received in the period Jul-Sep 2014, requesting wind data, processing software, and other support. For Oct-Dec 2014 an additional 67 Emails from 27 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 52, and 38 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
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.
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
Bureau of Meteorology		Australia
CPTEC - INPE		Brazil
StormGeo AS		Norway

Vienna University of Technology (TU Wien)		Austria
NSOAS		China
Deutscher Wetterdienst	DWD	Germany
Far-Eastern Centre for Reception and Processing of Satellite Data		Russia
Roshydromet		Russia
Sorbonne Universities		France
Brazilian Navy		Brazil
Hofstra University		U.S.A.
University of Tehran		Iran
Finnish Meteorological Institute	FMI	Finland
25 independent users (not affiliated to an organization)		

table 30 : List of registered Wind users at KNMI.

6.2 Statistics on the FTP sites use

6.2.1 Statistics on the SS1 and PO.DAAC ftp site use

SST and Fluxes products are available on IFREMER FTP server. Some 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.

Number of OSI SAF products downloaded on IFREMER FTP server over 2nd half 2014													
		JUL. 2014		AUG. 2014		SEP. 2014		OCT. 2014		NOV. 2014		DEC. 2014	
		Ifremer FTP	PO.DAAC	Ifremer FTP	PO.DAAC	Ifremer FTP	PO.DAAC	Ifremer FTP	PO.DAAC	Ifremer FTP	PO.DAAC	Ifremer FTP	PO.DAAC
SST MAP +LML		0	x	0	x	0	x	0	x	0	x	2	x
SSI MAP +LML		1	x	0	x	0	x	0	x	0	x	0	x
DLI MAP +LML		0	x	0	x	24	x	0	x	0	x	0	x
OSI-201	GBL SST	13436	1584	31559	1657	4251	1681	6860	1812	29905	2768	9795	880
OSI-202	NAR SST	1419	2460	1643	2974	1489	22171	4134	2230	1961	4141	2390	1560
OSI-204	MGR SST	17	1946	31	935	7	2935	5	25010	1	1556	0	622
OSI-206	METEOSAT SST	31	79	56	124	26	957	22	1613	31	42	24	14
OSI-207	GOES-E SST	2524	x	3062	x	10922	x	28292	x	9961	x	7465	x
OSI-303	METEOSAT DLI	729	x	1503	x	719	x	29025	x	2290	x	5405	x
OSI-304	METEOSAT SSI	491	x	560	x	1392	x	683	x	661	x	682	x
OSI-305	GOES-E DLI	336579	x	576934	x	361954	x	310737	x	331492	x	361632	x
OSI-306	GOES-E SSI	62	x	54	x	50	x	51	x	426	x	48	x

table 31 : Number of OSI SAF products downloaded from Ifremer FTP server and PO.DAAC server over 2nd half 2014.

Note : PO.DAAC statistics about the NAR SST product is the sum of NOAA-17, NOAA-18, NOAA-19 and Metop-A NAR SST products.

6.2.2 Statistics on the SS2 ftp site use

Sea Ice products are available on MET Norway FTP server. The numbers include the ice concentration, ice edge and ice type product for each product area in GRIB and HDF5 format.

Number of Sea Ice products downloaded on High Latitude FTP server over 2nd half 2014							
		JUL. 2014	AUG. 2014	SEP. 2014	OCT. 2014	NOV. 2014	DEC. 2014
OSI-401	Global Sea Ice Concentration	41338	11241	32043	25914	19233	5491
OSI-402	Global Sea Ice Edge	4405	1847	6115	2610	6588	2330
OSI-403	Global Sea Ice Type	7432	2785	2684	2614	5419	2517
OSI-404	Global Sea Ice Emissivity	323	187	200	277	737	205
OSI-405	Low resolution Sea Ice Drift	764	1340	11140	6655	4708	2735
OSI-407	Medium resolution Sea Ice Drift	336	127	628	266	479	686
OSI-409	Reprocessed Ice Concentration	38621	31312	16462	39609	51069	65320
Downloaded SST, DLI and SSI over the OSI SAF High Latitude FTP server							
OSI-203	AHL SST	157	280	351	183	215	156
OSI-301	AHL DLI	0	5	0	176	14	1
OSI-302	AHL SSI	113	2	6	10	1	0

table 32 : Number of OSI SAF products downloaded from OSI SAF Sea Ice FTP server over 2nd half 2014.

6.2.3 Statistics on the SS3 and PO.DAAC ftp site use

Wind products are available on KNMI FTP server. The products are also available at the PODAAC in NetCDF. 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.

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.

The number of downloads of the historic ASCAT wind products from the PO.DAAC archive 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 provide archived SeaWinds data to users during the reporting period. We provided archived OSCAT data to one user 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
OSI-102	ASCAT-A 25km	20	40	342,595 files by 84 users (Jul-Sep) 310,047 files by 110 users (Oct-Dec)
OSI-103	ASCAT-A 12.5km	20	40	432,423 files by 157 users (Jul-Sep) 245,854 files by 165 users (Oct-Dec)
OSI-104	ASCAT-A Coastal	20	25	90,661 files by 73 users (Jul-Sep) 200,644 files by 61 users (Oct-Dec)
OSI-102-b	ASCAT-B 25km	20	35	129,953 files by 61 users (Jul-Sep) 112,045 files by 59 users (Oct-Dec)
OSI-104-b	ASCAT-B Coastal	20	20	61,665 files by 40 users (Jul-Sep) 82,038 files by 48 users (Oct-Dec)

table 33 : number of downloads per OSI SAF product file in near-real time from KNMI FTP and from PO.DAAC over 2nd half 2014.

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 36 shows the overall number of OSI SAF users by country at 1st July 2014. In clear green, the countries with the greatest numbers of users.

Albania	3	Hungary	7	Sao Tome And Principe	2
Algéria	4	Iceland	1	Saudi Arabia	3
Angola	2	India	1	Senegal	6
Argentina	1	Iran, Islamic Republic Of	3	Serbia	3
Armenia	1	Iraq	1	Seychelles	2
Austria	18	Ireland	6	Sierra Leone	2
Bahrain	1	Isle Of Man	1	Slovakia	4
Belgium	9	Israel	6	Slovenia	1
Benin	2	Italy	248	Somalia	1
Bosnia And Herzegovina	1	Jordan	1	South Africa	21
Botswana	3	Kazakhstan	1	Spain	44
Brazil	37	Kenya	8	Sudan	3
Bulgaria	1	Korea, Republic Of	1	Swaziland	2
Burkina Faso	2	Kuwait	1	Sweden	3
Burundi	2	Kyrgyzstan	1	Switzerland	10
Cameroon	2	Latvia	1	Syrian Arab Republic	1
Canada	2	Lebanon	2	Tajikistan	1
Cape Verde	2	Lesotho	2	Tanzania, United Republic Of	3
Central African Republic	2	Liberia	2	Togo	2
Chad	3	Libyan Arab Jamahiriya	1	Tunisia	2
China	2	Lithuania	1	Turkey	4
Comoros	2	Luxembourg	1	Turkmenistan	1
Congo	2	Macedonia, The Former Yugoslav Republic Of	1	Uganda	3
Congo, The Democratic Republic Of The	4	Madagascar	3	Ukraine	2
Côte D'Ivoire	4	Malawi	2	United Arab Emirates	5
Croatia	2	Mali	2	United Kingdom	119
Cuba	1	Malta	2	United States	7
Cyprus	1	Martinique	1	Uzbekistan	1
Czech Republic	13	Mauritania	2	Viet Nam	1
Denmark	4	Mauritius	7	Yemen	1
Djibouti	2	Moldova, Republic Of	1	Zambia	2
Dominican Republic	1	Morocco	5	Zimbabwe	2
Egypt	4	Mozambique	4		
El Salvador	1	Namibia	5		
Equatorial Guinea	2	Netherlands	26		
Eritrea	2	Niger	6		
Estonia	3	Nigeria	3		
Ethiopia	5	Norway	4		
Finland	4	Oman	1		
France	50	Peru	1		
Gabon	2	Poland	11		

Gambia	2	Portugal	5
Germany	97	Qatar	2
Ghana	6	Reunion	1
Greece	12	Romania	4
Guinea	2	Russian Federation	5
Guinea-Bissau	2	Rwanda	5
Haiti	1	San Marino	1

table 34 : **Overall number of EUMETCast users by country at 1st July 2014.**

6.3.2 Users and retrievals from UMARF

Orders Summary over the 2nd half 2014

The table 35 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 clear green, the users who have downloaded more than 1GB of data at least during a month.

User Id	JUL. 2014	AUG. 2014	SEP. 2014	OCT. 2014	NOV. 2014	DEC. 2014	TOTAL (MB)
monteiroi	484						484
xuezhanbin		11039					11039
tic168			2926				2926
ydzhang			9008				9008
ragnhildn			496				496
ChengYuxin			36				36
daweilee			2996				2996
knownwhat			85240		11481		96721
Heinemann			22				22
StefanS					958		958
oananicola				165			165
ydzhang				4155	1817		5972
monteiroi				6			6
ndris					21		21
abuelgasim					17		17
hproe					4		4
meteo114					82		82
ayumif					304		304
sudani84					4		4
StefanS					2		2
kristina					5		5
	484	11039	100724	4326	14695	0	131268

table 35 : **Volume of data downloaded (in MB) by users and by month from EDC over 2nd half 2014.**

Ingestion Summary over the 2nd half 2014

The next tables list the received percentage of OSI SAF products 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.

		JUL. 2014	AUG. 2014	SEP. 2014	OCT. 2014	NOV. 2014	DEC. 2014
OSI-401	Global Sea Ice Concentration (DMSP-F17)	100.00	100.00	100.00	93.55	100.00	100.00
OSI-305	Daily Downward Longwave Irradiance (GOES-13)	100.00	100.00	100.00	100.00	100.00	100.00
OSI-306	Daily Surface Solar Irradiance (GOES-13)	100.00	100.00	100.00	100.00	100.00	100.00
OSI-305	Hourly Downward Longwave Irradiance (GOES-13)	100.00	98.52	99.72	100.00	100.00	99.73
OSI-306	Hourly Surface Solar Irradiance (GOES-13)	100.00	98.52	99.72	100.00	100.00	99.73
OSI-207	Hourly Sea Surface Temperature (GOES-13)	100.00	98.52	99.58	100.00	100.00	98.79
OSI-102-b	ASCAT 25km Wind (Metop-B)	100.00	100.00	100.00	99.77	100.00	100.00
OSI-104-b	ASCAT 12.5km Coastal Wind (Metop-B)	100.00	100.00	100.00	99.77	100.00	99.77
OSI-103	ASCAT 12.5km Wind (Metop-A)	100.00	100.00	100.00	99.77	100.00	100.00
OSI-102	ASCAT 25km Wind (Metop-A)	100.00	100.00	100.00	100.00	99.77	100.00
OSI-104	ASCAT 12.5km Coastal Wind (Metop-A)	100.00	100.00	100.00	100.00	100.00	100.00
OSI-201	Global Sea Surface Temperature (Metop-A)	100.00	98.39	100.00	100.00	100.00	100.00
OSI-202	NAR Sea Surface Temperature (Metop-A)	100.00	100.00	100.00	100.00	100.00	100.00
OSI-301	AHL Downward Longwave Irradiance (Multi Mission)	100.00	100.00	100.00	100.00	100.00	100.00
OSI-405	Global Sea Ice Drift (Multi Mission)	100.00	100.00	100.00	87.10	100.00	100.00
OSI-402	Global Sea Ice Edge (Multi Mission)	100.00	100.00	100.00	93.55	100.00	100.00
OSI-403	Global Sea Ice Type (Multi Mission)	100.00	100.00	100.00	93.55	100.00	100.00
OSI-302	AHL Surface Solar Irradiance (Multi Mission)	100.00	100.00	100.00	100.00	100.00	100.00
OSI-203	AHL Sea Surface Temperature (Multi Mission)	100.00	100.00	100.00	100.00	100.00	100.00
OSI-303	Daily Downward Longwave Irradiance (MSG)	100.00	100.00	100.00	100.00	100.00	100.00
OSI-304	Daily Surface Solar Irradiance (MSG)	100.00	100.00	100.00	100.00	100.00	100.00
OSI-303	Hourly Downward Longwave Irradiance (MSG)	100.00	99.60	99.72	100.00	99.86	99.87
OSI-304	Hourly Surface Solar Irradiance (MSG)	100.00	99.60	99.72	100.00	99.86	99.87
OSI-206	Hourly Sea Surface Temperature (MSG)	100.00	99.87	99.58	100.00	99.86	98.52
OSI-202	NAR Sea Surface Temperature (NOAA-19)	100.00	100.00	100.00	100.00	100.00	96.77
	TOTAL	100.00	99.44	99.80	99.69	99.94	99.61

table 36 : **Percentage of received OSI SAF products in 2nd half 2014.**

Comments :

21/10/2014 to 23/10/2014 : Due to a problem with the network at NOAA, High Latitudes sub-system was not receiving SSMIS data for the production of the OSI SAF Sea Ice products (concentration OSI-401, edge OSI-402, type OSI-403, emissivity OSI-404 and LR drift OSI-405). The LR sea ice drift product was also not available on two more days, as it relies on data from two consecutive days.

7 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
Analysis of ASCAT-A Transponder Calibration for Wind Processing	SAF/OSI/CDOP2/KNMI/TEC/TN/163	6.1	Aug. 2014
OSISAF CDOP2 HYR14-H1	SAF/OSI/CDOP2/M-F/TEC/RP/333	1.0	Sep. 2014
OSISAF AHL Radiative Fluxes Product User Manual	SAF/OSI/CDOP/met.no/TEC/MA/116	1.2	Sep. 2014
OSISAF Sea Ice Product User Manual	SAF/OSI/Met.no/ TEC/MA/125	3.11	Sep. 2014
MAIA v4 Science validation (intercomparison with PPS VIIRS cloud mask)	SAF/OSI/CDOP2/M-F/TEC/MA/217	1.0	Sep. 2014
OSISAF CDOP2 HYR13-H1	SAF/OSI/CDOP2/M-F/TEC/RP/331	1.2	Oct. 2014
OSISAF METOP-A IASI SST L2P validation report	SAF/OSI/CDOP2/M-F/TEC/RP/210	1.2	Nov. 2014
Low Earth Orbiter Sea Surface Temperature Product User Manual	SAF/OSI/CDOP/M-F/TEC/MA/127	2.7	Nov. 2014
Minutes of OSI SAF Operation Review 10	EUM/TSS/MIN/14/778177	1.a	Oct. 2014
OSI SAF CDOP-2 Configuration Management Plan	SAF/OSI/CDOP2/M-F/MGT/PL/2-009	1.0	Nov. 2014
OSI SAF CDOP-2 Master Schedule	SAF/OSI/CDOP2/M-F/MGT/PL/2-007	1.2	Nov. 2014
OSI SAF CDOP-2 Service Specification Document	SAF/OSI/CDOP2/M-F/MGT/PL/2-003	2.3	Nov. 2014
OSI SAF CDOP-2 HYR14-H1	SAF/OSI/CDOP2/M-F/TEC/RP/333	1.1	Nov. 2014
Status Report n°6 for CDOP2 SG06	SAF/OSI/CDOP2/M-F/MGT/RP/2-016	1.2	Nov. 2014
EUMETSAT - OSI SAF Joint Operation Procedure	EUM/OPS/ICD/04/0201	8b	Nov. 2014
Minutes of 6th CDOP2 Steering Group meeting	SAF/OSI/CDOP2/M-F/MGT/RP/2-106	1.0	Dec. 2014
OSI SAF CDOP2 Product Requirements Document	SAF/OSI/CDOP2/M-F/MGT/PL/2-007	3.0	Jan. 2015
OSI SAF CDOP2 Master Schedule	SAF/OSI/CDOP2/M-F/MGT/PL/2-007	1.3	Jan. 2015

table 37 : **Documentation updates.**

Recent publications

Anne Marsouin, Pierre Le Borgne, Gérard Legendre, Sonia Péré, Hervé Roquet, Six years of OSI SAF METOP-A AVHRR sea surface temperature, to be published in Remote Sensing of Environement in 2015.

King, G., J. Vogelzang and A. Stoffelen, Second-order structure function analysis of scatterometer winds over the Tropical Pacific, J. Geophys. Res., 2014. Abstract (html) Complete text (pdf: 2 MB)

King, G., J. Vogelzang and A. Stoffelen, Upscale and downscale energy transfer over the tropical Pacific revealed by scatterometer winds, J. Geophys. Res., 2014. Abstract (html) Complete text (pdf: 894 KB)

Lin, W., M. Portabella, A. Stoffelen, A. Turiel and A. Verhoef, RAIN IDENTIFICATION IN ASCAT WINDS USING SINGULARITY ANALYSIS, IEEE Gosci. Remote Sensing Letters, 2014, 11, 9, 1519-1523, doi:10.1109/LGRS.2014.2298095. Abstract (html) Complete text (pdf: 960 KB)

McColl, K.A., J. Vogelzang, A.G. Konings, D. Entekhabi, M. Piles and A. Stoffelen, Extended triple collocation: estimating errors and correlation coefficients with respect to an unknown target, accepted, Geophys. Res. Lett., 2014. Abstract (html) Complete text (pdf: 363 KB)

Vogelzang, J., G.P. King and A. Stoffelen, Spatial variances of wind fields: their sensitivity to sampling strategy and their relation to second-order structure functions and spectra, J. Geophys. Res., 2014. Abstract (html)

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. Abstract (html) Complete text (html)