

The EUMETSAT  
Network of  
Satellite Application  
Facilities



**OSI SAF**

Ocean and Sea Ice

# **OSI SAF CDOP2**

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## **HALF-YEARLY OPERATIONS REPORT**

—

### **2nd half 2015**

—

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—

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**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 1<sup>st</sup> of July to 31<sup>th</sup> of December 2015.

The objective of this document is to provide EUMETSAT and users, in complement with the web site [www.osi-saf.org](http://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 2.6 (23 November 2015)

### 1.3.2 Reference documents

[RD-1] : ASCAT Wind Product User Manual  
OSI-102, OSI-102-b, OSI-103, OSI-104, OSI-104-b

[RD-2] : RapidScat Wind Product User Manual  
OSI-109

[RD-3] Reprocessed SeaWinds L2 winds Product User Manual  
OSI-151

[RD-4] : Low Earth Orbiter Sea Surface Temperature Product User Manual  
OSI-201, OSI-202, OSI-204, OSI-208

[RD-5] : Atlantic High Latitude L3 Sea Surface Temperature Product User Manual  
OSI-203

[RD-6] : Geostationary Sea Surface Temperature Product User Manual  
OSI-206, OSI-207

[RD-7] : Atlantic High Latitude Radiative Fluxes Product User Manual  
OSI-301, OSI-302

[RD-8] : Geostationary Radiative Flux Product User Manual  
OSI-303, OSI-304, OSI-305, OSI-306

[RD-9] : OSI SAF Sea Ice Product User Manual  
OSI-401-a, OSI-402-a, OSI-403-a

[RD-10] : 50 Ghz Sea Ice Emissivity Product User Manual  
OSI-404

[RD-11] : Low Resolution Sea Ice Drift Product User Manual  
OSI-405

[RD-12] : Medium Resolution Sea Ice Drift Product User Manual  
OSI-407

[RD-13] : Global Sea Ice Concentration Reprocessing Product User Manual  
OSI-409, OSI-409-a, OSI-430

[RD-15] : Sea Ice Product User's Manual  
OSI-401-a, OSI-402-a, OSI-403-a

[RD-16] : Global Sea Ice Edge and Type Product User's Manual  
OSI-402-b, OSI-403-b

[RD-17] : Low Resolution Sea Ice Drift Product User's Manual  
OSI-405-b

## 1.4 Definitions, acronyms and abbreviations

AHL	Atlantic High Latitude
ASCAT	Advanced SCATterometer
AVHRR	Advanced Very High Resolution Radiometer
BUFR	Binary Universal Format Representation
CDOP	Continuous Development and Operations Phase
CMS	Centre de Météorologie Spatiale (Météo-France)
DLI	Downward Long wave Irradiance
DMI	Danish Meteorological Institute
DMSP	Defense Meteorological Satellite Program
ECMWF	European Centre for Medium range Weather Forecasts
EDC	EUMETSAT Data Centre
EPS	European Polar System

FTP	File Transfer Protocol
GBL	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
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 (or MET)	Norwegian Meteorological Institute
Metop	METeorological OPerational Satellite
MF	Météo-France
MGR	Meta-GRanule
MSG	Meteosat Second Generation
NAR	Northern Atlantic and Regional
NESDIS	National Environmental Satellite, Data and Information Service
NetCDF	Network Common Data Form
NIC	National Ice Center (USA)
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
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
SSI	Surface Short wave Irradiance
SSMI	Special Sensor Microwave Imager
SSMIS	Special Sensor Microwave Imager and Sounder
SST/IST	Sea Surface Temperature/ sea Ice Surface Temperature
SST	Sea Surface Temperature
TBC	To Be Confirmed
TBD	To Be Defined
WMO	World Meteorological Organisation

**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.

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.

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.

The **RapidScat 2 hours and 3 hours wind products** originate from independent input data streams and have different timeliness requirements (120 minutes and 180 minutes). The availability is defined as the percentage of products which are available within the specified timeliness where valid input satellite data are available.

So the number of 3 hours products available within 180 minutes can be lower than the number of 2 hours products available within 120 minutes, depending on the received input data at KNMI.

Please find in section 3 comments on the tables included in section 2.1 and 2.2.

## 2.1 Availability on FTP servers

Ref.	Product	JUL. 2015	AUG. 2015	SEP. 2015	OCT. 2015	NOV. 2015	DEC. 2015
OSI-102	ASCAT-A 25 km Wind	100	99.9	100	99.9	100	100
OSI-102-b	ASCAT-B 25 km Wind	100	99.9	100	99.9	100	100
OSI-104	ASCAT-A Coastal Wind	99.8	99.7	99.7	99.5	99.7	99.9
OSI-104-b	ASCAT-B Coastal Wind	98.2	99.0	99.8	99.6	99.9	99.9
OSI-109-a	RapidScat 25 km Wind 2 hours	99.5	99.5	99.5	99.3	99.6	99.7
OSI-109-b	RapidScat 50 km Wind 2 hours	99.5	99.5	99.5	99.3	99.6	99.3
OSI-109-c	RapidScat 25 km Wind 3 hours	99.7	99.5	99.5	99.5	99.8	99.7
OSI-109-d	RapidScat 50 km Wind 3 hours	99.7	99.5	99.5	99.5	99.8	99.7
OSI-201	GBL SST	100.00	100.00	96.67	100.00	98.33	100.00
OSI-202	NAR SST	100.00	100.00	97.50	100.00	100.00	99.19
OSI-203	AHL SST / NHL SSIST	100	100	100	100	100	100
OSI-204	MGR SST	99.89	99.37	97.97	99.78	99.33	99.37
OSI-206	METEOSAT SST	95.70	98.12	98.19	100.00	98.33	99.66
OSI-207	GOES-E SST	95.56	99.06	97.92	100.00	98.33	99.19
OSI-208	IASI SST	86.42	92.38	87.23	93.15	97.34	96.40
OSI-301	AHL DLI	100	100	100	100	100	96.8
OSI-302	AHL SSI	100	100	100	100	100	96.8
OSI-303	METEOSAT DLI - hourly	95.56	98.52	98.06	100.00	99.17	99.73
	METEOSAT DLI - daily	96.77	96.77	96.67	100.00	96.67	100.00
OSI-304	METEOSAT SSI - hourly	95.56	98.52	98.06	100.00	99.17	99.73
	METEOSAT SSI - daily	96.77	96.77	96.67	100.00	96.67	100.00
OSI-305	GOES-E DLI - hourly	95.43	98.92	98.19	99.73	99.17	99.06
	GOES-E DLI - daily	80.65	87.10	96.67	93.55	100.00	100.00
OSI-306	GOES-E SSI - hourly	95.43	98.92	98.19	99.73	99.17	99.06
	GOES-E SSI - daily	80.65	87.10	96.67	93.55	100.00	100.00
OSI-401	Global Sea Ice Concentration	100	100	100	100	100	100
OSI-402(-a)	Global Sea Ice Edge	100	100	100	100	100	100
OSI-403(-a)	Global Sea Ice Type	100	100	100	100	100	100
OSI-404	Global Sea Ice Emissivity	100	100	100	100	100	100
OSI-405(-a)	Low Res. Sea Ice Drift	100	100	100	100	100.	100.
OSI-407	Medium Res. Sea Ice Drift	100	43.5	80	98.4	100	100

table 2 : Percentage of OSI SAF products available on the local FTP servers within the specified time over 2nd half 2015.



## 2.2 Availability via EUMETCast

Ref.	Product	JUL. 2015	AUG. 2015	SEP. 2015	OCT. 2015	NOV. 2015	DEC. 2015
OSI-102	ASCAT-A 25 km Wind	100	99.9	100	99.9	100	100
OSI-102-b	ASCAT-B 25 km Wind	100	99.9	100	99.9	100	100
OSI-104	ASCAT-A Coastal Wind	99.8	99.7	99.7	99.5	99.7	99.9
OSI-104-b	ASCAT-B Coastal Wind	98.2	99.0	99.8	99.6	99.9	99.9
OSI-109-a	RapidScat 25 km Wind 2 hours	99.5	99.5	99.5	99.3	99.6	99.7
OSI-109-b	RapidScat 50 km Wind 2 hours	99.5	99.5	99.5	99.3	99.6	99.3
OSI-109-c	RapidScat 25 km Wind 3 hours	99.7	99.5	99.5	99.5	99.8	99.7
OSI-109-d	RapidScat 50 km Wind 3 hours	99.7	99.5	99.5	99.5	99.8	99.7
OSI-201	GBL SST	100.00	100.00	100.00	100.00	100.00	100.00
OSI-202	NAR SST	100.00	100.00	99.17	100.00	100.00	100.00
OSI-203	AHL SST / NHL SSIST	100	100	100	100	100	100
OSI-204	MGR SST	99.93	99.94	99.89	99.74	99.96	99.93
OSI-206	METEOSAT SST	96.10	98.52	100.00	100.00	98.89	100.00
OSI-207	GOES-E SST	95.97	99.46	100.00	100.00	99.17	99.87
OSI-208	IASI SST	77.60	82.68	80.13	84.90	93.20	89.70
OSI-301	AHL DLI	100	100	100	100	100	100
OSI-302	AHL SSI	100	100	100	100	100	100
OSI-303	METEOSAT DLI - hourly	98.25	98.92	99.86	100.00	99.31	100.00
	METEOSAT DLI - daily	100.00	100.00	100.00	100.00	100.00	96.77
OSI-304	METEOSAT SSI - hourly	98.12	98.79	99.86	100.00	99.72	100.00
	METEOSAT SSI - daily	100.00	100.00	100.00	100.00	100.00	96.77
OSI-305	GOES-E DLI - hourly	96.64	96.51	99.17	96.51	97.64	97.04
	GOES-E DLI - daily	70.97	70.97	90.00	87.10	93.33	96.77
OSI-306	GOES-E SSI - hourly	96.91	96.37	98.75	96.37	98.06	96.51
	GOES-E SSI - daily	70.97	61.29	93.33	87.10	90.00	96.77
OSI-401	Global Sea Ice Concentration	100	100	100	100	100	100
OSI-402(-a)	Global Sea Ice Edge	100	100	100	100	100	100
OSI-403(-a)	Global Sea Ice Type	100	100	100	100	100	100
OSI-404	Global Sea Ice Emissivity	100	100	100	100	100	100
OSI-405(-a)	Low Res. Sea Ice Drift	100	100	95.0	100	100	100
OSI-407	Medium Res. Sea Ice Drift	100	43.5	80	98.4	100	100

table 3 : Percentage of OSI SAF products delivered via EUMETCast within the specified time over 2nd half 2015.

### **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](http://www.osi-saf.org).

#### **3.1 At SS1**

Note that the calculation for table 3 have been improved for this report in order to reflect the whole performance.

The IASI MGR SST (OSI-208) performance is based on usable data received from Eumetsat (containing SST data). Note that the Eumetsat processing is under its responsibility. These data are received by paquets, so, when arriving at SS1, some of the IASI MGR SST are already out of time. This is the main impact on the performance observed on table 2. Note also an 24h non access to Ifremer ftp site at the end of september. This impact of the late arrival from Eumetsat is also observed on table 3, but in addition, the results are also impacted with variable transmission time observed on EUMETCast. In conclusion, the lower performance for this IASI MGR SST (OSI-208) is due to the timeliness.

For OSI-305 and OSI-306, only GOES-E DLI and GOES-E SSI daily products have a lower performance than required. Firstly, we want to stressed the fact that the performance of a daily product have an important weight (3,33%) on the monthly percentage. However, we observed sometimes a longer processing end time which have an impact on the time delivery of the daily products in table 2. As for OSI-208, the performance, in table 3, are also, in addition, affected by the variable transmission time observed on EUMETCast. The longer processing time of GOES-E daily products is currently under investigation.

#### **3.2 At SS2**

In July there were a SSMIS data outage from NOAA/NESDIS which caused a degradation of the OSI SAF sea ice products. Next day the SSMIS data flow was back to nominal.

In August a bug in the MR ice drift was discovered and the distribution was stopped. The bug caused the dates in the files to be shifted by one day. The bug was in a software which is only used for the MR ice drift, so it has been secured that it is not a problem for other products. The bug was fixed and a series of tests was performed before the data was released to the users in September. The archived data on the FTP archive was corrected in January 2016 and on 19 January 2016 the users were informed that the archived data on the FTP archive now is correct.

In August it was noticed that the emissivity product during the summer had sectors of variable size with missing data mainly on the southern hemisphere. The reason was found to be a bug in the input file decoding queue. This was fixed and insured that the bug was not in other products.

15.09.2016 : Delayed LR ice drift product on EUMETCast, not on FTP, due to a processing environment error that was introduced during an update. Reported to users and fixed.

21.12.2016 : AHL SSI and DLI products were a few minutes delayed. Users were not informed.

### **3.3 At SS3**

A small calibration change (drop in backscatter for all beams) has occurred in October 2014 in the ASCAT instrument on Metop-A. This has led to a drop in average wind speed of approximately 0.06 m/s. The impact for near-real time users is minimal but corrective measures will be taken when it comes to reprocessing climate data records. The reason for the change has been investigated by EUMETSAT and industry but is not clear yet.

The ASCAT-A winds have been unavailable on 14 October between 11:30 and 16:42 UTC sensing time due to a Metop-A out of plane manoeuvre.

The ASCAT-A winds have been unavailable between 14 October 23:36 and 15 October 2:54 UTC sensing time due to a ground segment anomaly.

The ASCAT-B winds have been unavailable on 15 October between 0:27 and 3:48 UTC sensing time due to a ground segment anomaly.

The ASCAT-A winds have been unavailable on 4 November between 10:54 and 16:12 UTC sensing time due to a Metop-A 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](http://www.osi-saf.org).

### **4.1 At SS1**

From 04/12/2015, the METEOSAT SST (OSI-206) and the GOES SST (OSI-207) have been disseminated in L3C NetCDF4 on Ifremer FTP server in addition to the L3C NetCDF3 products. The goal is to stop the second ones in Q1/2016.

### **4.2 At SS2**

07.07.2015

OSI SAF sea ice team released improved version of the sea ice products ice edge, type, concentration and LR ice drift. The new and old versions were distributed in an overlapping period through FTP for users to adjust to the new versions.

26.07.2015

OSI SAF sea ice team released the new continuous reprocessed sea ice concentration offline product (OSI-430).

In July the trial dissemination of the improved sea ice concentration was started and in October the improved sea ice concentration was distributed parallel to the old version on EUMETCast. The improved sea ice concentration are not yet declared operational. The users had good feedback and found some errors in the improved ice concentration over lakes. These errors are now fixed.

### **4.3 At SS3**

There were no events or modifications.

### **4.4 Data records and off-line products released during the period**

On the 15 June 2015, the updated version 1.2 of the reprocessed sea ice concentration data set (OSI-409-a) was released. The data set now covers the period Oct 1978-Apr 2015. Version 1.2 is an extension in time of version 1.1 (OSI-409), adding the period from October 2009 to April 2015. There is no change in the algorithms or processing chain used.

On the 26 July 2015, the global continuous reprocessed sea ice concentration offline product (OSI-430) was released. This product is a continuous reprocessing to continue the OSI SAF reprocessed sea ice concentration data set (OSI-409-a) that covers the period 25th October 1978 - 15th April 2015. This offline product is a daily

product, is delivered with a monthly delay (33 days) and is available since 16 April 2015 onwards.

More details about the products are available here:

<http://osisaf.met.no/p/ice/index.html#conc-cont-reproc>

Reprocessed SeaWinds L2 25 km (OSI-151-a) and 50 km (OSI-151-b) winds Climate Data Records (CDR) have been created covering the full QuikSCAT mission history from July 1999 until November 2009. Scatterometer data have been collocated with ECMWF ERA-Interim winds and scatterometer level 2 wind products have been created at 50-km and 25-km.

More details about the products are available here :

[http://projects.knmi.nl/scatterometer/qscat\\_prod/](http://projects.knmi.nl/scatterometer/qscat_prod/)

## 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 and GOES-E SST), and 0.8°C for the polar ones (GBL, NAR, AHL, MGR and IASI SST).

According to GHRSSST-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.lfremer.fr/lfremer/cersat/projects/myocean/sst-tac/insitu/blacklist>

In the following maps, there are at least 5 in situ measurements per box.

#### 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/lml/#qua\\_SST%20Metop%20GBL%20SST\\_monthly%20map\\_monthly\\_Night%20time](http://www.osi-saf.org/lml/#qua_SST%20Metop%20GBL%20SST_monthly%20map_monthly_Night%20time).

The operational SST retrieval from MSG/SEVIRI and GOES-E updated chain validation report v1.1 ([http://www.osi-saf.org/lml/#doc\\_SST](http://www.osi-saf.org/lml/#doc_SST)) gives further details about the regional bias observed.

METEOSAT10 SST diff 2015-07-01 0131 2015-12-31 2325 zso 110-180 ql 3-5 n&gt;5 (safos)

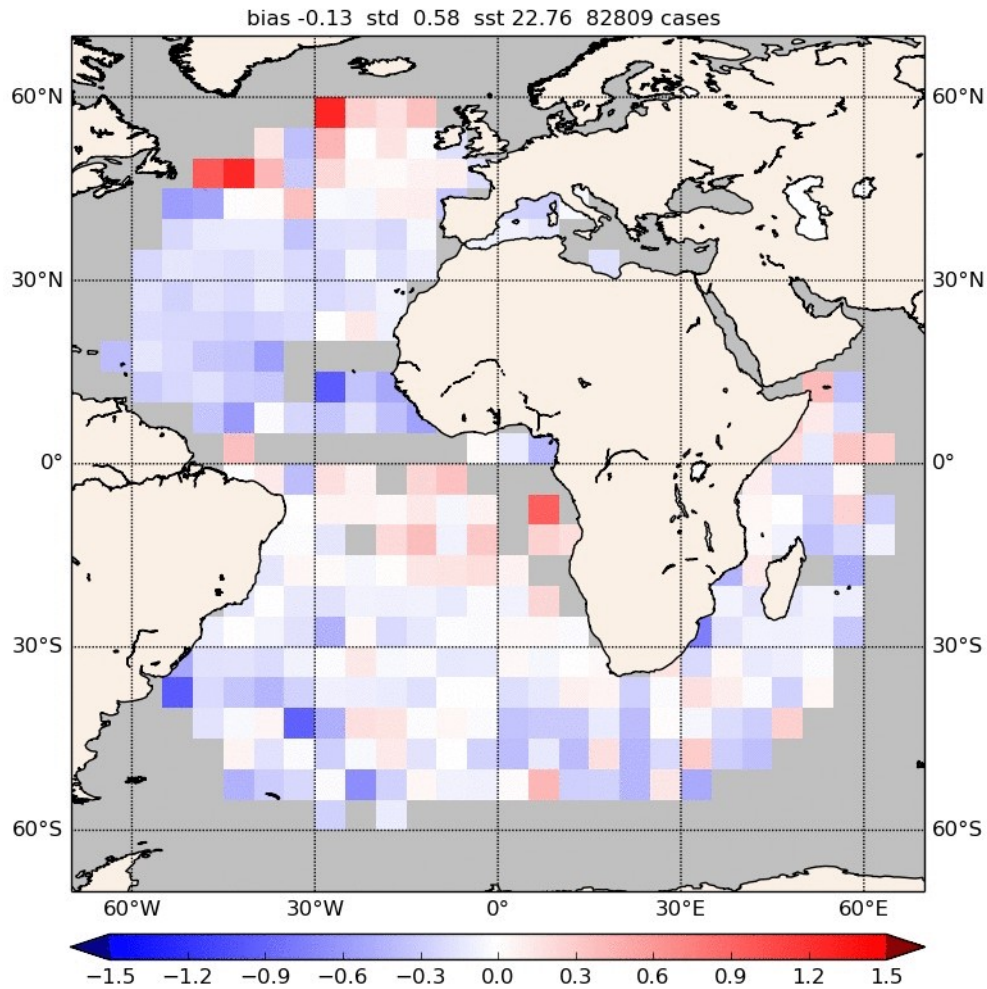
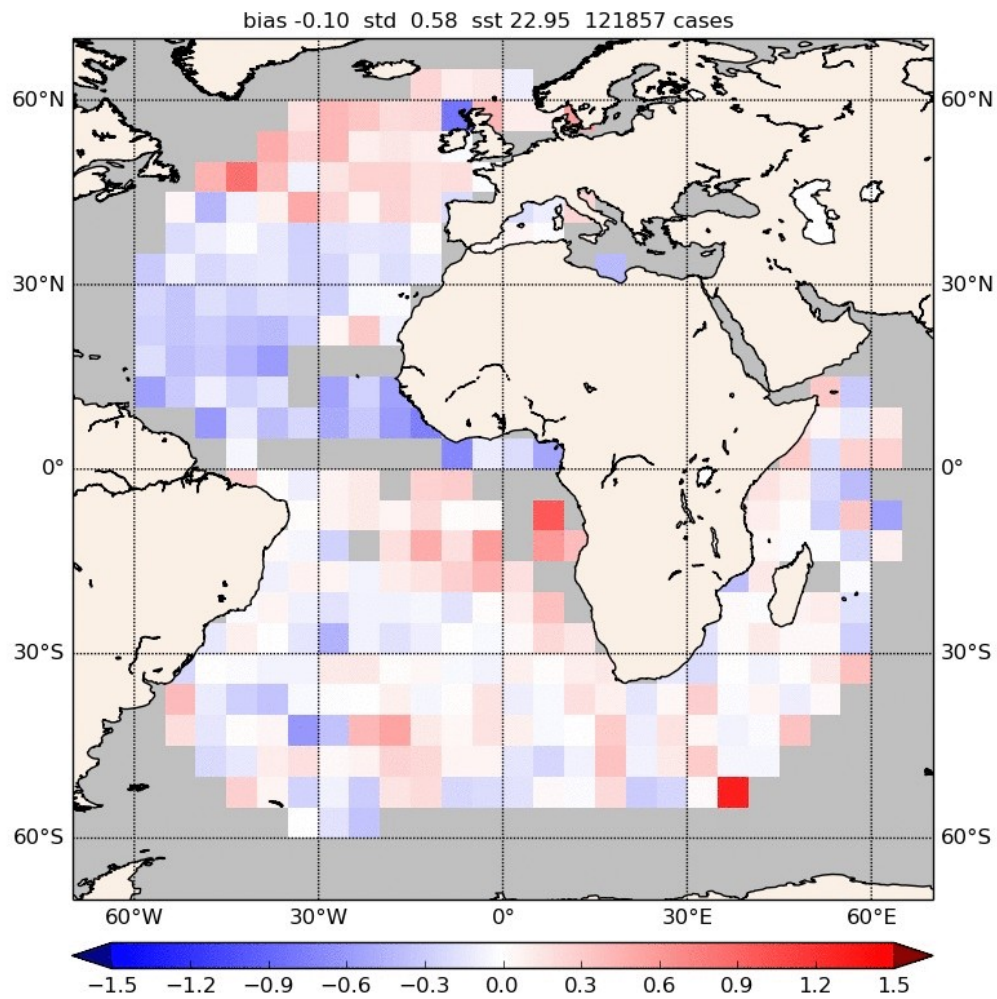


Figure 1 : mean METEOSAT night-time SST error with respect to buoys measurements for quality level 3,4,5



METEOSAT10 SST diff 2015-07-01 0256 2015-12-31 2039 zso 0- 90 ql 3-5 n&gt;5 (safos)



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



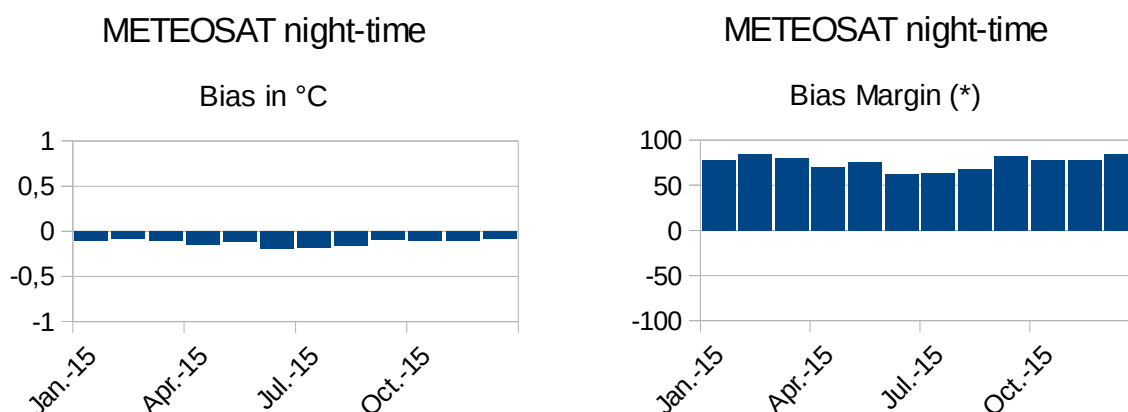
The following table provides the METEOSAT-derived SST quality results over the reporting period.

METEOSAT <u>night-time</u> SST quality results over 2nd half 2015							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Req °C	Dev margin (**)
JUL. 2015	13684	-0.18	0.5	64	0,6	1	39
AUG. 2015	18022	-0.16	0.5	68	0,6	1	38
SEP. 2015	17649	-0.09	0.5	82	0.61	1	39
OCT. 2015	13905	-0.11	0.5	78	0.58	1	42
NOV. 2015	9798	-0.11	0.5	78	0.57	1	43
DEC. 2015	9944	-0.08	0.5	84	0.52	1	48
METEOSAT <u>day-time</u> SST quality results over 2nd half 2015							
JUL. 2015	25214	-0,20	0.5	60	0.64	1	36
AUG. 2015	27297	-0,13	0.5	74	0.61	1	39
SEP. 2015	23841	-0,07	0.5	86	0.62	1	38
OCT. 2015	18560	-0.06	0.5	88	0.54	1	46
NOV. 2015	13365	-0.05	0.5	90	0.53	1	47
DEC. 2015	14154	0	0.5	100	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.							

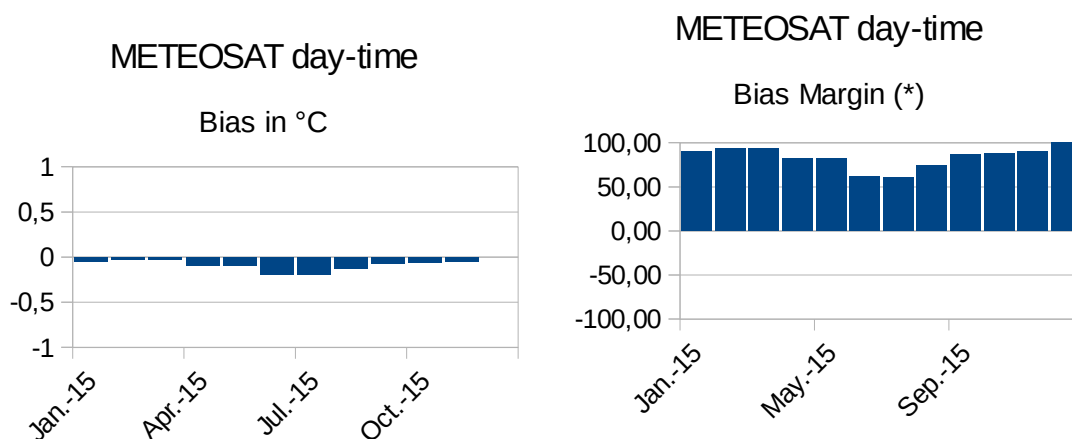
**table 4 : METEOSAT SST quality results over 2nd half 2015, for 3, 4, 5 quality indexes.**

**Comments:** Quality results are good and quite stable. We note increased bias in July and August: this is due to Saharan dust aerosols events frequent in the season.

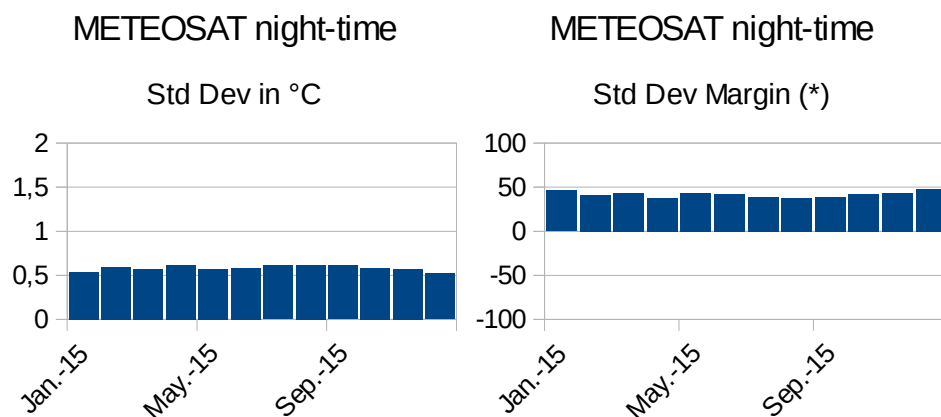
The following graphs illustrate the evolution of METEOSAT-derived SST quality results over the past 12 months.



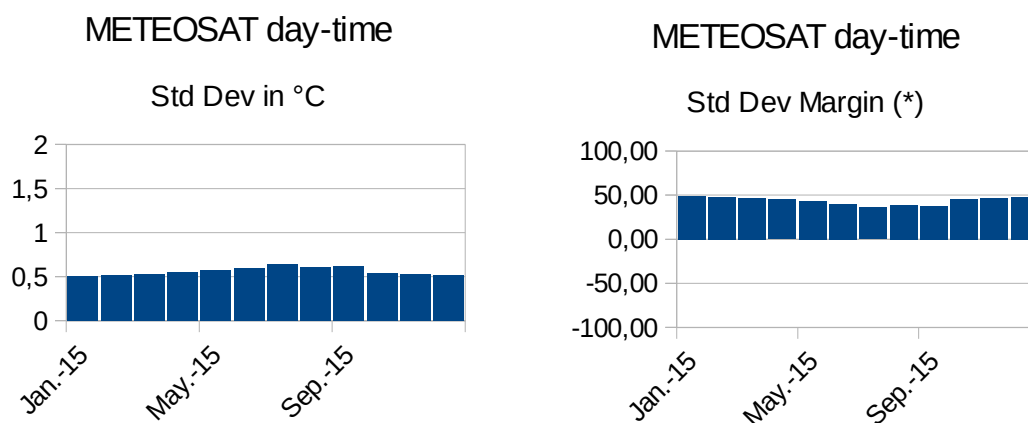
**Figure 3 : Left: METEOSAT night-time SST Bias. Right METEOSAT night-time SST Bias Margin**



**Figure 4 : Left: METEOSAT day-time SST Bias.  
Right METEOSAT day-time SST Bias Margin**



**Figure 5 : Left: METEOSAT night-time SST Standard deviation.  
Right METEOSAT night-time SST Standard deviation Margin.**



**Figure 6 : Left: METEOSAT day-time SST Standard deviation.  
Right METEOSAT day-time SST Standard deviation Margin.**

IETEOSAT10 SST diff 2015-07-01 0131 2015-12-31 2325 zso 110-180 QL 3-5 >1.0% (safo:

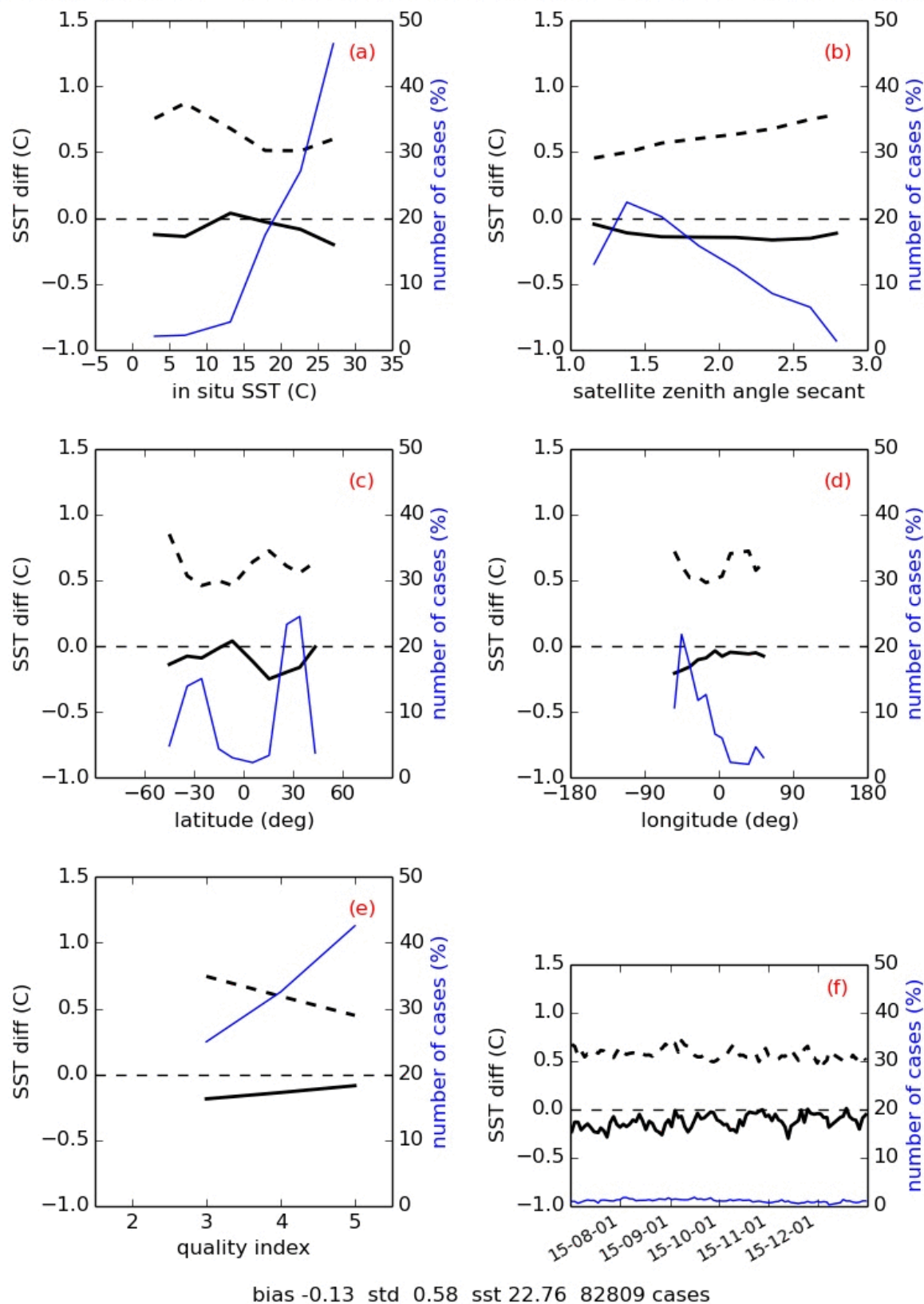


Figure 7 : Complementary quality assessment statistics on METEOSAT SST, night-time : dependence of the bias, standard deviation and number of matchups as a function of in situ SST (a), satellite zenith angle secant (b), latitude (c), longitude (d), confidence level (e), and time (f)

METEOSAT10 SST diff 2015-07-01 0256 2015-12-31 2039 zso 0- 90 QL 3-5 >1.0% (safos)

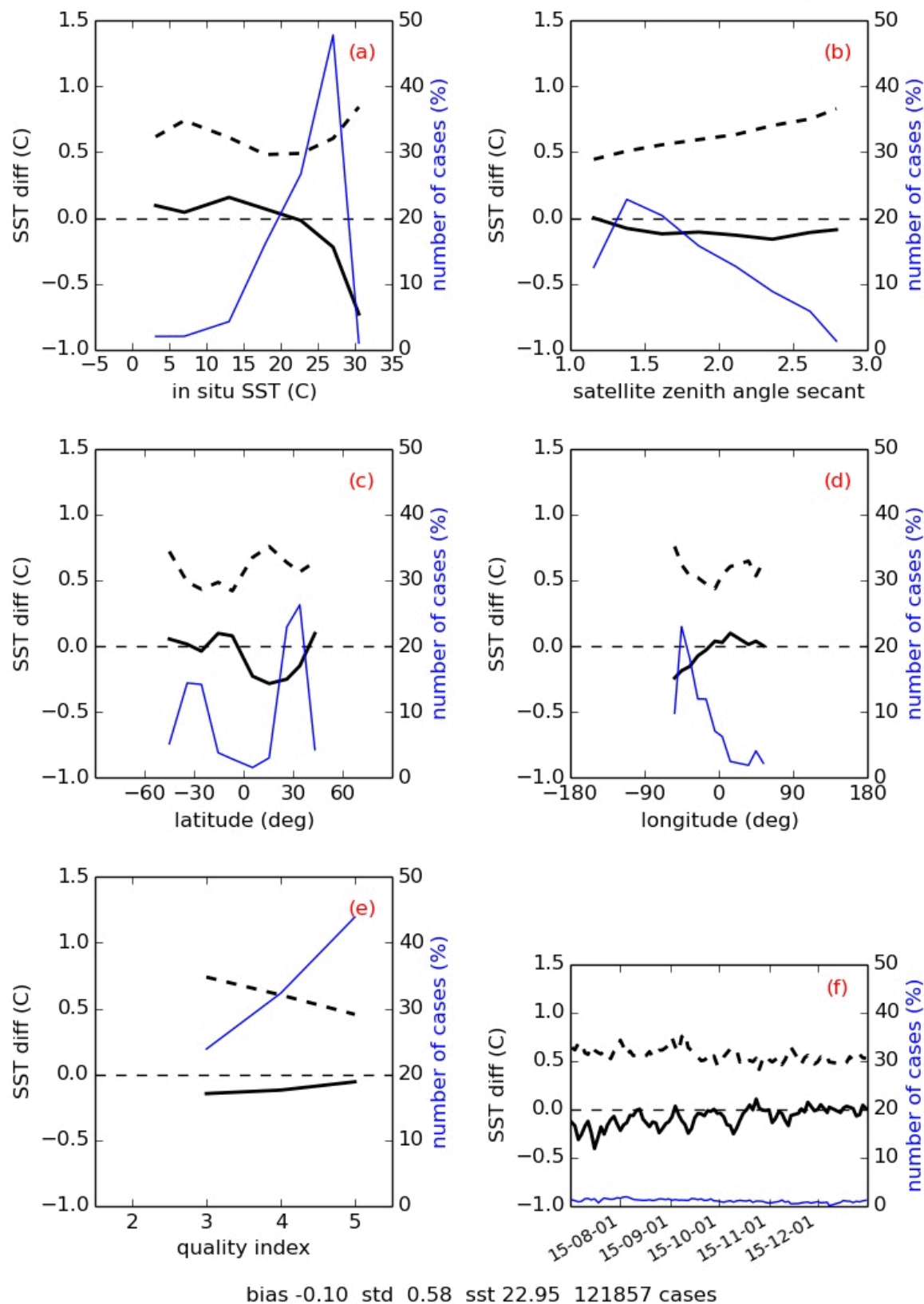


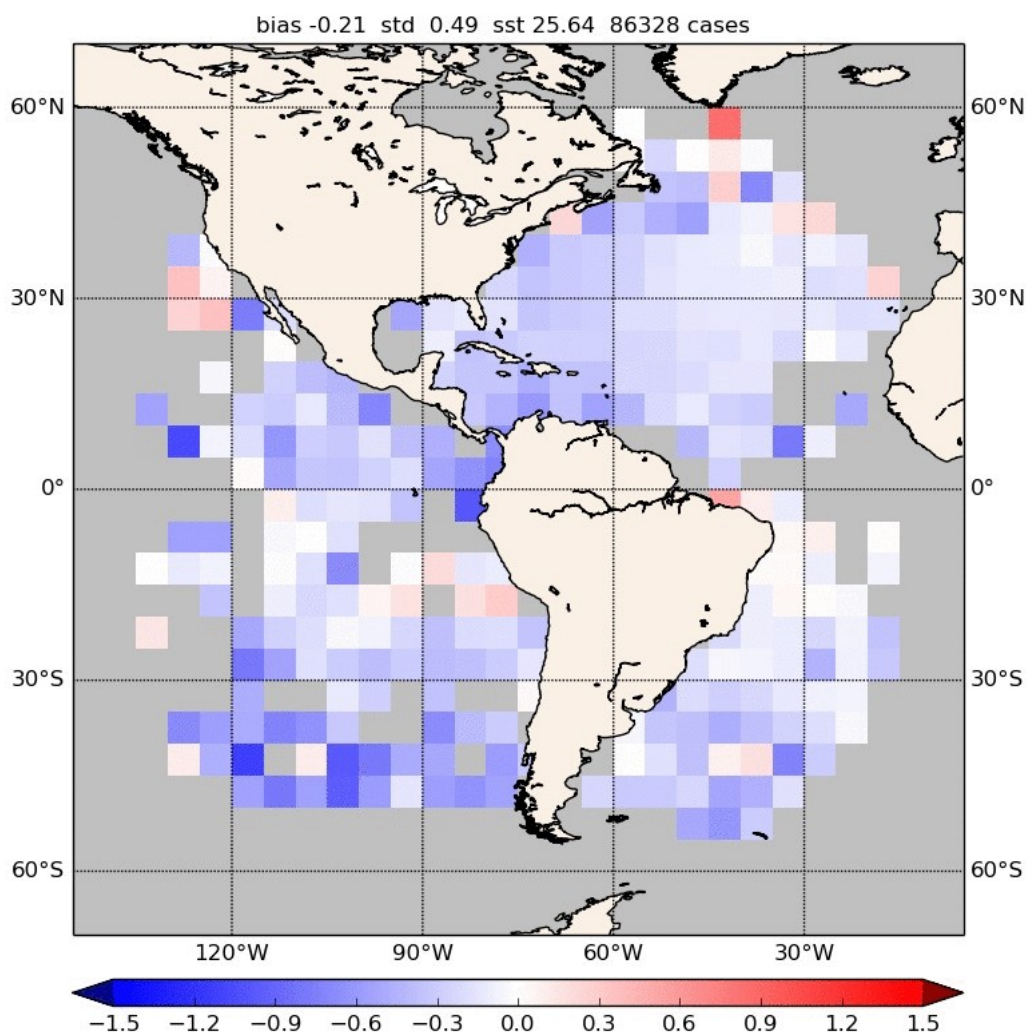
Figure 8 : Complementary quality assessment statistics on METEOSAT SST, day-time : dependence of the bias, standard deviation and number of matchups as a function of in situ SST (a), satellite zenith angle secant (b), latitude (c), longitude (d), confidence level (e), and time (f)

### 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](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](http://www.osi-saf.org/biblio/docs/ss1_geo_sst_val_rep_1_1.pdf)) gives further details about the regional bias observed.

GOES13 SST diff 2015-07-01 0004 2015-12-31 2328 zso 110-180 ql 3-5 n>5 (safos)



**Figure 9 : mean GOES-E night-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 <u>night-time</u> SST quality results 2nd half 2015								
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Req °C	Dev	Std Dev margin (**)
JUL. 2015	23165	-0.25	0.5	50	0.45	1		55
AUG. 2015	28247	-0.24	0.5	52	0.48	1		52
SEP. 2015	24154	-0.22	0.5	56	0.49	1		51
OCT. 2015	18150	-0.24	0.5	52	0.48	1		52
NOV. 2015	16897	-0.2	0.5	60	0.54	1		46
DEC. 2015	19154	-0.15	0.5	70	0.51	1		49
(*) 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 2015, for 3, 4, 5 quality indexes**

**Comments:** 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.

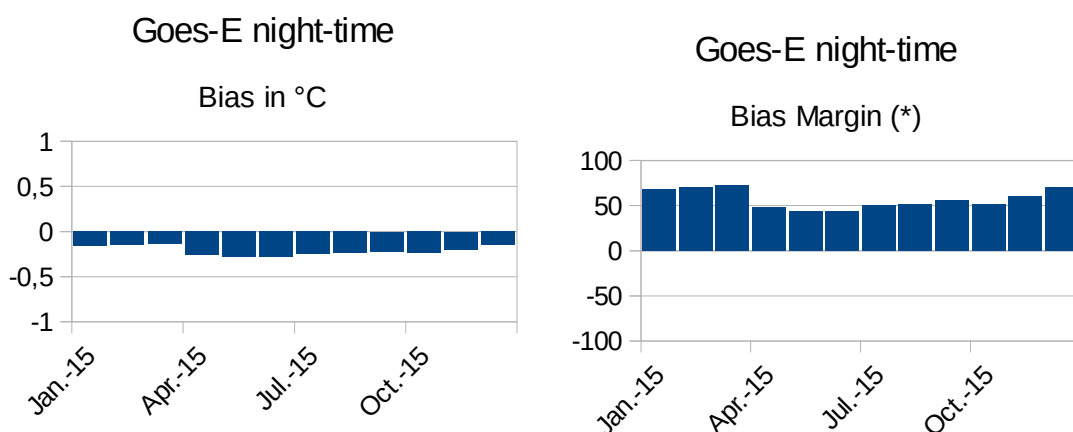


Figure 10 : **Left: Goes-E night-time SST Bias.**  
**Right: Goes-E night-time SST Bias Margin.**

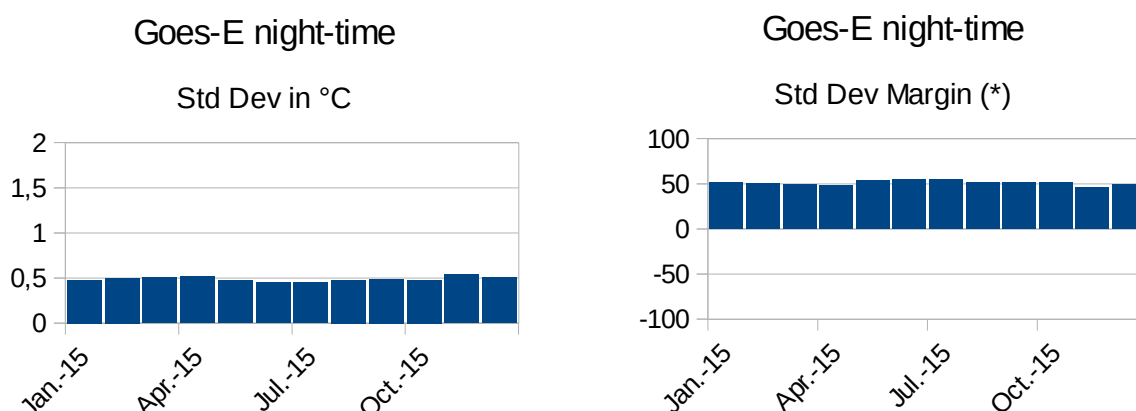


Figure 11 : **Left: Goes-E night-time SST Standard deviation.**  
**Right Goes-E night-time SST Standard deviation Margin.**



GOES13 SST diff 2015-07-01 0004 2015-12-31 2328 zso 110-180 QL 3-5 &gt;1.0% (safos)

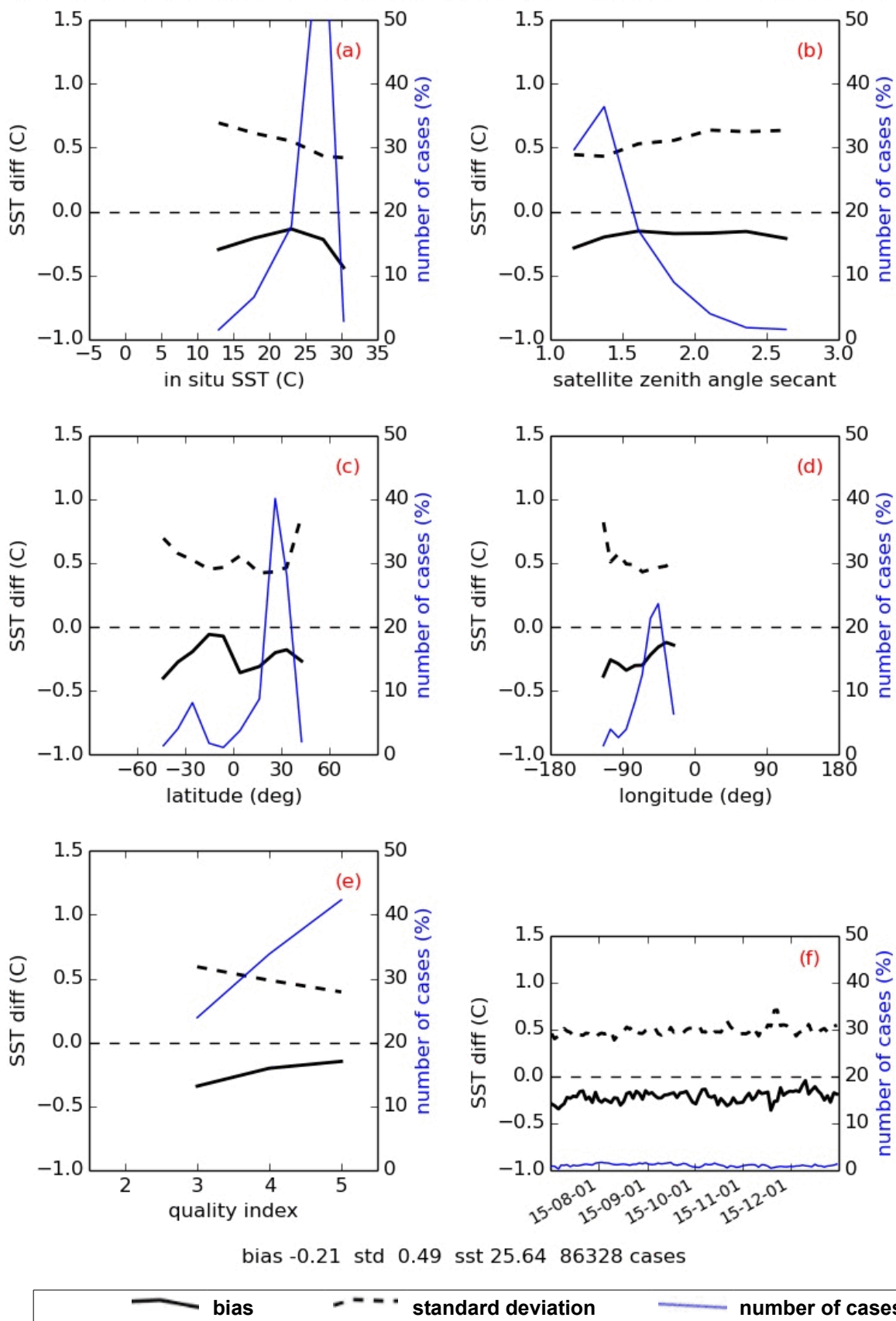


Figure 12 : Complementary quality assessment statistics on GOES-E SST, night-time : dependence of the bias, standard deviation and number of matchups as a function of in situ SST (a), satellite zenith angle secant (b), latitude (c), longitude (d), confidence level (e), and time (f)

### 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](http://www.osi-saf.org/production/cms/validation_sst_leo.php).

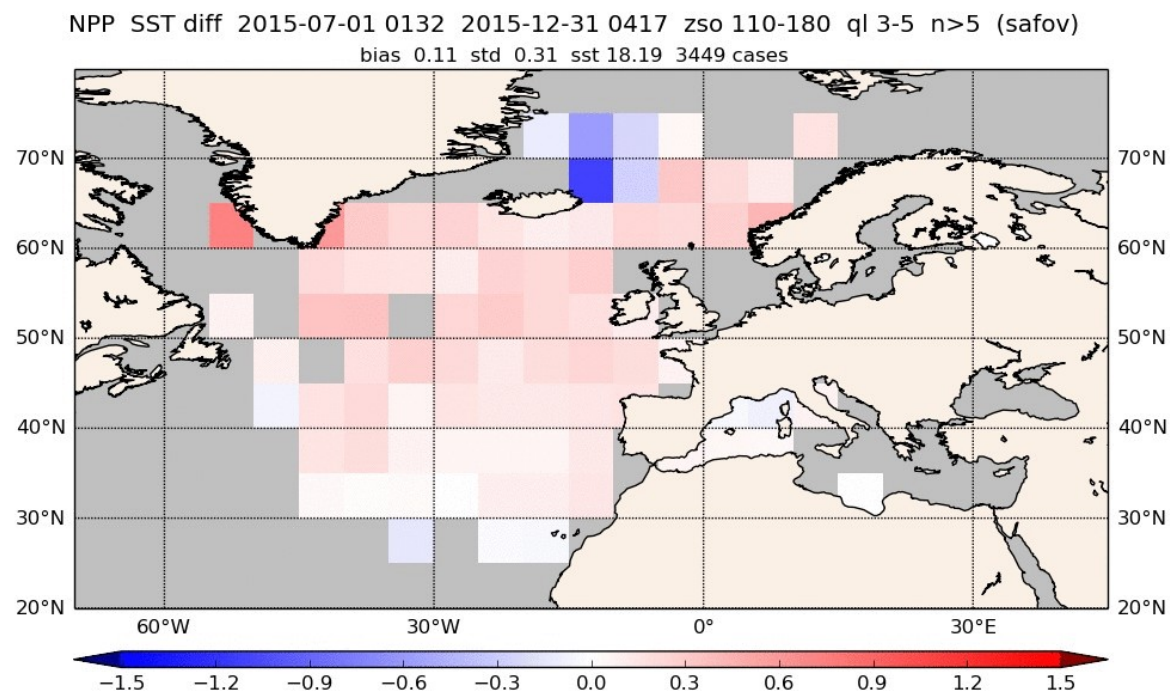
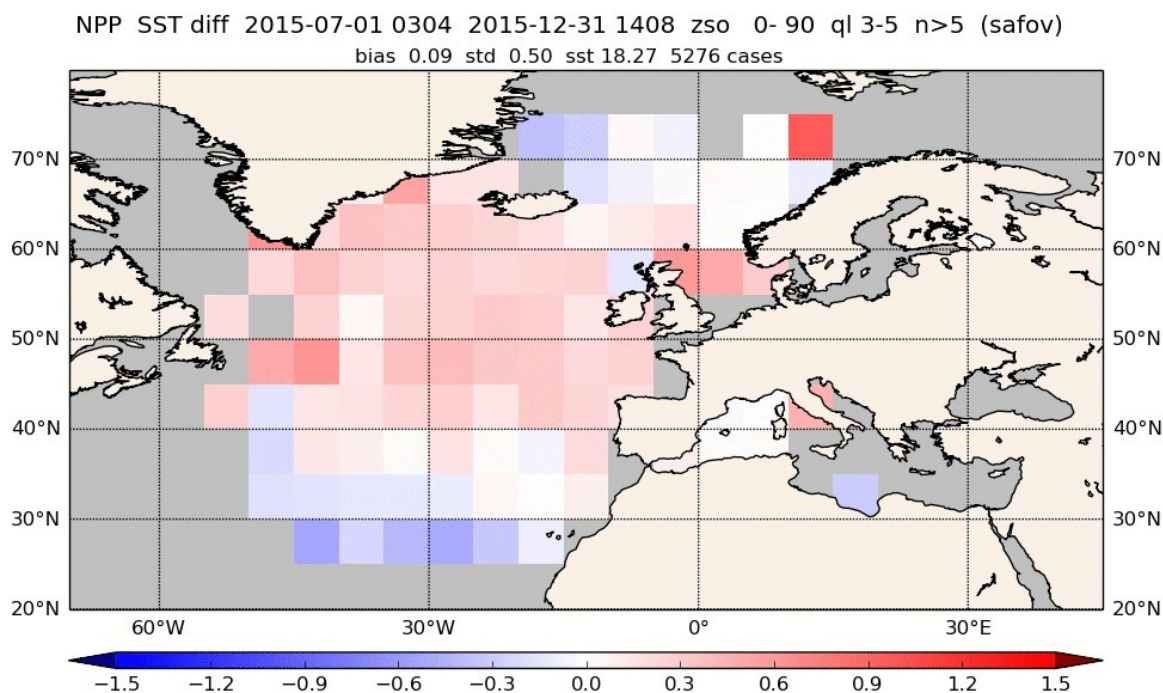


Figure 13 : mean NPP NAR night-time SST error with respect to buoys measurements for quality level 3,4,5





**Figure 14 : mean NPP NAR day-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 <u>night-time</u> SST quality results over 2nd half 2015							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (**)
JUL. 2015	457	0.02	0.5	96	0.34	0.8	57.50
AUG. 2015	521	0.07	0.5	86	0.28	0.8	65.00
SEP. 2015	506	0.12	0.5	76	0.29	0.8	63.75
OCT. 2015	647	0.16	0.5	68	0.29	0.8	63.75
NOV. 2015	677	0.13	0.5	74	0.35	0.8	56.25
DEC. 2015	644	0.14	0.5	72	0.28	0.8	65.00
NPP NAR <u>day-time</u> SST quality results over 2nd half 2015							
JUL. 2015	1117	0.04	0.5	92	0.58	0.8	27.50
AUG. 2015	1185	0.02	0.5	96	0.53	0.8	33.75
SEP. 2015	869	0.09	0.5	82	0.53	0.8	33.75
OCT. 2015	893	0.15	0.5	70	0.47	0.8	41.25
NOV. 2015	737	0.14	0.5	72	0.42	0.8	47.50
DEC. 2015	538	0.17	0.5	66	0.42	0.8	47.50
(*) 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 2015, 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.

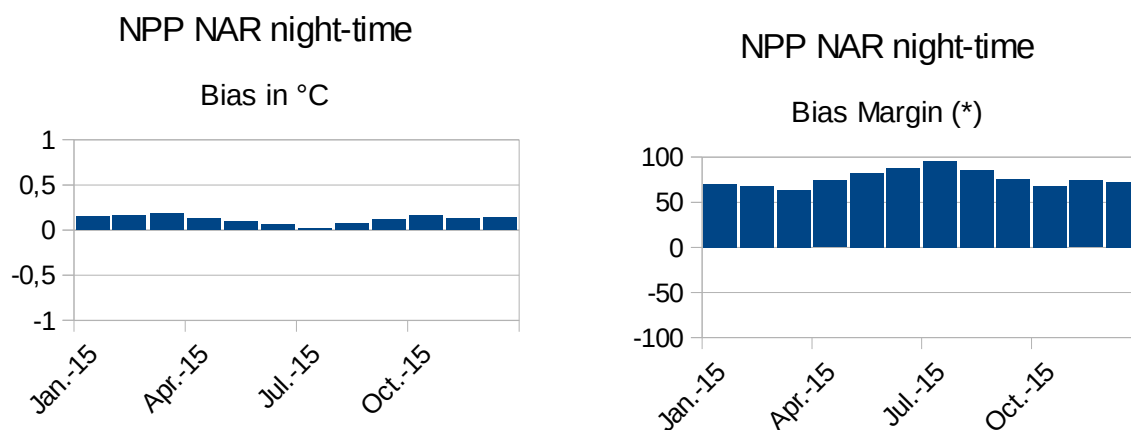


Figure 15 : Left: NPP NAR night-time SST Bias.  
Right : NPP NAR night-time SST Bias Margin.

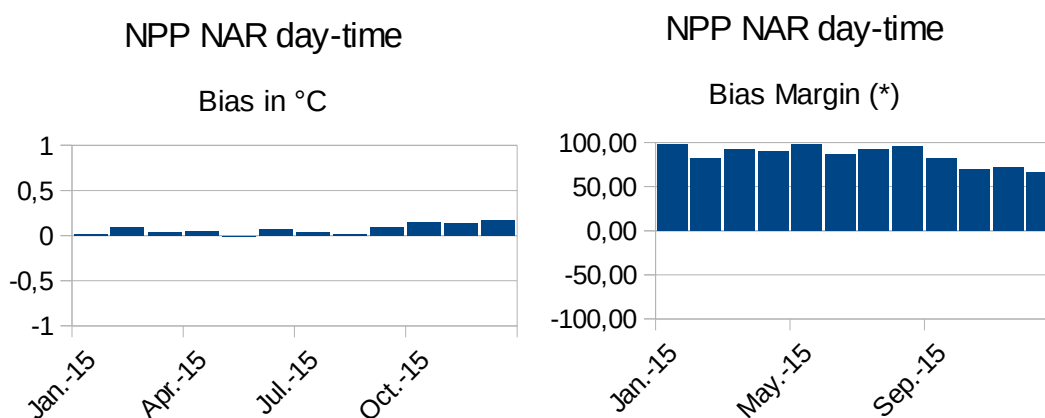


Figure 16 : Left: NPP NAR day-time SST Bias.  
Right : NPP NAR day-time SST Bias Margin.

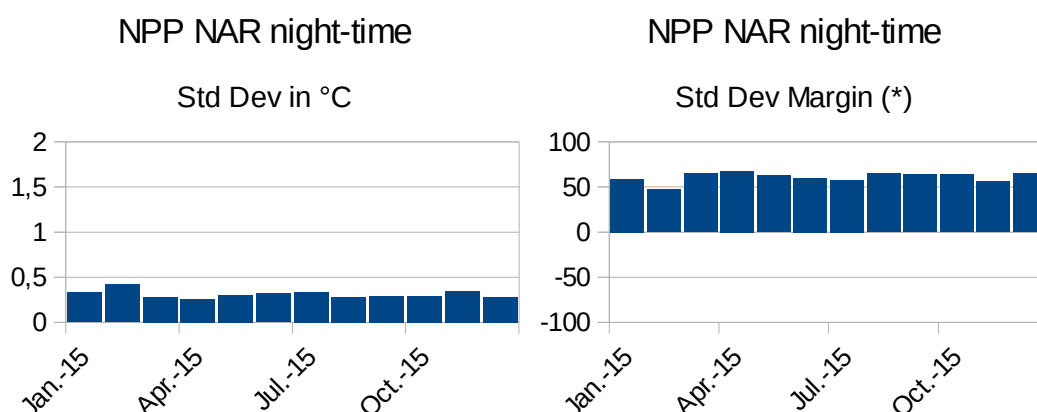


Figure 17 : Left: NPP NAR night-time SST Standard deviation.  
Right : NPP NAR night-time SST Standard deviation Margin.

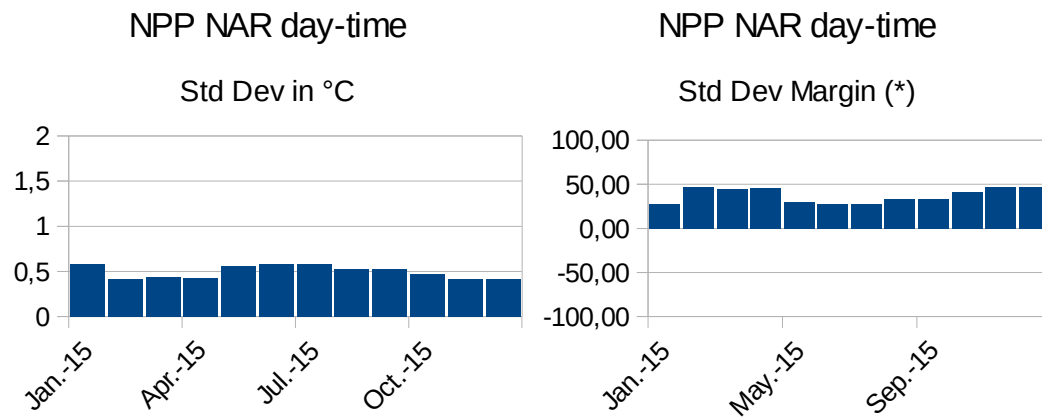


Figure 18 : Left: NPP NAR day-time SST Standard deviation.  
Right : NPP NAR day-time SST Standard deviation Margin.

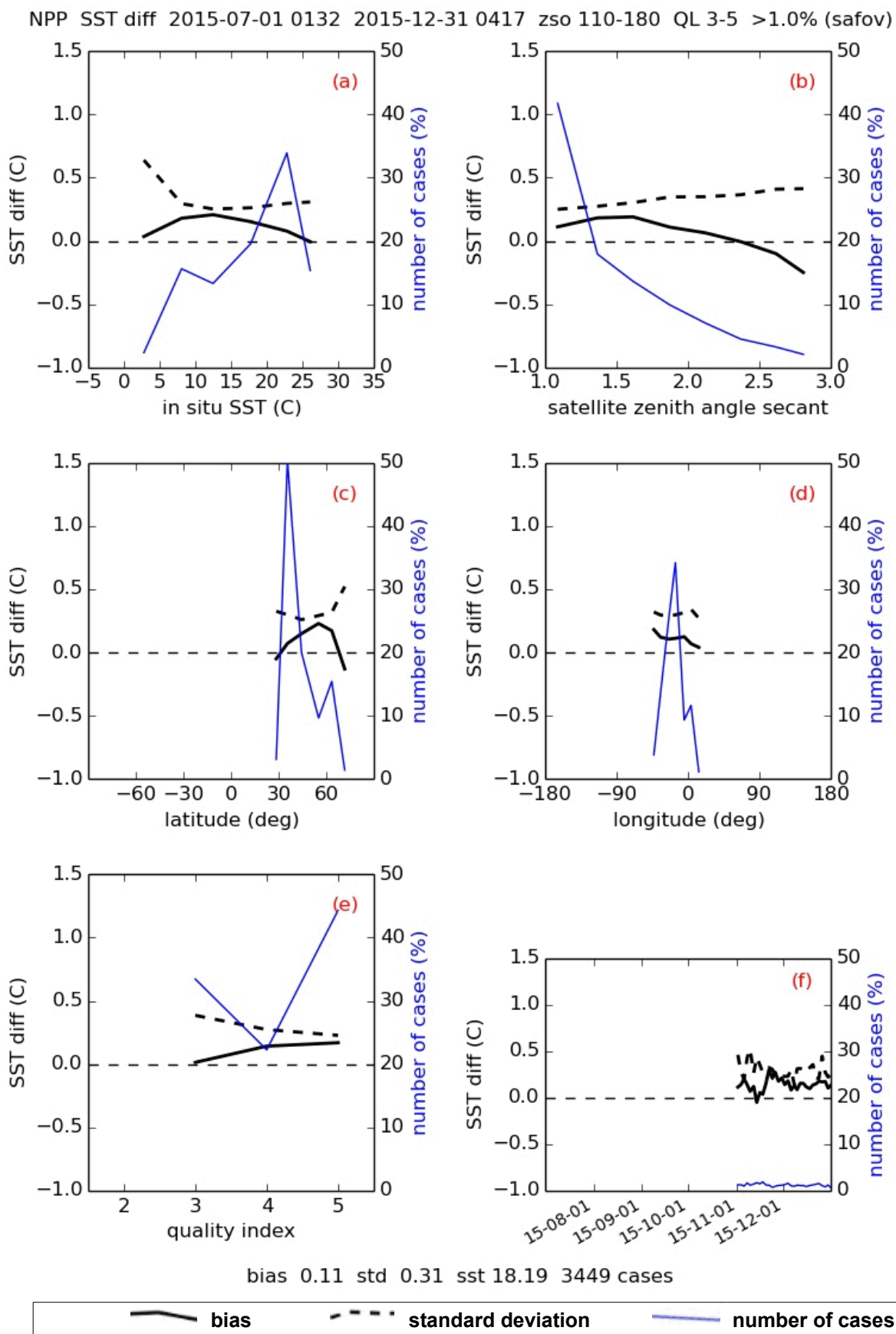


Figure 19: **Complementary quality assessment statistics on NPP NAR SST night-time** : dependence of the bias, standard deviation and number of matchups as a function of in situ SST (a), satellite zenith angle secant (b), latitude (c), longitude (d), confidence level (e), and time (f)

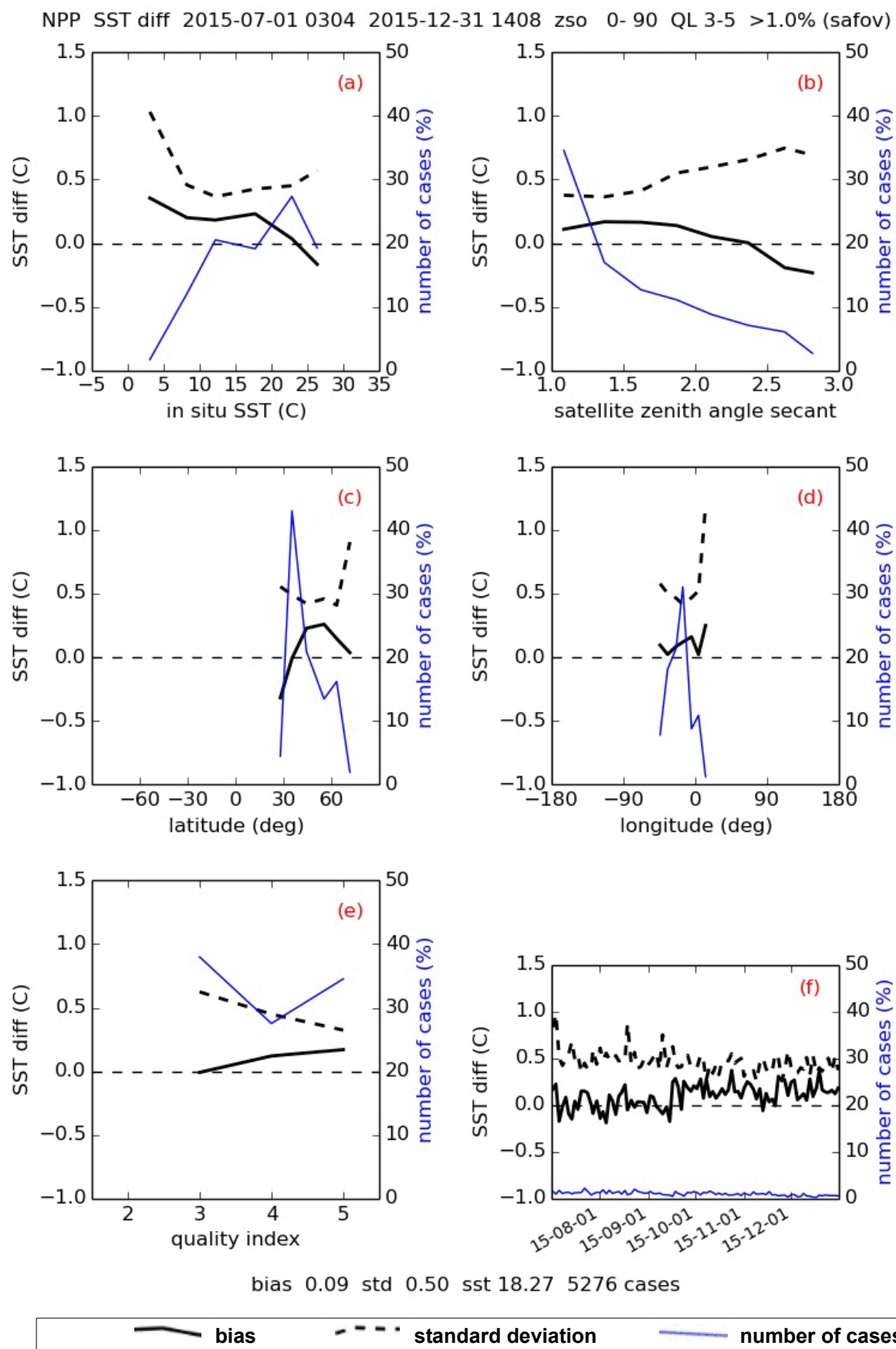


Figure 20 : Complementary quality assessment statistics on NPP NAR SST day-time : dependence of the bias, standard deviation and number of matchups as a function of in situ SST (a), satellite zenith angle secant (b), latitude (c), longitude (d), confidence level (e), and time (f)



### 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](http://www.osi-saf.org/production/cms/validation_sst_leo.php).

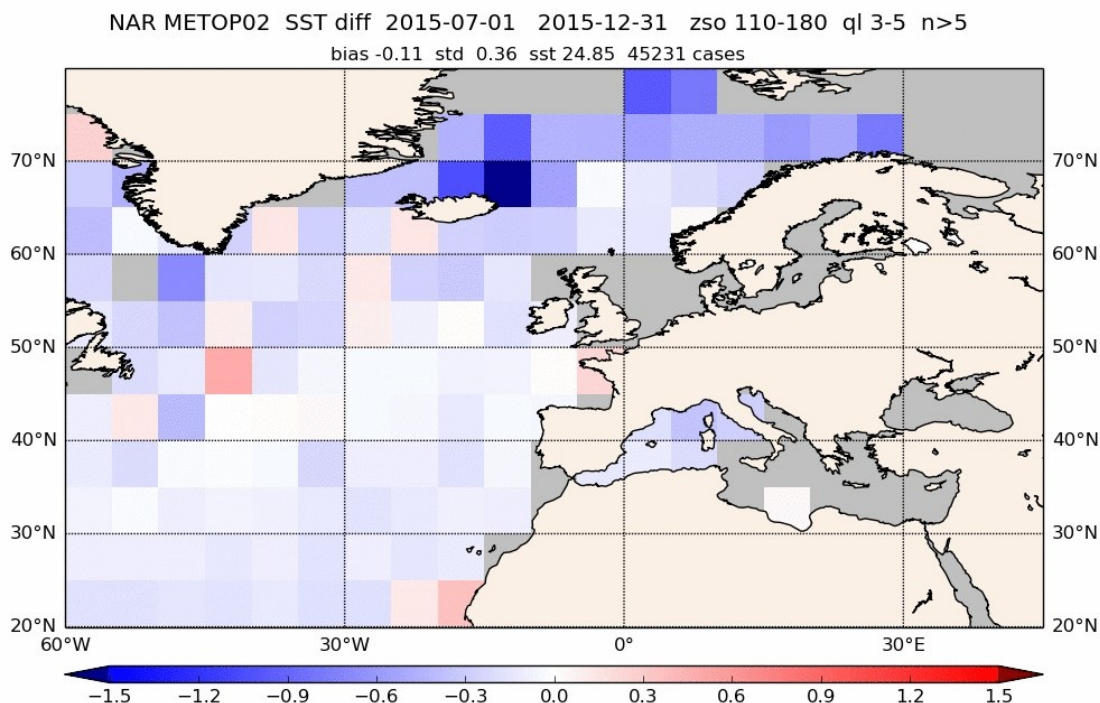


Figure 21 : mean Metop-A NAR night-time SST error with respect to buoys measurements for quality level 3,4,5

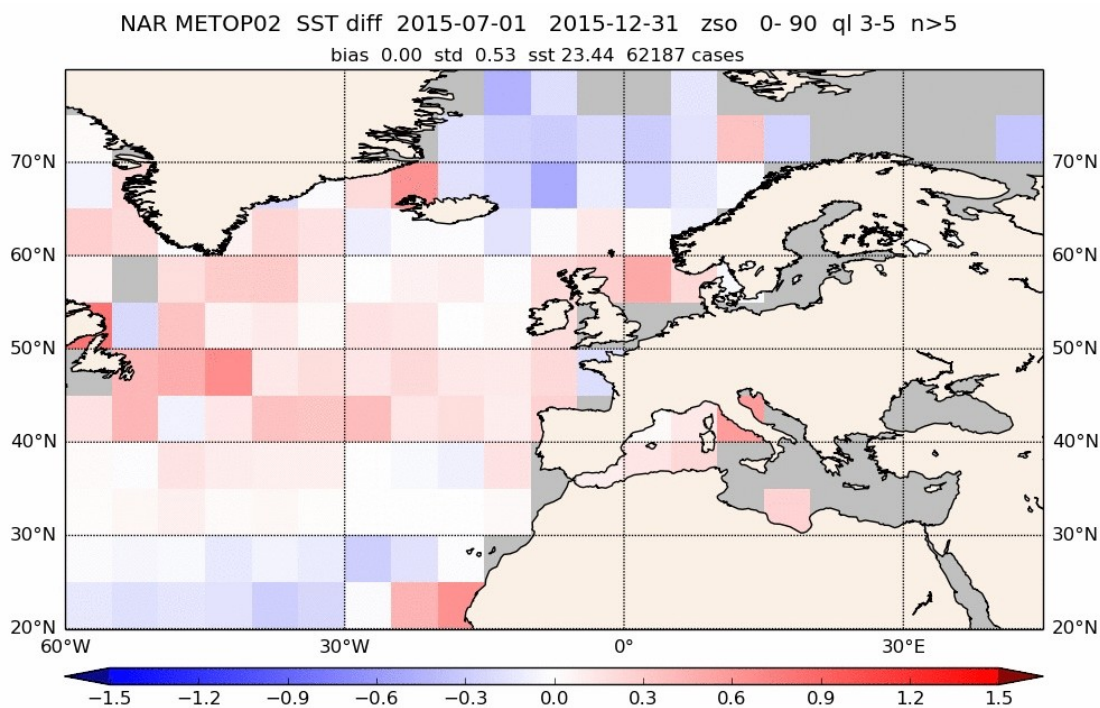


Figure 22 : mean Metop-A NAR day-time SST error with respect to buoys measurements for quality level 3,4,5

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

Metop-A NAR <u>night-time</u> SST quality results over 2nd half 2015							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (**)
JUL. 2015	1200	-0.08	0.5	84	0.33	0.8	58.75
AUG. 2015	1894	-0.15	0.5	70	0.36	0.8	55.00
SEP. 2015	1625	-0.09	0.5	82	0.36	0.8	55.00
OCT. 2015	1374	-0.07	0.5	86	0.39	0.8	51.25
NOV. 2015	1237	-0.14	0.5	72	0.41	0.8	48.75
DEC. 2015	1032	-0.11	0.5	78	0.38	0.8	52.50
Metop-A NAR <u>day-time</u> SST quality results over 2nd half 2015							
JUL. 2015	2781	-0.04	0.5	92	0.55	0.8	31.25
AUG. 2015	3342	-0.01	0.5	98	0.57	0.8	28.75
SEP. 2015	2228	-0.08	0.5	84	0.59	0.8	26.25
OCT. 2015	1741	0.03	0.5	94	0.5	0.8	37.50
NOV. 2015	1342	0.06	0.5	88	0.43	0.8	46.25
DEC. 2015	1038	0.04	0.5	92	0.41	0.8	48.75
(*) 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 7 : **Quality results for Metop-A NAR SST over 2nd half 2015, for 3, 4, 5 quality indexes**

**Comments:** Quality results are good and quite stable.

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

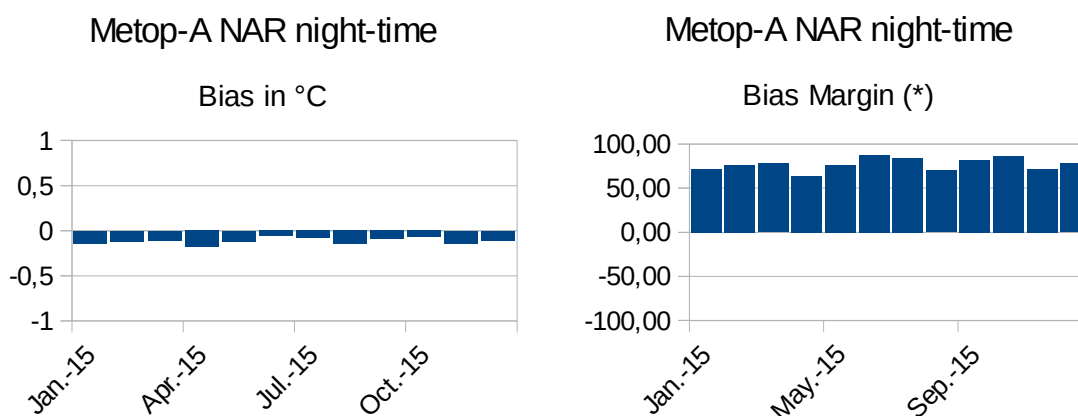
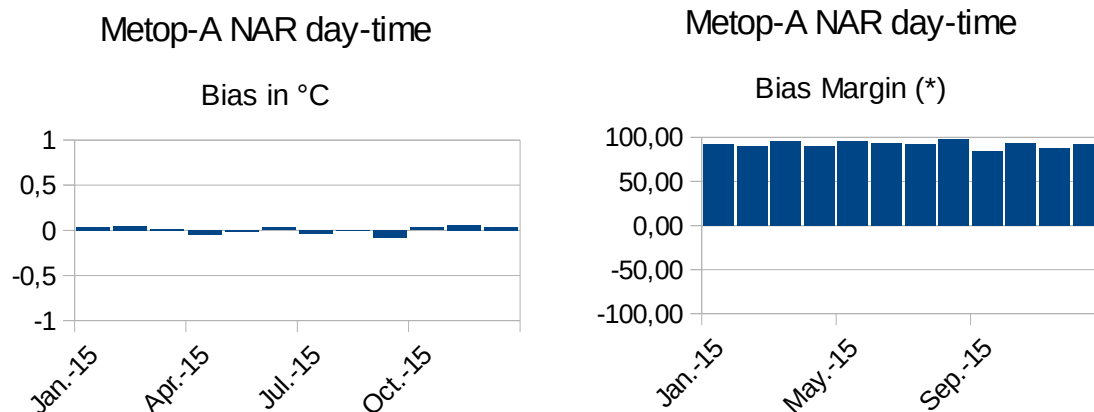
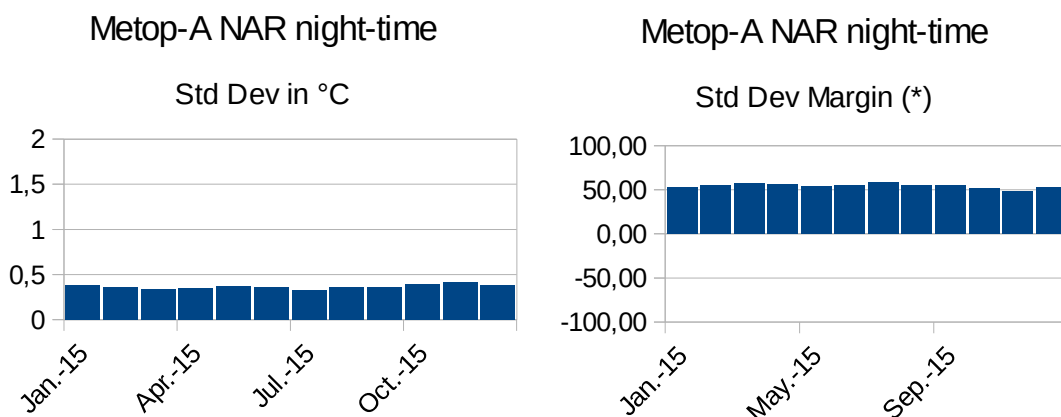


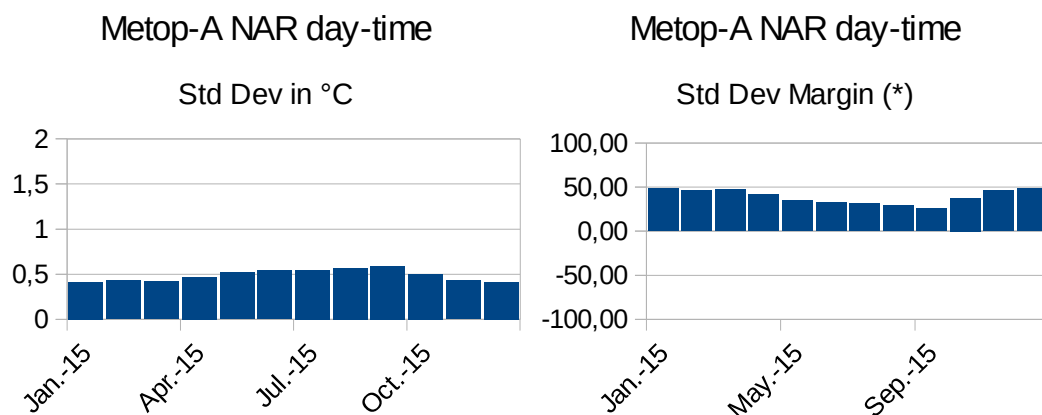
Figure 23 : **Left: Metop-A NAR night-time SST Bias.**  
**Right: Metop-A NAR night-time SST Bias Margin.**



**Figure 24 : Left: Metop-A NAR day-time SST Bias.  
Right: Metop-A NAR day-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.**



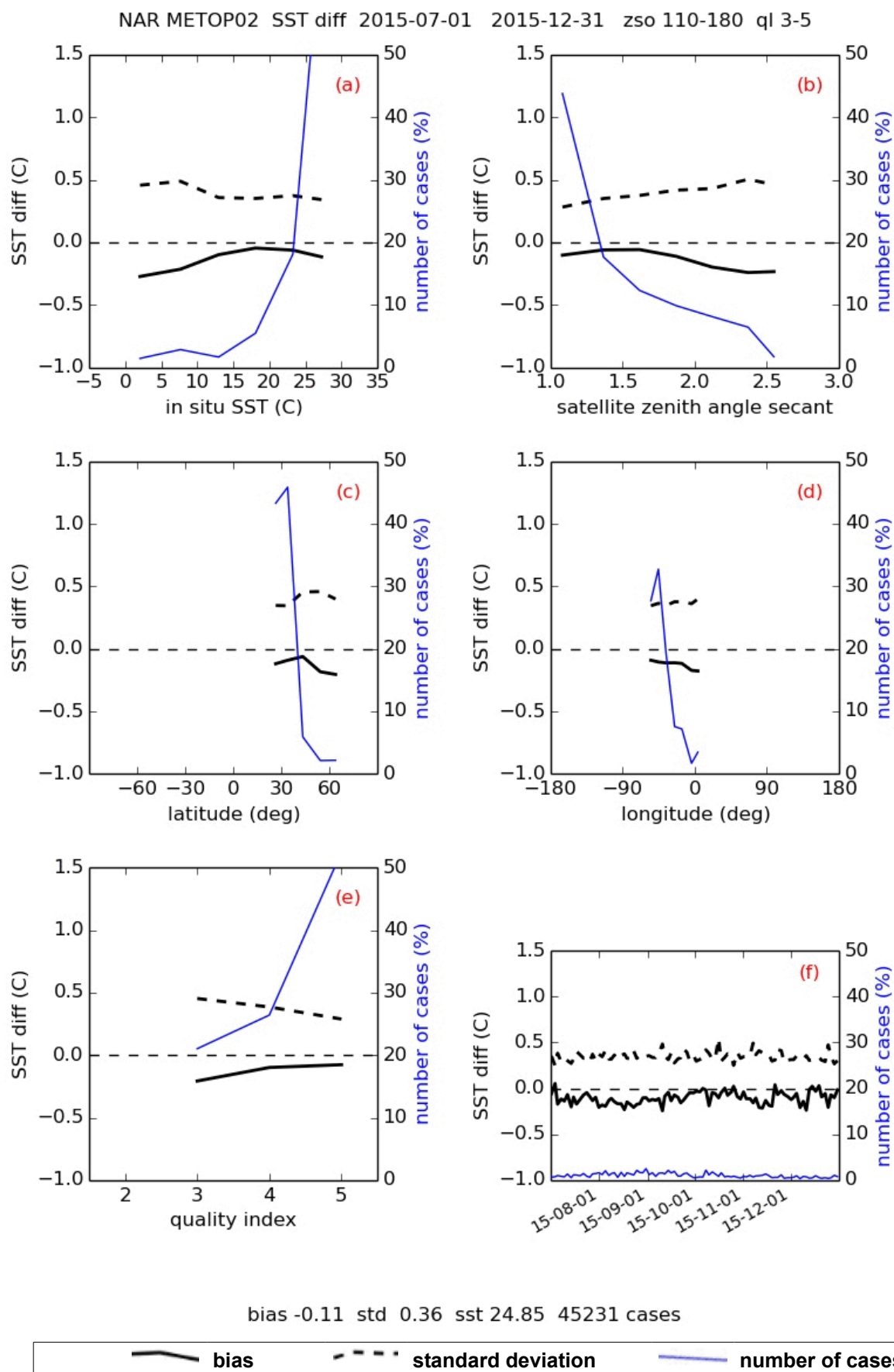


Figure 27 : Complementary quality assessment statistics on Metop NAR SST night-time : dependence of the bias, standard deviation and number of matchups as a function of in situ SST (a), satellite zenith angle secant (b), latitude (c), longitude (d), confidence level (e), and time (f)

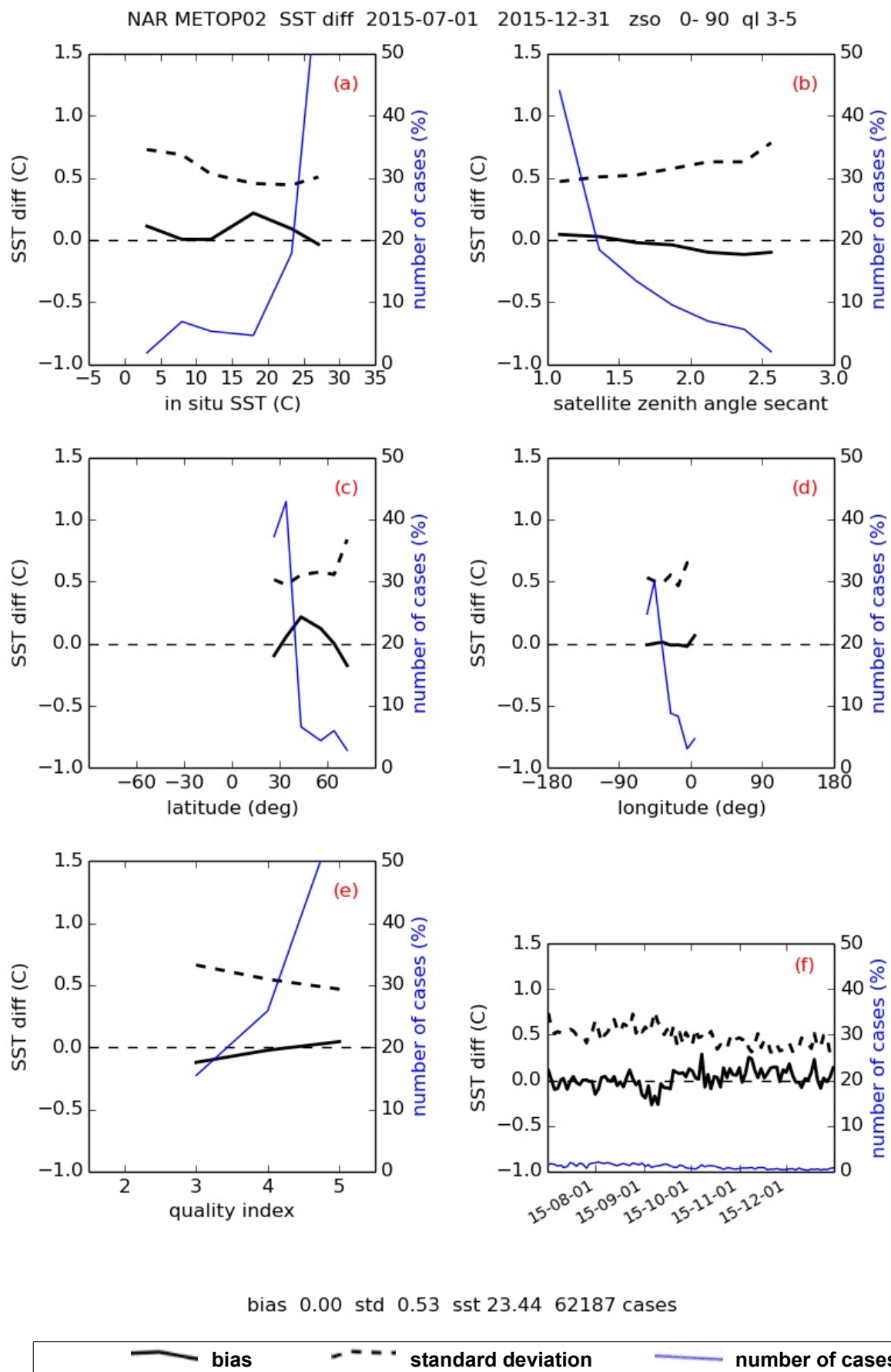


Figure 28 : Complementary quality assessment statistics on Metop NAR SST day-time : dependence of the bias, standard deviation and number of matchups as a function of in situ SST (a), satellite zenith angle secant (b), latitude (c), longitude (d), confidence level (e), and time (f)

#### 5.1.4 GBL SST (OSI-201) and MGR SST (OSI-204) quality

The OSI SAF SST products on global coverage (GBL 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](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](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.

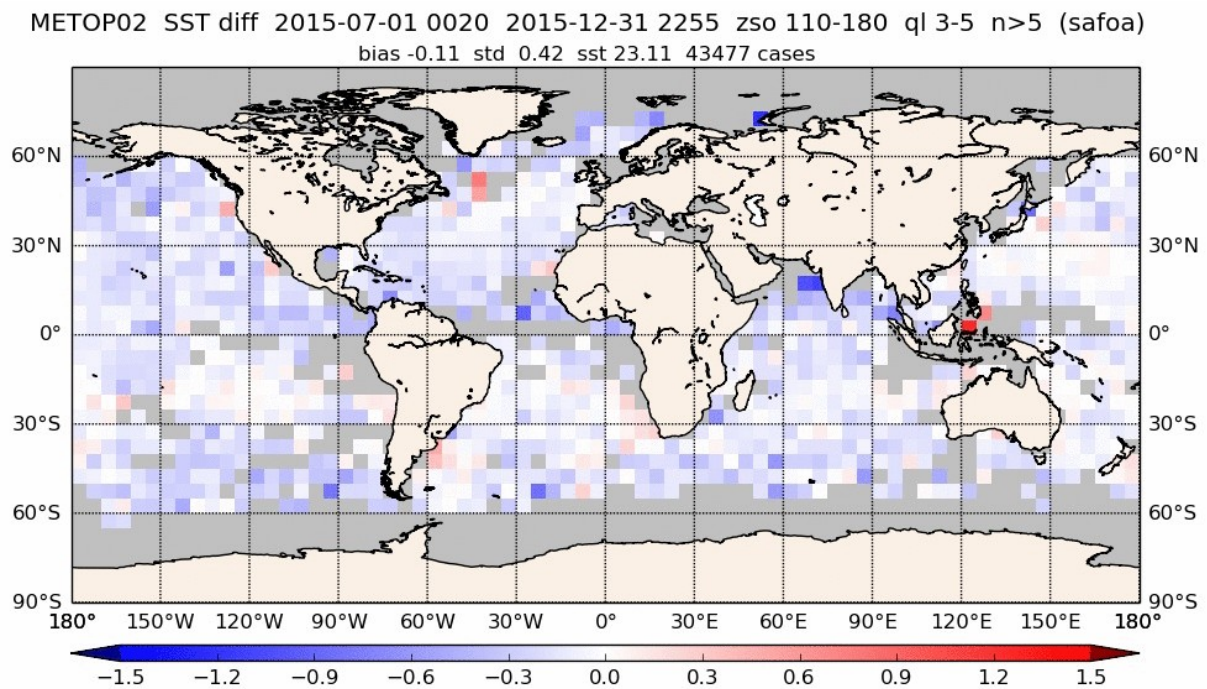
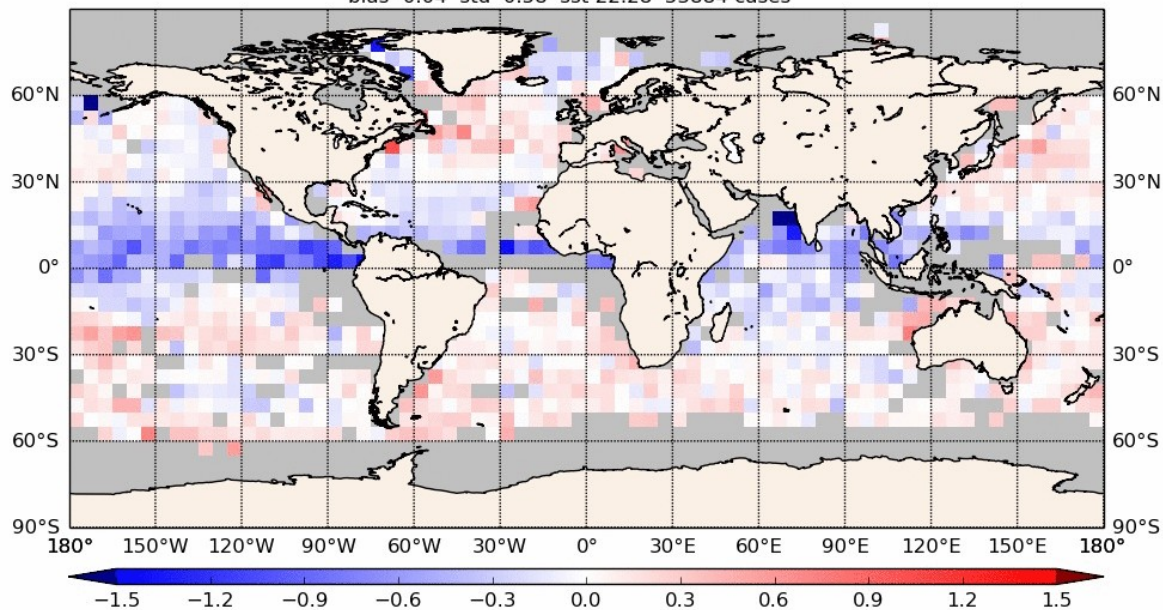


Figure 29 : mean Metop-A night-time SST error with respect to buoys measurements for quality level 3,4,5



METOP02 SST diff 2015-07-01 0117 2015-12-31 2352 zso 0- 90 ql 3-5 n>5 (safoa)  
bias -0.04 std 0.58 sst 22.28 53884 cases



**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 <u>night</u> -time SST quality results over 2nd half 2015							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (**)
JUL. 2015	6552	-0.12	0.5	76	0.43	0.8	46.25
AUG. 2015	7823	-0.15	0.5	70	0.47	0.8	41.25
SEP. 2015	8042	-0.12	0.5	76	0.42	0.8	47.50
OCT. 2015	8144	-0.10	0.5	80	0.44	0.8	45.00
NOV. 2015	6525	-0.11	0.5	78	0.44	0.8	45.00
DEC. 2015	6708	-0.09	0.5	82	0.40	0.8	50.00
Global Metop-A <u>day</u> -time SST quality results over 2nd half 2015							
JUL. 2015	9278	-0.08	0.5	84	0.65	0.8	18.75
AUG. 2015	10164	-0.08	0.5	84	0.62	0.8	22.50
SEP. 2015	9680	-0.09	0.5	82	0.59	0.8	26.25
OCT. 2015	9584	-0.01	0.5	98	0.56	0.8	30.00
NOV. 2015	7815	0.02	0.5	96	0.54	0.8	32.50
DEC. 2015	8035	-0.01	0.5	98	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 2015, for 3,4,5 quality indexes**

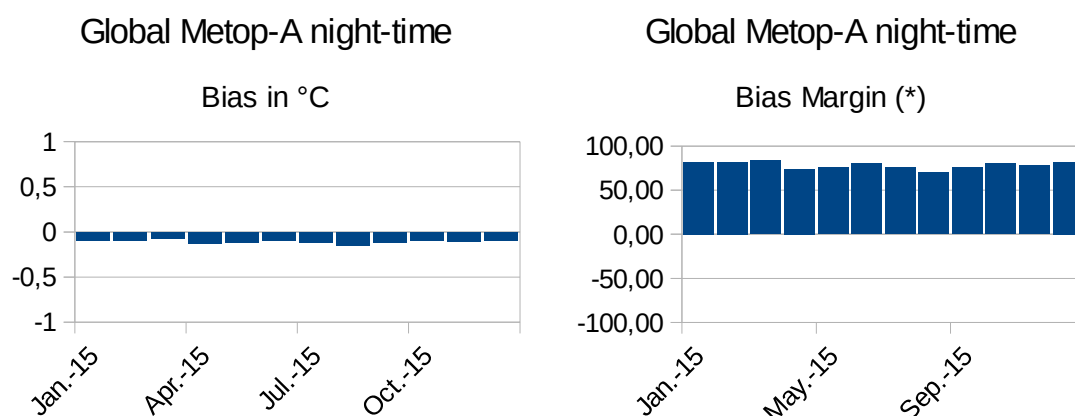
**Comments:** Quality results are good and quite stable.

Regional biases visible on Figure 30 are unavoidable limitations due to the method of retrieval which cannot handle all types of atmosphere (humidity profiles).This

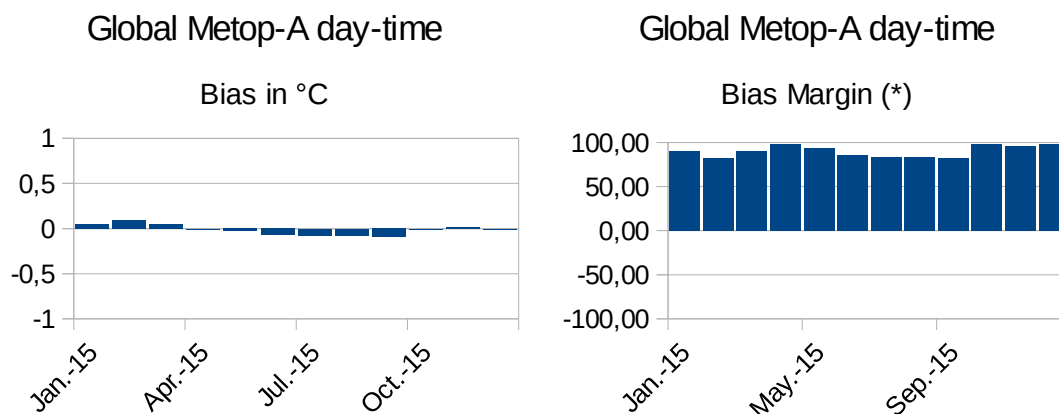
features are particularly visible during day time because the SST algorithm is only based on 2 channels (11 and 12 micron). During night-time three channels (3.7, 11 and 12 micron) are used which makes the retrieval less sensitive to atmospheric conditions.

These biases are also visible on the latitude-dependence of the error on Figure 36c and they present a seasonal variability which is visible on the time evolution of the error on Figure 36f.

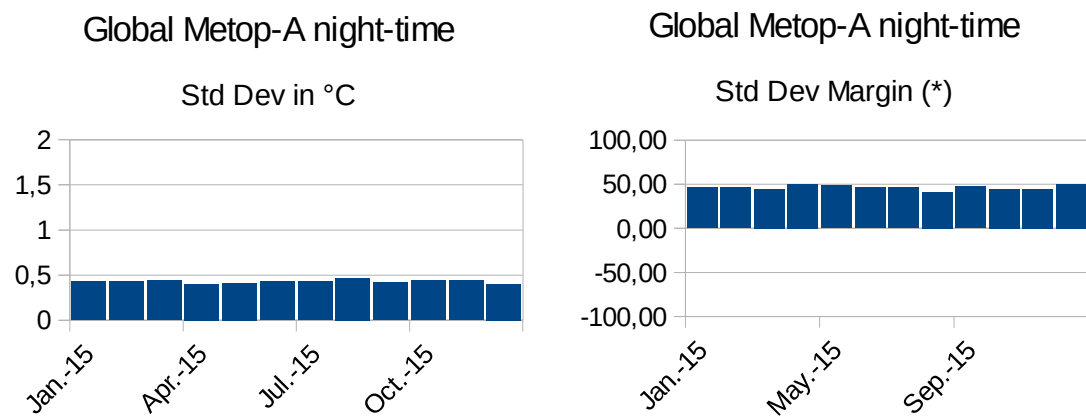
The following graphs illustrate the evolution of global METOP SST quality results over the past 12 months.



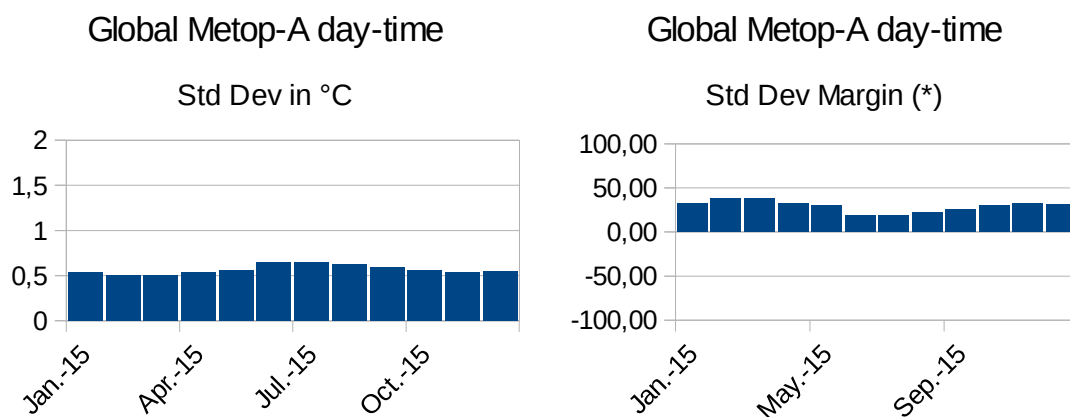
**Figure 31 : Left : global Metop-A night-time SST Bias.  
Right : global Metop-A night-time SST Bias Margin.**



**Figure 32 : Left : global Metop-A day-time SST Bias.  
Right : global Metop-A day-time SST Bias Margin.**



**Figure 33 : Left: global Metop-A night-time SST Standard deviation.  
Right: global Metop-A night-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.**

METOP02 SST diff 2015-07-01 0020 2015-12-31 2255 zso 110-180 QL 3-5 &gt;1.0% (safoa)

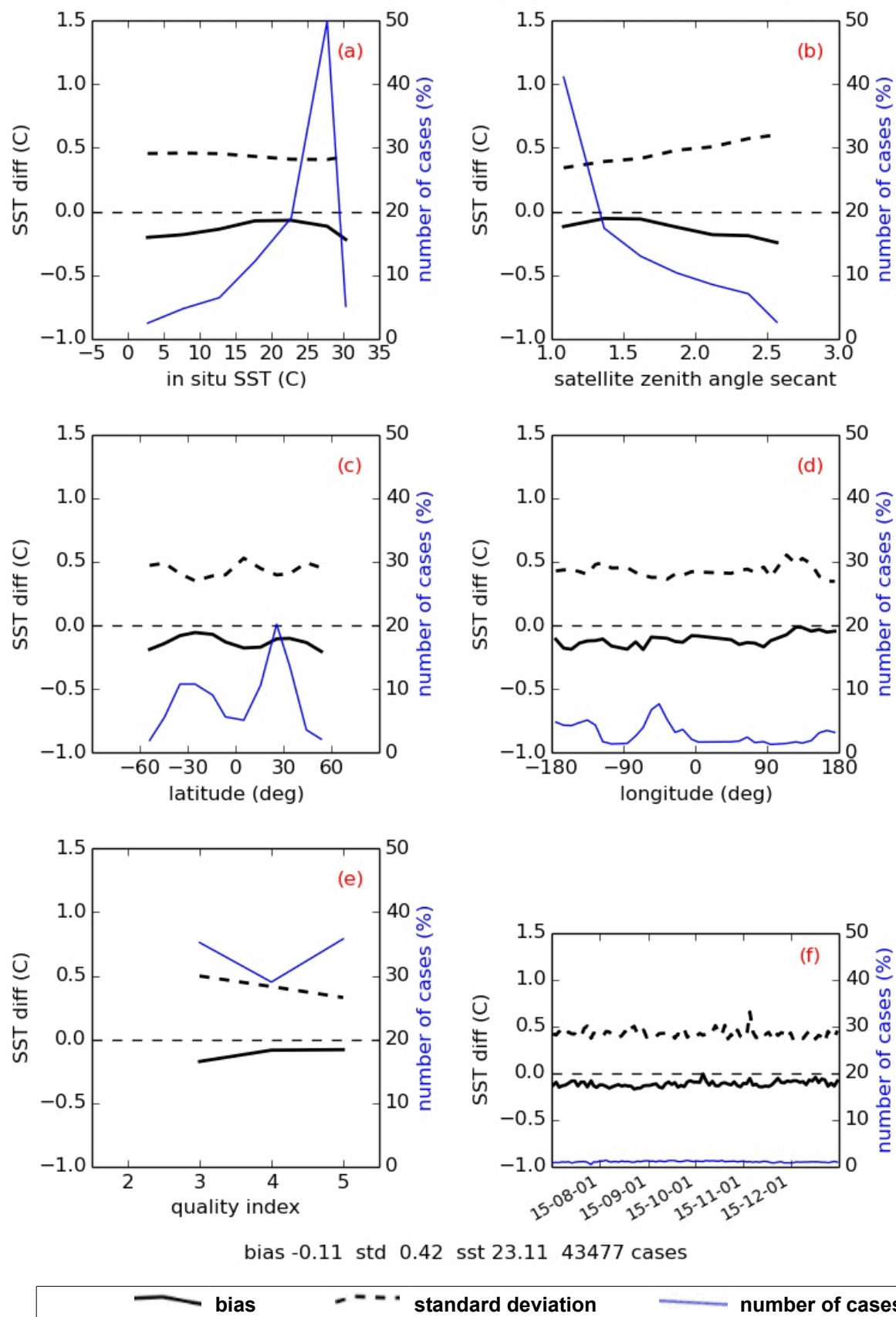


Figure 35 : Complementary quality assessment statistics on Metop GBL SST night-time : dependence of the bias, standard deviation and number of matchups as a function of in situ SST (a), satellite zenith angle secant (b), latitude (c), longitude (d), confidence level (e), and time (f)

METOP02 SST diff 2015-07-01 0117 2015-12-31 2352 zso 0- 90 QL 3-5 >1.0% (safoa)

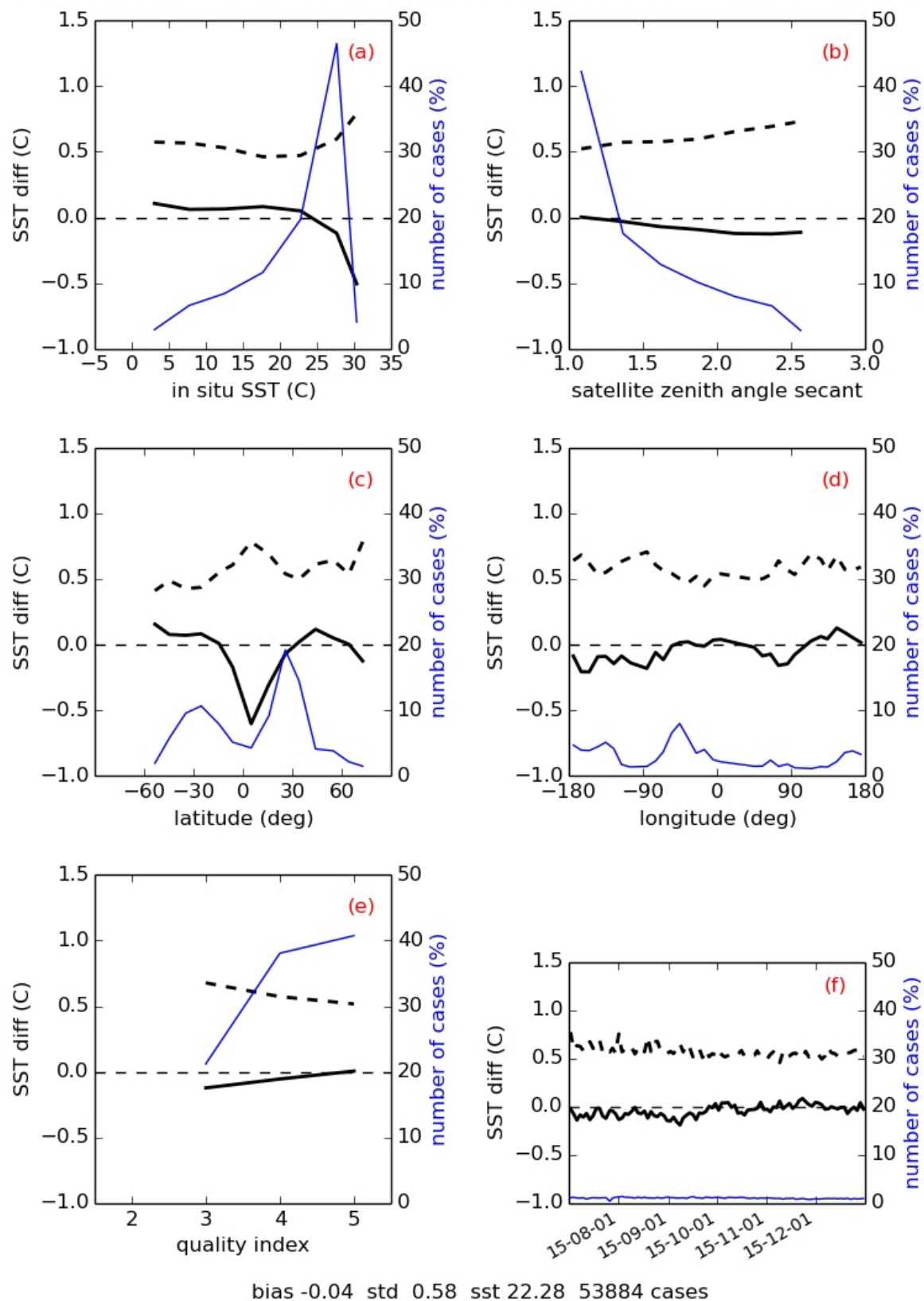


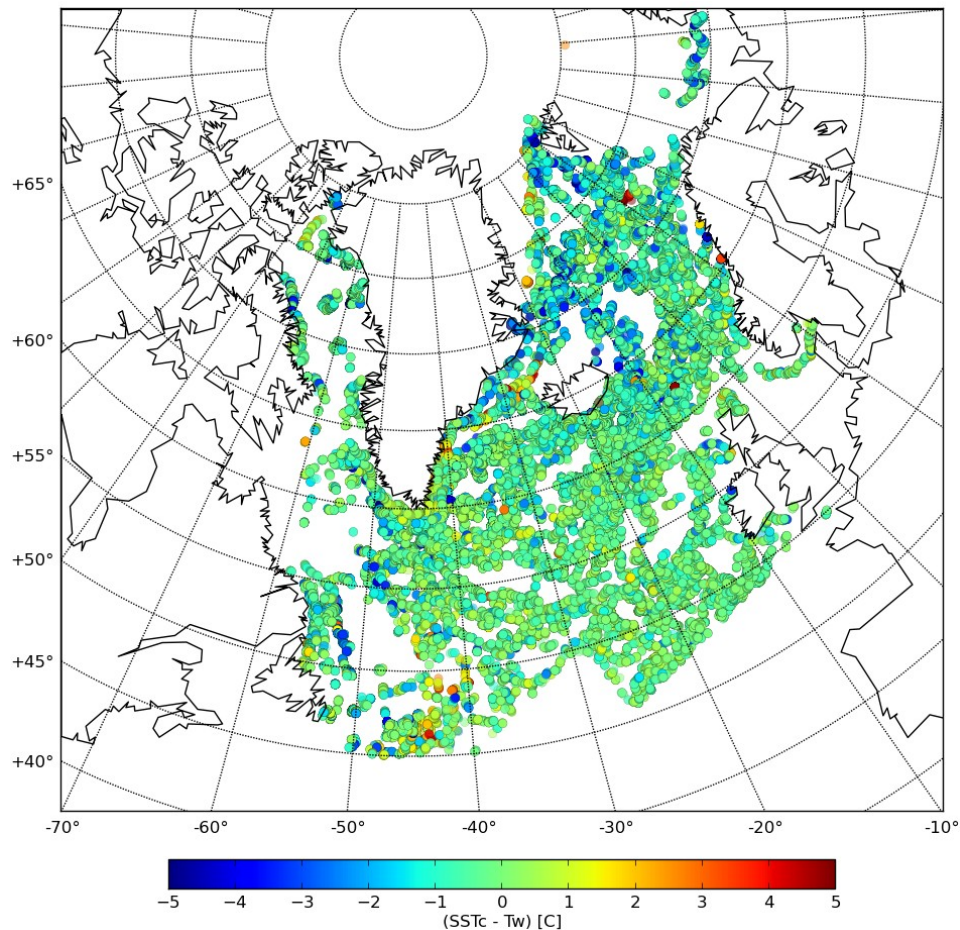
Figure 36 : Complementary quality assessment statistics on Metop GBL SST day-time : dependence of the bias, standard deviation and number of matchups as a function of in situ SST, satellite zenith angle secant, latitude, longitude, confidence level, coverage, mask indicator and and time



### 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. 2015 to DEC. 2015 mean AHL night-time SST error with respect to buoys measurements for quality level 3,4,5**

AHL AVHRR SST quality results over JAN. 2015 to DEC. 2015, night-time							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (**)
JAN. 2015	1142	-0.54	0.5	-8.56	0.75	0.8	6.54
FEB. 2015	774	-0.47	0.5	5.01	0.81	0.8	-1.60
MAR. 2015	1274	-0.43	0.5	14.20	0.73	0.8	9.34
APR. 2015	1482	-0.43	0.5	13.44	0.77	0.8	3.37
MAY 2015	1255	-0.34	0.5	32.94	0.70	0.8	12.50
JUN. 2015	526	-0.21	0.5	57.37	0.84	0.8	-5.22
JUL. 2015	645	-0.21	0.5	58.3	0.75	0.8	6.8
AUG. 2015	826	-0.29	0.5	41.8	0.89	0.8	-11.4
SEP. 2015	888	-0.47	0.5	6.2	0.89	0.8	-10.8
OCT. 2015	1058	-0.47	0.5	5.2	0.83	0.8	-3.3
NOV. 2015	638	-0.32	0.5	35.2	0.72	0.8	10.3
DEC. 2015	391	-0.31	0.5	38.8	0.64	0.8	20.5
AHL AVHRR SST quality results over JAN. 2015 to DEC. 2015, day-time							
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Std Dev margin (**)
JAN. 2015	1253	-0.61	0.5	-21.27	0.74	0.8	7.76
FEB. 2015	772	-0.48	0.5	4.97	0.79	0.8	1.06
MAR. 2015	1087	-0.34	0.5	31.56	0.66	0.8	17.34
APR. 2015	1307	-0.26	0.5	48.14	0.53	0.8	33.22
MAY 2015	1217	-0.21	0.5	57.97	0.60	0.8	24.93
JUN. 2015	565	-0.03	0.5	93.04	0.65	0.8	18.90
JUL. 2015	992	-0.08	0.5	83.7	0.61	0.8	24.3
AUG. 2015	1195	-0.06	0.5	87.3	0.70	0.8	11.4
SEP. 2015	1312	-0.25	0.5	48.7	0.76	0.8	4.9
OCT. 2015	1634	-0.29	0.5	41.7	0.74	0.8	7.8
NOV. 2015	933	-0.35	0.5	30.6	0.72	0.8	10.6
DEC. 2015	599	-0.43	0.5	14.0	0.70	0.8	12.8
(*) 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. 2015 to DEC. 2015, for 3,4,5 quality indexes, by night and by day.**

#### Comments:

The AHL SST product is within the requirement for bias (within +/- 0.5) and standard deviation (less than 0.8) for all month within the reporting period (July-December) for the daytime cases. For night time cases the quality is general lower and the standard deviation is outside the requirement for August, September and October.

### 5.1.6 IASI SST (OSI-208) quality

The product requirements for IASI SSTs are to have a target accuracy of 0.5K bias and 0.8K standard deviation compared to drifting buoy SSTs.

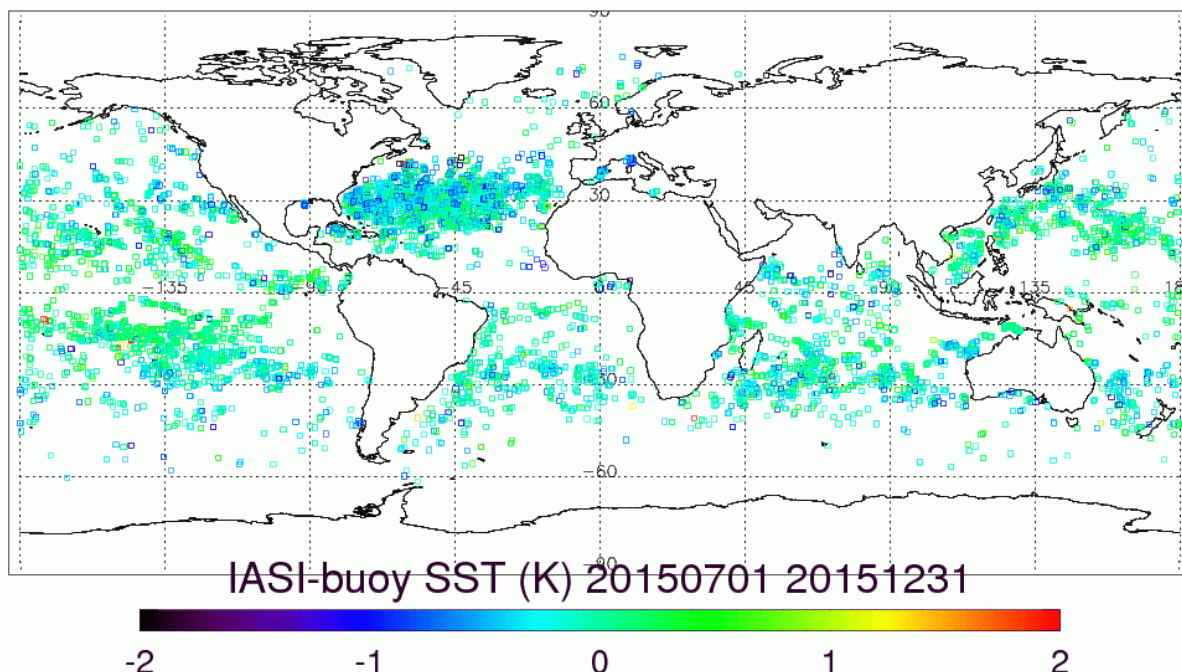


Figure 38 : Mean Metop-A IASI night-time SST minus drifting buoy SST for Quality Levels 3, 4 and 5 January to June 2015

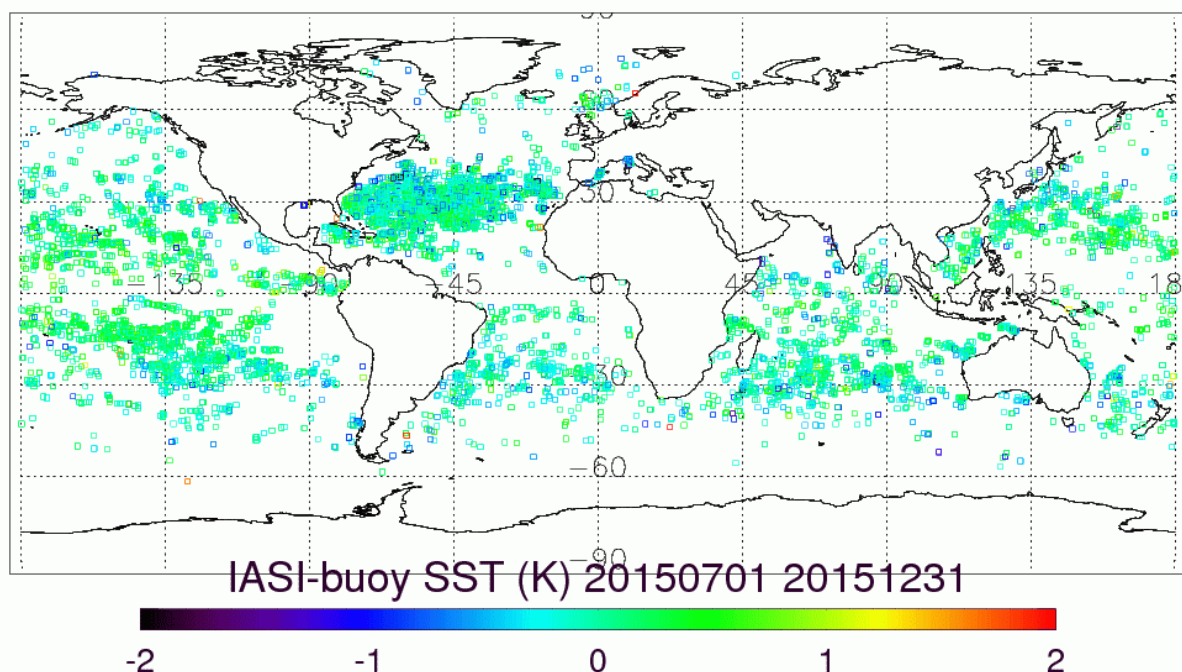


Figure 39 : Mean Metop-A IASI day-time SST minus drifting buoy SST for Quality Levels 3, 4 and 5 January to June 2015

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

Global Metop-A IASI <u>night</u> -time SST quality results over 2nd half 2015								
Month	Number of cases	Bias °C	Bias Req °C	Bias Margin (*)	Std Dev °C	Std Dev Req °C	Dev	Std Dev margin (**)
JUL. 2015	3931	-0.14	0.5	72	0.41	0.8		48.75
AUG. 2015	3900	-0.12	0.5	76	0.39	0.8		51.25
SEP. 2015	3768	-0.11	0.5	78	0.39	0.8		51.25
OCT. 2015	2900	-0.05	0.5	90	0.43	0.8		46.25
NOV. 2015	2805	-0.08	0.5	84	0.37	0.8		53.75
DEC. 2015	1894	-0.03	0.5	94	0.37	0.8		53.75
Global Metop-A IASI <u>day</u> -time SST quality results over 2nd half 2015								
JUL. 2015	3552	-0.01	0.5	98	0.41	0.8		48.75
AUG. 2015	3585	0.0	0.5	100	0.38	0.8		52.5
SEP. 2015	4209	-0.01	0.5	98	0.41	0.8		48.75
OCT. 2015	3622	0.03	0.5	94	0.41	0.8		48.75
NOV. 2015	2213	0.04	0.5	92	0.38	0.8		52.5
DEC. 2015	2039	0.07	0.5	86	0.38	0.8		52.5
(*) 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 : Quality results for global METOP-A IASI SST over 2nd half 2015, for Quality Levels 3, 4 and 5

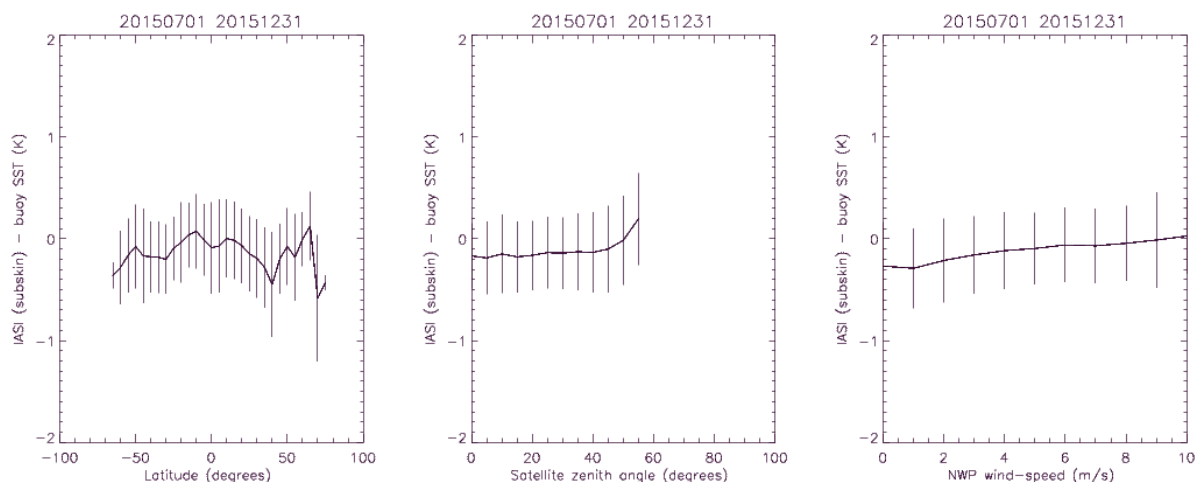
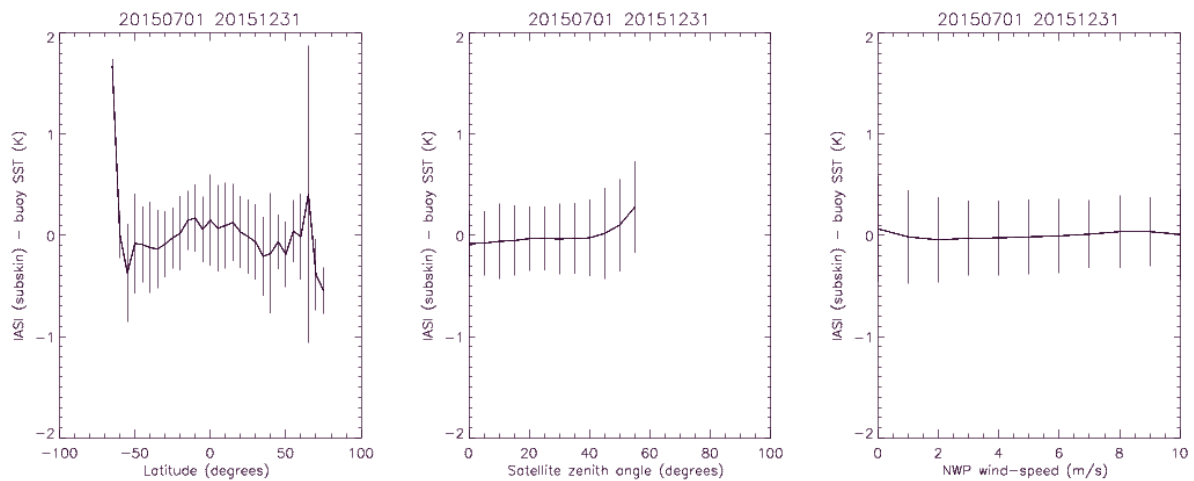


Figure 40 : Mean Metop-A IASI night-time SST minus drifting buoy SST analyses for Quality Levels 3, 4 and 5, JAN. 2015 to DEC. 2015



**Figure 41 : Mean Metop-A IASI day-time SST minus drifting buoy SST analyses for Quality Levels 3, 4 and 5, JAN. 2015 to DEC. 2015**

**Comments:**

Over the six month reporting period the night-time mean IASI bias (for quality levels 3 and above) against drifting buoy SSTs is -0.12K with a standard deviation of 0.39K (n=14668); and the day-time mean bias is -0.01K, standard deviation 0.38K (n=15661). The monthly mean and whole time period results are within the target accuracy.

## 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](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 2015										
Month	Number of cases	Mean DLI in Wm <sup>-2</sup>	Bias in Wm <sup>-2</sup>	Bias in %	Bias Req In %	Bias Marg in %(*)	Std Dev in Wm <sup>-2</sup>	Std Dev in %	Std Dev Req In %	Std Dev margin (**) in %
JAN. 2015	4246	267.83	-8.71	-3.25	5.0	34.96	7.67	7.67	10.0	23.27
FEB. 2015	4044	261.75	-8.38	-3.20	5.0	35.97	8.39	8.39	10.0	16.14
MAR. 2015	4369	289.71	-7.22	-2.49	5.0	50.16	6.55	6.55	10.0	34.45
APR. 2015	4212	308.57	-3.68	-1.19	5.0	76.15	5.39	5.39	10.0	46.14
MAY 2015	5758	333.58	-0.69	-0.21	5.0	95.86	5.01	5.01	10.0	49.94
JUN. 2015	4868	361.97	-2.27	-0.63	5.0	87.46	4.78	4.78	10.0	52.18
JUL. 2015	4314	376.37	0.54	0.14	5.0	97.13	15.36	4.08	10.0	59.19
AUG. 2015	4499	368.27	1.53	0.42	5.0	91.69	16.20	4.40	10.0	56.01
SEP. 2015	4976	348.18	-1.54	-0.44	5.0	91.15	15.69	4.51	10.0	54.94
OCT. 2015	4957	317.68	-4.32	-1.36	5.0	72.80	18.06	5.68	10.0	43.15
NOV. 2015	3941	293.32	-4.89	-1.67	5.0	66.66	17.98	6.13	10.0	38.70
DEC. 2015	4317	296.52	-8.86	-2.99	5.0	40.24	22.83	7.70	10.0	23.01
(*) 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 : Geostationary DLI quality results over 2nd half 2015.**

**Comments:** The negative DLI bias observed in December 2015 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.

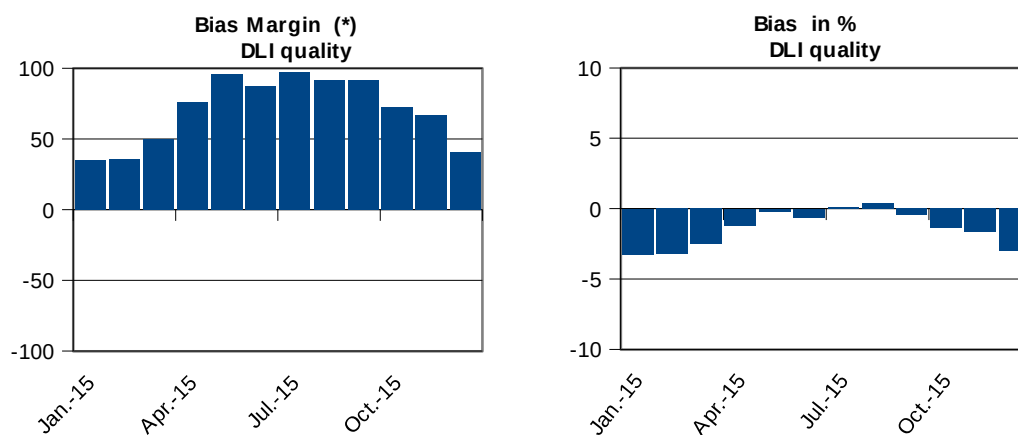


Figure 42 : Left: Geostationary DLI Bias. Right Geostationary DLI Bias Margin .

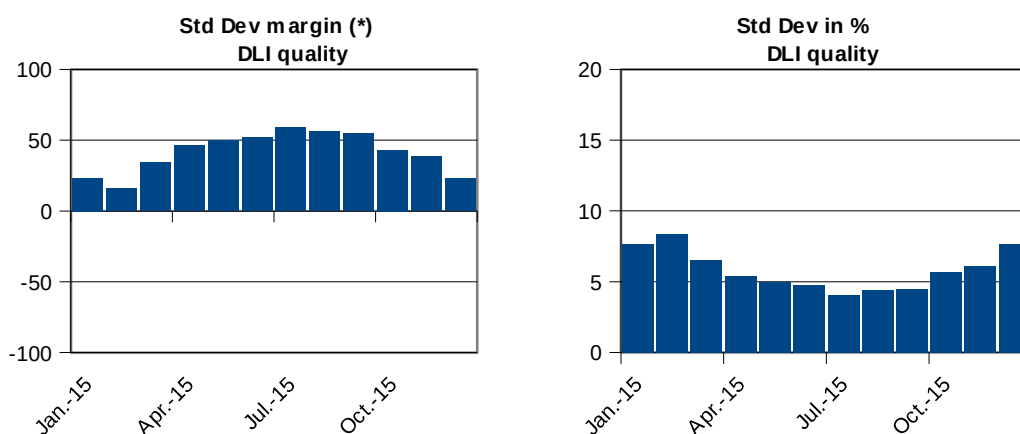


Figure 43 : Left: Geostationary DLI Standard deviation. Right DLI Geostationary Standard deviation Margin.

### 5.2.1.2 AHL DLI (OSI-301) quality

The pyrgeometer stations used for validation of the AHL DLI product are selected stations from Table 14. Specifically the following stations are currently used :

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

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. 2015 to DEC. 2015								
Month	Number of cases	Mean DLI in Wm <sup>-2</sup>	Bias in %	Bias Req In %	Bias Marg in %(*)	Std Dev In %	Std Dev Req In %	Std Dev margin (**) in %
JAN. 2015	248	278.31	2.99	5.0	40.2	5.85	10.0	41.5
FEB. 2015	303	270.29	0.90	5.0	82	5.78	10.0	42.2
MAR. 2015	300	277.01	1.23	5.0	75.4	5.35	10.0	46.5
APR. 2015	327	281.41	2.46	5.0	50.8	4.44	10.0	55.6
MAY 2015	339	297.38	2.96	5.0	40.8	4.37	10.0	56.3
JUN. 2015	316	312.44	3.71	5.0	25.8	3.78	10.0	62.2
JUL. 2015	277	331.60	4.11	5.0	17.8	3.51	10.0	64.9
AUG. 2015	310	334.34	6.17	5.0	-23.4	3.22	10.0	67.8
SEP. 2015	210	322.00	4.03	5.0	19.4	4.21	10.0	57.9
OCT. 2015	210	297.87	2.48	5.0	50.4	5.66	10.0	43.4
NOV. 2015	296	295.89	2.89	5.0	42.2	6.15	10.0	38.5
DEC. 2015	235	281.06	3.20	5.0	36	7.14	10.0	28.6
(*) 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 12 : AHL DLI quality results over JAN. 2015 to DEC. 2015.**

### Comments:

Requirements are not met in August. During this period the processing is underestimating the DLI. At summer, the cloudmask and cloudtype detection is generally underestimating (Karlsson and Dybbroe, 2010) the cloud cover and especially the amount of low clouds. This will cause an underestimation in the DLI and the underestimation is observed to various degrees for all the Arctic stations used in validation for the period July through September. No direct validation of the cloudmask and cloudtype is currently being done at these stations. This will be reimplemented as the validation process is moved to a new processing facility. Except for this deviation in August, the DLI product is generally behaving well. The most important factor for the performance currently is the performance of the cloudmask/cloudtype generation.

## 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](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 2015										
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. 2015	4499	309.5	18.47	5.97	10.0	40.32	84.69	27.36	30.0	8.79
FEB. 2015	5232	351.71	18.15	5.16	10.0	48.39	91.78	26.10	30.0	13.02
MAR. 2015	5973	378.68	26.72	7.06	10.0	29.44	97.77	25.82	30.0	13.94
APR. 2015	6366	449.83	22.69	5.04	10.0	49.56	84.7	18.83	30.0	13.94
MAY 2015	8295	456.76	5.41	1.18	10.0	88.16	82.8	18.13	30.0	39.57
JUN. 2015	7889	483	8.9	1.84	10.0	81.57	85.84	17.77	30.0	40.76
JUL. 2015	7336	480.23	11.43	2.38	10.0	76.20	80.37	16.74	30.0	44.21
AUG. 2015	7013	469.66	9.48	2.02	10.0	79.82	80.3	17.10	30.0	43.01
SEP. 2015	6526	433.61	16.85	3.89	10.0	61.14	88.54	20.42	30.0	31.94
OCT. 2015	5976	377.63	12.84	3.40	10.0	66.00	71.19	18.85	30.0	37.16
NOV. 2015	4533	347.77	15.53	4.47	10.0	55.34	70.98	20.41	30.0	31.97
DEC. 2015	3820	321.29	14.59	4.54	10.0	54.59	82.62	25.72	30.0	14.28

(\*) Bias Margin =  $100 * (1 - (|Bias / Bias Req|))$

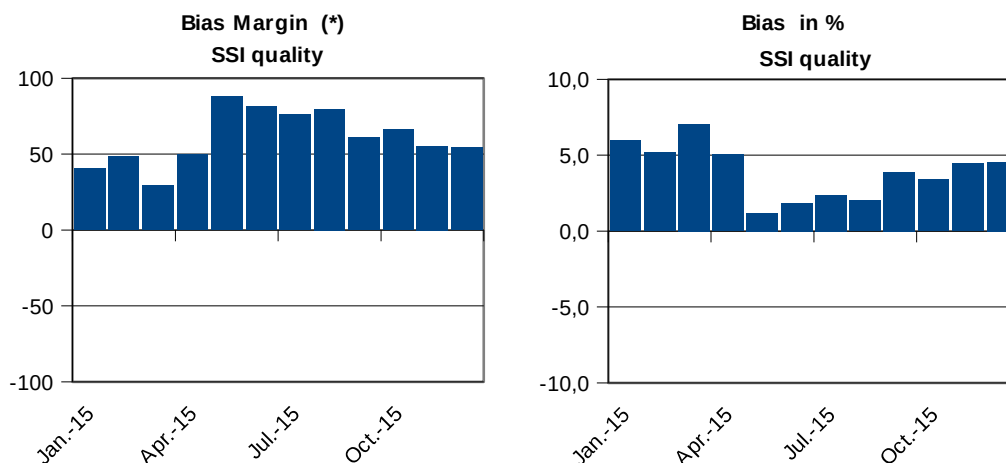
(\*\*) Std Dev margin =  $100 * (1 - (Std Dev / Std Dev Req))$

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.

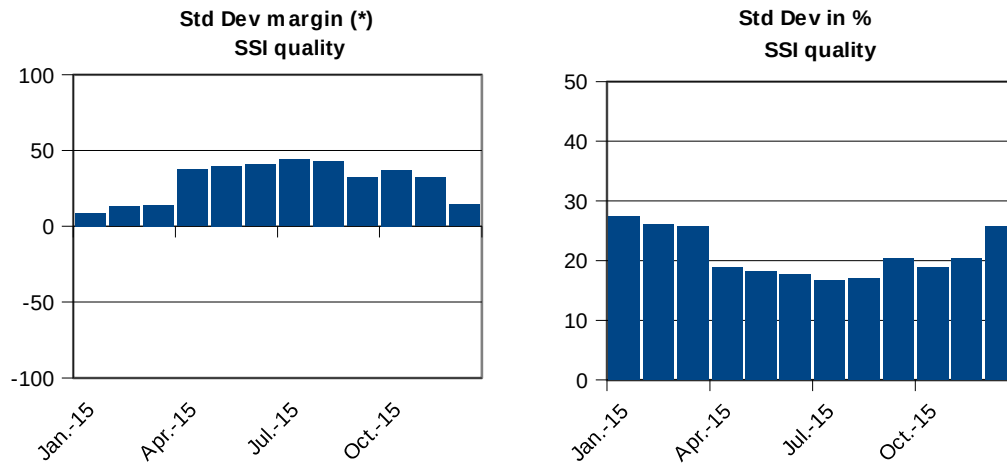
**table 13 : Geostationary SSI quality results over 2nd half 2015.**

**Comments:** Results are within specifications.

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



**Figure 44 : Left: Geostationary SSI Bias. Right Geostationary SSI Bias Margin.**



**Figure 45 : Left: Geostationary SSI Standard deviation. Right Geostationary SSI Standard deviation Margin.**

#### 5.2.2.2 AHL SSI (OSI-302) quality

The stations used for validation of the AHL radiative flux products are listed in the following table.

Station	Stld	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	The station was closed due to change platforms in the position. Instrumentation is recovered and work in progress to remount equipment. No data can be expected until late 2016 at best.
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.
Hopen	99720	76.51°N	25.01°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

Station	StId	Latitude	Longitude		Status
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, temporarily disabled for SSI validation. Problems likely to be connected with snow on ground.
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 14 : 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, Finnish Meteorological Institute (FMI), Swedish Meteorological Institute (SMHI) and Deutscher Wetterdienst (DWD). Data from DWD and SMHI are extracted from WMO GTS, data from the other sources are received by email or through other direct connections. More stations are being considered for inclusion.

The station at Ekofisk was stopped in July, instruments are recovered and work in progress to remount equipment on a new platform. This is however pending financial support. There will probably not be any data available from Ekofisk until at least late 2016, provided financial support if found. As this was the only pure maritime station available, this is a serious drawback for evaluation of the performance of the flux products.

This period there has been substantial communication problems with the Arctic stations (Jan Mayen, Bjørnøya and Hopen), reducing the number of available validation data from these stations in periods. These problems started in September.

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
- Jan Mayen
- Bjørnøya
- Hopen
- Schleswig
- Hamburg-Fuhlsbuettel
- Jokioinen

A report from OSI SAF about the validation data used for validating the high latitude surface radiative flux products is available here :

[http://osisaf.met.no/docs/osisaf\\_cdop2\\_ss2\\_rep\\_flux-val-data\\_v1p0.pdf](http://osisaf.met.no/docs/osisaf_cdop2_ss2_rep_flux-val-data_v1p0.pdf)

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

AHL SSI quality results over JAN. 2015 to DEC. 2015										
Month	Number of cases	Mean SSI in Wm <sup>-2</sup>	Bias in Wm <sup>-2</sup>	Bias in %	Bias Req in %	Bias Marg in %(*)	Std Dev in Wm <sup>-2</sup>	Std Dev in %	Std Dev Req in %	Std Dev margin (**) in %
JAN. 2015	366	12.18	3.53	31.82	10.0	-218.2	8.34	50.54	30.0	-68.47
FEB. 2015	327	25.81	3.44	35.02	10.0	-250.2	12.23	62.20	30.0	-107.33
MAR. 2015	354	71.31	6.48	12.54	10.0	-25.4	13.97	23.32	30.0	22.27
APR. 2015	354	137.44	8.77	8.17	10.0	18.3	22.81	17.65	30.0	41.17
MAY 2015	366	173.51	15.34	9.06	10.0	9.4	27.94	16.28	30.0	45.73
JUN. 2015	348	210.39	15.24	8.82	10.0	11.8	29.92	14.42	30.0	51.93
JUL. 2015	303	187.43	9.64	7.31	10.0	26.9	28.53	15.36	30.0	48.8
AUG. 2015	305	145.35	-0.33	9.88	10.0	1.2	23.46	18.48	30.0	38.4
SEP. 2015	235	101.77	4.65	4.76	10.0	52.4	18.58	18.18	30.0	39.4
OCT. 2015	240	50.41	2.08	7.87	10.0	21.3	11.87	24.11	30.0	19.63
NOV. 2015	295	12.64	0.85	15.39	10.0	-53.9	11.16	58.85	30.0	-96.17
DEC. 2015	260	5.60	3.24	17.02	10.0	-70.2	10.25	58.59	30.0	-95.3
(*) 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 15 : AHLSSI quality results over JAN. 2015 to DEC. 2015**

### Comments:

The SSI product meet the requirements except for in November and December. The mean observed insolation in these months is below 15W/m<sup>2</sup> and this certainly affects the requirements as they are based on relative values. Recent analyses of the performance have shown that the performance of the SSI can be improved with a better cloudmask/cloudtype determination and with tuning of the algorithm at high latitudes (>72°N). Performance issues earlier attributed to snow cover seem to have a more complex explanation than anticipated, and the two previous issues need to be taken into consideration. Validation in the inner Arctic is still pending collocation with new data.

## 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.  $\pm 10\%$  and  $\pm 20\%$ . 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 16 : 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.

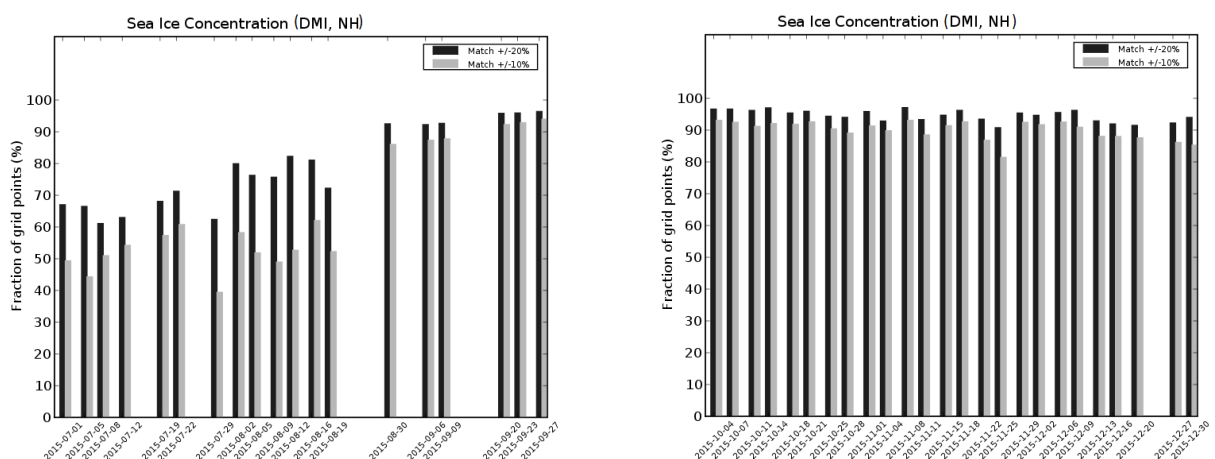
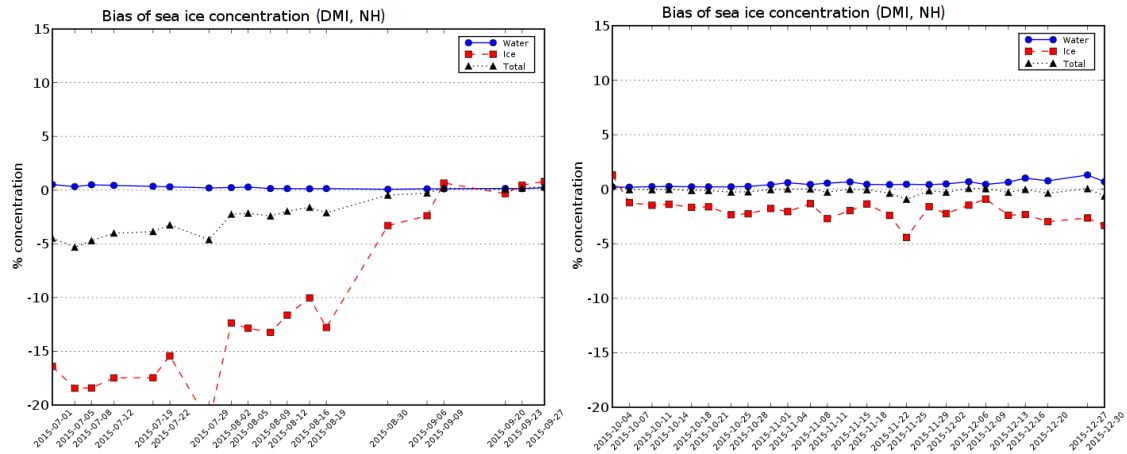
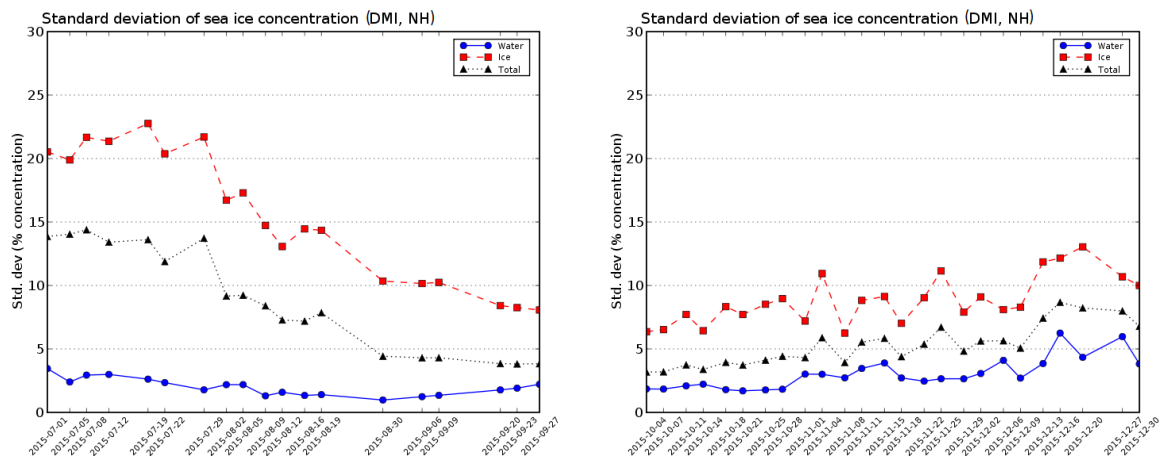


Figure 46 : Comparison of ice concentrations from the Greenland overview charts made by DMI and the OSI SAF concentration product. Northern hemisphere. 'Match +/- 10%' corresponds to those grid points where concentrations are within the range of +/- 10%, and likewise for +/-20%.

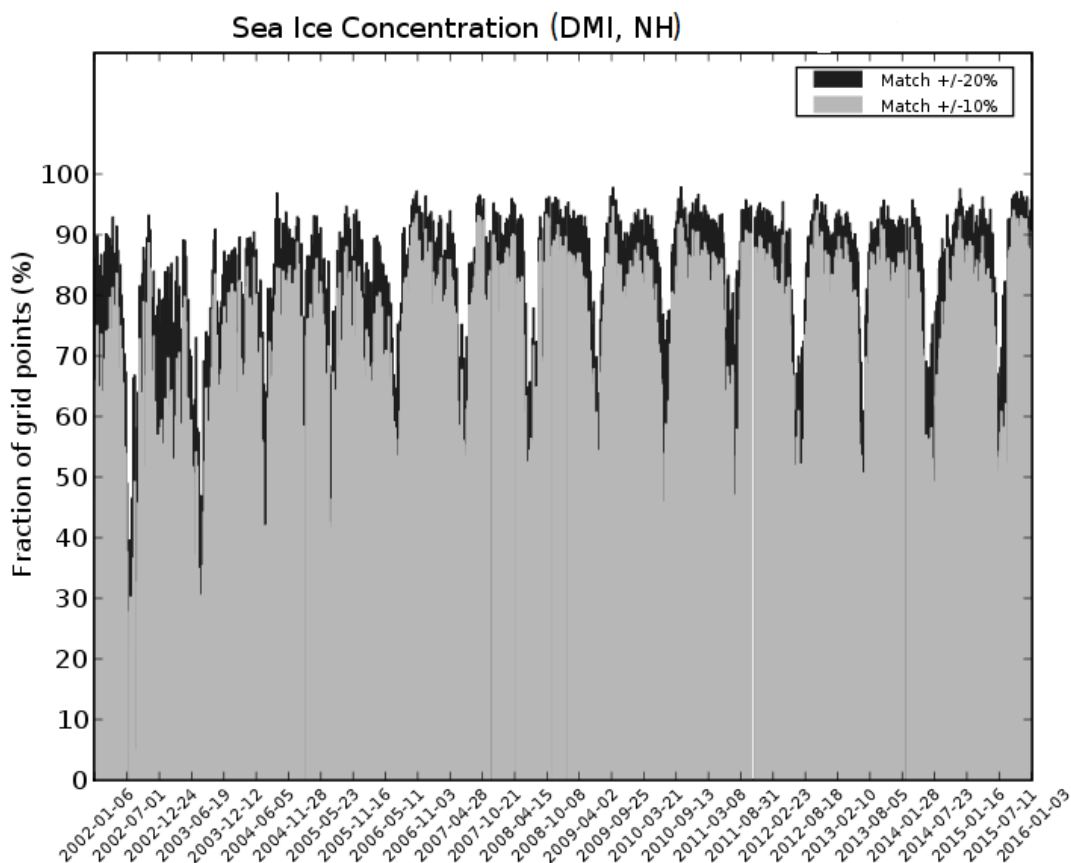




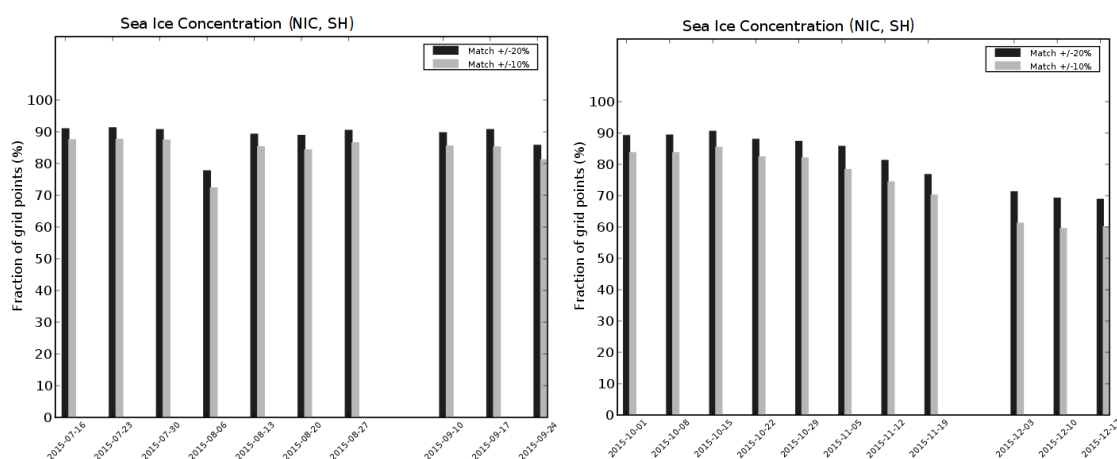
**Figure 47 : Difference between ice concentrations from the Greenland overview charts made by DMI and OSI SAF concentration product for three categories: water, ice and total. The total difference is the difference between the ice analysis and sea ice concentration product within the area covered by 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.**



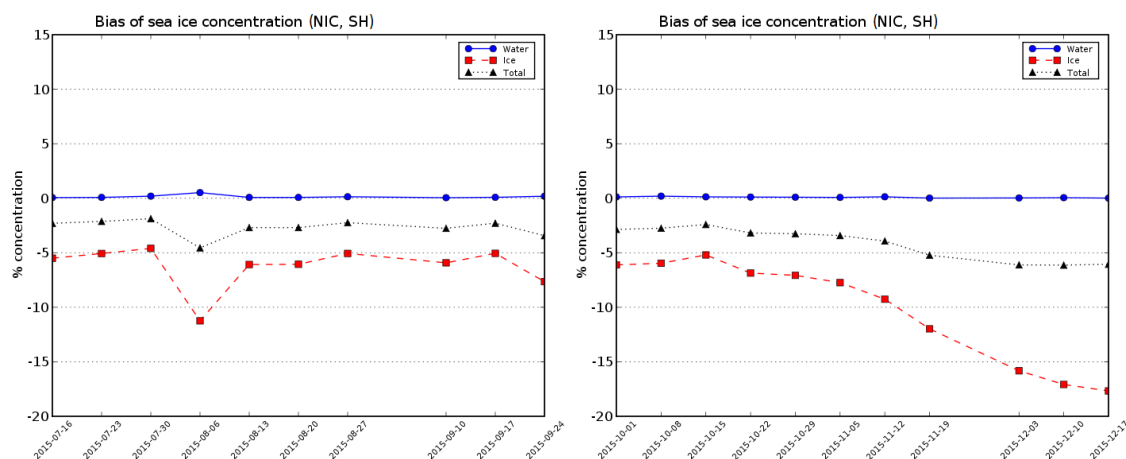
**Figure 48 : Standard deviation of the difference in ice concentrations from the Greenland overview charts made by DMI and OSI SAF concentration product for three categories: water, ice and total. Northern hemisphere.**



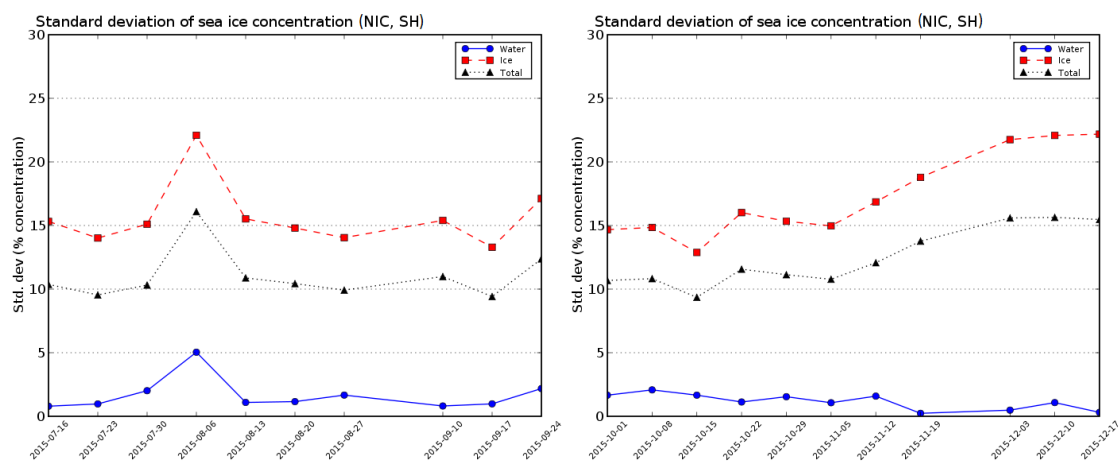
**Figure 49 : Multiyear variability. Comparison between ice concentrations from the Greenland overview charts made by DMI and the OSI SAF concentration product. 'Match +/- 10%' corresponds to those grid points where concentrations are within the range of +/- 10%, and likewise for +/-20%. Northern hemisphere.**



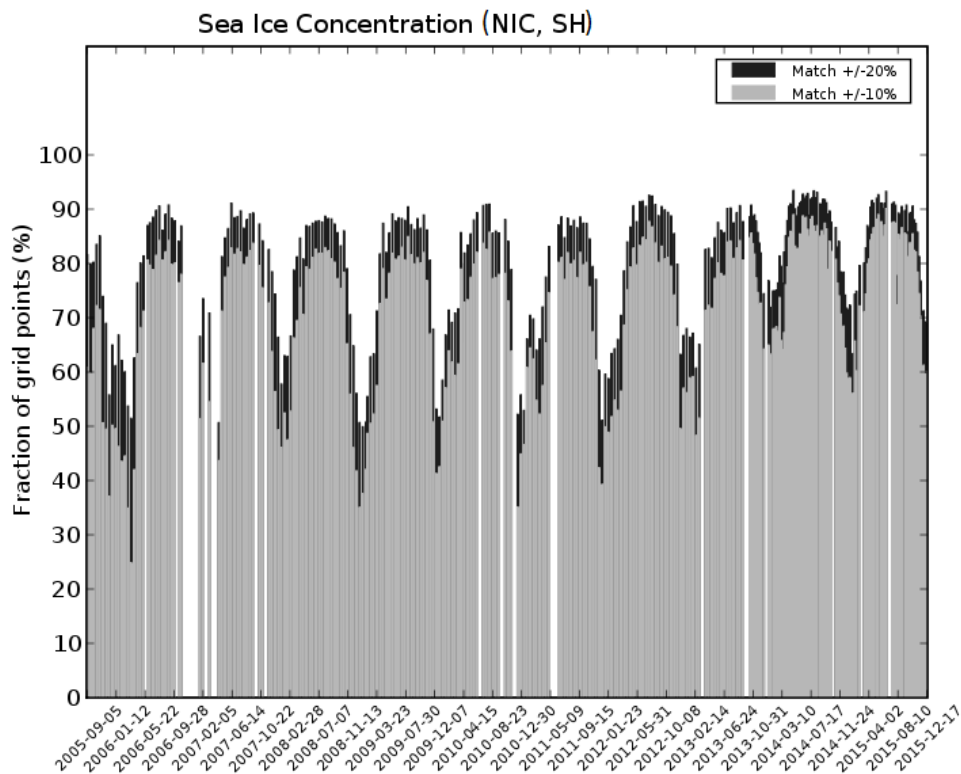
**Figure 50 : Comparison between ice concentrations from the NIC ice analysis and the OSI SAF concentration product. 'Match +/- 10%' corresponds to those grid points where concentrations are within the range of +/-10%, and likewise for +/-20%. Southern hemisphere.**



**Figure 51 : 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 52 : 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 53 : Multiyear 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. 2015	84.08	91.98	-0.83	10.36	19497
FEB. 2015	81.75	92.19	NA	NA	30523
MAR. 2015	82.37	93.04	-1.44	9.91	68879
APR. 2015	81.65	92.33	-2.41	9.45	51446
MAY 2015	87.79	95.11	-0.54	8.22	53023
JUN. 2015	83.87	93.02	-2.03	8.83	62027
JUL. 2015	75.07	89.31	-5.13	11.11	83345
AUG. 2015	82.76	86.75	-4.83	12.29	114501
SEP. 2015	93.24	96.17	-0.80	6.69	154481
OCT. 2015	93.00	96.91	-0.49	5.82	65428
NOV. 2015	85.97	94.15	-2.44	8.04	100600
DEC. 2015	86.03	93.59	-2.82	8.84	83119

**table 17 : 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. 2015 to DEC. 2015. 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. 2015	86.84	12.84	0.31	0.02	0.00	52.29
AUG. 2015	89.59	10.20	0.20	0.01	0.00	52.27
SEP. 2015	91.42	8.41	0.16	0.01	0.00	52.46
OCT. 2015	92.49	7.36	0.15	0.01	0.00	52.72
NOV. 2015	92.64	7.18	0.17	0.01	0.00	53.09
DEC. 2015	92.14	7.61	0.24	0.01	0.00	53.49

**table 18 : 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. 2015	73.11	25.66	1.22	0.01	0.00	22.63
AUG. 2015	73.01	25.51	1.47	0.01	0.00	22.64
SEP. 2015	72.58	25.78	1.63	0.01	0.00	22.66
OCT. 2015	71.31	26.89	1.79	0.01	0.00	22.66
NOV. 2015	70.80	27.37	1.82	0.01	0.00	22.65
DEC. 2015	71.90	26.41	1.68	0.01	0.00	22.65

**table 19 : Statistics for sea ice concentration confidence levels, Code 0-5, Southern Hemisphere.**

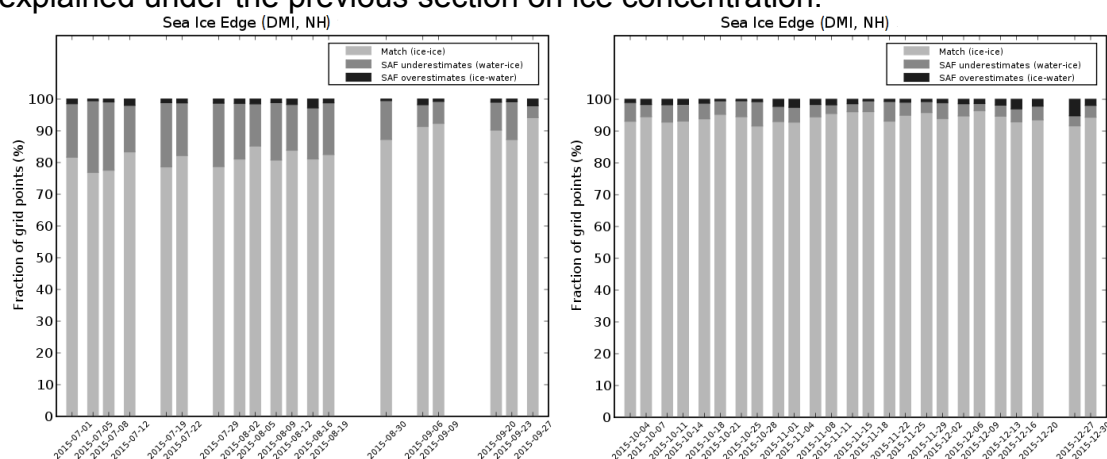
### Comments:

The quality of the OSI SAF ice concentration product is increasing in the Arctic freeze-up season and is somewhat stable in the Antarctic melting season.

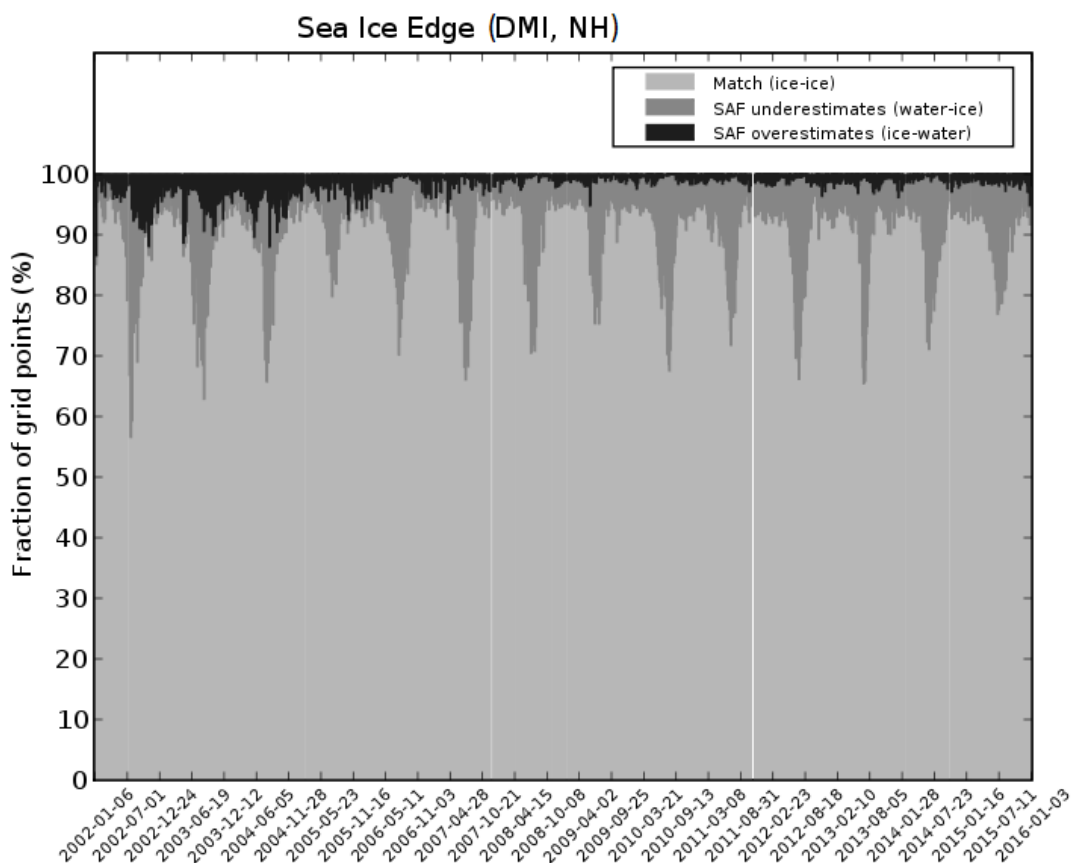
The standard deviation is higher in the melting season for both Arctic and Antarctic, but on average throughout the year the standard deviation is below the service specification of 10 % yearly standard deviation for NH and 15 % for SH.

### 5.3.2 Global sea ice edge (OSI-402) quality

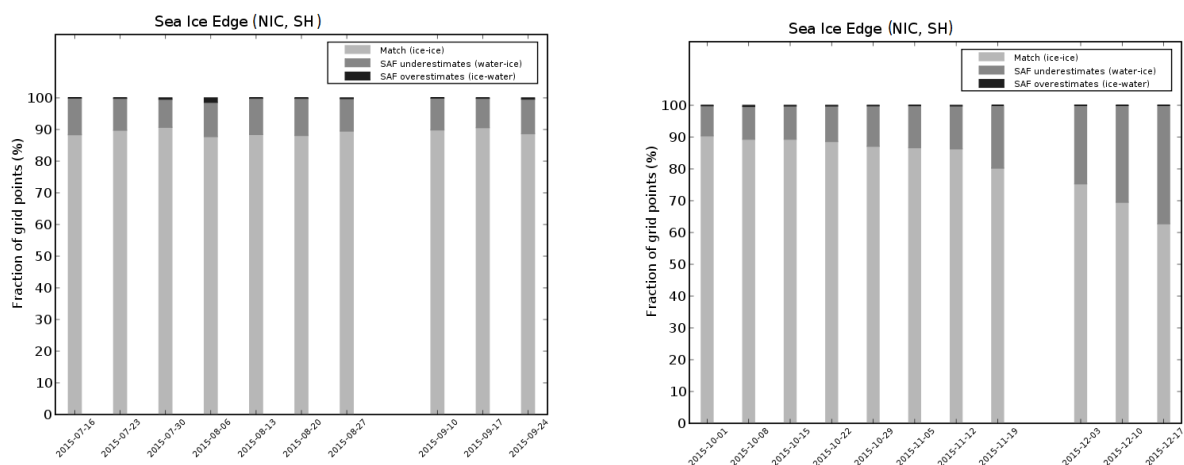
The OSI SAF sea ice edge product is validated against navigational ice charts, as explained under the previous section on ice concentration.



**Figure 54 : 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.**

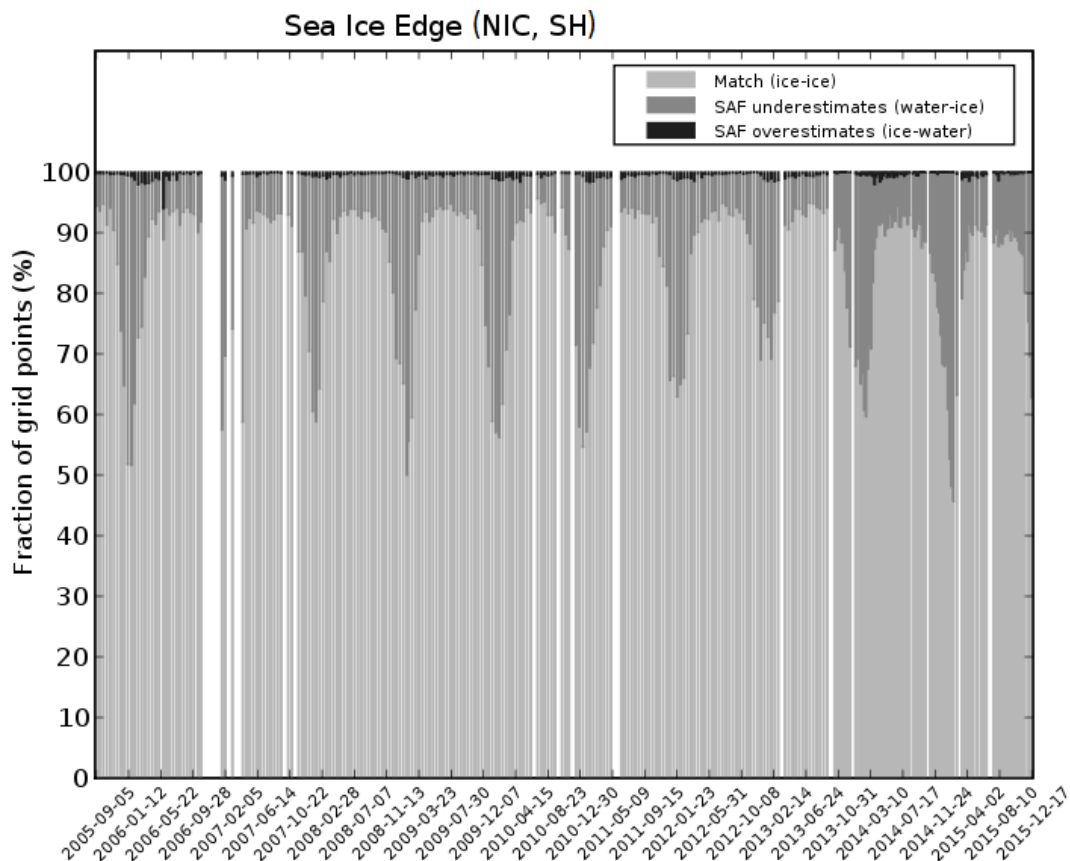


**Figure 55 : Multiyear variability. Comparison between the Greenland overview charts made by DMI and the OSI SAF sea ice edge product. Northern hemisphere. 'SAF water – DMI ice' means grid points where the OSI SAF product indicated water and the DMI ice analysis indicated ice and vice versa for the 'SAF ice – DMI water' category.**



**Figure 56 : 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 57 : Multiyear 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.**

Month	Correct (%)	SAF lower (%)	SAF higher (%)	Mean edge diff (km)	Num obs
JAN. 2015	96.61	1.55	1.84	11.67	21003
FEB. 2015	95.87	1.60	2.53	11.55	34127
MAR. 2015	96.62	0.84	2.54	10.24	76087
APR. 2015	97.43	1.22	1.36	16.74	54643
MAY 2015	98.19	0.48	1.33	13.30	57395
JUN. 2015	97.99	0.77	1.25	13.81	66258
JUL. 2015	97.53	1.48	0.99	13.38	87067
AUG. 2015	96.38	2.54	1.08	22.12	119607
SEP. 2015	98.33	0.80	0.87	14.68	152642
OCT. 2015	98.53	0.58	0.89	12.67	54048
NOV. 2015	97.79	1.20	1.01	13.57	107359
DEC. 2015	97.66	1.26	1.08	12.46	90118

**table 20 : Monthly quality assessment results from comparing OSI SAF sea ice products to MET Norway ice service analysis for the Svalbard area, from JAN. 2015 to DEC. 2015. Mean edge diff is the mean difference in distance between the ice edges in the OSI SAF edge product and MET Norway ice chart.**

**Comments:**

The yearly averaged mean edge difference is 13.9 km, which is within the requirement of 20km.

Month	Code=5	code=4	code=3	code=2	code=1	Unprocessed
JUL. 2015	86.49	2.83	5.20	4.27	1.20	52.16
AUG. 2015	89.21	2.03	4.27	3.55	0.95	52.15
SEP. 2015	91.37	1.59	3.45	2.83	0.75	52.12
OCT. 2015	92.12	1.46	3.15	2.56	0.71	52.19
NOV. 2015	92.23	1.50	3.07	2.52	0.68	52.36
DEC. 2015	91.90	1.69	3.17	2.56	0.68	52.58

**table 21 : 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. 2015	89.73	2.72	3.98	3.07	0.50	22.54
AUG. 2015	89.23	2.63	4.14	3.40	0.60	22.54
SEP. 2015	86.58	3.37	5.17	4.21	0.67	22.60
OCT. 2015	82.90	4.80	6.62	4.95	0.73	55.56
NOV. 2015	82.03	4.73	6.99	5.43	0.83	22.53
DEC. 2015	82.33	4.28	6.65	5.67	1.05	22.52

**table 22 : Statistics for sea ice edge confidence levels, Code 0-5, Southern Hemisphere.**

#### **Comments :**

The statistics for the confidence levels show stable values, with more high quality data during winter than summer, as expected (opposite at NH and SH).

### **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 100.000km<sup>2</sup> to meet the target accuracy requirement.

Month	Std dev wrt running mean [km <sup>2</sup> ]	Mean MYI coverage [km <sup>2</sup> ]
JAN. 2015	41646	2236549
FEB. 2015	44641	2259479
MAR. 2015	37225	1884845
APR. 2015	46322	1892020
MAY 2015	-	-
JUN. 2015	-	-
JUL. 2015	-	-
AUG. 2015	-	-
SEP. 2015	-	-
OCT. 2015	27887	2612897
NOV. 2015	60933	2274458
DEC. 2015	75493	2161803

**table 23 : 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. 2015	83.46	0.36	1.01	14.89	0.28	52.16
AUG. 2015	85.77	0.37	0.79	12.80	0.26	52.15
SEP. 2015	87.01	0.37	0.70	11.72	0.20	52.12
OCT. 2015	88.32	0.43	0.75	10.33	0.18	52.19
NOV. 2015	89.90	0.51	1.01	8.41	0.16	52.36
DEC. 2015	90.51	0.58	1.65	7.10	0.16	52.58

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

Month	Code=5	code=4	code=3	code=2	code=1	Unprocessed
JUL. 2015	67.46	0.30	31.80	0.35	0.08	22.54
AUG. 2015	66.50	0.31	32.72	0.38	0.09	22.54
SEP. 2015	65.69	0.30	27.11	6.81	0.09	22.60
OCT. 2015	65.27	0.29	20.36	13.99	0.09	22.56
NOV. 2015	66.04	0.29	16.44	17.14	0.09	22.53
DEC. 2015	68.39	0.31	13.76	17.42	0.12	22.52

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

**Comments :**

The statistics for the confidence levels show stable values, with more high quality data during winter than summer, as expected.

### 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 atmosphere 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  $\sigma()$  the standard deviation of the error  $\epsilon(X) = X_{\text{prod}} - X_{\text{ref}}$ . Columns  $\alpha$ ,  $\beta$  and  $\rho$  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.

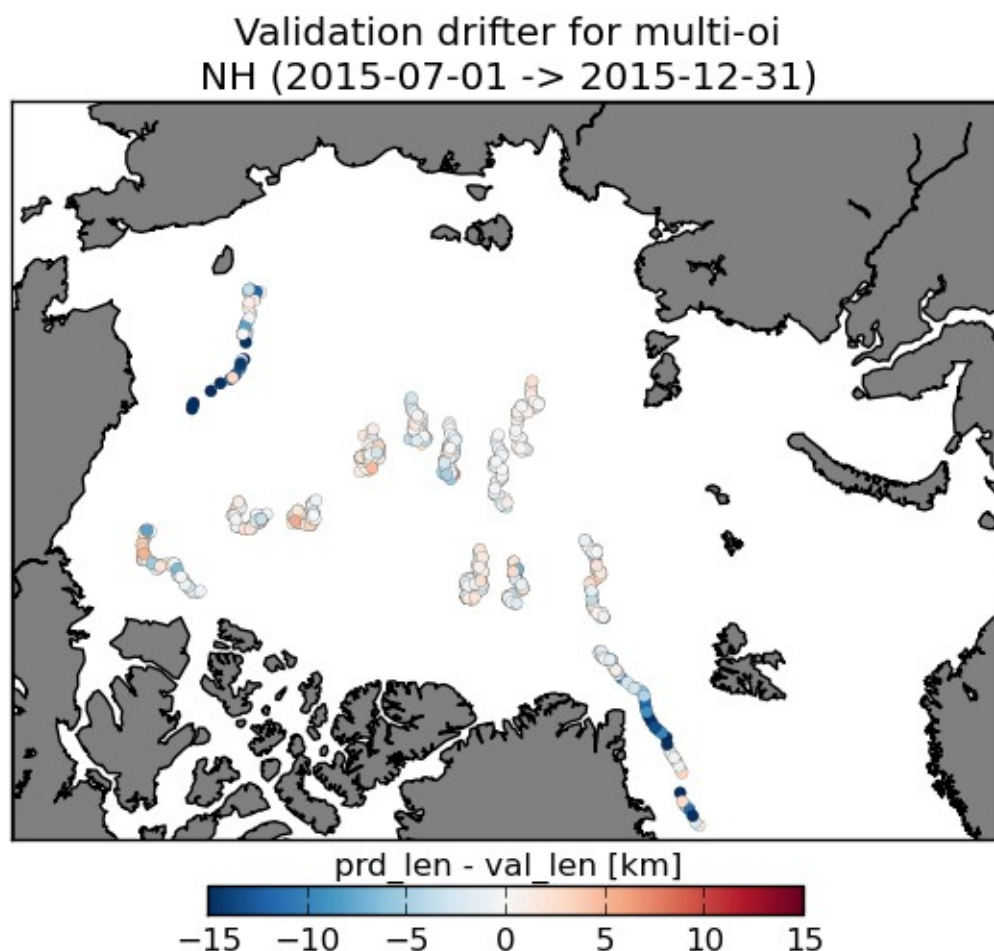


Figure 58 : Location of GPS drifters for the quality assessment period (JUL. 2015 to DEC. 2015). The shade of each symbol represents the bias (prod-ref) in drift length (km over 2 days).

Month	b(X) [km]	b(Y) [km]	$\sigma(X)$ [km]	$\sigma(Y)$ [km]	$\alpha$	$\beta$ [km]	$\rho$	N
JAN. 2015	+0.138	-0.301	3.202	3.035	0.93	-0.080	0.95	489
FEB. 2015	-0.669	-0.406	3.601	2.831	0.92	-0.336	0.96	403
MAR. 2015	-0.288	-0.387	3.730	4.334	0.82	-0.019	0.93	405
APR. 2015	+0.172	-0.404	3.411	2.803	0.95	-0.101	0.96	366
MAY 2015	-	-	-	-	-	-	-	0
JUN. 2015	-	-	-	-	-	-	-	0
JUL. 2015	-	-	-	-	-	-	-	0
AUG. 2015	-	-	-	-	-	-	-	0
SEP. 2015	-	-	-	-	-	-	-	0
OCT. 2015	-0.497	+0.754	4.464	4.894	0.77	+1.402	0.91	143
NOV. 2015	-0.455	-0.123	3.165	3.004	0.89	-0.067	0.97	417
DEC. 2015	-0.218	-0.376	3.135	3.498	0.93	-0.169	0.97	415
Last 12 months	-0.215	-0.259	3.471	3.550	0.90	-0.055	0.96	2715

**table 26 : Quality assessment results for the LRSID (multi-oi) product (NH)  
for JAN. 2015 to DEC. 2015.**

Month	b(X) [km]	b(Y) [km]	$\sigma(X)$ [km]	$\sigma(Y)$ [km]	$\alpha$	$\beta$ [km]	$\rho$	N
JAN. 2015	+0.032	-0.217	3.649	3.390	0.95	-0.092	0.94	474
FEB. 2015	-0.360	-0.434	3.390	2.901	0.96	-0.315	0.96	380
MAR. 2015	+0.001	-0.206	3.272	3.072	0.92	-0.013	0.95	378
APR. 2015	-0.008	-0.363	3.826	3.625	0.95	-0.196	0.94	337
MAY 2015	-	-	-	-	-	-	-	0
JUN. 2015	-	-	-	-	-	-	-	0
JUL. 2015	-	-	-	-	-	-	-	0
AUG. 2015	-	-	-	-	-	-	-	0
SEP. 2015	-	-	-	-	-	-	-	0
OCT. 2015	-0.422	+0.640	4.509	6.308	0.81	+1.199	0.88	127
NOV. 2015	+0.054	-0.032	4.235	3.881	0.91	+0.192	0.95	360
DEC. 2015	-0.406	-0.523	4.145	3.812	0.96	-0.378	0.96	376
Last 12 months	-0.145	-0.253	3.809	3.690	0.93	-0.095	0.95	2492

**table 27 : Quality assessment results for the LRSID (ssmis-f17) product (NH) for JAN. 2015 to DEC. 2015.**

#### Comments:

The validation statistics are as expected and meet the requirement. The worsen statistics for October are due to lack of validation data (value of N lower than other months).

### 5.3.5 Medium resolution sea ice drift (OSI-407) 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 buoys (e.g. the Ice Tethered Profilers) or ice camps (e.g. the Russian manned stations) that report their position at typically hourly to 3 hourly intervals. They are made available in near-real-time via the GTS network at DMI. Argos data in the DMI GTP data have no quality flags and accuracy can be greater than 1500 m. It has been shown that the MR ice drift error statistics improves significantly when validation is performed against high accuracy GPS drifters only (OSI-407 validation report and Phil Hwang, 2013. DOI: 10.1080/01431161.2013.848309). The CDOP3 WP22910 'HL temperature and sea ice drift in-situ validation database' includes work to archive and improve quality control of drifter data to be used in the MR ice drift validation.

A nearest-neighbor approach is implemented for the collocation and any collocation pair whose distance between the product and the buoy is larger than 20 km or temporal difference greater than  $\pm 60$  minutes from the satellite start time and, likewise, satellite end time is disregarded. The temporal mismatch between satellite pairs and the corresponding buoy data is thus maximum 2 hours, but zero in average.

The product requirements for the MR ice drift product on threshold accuracy, target accuracy and optimal accuracy is 5 km, 2 km and 1 km yearly standard deviation, respectively.



## Reported statistics

The Medium Resolution Sea Ice Drift product comprises two production modes, a summer mode from May to August, and a winter mode from September to April. These modes are using Visible (AVHRR channel 2) and Thermal Infra-Red (AVHRR channel 4), respectively.

## Quality assessment statistics

The table below, show selected error statistics against drifting buoys. Bias (x-bias, y-bias) and standard deviation of errors (x-std, y-std) are shown, in meters, for the 2 perpendicular drift components (x, y). Statistics from the best fit between OSI-407 and buoy data are shown as slope of fit ( $\alpha$ ) and correlation coefficient ( $r$ ). N, indicate the number of data pairs that are applied in the error statistics.

Month	b(X) [m]	b(Y) [m]	$\sigma(X)$ [m]	$\sigma(Y)$ [m]	$\alpha$	$\beta$ [m]	$\rho$	N
JAN. 2015	315	438	340	525	0.94	-391	0.96	16
FEB. 2015	78	77	1188	1453	1.16	-64	0.96	24
MAR. 2015	1375	344	495	179	1.06	-817	0.99	12
APR. 2015	-41	214	566	538	0.99	-102	0.96	40
MAY 2015	252	34	303	625	0.97	-110	0.99	48
JUN. 2015	109	389	757	1028	0.96	-236	0.95	428
JUL. 2015	170	290	1491	2608	0.97	-170	0.86	804
AUG. 2015	-113	162	624	786	1.07	-37	0.99	92
SEP. 2015	864	1034	2094	2030	1.16	-1004	0.85	16
OCT. 2015	29	268	953	1205	1.00	-146	0.98	292
NOV. 2015	-65	-62	1877	1265	0.98	54	0.96	838
DEC. 2015	-93	212	828	924	1.00	-60	0.99	1501
Jan-Dec 2015	-4	194	1257	1502	0.99	-92	0.96	4111

**table 28 :** MR sea ice drift product (OSI-407) performance, JAN. - DEC. 2015

**Comments:** Semi-automatic quality control (based on threshold on maximum buoy drift, visual inspection on drift scatter plots (buoy vs. satellite) and inspection of extreme outliers) has been carried out and unrealistic satellite drift data from the morning (UTC) on Nov. 3 and Nov. 4 was found corrupted and are therefore excluded from the data behind this quality analysis. Large standard deviations in July is to some extent due to little data for comparison (N=16). All months, except from July, September and November show reasonable correlation with Buoy drift and the target accuracy on 2 km on yearly standard deviation is met.

## 5.4 Global Wind quality (OSI-102, OSI-104, OSI-109)

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.

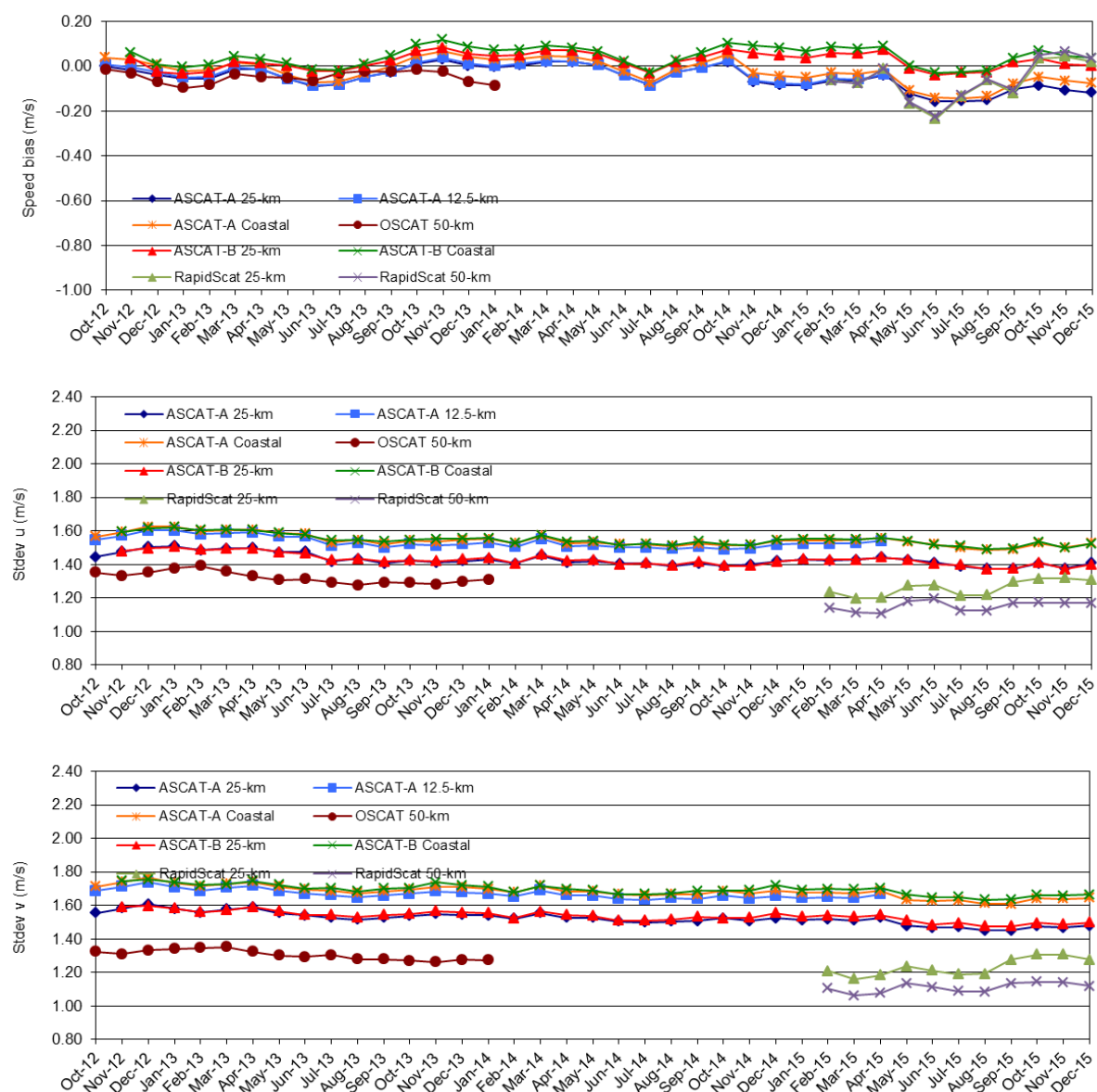
Seasonal weather variations imply differences in mean atmospheric stability, differences in dynamics, and differences in the distribution of wind speeds. These differences cause variations in the spatial representativeness errors associated with scatterometer wind quality assessment and in the difference 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 2015. 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. The OSI SAF winds are routinely compared to Met Office NWP model data in the NWP SAF project. Monthly statistics of the products are available as e.g. 2D histograms and map plots, see [http://nwpsaf.eu/monitoring/scatter/monthly\\_mon.html](http://nwpsaf.eu/monitoring/scatter/monthly_mon.html).



**Figure 59 : 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

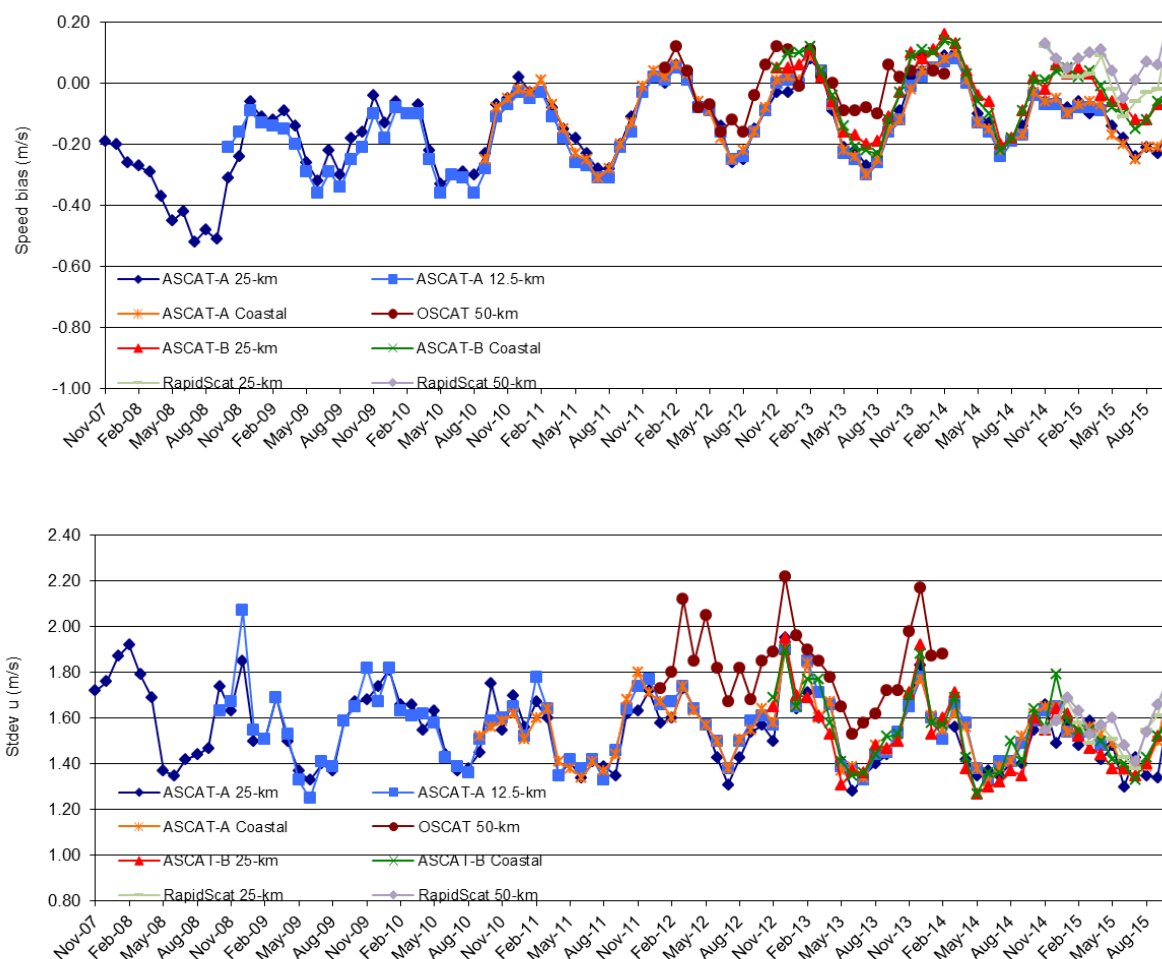
We compare the scatterometer winds with wind data from moored buoys on a monthly basis. The buoy data of approximately 150 buoys spread over the oceans (most of them in the tropical oceans and near Europe and North America) are retrieved from the ECMWF MARS archive and collocated with scatterometer winds. 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.

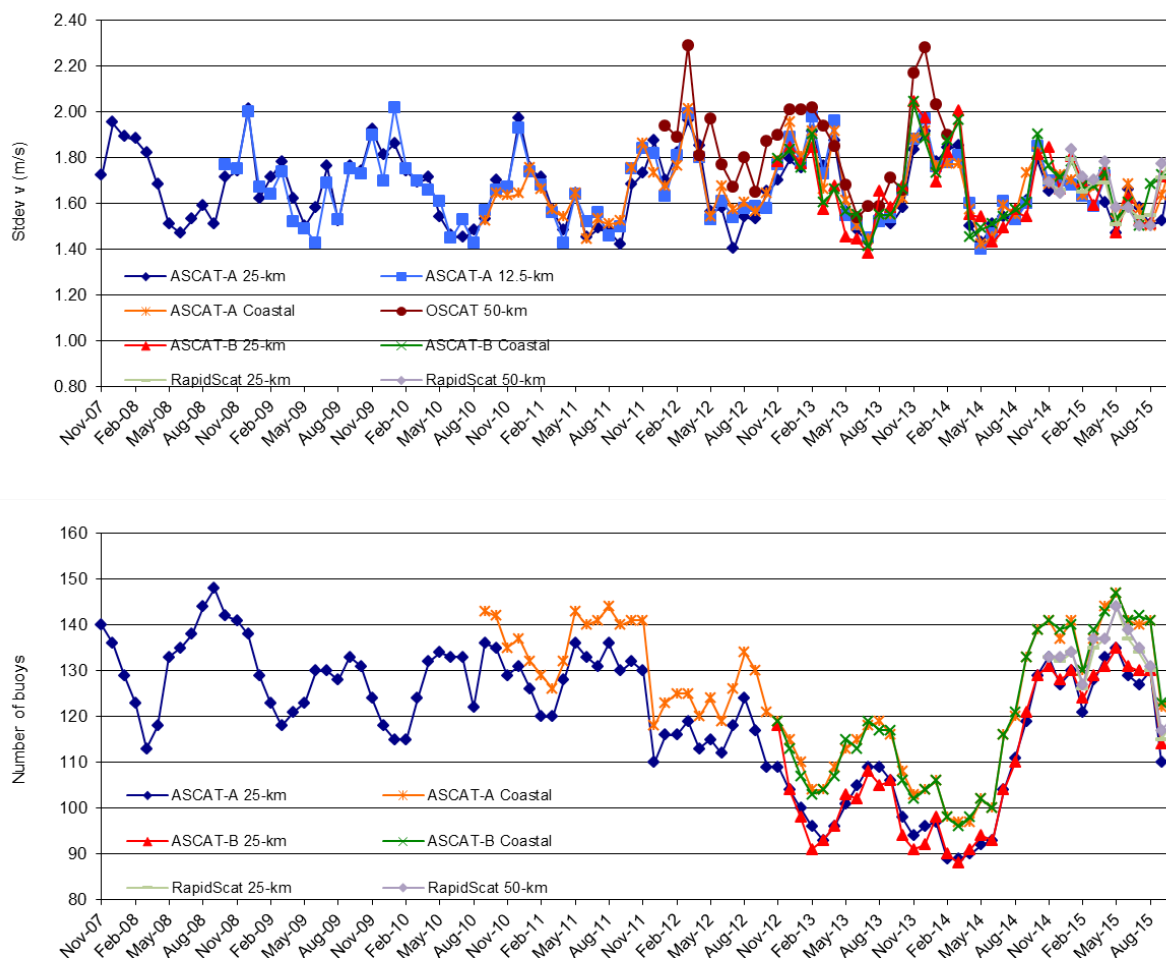
The figure below shows the monthly results of November 2007 to November 2015.

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. Also the number of available buoys changes over time as is shown in the bottom plot. 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 60 : 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 (2nd plot) and wind  $v$  component standard deviation (3rd plot) are shown. Also the number of buoys available for the comparisons is shown (bottom).**

## 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](http://www.osi-saf.org), managed by MF/CMS,
- a web site for SS1, <http://www.osi-saf.org/lml/>, managed by MF/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.

SS1 web site statistics are included in the central web site statistics.

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	Pages	User requests
JUL. 2015	1003	56715	7
AUG. 2015	1007	53643	3
SEP. 2015	1014	53924	4
OCT. 2015	1021	46534	5
NOV. 2015	1032	47425	3
DEC. 2015	1039	31784	0

table 29 : Statistics on central OSI SAF Web site use over 2nd half 2015.

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

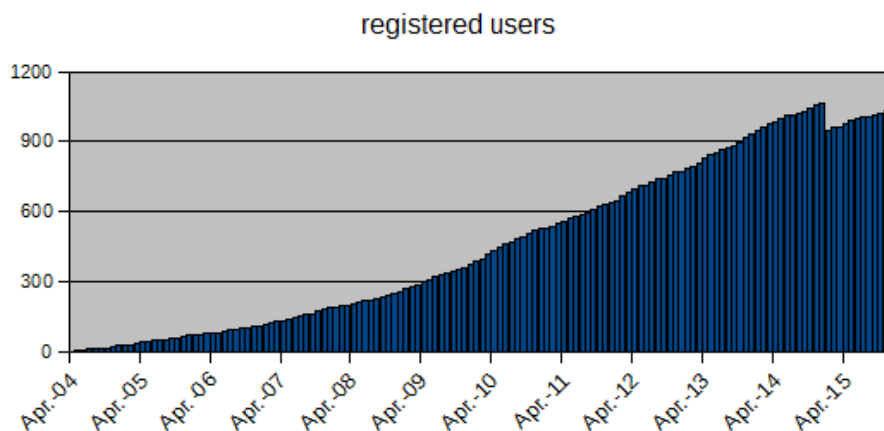


Figure 61 : Evolution of external registered users on the central Web Site from April 2004 to December 2015.



**Comment** : In January 2015, 143 accounts with non valid email adress were removed.

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	Tidetch LTD	Tidetch
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	Universidade 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	anhugongyedaxue	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	Shenzhen graduate school of tsinghua university	
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	Tongji university	TJU
China	Xiamen University	XMU
China	Zhejiang Ocean University	ZOU
Colombia	Universidad Distrital Francisco Jose de Caldas	UDFJDC
Croatia	Rudjer Boskovic Institute	IRB/ZIMO
Cyprus	Offshore Monitoring Ltd	OSM
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 Salvador	University of El Salvador	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	ARVALIS Institut du vegetal	ARVALIS
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 de la Recherche Scientifique	CNRS/MIO
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 Recherche 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	Kedge business school	Kedge bs
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	German Federal Maritime and Hydrographic Agency	BSH
Germany	HTWK Leipzig	HTWK Leipzig
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 für 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	Ulm University of Applied Science	HSU
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	Indonesian Agency for Meteorology Climatology and Geophysics	BMKG
Indonesia	Maxxima	AIS
Indonesia	Ministry of Marine Affairs and Fisheries	MMAF
Indonesia	Hasanuddin University	UNHAS
Indonesia	Sekolah Tinggi Meteorologi Klimatologi dan Geofisika	STMKG
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	Agenzia Spaziale Italiana	ASI
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	Istituto di BioMeteorologia – Consiglio Nazionale delle Ricerche	IBIMET-CNR
Italy	Istituto Nazionale di Geofisica e Vulcanologia	INGV
Italy	Istituto Scienze dell'Atmosfera e del Clima – Consiglio Nazionale delle Ricerche	ISAC – CNR
Italy	Istituto Superiore per la Ricerca e la Protezione Ambientale	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	AS MERC

Japan	Atmosphere and Ocean Research Institute, the University of Tokyo	AORI, UT
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
Madagascar	Directorat Generale of Meteorology	DGM
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	Shell international	Shell
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	Norske Meteorologiske Institutt	MET Norway
Norway	Norwegian Defense Research Establishment	FFI
Norway	Norwegian Naval Training Establishment	NNTE
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	Instituto Geofisico del Peru	IGP
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	Centrum Badan Kosmicznych PAN	CBK PAN
Poland	Institute of Geophysics, University of Warsaw	IGF UW
Poland	Institute of Meteorology and Water Management	IMWM
Poland	Institute of Oceanology of the Polish Academy of Sciences	IOPAN
Poland	Maritime Academy Gdynia	AM/KN
Poland	Media Fm	Media Fm
Poland	Pomeranian University in S <sup>3</sup> upsk	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	Universidade dos Acores	UAC
Romania	Mircea cel Batran Naval Academy	MBNA
Romania	National Meteorological Administration	NMA
Romania	University of Bucharest	UB
Russia	V.I.II'ichev Pacific Oceanological Institute	VIPOI
Russia	Atlantic Research institute of Marine fisheries and oceanography	AtlantNIRO
Russia	Far Eastern Federal University	FEFU
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.II'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
Slovakia	IBL Software Engineering	IBL
Slovenia	Slovenian Environment Agency	SEA
South Africa	Cape Peninsula University of Technology	CPUT
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 Africa	Total Exploration and Production South Africa	TEPSA
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
South Korea	Seoul National University	SNU
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 Oceanografía	IEO
Spain	Instituto Mediterraneo de Estudios Avanzados	IMEDEA (CSIC-UIB)
Spain	Instituto Nacional de Meteorología	INM
Spain	Instituto Nacional de Pesquisas Espaciais	INPE
Spain	Instituto Nacional de Técnica 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 Científicas	MNCN-CSIC
Spain	Starlab Barcelona sl.	STARLAB BA
Spain	Universidad Autonoma de Madrid	UAM
Spain	University of Barcelona	UB
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 Atmos 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	HR Wallingford	HRW
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	Tullow Oil	
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 Manchester	UMcr
United Kingdom	University of Plymouth	UOP
United Kingdom	University of Southampton	UoS
United Kingdom	Weatherquest Ltd	Weatherquest
Uruguay	DIRECCI�N NACIONAL DE RECURSOS ACU�TICOS	DNRA
USA	Alaska Department Of Fish and Game	ADFG
USA	Antarctic Support Contract	USAP
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	Columbia University	CU
USA	Colorado State University	CSU
USA	Cooperative Institute for Meteorological Studies	CIMSS
USA	Cooperative Institute for Research Environmental Sciences	CIRES
USA	Dartmouth 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	Oregon State University	OSU
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 30 : 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.

<b>Usage of the OSI SAF central Web Site by country (top 10) over 2nd half 2015 (pages views)</b>						
<b>Countries</b>	<b>JUL. 2015</b>	<b>AUG. 2015</b>	<b>SEP. 2015</b>	<b>OCT. 2015</b>	<b>NOV. 2015</b>	<b>DEC. 2015</b>
France	22843	8614	21125	12325	16053	8507
Netherlands	1310	1375	806	1150	3348	989
Germany	1344	1209	1830	1327	1383	1254
Italy	1613	708	1219	1547	723	715
Sweden	1305	1399	852	306	598	641
Austria	34	14	19	986	940	2189
Uruguay	0	29	3839	8	0	0
Denmark	517	750	486	675	1111	164
Australia	338	1186	745	174	190	164
Portugal	638	245	221	375	959	206

**table 31 : Usage of the OSI SAF central Web Site by country (top 10) over 2<sup>nd</sup> half 2015**

#### 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.

<b>Reference</b>	<b>Date</b>	<b>Subject</b>	<b>Status</b>
150015	02/07/2015	Problem to receive OSI SAF service messages	closed
email	13/07/2015	Requesting ASCAT soil moisture datasets	Closed (forwarded to EUMETSAT)
INC554110	19/07/2015	Low data volume for VIIRS_NAR data.	closed
email	20/07/2015	Missing SST files on Ifremer FTP server	closed
email	20/07/2015	Missing radiative fluxes files on Ifremer FTP server	closed
email	21/07/2015	Change of "level type" in conc., edge, type sea ice products ?	closed
150016	30/07/2015	Request to access to wind data	closed
email	05/08/2015	ftp timeout on KNMI FTP server	closed

Reference	Date	Subject	Status
email	07/08/2015	Strange artefacts in OSI-SAF seaice data used in OSTIA	closed
email	20/08/2015	Request to access to wind data	closed
email	07/09/2015	Locating the NAR data by using PROJ4 library	closed
email	15/09/2015	How to use sea ice products to find melt locations	closed
email	21/09/2015	Animation about sea ice concentration	closed
email	28/09/2015	Problem to access data on Ifremer FTP server	closed
150017	08/10/2015	Request to access to wind data	closed
email	09/10/2015	Sea ice type data maked as ambiguous	closed
150018	13/10/2015	Anomaly in the sea ice concentrations in the Baltic	closed
email	14/10/2015	Missing Rapidscat data	closed
email	25/10/2015	Differences between new/old sea ice concentration products over lakes	closed
email	06/11/2015	Request to access GOES-E radiative fluxes products	closed
INC563844	16/11/2015	Problem to get METEOSAT products (MSG-3 outage)	closed
email	30/11/2015	Problem to get AVHRR SST data on Ifremer FTP server	closed

**table 32 : Status of User requests on central OSI SAF Help Desk.**

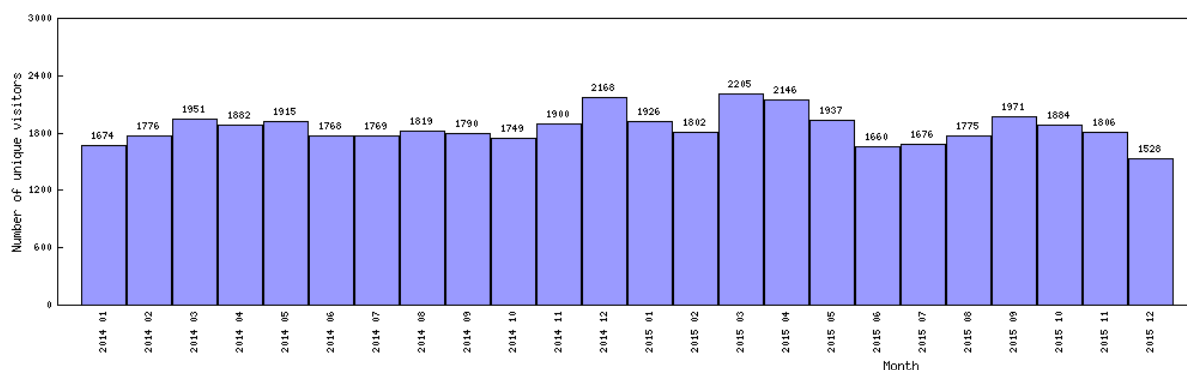
Following table provides the status of requests forwarded from EUMETSAT Help Desk.

reference	Date	subject	status
300029711	03/07/2015	Ambiguity Removal Step performed in L2 ASCAT winds ?	closed

**table 33 : Status of requests from EUMETSAT Help Desk.**

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

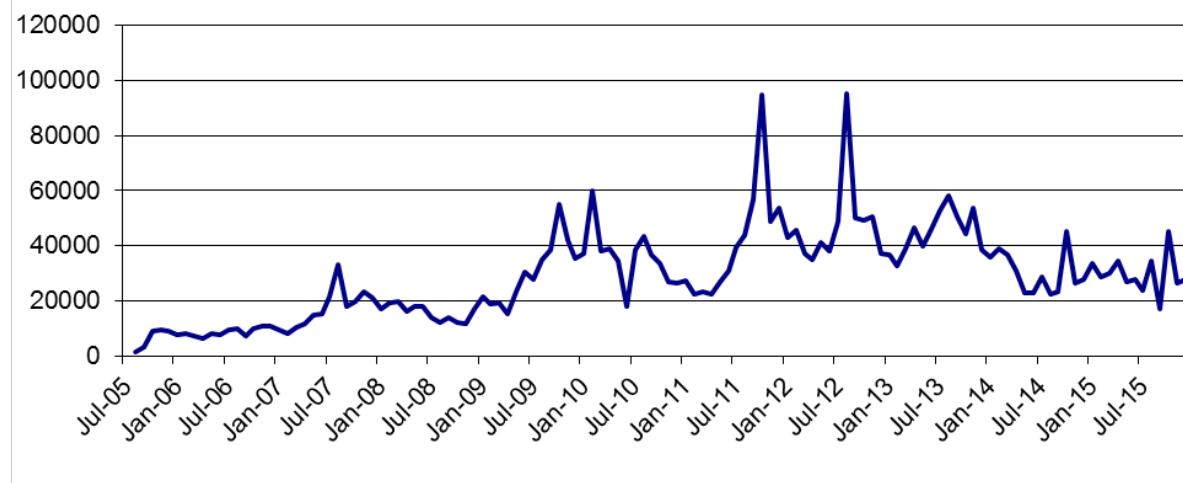
The following graph illustrates the evolution of visitors on the OSI SAF High Latitude portal (<http://osisaf.met.no/>).



**Figure 62 : Evolution of visitors on the HL OSI SAF Sea Ice portal from January 2014 to December 2015 (<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 2015. Only external sessions (from outside KNMI) are counted.



**Figure 63 : Number of page views on KNMI scatterometer website per month.**

At scat@knmi.nl, 118 Emails from 23 different addresses were received in the period Jul-Sep 2015, requesting wind data, processing software, and other support. For Oct-Dec 2015 an additional 51 Emails from 21 different addresses were received. This includes requests in the OSI SAF, the NWP SAF, and the EARS project. The total number of inquiries in this half year was 46, and 27 of them were identified as OSI SAF inquiries. All requests were acknowledged or answered within three working days.

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

Entity	Acronym	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

Entity	Acronym	Country
UAE Met. Department		United Arab Emirates
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		Ecuador
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

Entity	Acronym	Country
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
Stretch Space Ltd.		U.K.
Korea Institute of Ocean Science and Technology		South Korea
National Satellite Meteorological Center	NSMC	China
Irvin & Johnson Holding Company		South Africa
Fleet Numerical Meteorology and Oceanography Center, US Navy		U.S.A.
Shanghai Ocean University		China
Marine forecast station of Xiamen		China
26 independent users (not affiliated to an organization)		

table 34 : 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 2015													
		JUL. 2015		AUG. 2015		SEP. 2015		OCT. 2015		NOV. 2015		DEC. 2015	
		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	1	x	0	x
SSI MAP +LML		0	x	0	x	0	x	0	x	0	x	0	x
DLI MAP +LML		0	x	0	x	0	x	0	x	0	x	0	x
OSI-201	GBL SST	784	180	62	3292	58	583	58	0	60	601	64	7181
OSI-202	NAR SST	673	392	680	460	650	1101	710	0	687	1047	6628	2961
OSI-204	MGR SST	332606	5162	355703	7379	337175	9613	379407	0	552747	132295	707691	190641
OSI-206	METEOSAT SST	7577	232	7310	1709	7583	3154	6445	3991	5759	6637	47904	10259
OSI-207	GOES-E SST	3642	232	2286	1798	2440	3115	4070	10.6	3603	5915	32938	7140
OSI-208	IASI SST	14777	1150	30330	1907	28377	1339	28533	1.0	186308	28423	46346	93330
OSI-303	METEOSAT DLI	2	x	0	x	5	x	0	x	0	x	2267	x
OSI-304	METEOSAT SSI	30149	x	5961	x	4880	x	30434	x	15801	x	13296	x
OSI-305	GOES-E DLI	1400	x	31	x	27	x	30	x	30	x	211	x
OSI-306	GOES-E SSI	12784	x	3298	x	2787	x	3050	x	48756	x	5446	x

table 35 : Number of OSI SAF products downloaded from Ifremer FTP server and PO.DAAC server over 2nd half 2015.

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.

<b>Number of Sea Ice products downloaded on High Latitude FTP server over 2nd half 2015</b>													
		JUL. 2015		AUG. 2015		SEP. 2015		OCT. 2015		NOV. 2015		DEC. 2015	
		HL FTP	CMEMS	HL FTP	CMEMS	HL FTP	CMEMS	HL FTP	CMEMS	HL FTP	CMEMS	HL FTP	CMEMS
OSI-401	Global Sea Ice Concentration	59304		12277		12754		6870		11046		7304	
OSI-402	Global Sea Ice Edge	75337		3727		1633		2462		5659		4892	
OSI-403	Global Sea Ice Type	97995		13011		3806		14765		10540		9589	
OSI-404	Global Sea Ice Emissivity	3339		296		103		216		559		108	
OSI-405	Low resolution Sea Ice Drift	46799		2405		2376		4912		4050		5572	
OSI-407	Medium resolution Sea Ice Drift	2464		1192		101		1318		414		430	
OSI-409	Reprocessed Ice Concentration	425417		45495		134793		84025		44824		68827	
<b>Downloaded SST, DLI and SSI over the OSI SAF High Latitude FTP server</b>													
OSI-203	AHL SST	874		375		394		436		337		478	
OSI-301	AHL DLI	206		33		3		0		0		1	
OSI-302	AHL SSI	202		30		0		0		0		2	

table 36 : **Number of OSI SAF products downloaded from OSI SAF Sea Ice FTP server over 2nd half 2015.**

### **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 numbers for the KNMI FTP server are the average number of downloads per product file of the near-real time products. The numbers for PO.DAAC are the downloaded number of archived product files (containing one orbit each) which may cover the whole product history. Note that the BUFR products are also disseminated through EUMETCast.

We provided archived SeaWinds data to 1 user and archived OSCAT data to 1 user during the reporting period.

Number of OSI SAF products downloaded on KNMI FTP server over 2nd half 2015													
		JUL. 2015		AUG. 2015		SEP. 2015		OCT. 2015		NOV. 2015		DEC. 2015	
		KNMI FTP	PO.DAAC	KNMI FTP	PO.DAAC	KNMI FTP	PO.DAAC	KNMI FTP	PO.DAAC	KNMI FTP	PO.DAAC	KNMI FTP	PO.DAAC
OSI-102	ASCAT-A 25km	19 per file (BUFR), 40 per file (NetCDF)	157589	19 per file (BUFR), 40 per file (NetCDF)	19241	19 per file (BUFR), 40 per file (NetCDF)	127485	20 per file (BUFR), 26 per file (NetCDF)	218721	20 per file (BUFR), 26 per file (NetCDF)	115791	20 per file (BUFR), 26 per file (NetCDF)	112532
OSI-102-b	ASCAT-B 25km	20 per file (BUFR), 40 per file (NetCDF)	22992	20 per file (BUFR), 40 per file (NetCDF)	20576	20 per file (BUFR), 40 per file (NetCDF)	30071	20 per file (BUFR), 21 per file (NetCDF)	29857	20 per file (BUFR), 21 per file (NetCDF)	12485	20 per file (BUFR), 21 per file (NetCDF)	49726
OSI-103	ASCAT-A 12.5km	-	10531	-	69323	-	71332	-	14670	-	21269	-	71963
OSI-104	ASCAT-A Coastal	20 per file (BUFR), 40 per file (NetCDF)	152569	20 per file (BUFR), 40 per file (NetCDF)	130750	20 per file (BUFR), 40 per file (NetCDF)	169210	20 per file (BUFR), 26 per file (NetCDF)	149903	20 per file (BUFR), 26 per file (NetCDF)	101419	20 per file (BUFR), 26 per file (NetCDF)	163154
OSI-104-b	ASCAT-B Coastal	20 per file (BUFR), 40 per file (NetCDF)	26221	20 per file (BUFR), 40 per file (NetCDF)	81358	20 per file (BUFR), 40 per file (NetCDF)	47153	20 per file (BUFR), 21 per file (NetCDF)	42247	20 per file (BUFR), 21 per file (NetCDF)	7943	20 per file (BUFR), 21 per file (NetCDF)	48191
OSI-109-a	RapidScat 25 km Wind 2 hours	14 per file (BUFR), 7 per file (NetCDF)	-	14 per file (BUFR), 7 per file (NetCDF)	-	14 per file (BUFR), 7 per file (NetCDF)	-	12 per file (BUFR), 14 per file (NetCDF)	-	12 per file (BUFR), 14 per file (NetCDF)	-	12 per file (BUFR), 14 per file (NetCDF)	-
OSI-109-b	RapidScat 50 km Wind 2 hours	13 per file (BUFR), 7 per file (NetCDF)	-	13 per file (BUFR), 7 per file (NetCDF)	-	13 per file (BUFR), 7 per file (NetCDF)	-	10 per file (BUFR), 12 per file (NetCDF)	-	10 per file (BUFR), 12 per file (NetCDF)	-	10 per file (BUFR), 12 per file (NetCDF)	-
OSI-109-c	RapidScat 25 km Wind 3 hours	14 per file (BUFR), 20 per file (NetCDF)	26221	14 per file (BUFR), 20 per file (NetCDF)	-	14 per file (BUFR), 20 per file (NetCDF)	-	12 per file (BUFR), 15 per file (NetCDF)	-	12 per file (BUFR), 15 per file (NetCDF)	-	12 per file (BUFR), 15 per file (NetCDF)	-
OSI-109-d	RapidScat 50 km Wind 3 hours	14 per file (BUFR), 10 per file (NetCDF)	-	14 per file (BUFR), 10 per file (NetCDF)	-	14 per file (BUFR), 10 per file (NetCDF)	-	10 per file (BUFR), 15 per file (NetCDF)	-	10 per file (BUFR), 15 per file (NetCDF)	-	10 per file (BUFR), 15 per file (NetCDF)	-

table 37 : Number of OSI SAF products downloaded from KNMI FTP server and PO.DAAC server over 2nd half 2015.

## 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 below shows the overall number of OSI SAF users by country at the 6 July 2015. In clear green, the countries with the greatest numbers of users.

Albania	3	Gabon	1	Nigeria	3
Algérie	4	Gambia	2	Norway	4
Angola	2	Germany	97	Oman	2
Argentina	2	Ghana	6	Peru	1
Armenia	1	Greece	12	Poland	11
Australia	1	Guinea	2	Portugal	5
Austria	18	Guinea-Bissau	2	Qatar	3
Azerbaijan	3	Hungary	8	Reunion	1
Bahrain	1	Iceland	1	Romania	5
Belgium	9	India	1	Russian Federation	7
Benin	2	Iran, Islamic Republic Of	4	Rwanda	5
Bosnia And Herzegovina	1	Iraq	1	San Marino	1
Botswana	3	Ireland	5	Sao Tome And Principe	2
Brazil	37	Isle Of Man	1	Saudi Arabia	4
Bulgaria	1	Israel	7	Senegal	6
Burkina Faso	2	Italy	244	Serbia	3
Burundi	2	Jordan	1	Seychelles	2
Cameroon	3	Kazakhstan	3	Sierra Leone	2
Canada	2	Kenya	9	Slovakia	4
Cape Verde	2	Korea, Republic Of	2	Slovenia	1
Central African Republic	2	Kuwait	1	Somalia	1
Chad	2	Kyrgyzstan	1	South Africa	16
China	3	Latvia	1	Spain	43
Comoros	2	Lebanon	3	Sudan	3
Congo	2	Lesotho	2	Swaziland	2
Congo, The Democratic Republic Of The	4	Liberia	2	Sweden	3
Côte D'Ivoire	4	Libyan Arab Jamahiriya	1	Switzerland	9
Croatia	2	Lithuania	2	Syrian Arab Republic	1
Cuba	1	Luxembourg	1	Tajikistan	1
Cyprus	1	Macedonia, The Former Yugoslav Republic Of	1	Tanzania, United Republic Of	3
Czech Republic	14	Madagascar	3	Togo	1
Denmark	4	Malawi	1	Tunisia	2
Djibouti	2	Mali	1	Turkey	6
Dominican Republic	1	Malta	2	Turkmenistan	1
Ecuador	1	Martinique	1	Uganda	3
Egypt	4	Mauritania	2	Ukraine	2
El Salvador	1	Mauritius	7	United Arab Emirates	5
Equatorial Guinea	2	Moldova, Republic Of	1	United Kingdom	119
Eritrea	2	Morocco	5	United States	7
Estonia	3	Mozambique	4	Uzbekistan	1
Ethiopia	5	Namibia	5	Viet Nam	1
Finland	4	Netherlands	25	Zambia	2
France	52	Niger	6	Zimbabwe	3

table 38 : Overall number of EUMETCast users by country at 6 July 2015.

### 6.3.2 Users and retrievals from EUMETSAT Data Center

#### Orders Summary over the 2nd half 2015

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

User Id.	JUL. 2015	AUG. 2015	SEP. 2015	OCT. 2015	NOV 2015	DEC. 2015	TOTAL (MB)
grieco	3192						3192
VincentMic	25237						25237
wudstak	6952						6952
barry_rawn	680						680
MartinsDim	240	323					563
thomas2	10						10
benedicto	2						2
knownwhat	1683						1683
hproe		4					4
monteiroi		522					522
ioos2ooi		1486					1486
OlivierCha				45			45
konstir				3549			3549
SonsolesR				4			4
MFI_full				181			181
ValtersZ				125			125
gspreen				2			2
sdljustin				4			4
charleswei					586.4		586.4
celamrani					27		27
wdgross					7		7
SatManuela					166		166
huelin					186		186
mattnorth					1335		1335
TOTAL	37996	2335	0	3910	2307.4	0	46548.4

**table 39 : Volume of data downloaded (in MB) by users and by month from EDC over 2nd half 2015.**

#### Ingestion Summary over the 2nd half 2015

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.

Identifier	Product	JUL. 2015	AUG. 2015	SEP. 2015	OCT. 2015	NOV. 2015	DEC. 2015
OSI-401(-a)	Global Sea Ice Concentration (DMSP-F17)	100	100	100	100	100	100
OSI-305	Daily Downward Longwave Irradiance (GOES-13)	100	100	100	100	100	100
OSI-306	Daily Surface Solar Irradiance (GOES-13)	100	100	100	100	100	100
OSI-305	Hourly Downward Longwave Irradiance (GOES-13)	100	100	100	100	100	100
OSI-306	Hourly Surface Solar Irradiance (GOES-13)	100	100	100	100	100	100
OSI-207	Hourly Sea Surface Temperature (GOES-13)	98.25	100	100	100	99.44	99.86
OSI-102-b	ASCAT 25km Wind (Metop-B)	100	100	100	99.77	99.52	100
OSI-104-b	ASCAT 12.5km Coastal Wind (Metop-B)	100	100	100	100	98.34	100
OSI-102	ASCAT 25km Wind (Metop-A)	100	100	100	100	99.05	100
OSI-104	ASCAT 12.5km Coastal Wind (Metop-A)	99.97	100	100	99.54	97.64	100
OSI-201	Global Sea Surface Temperature (Metop-A)	100	100	100	100	100	100
OSI-202	NAR Sea Surface Temperature (Metop-A)	100	100	100	100	100	100
OSI-301	AHL Downward Longwave Irradiance (Multi Mission)	100	100	100	100	100	100
OSI-407	Global Sea Ice Drift (Multi Mission)	100	100	40	0	0	0
OSI-402(-a)	Global Sea Ice Edge (Multi Mission)	100	100	100	100	100	100
OSI-403(-a)	Global Sea Ice Type (Multi Mission)	100	100	100	100	100	100
OSI-302	AHL Surface Solar Irradiance (Multi Mission)	100	100	100	100	100	100
OSI-203	AHL Sea Surface Temperature (Multi Mission)	100	100	100	100	100	100
OSI-303	Daily Downward Longwave Irradiance (MSG)	100	100	100	100	100	100
OSI-304	Daily Surface Solar Irradiance (MSG)	100	100	100	100	100	100
OSI-303	Hourly Downward Longwave Irradiance (MSG)	99.59	99.05	100	100	99.86	100
OSI-304	Hourly Surface Solar Irradiance (MSG)	99.59	99.05	100	100	99.86	100
OSI-206	Hourly Sea Surface Temperature (MSG)	97.98	100	100	100	99.16	100
OSI-202	NAR Sea Surface Temperature (NPP)	100	100	98.33	100	100	100

**table 40 : Percentage of received OSI SAF products in EDC in 2nd half 2015.**

#### Comments :

MGR SST (OSI-204) is not ingested in EDC and is not planned to.

IASI SST (OSI-208) is not yet ingested in EDC : waiting for informations from EDC team on how to implement the ingestion of the IASI SST (OSI-CDOP2- SG06-11 and OSI-CDOP2-SG07-23).

Following products are not yet ingested in EDC, their ingestion should begin in early 2016 :

- RapidScat 25km winds (OSI-109-c),
- RapidScat 50km winds (OSI-109-d),
- Sea ice emissivity (OSI-404),
- Low resolution sea ice drift (OSI-405),
- Medium resolution sea ice drift (OSI-407).

Following data records have been ingested in EDC : Reprocessed SeaWinds L2 25 km winds (OSI-151-a), Reprocessed SeaWinds L2 50 km winds (OSI-151-b).

Global reprocessed Sea Ice Concentration (Datarecord) (OSI-409-a) ingestion should be done in 2016.



## 7 Training

Webinar on RapidScat winds, 16 September 2015, online meeting, 15:00-17:30;  
Provided by Ad Stoffelen

EUMETCAL “2nd EUMeTrain Marine Satellite Course”.

This Sept.-Dec. 2015 course has been developed by experts of the EUMeTrain project in collaboration with Eumetcal, external experts (i.a., Ad Stoffelen) and EUMETSAT;

## 8 Documentation update

The following tables 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](http://www.osi-saf.org)).

Top-level documentation :

Name of the document	-	Reference	Latest version	date
OSI SAF CDOP-2 Half-yearly operations report 2015 1st half	HYR15-H1	SAF/OSI/CDOP2/M-F/TEC/RP/335	1.0	Sep. 2015
OSI SAF CDOP-2 Status Report n°8	SR08	SAF/OSI/CDOP2/M-F/TEC/RP/2-018	1.0	Oct. 2015
OSI SAF CDOP2 Master Schedule	MSch	SAF/OSI/CDOP2/M-F/MGT/PL/2-007	1.5	Oct. 2015
Minutes of OSI SAF Operation Review 11	OR11	EUM/TSS/REP/15/830806	1	Nov. 2015
Minutes of OSI SAF PMR 2015	PMR2015	EUM/PRS/REP/15/830982	1	Nov. 2015
OSI SAF CDOP-2 Half-yearly operations report 2014 2nd half	HYR14-H2	SAF/OSI/CDOP2/M-F/TEC/RP/334	1.1	Nov. 2015
OSI SAF CDOP-2 Half-yearly operations report 2015 1st half	HYR15-H1	SAF/OSI/CDOP2/M-F/TEC/RP/335	1.1	Nov. 2015
Minutes of 8th CDOP2 Steering Group meeting	SG08	SAF/OSI/CDOP2/M-F/MGT/RP/2-108	1.0	Nov. 2015
OSI SAF CDOP2 Master Schedule	MSch	SAF/OSI/CDOP2/M-F/MGT/PL/2-007	1.6	Nov. 2015
OSI SAF CDOP2 Project Plan	PP	SAF/OSI/CDOP2/M-F/MGT/PL/2-005	1.4	Nov. 2015
OSI SAF CDOP2 Service Specification Document	SeSp	SAF/OSI/CDOP2/M-F/MGT/PL/2-003	2.6	Nov. 2015
OSI SAF CDOP2 Product Requirements Document	PRD	SAF/OSI/CDOP2/M-F/MGT/PL/2-007	3.3	Nov. 2015

**table 41 : Top-level documentation updates**

Sub-systems documentation :

Name of the document	-	Reference	Latest version	date
Reprocessed MSG/SEVIRI SST RR justification of requirements	TN	SAF/OSI/CDOP2/M-F/TEC/TN/230	1.0	Jun. 2015
MSG/SEVIRI SST : Data Set Generation Capability Description Document	DSGCDD	SAF/OSI/CDOP2/M-F/TEC/TN/231	1.0	Jun. 2015
Global Sea Ice Concentration PUM (OSI-409, OSI-409-a, OSI-430)	ATBD	SAF/OSI/CDOP/MET/TEC/MA/138	2.1	Jul. 2015
Global Sea Ice Concentration PUM (OSI-409, OSI-409-a, OSI-430)	ATBD	SAF/OSI/CDOP/MET/TEC/MA/138	2.2	Aug. 2015
Validation data for surface radiative fluxes (OSI-301, OSI-302)	VR	SAF/OSI/CDOP2/MET/SCI/RP/232	1.0	Oct. 2015
Global SIC Climate Data Record (OSI-450) System Requirement Document	TN	SAF/OSI/CDOP2/MET/TEC/TN/233	1.0	Nov. 2015
Validation report for OSI SAF Metop/AVHRR SST (OSI-201-b, OSI-202-b and OSI-204-b)	RP	SAF/OSI/CDOP2/MF/SCI/RP/234	1.0	Nov. 2015
Low Earth Orbiter Sea Surface Temperature Product User Manual (OSI-201-b, OSI-202-b, OSI-204-b, OSI-208-b)	RP	SAF/OSI/CDOP2/MF/SCI/RP/234	3.0	Nov. 2015
ASCAT L2 winds data record Product User Manual (OSI-150)	MA	SAF/OSI/CDOP2/KNMI/TEC/MA/238	1.0	Nov. 2015
ASCAT L2 winds data record validation report (OSI-150)	VR	SAF/OSI/CDOP2/KNMI/TEC/RP/239	1.0	Nov. 2015
New LEO processing chain Regression Test Report (OSI-201-b, OSI-202-b, OSI-204-b, OSI-208-b)	RP	SAF/OSI/CDOP2/MF/TEC/RP/240	1.0	Nov. 2015
Global Sea Ice Concentration Datarecord Justifications of Requirements OSI-450	TN	SAF/OSI/CDOP2/DMI/TEC/TN/241	1.0	Nov. 2015
NHL L3 SST/IST Justification of Requirements OSI-203-a	TN	SAF/OSI/CDOP2/MET/TEC/TN/245	1.0	Nov. 2015
High Latitudes L2 Sea and Sea Ice Surface Temperature Product User Manual	PUM	SAF/OSI/CDOP2/DMI/TEC/MA/246	1.0	Dec. 2015
High Latitudes L2 Sea and Sea Ice Surface Temperature Validation Report	SVR	SAF/OSI/CDOP2/DMI/SCI/RP/247	1.0	Dec. 2015
OSI SAF AMSR-2 Sea Ice Concentration (OSI-408) Algorithm Theoretical Basis Document	ATBD	SAF/OSI/CDOP2/DMI/SCI/MA/248	1.0	Dec. 2015
Low Resolution Sea Ice Drift ATBD (OSI-405-c)	ATBD	SAF/OSI/CDOP/MET/SCI/MA/130	1.2	Dec. 2015
Global Sea Ice Edge and Type ATBD (OSI-402-c, OSI-403-c)	ATBD	SAF/OSI/CDOP2/MET/SCI/MA/208	2.0	Dec. 2015

table 42 : Sub-systems documentation updates