EUMETSAT Satellite Application Facility on Land Surface Analysis

Operations Semester Report

2014/S1

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Version 1.1	2014/10/08	Modified according to the outcome of OR8

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1. Introduction

1.1. Purpose

The purpose of the present document is to provide a summary of the operational performance of LSA SAF services during the first semester of 2014 (from 1st of January to the 30th of June). The services include the generation and dissemination of MSG based products and the helpdesk activities.

Intended readers of this report are the EUMETSAT Secretariat, Operations and SAF network teams, the Review Board, the Steering Group, the Project Team, and also the LSA SAF users.

1.2. Reporting Period

The present report covers the first six months of 2014 (from 1st January to 30th June). All the tables, graphics and conclusions in the following sections only refer to this period unless a different period is stated explicitly.

1.3. Document organisation

This document is organised as follows:

- The present section describes the purpose of the document and the reporting period and includes a list of acronyms and abbreviations referenced throughout this document;
- The **Executive Summary** is provided in Section 2;
- Section 3 describes the operational performance of the LSA SAF system in what respects to MSG products generation. Here the performance of both production and dissemination is assessed;
- Section 4 is dedicated to describe the new products or new versions of pre-existing algorithms that were integrated in the LSA SAF system during the reporting period;
- The status of user services provided by LSA SAF is described in Section 5. Here the helpdesk activities are also presented;
- In Section 7 an overview on the Quality of LSA SAF products is provided.

1.4. Definitions, acronyms and abbreviations

AL	Surface ALbedo
MTAL	MSG Ten Day Surface ALbedo
BRDF	Bi-directional Reflectance Distribution Function
CDOP	Continuous Development and Operation Phase
DB	DataBase
DIDSLF	Daily Downward Surface Shortwave Flux
DIDSSF	Daily Downward Surface Longwave Flux
DMET	Daily Evapotranspiration
DM	Dissemination Manager
DSSF	Downwelling Surface Shortwave Flux
DSLF	Downwelling Surface Longwave Flux
ECMWF	European Centre for Medium-Range Weather Forecasts
EUMETCast	EUMETSAT multi-service dissemination service system
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
Euro	Europe
EPS	EUMETSAT Polar System
FAPAR	Fraction of Absorbed Photosynthetic Active Radiation
FRM	Fire Risk Map
FRPPIXEL	Fire Radiative Power - PIXEL
FRPGRID	Fire Radiative Power - GRID
FTP	File Transfer Protocol
FVC	Fraction of Vegetation Cover
GEO	GEOstationary
HTTP	Hyper Text Transfer Protocol
IM	Instituto de Meteorologia (Portuguese Meteorological Institute)
IPMA	Instituto Português do Mar e da Atmosfera (Portuguese Meteorological Institute)
LAI	Leaf Area Index
LSA SAF	Satellite Application Facility for Land Surface Analysis
LST	Land Surface Temperature
MSG	METEOSAT Second Generation
MTG	METEOSAT Third Generation
N/A	Not Applicable or Not Available
NAfr	North Africa
NRT	Near Real Time
NWC	SAF Nowcasting
OSR	Operational Semester Report
PDU	Product Dissemination Unit
QMD	Quality Monitoring Daily
QMM	Quality Monitoring Monthly
RFM	Fire Risk Map
S1	First Semester
S2	Second Semester
SAF	Satellite Application Facility
SAFMIL	LSA SAF FTP server (safmil.ipma.pt)
SAfr	South Africa
SAme	South America
SC	Snow Cover
SEVIRI	Scanning Enhanced Visible and InfraRed Imager
TSP	Thermal Surface Parameter
UMARF	Unified Meteorological Archive & Retrieval Facility
VEGA	Vegetation
Web	World Wide Web
WWW	World Wide Web

2. Executive summary

During the first semester of 2014 more than 99% of raw data were successfully received and prepared by the LSA SAF system to be used by the MSG based pre-operational and operational products.

The monthly performance of MSG products generation was above 95% for all products with the exception of MTAL. Despite the adjustments made in the processing chain during the reporting period, which have led to a gradual increase in performance, MTAL generation was still not satisfactory (below 90%).

The months with poorer overall production performance were February (98%) and June (97%). The latter case was caused by a human failure after the annual re-scheduling of the MSG system. The former was due to a software failure that affected a pre-processing component and therefore all the downstream products. This failure has also impacted the system component responsible for the dissemination procedures. As such the dissemination was affected, with a negative impact on the dissemination performance in February (around 92%).

During the reporting period 108 new users have registered in the LSA SAF page. At the end of June the number of EUMETCast users interested in LSA SAF products reaches 1044. During the same period the helpdesk team has answered to 81 users that made 115 queries to report problems, to ask for details about products format and content and also requesting data not available for direct download in the webpage. The users received a first answer within 1 working day in 95% of the cases.

A general verification of processed pixels and products values is presented in the last section of this report. The aim of this product monitoring is to ensure that the statistical distribution of generated products is roughly within that expected per geographical area/month.

3. MSG System

3.1. Input Data Pre-Processing

This section reports the performance of MSG pre-processing components of the LSA SAF system. It should be noticed that the lack of input data for reasons beyond LSA SAF, including possible outages on ECMWF and/or on EUMETSAT images distribution, are also reflected in the reported values.

The figures and tables represent the availability of the pre-processed data to be used as input by the internal, pre-operational and operational LSA SAF products. This includes the preparation of raw data received from different sources by the LSA SAF MSG system: i) SAF NWC software (version 2012), ii) ECMWF forecasts from operational model and iii) MSG/SEVIRI images (from EUMETCast).

Table 1 provides the monthly overview of the scheduled and actually generated pre-processing tasks. The overall success rate of each pre-processing component was 99% - far above the threshold of 95%, as can easily be observed in Figure 1.

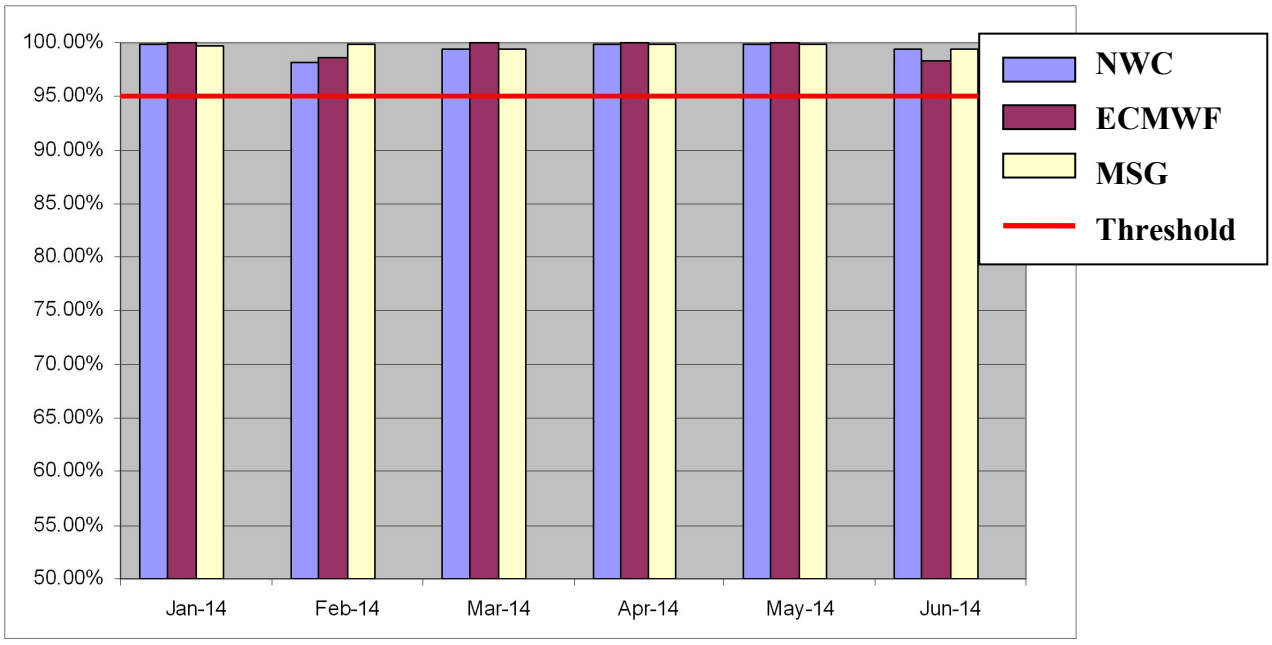

Figure 1 – Monthly performance of pre-processing packages. Red line indicates the threshold for operational production.

	January 2014			February 2014			March 2014		
	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)
NWC	11,904	11,880	99.8%	10,752	10,551	98.1%	11,904	11,827	99.3%
ECMWF	248	248	100.0%	224	221	98.7%	248	248	100.0%
MSG	11,904	11,875	99.8%	10,752	10,740	99.9%	11,904	11,828	99.4%
Total	**24,056**	**24,003**	**99.8%**	**21,728**	**21,512**	**99.0%**	**24,056**	**23,903**	**99.4%**

	April 2014			May 2014			June 2014		
	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)
NWC	11,520	11,509	99.9%	11,904	11,886	99.8%	11,520	11,453	99.4%
ECMWF	240	240	100.0%	248	248	100.0%	240	236	98.3%
MSG	11,520	11,509	99.9%	11,904	11,881	99.8%	11,520	11,450	99.4%
Total	**23,280**	**23,258**	**99.9%**	**24,056**	**24,015**	**99.8%**	**23,280**	**23,139**	**99.4%**

Table 1 – Monthly overview of scheduled and generated pre-processing tasks.

3.2. Products Processing

This section reports the daily performance of MSG production during the period under analysis. The monthly performance of MSG production detailed by product and by the geographical area for which the LSA SAF products are generated are presented in the sub-sections 3.2.1 and 3.2.2, respectively.

Figure 2 presents an overview of the number of scheduled and successfully generated products per day. The enumerated boxes identify the main events that had a negative impact in the production. Such events are described in Table 3.

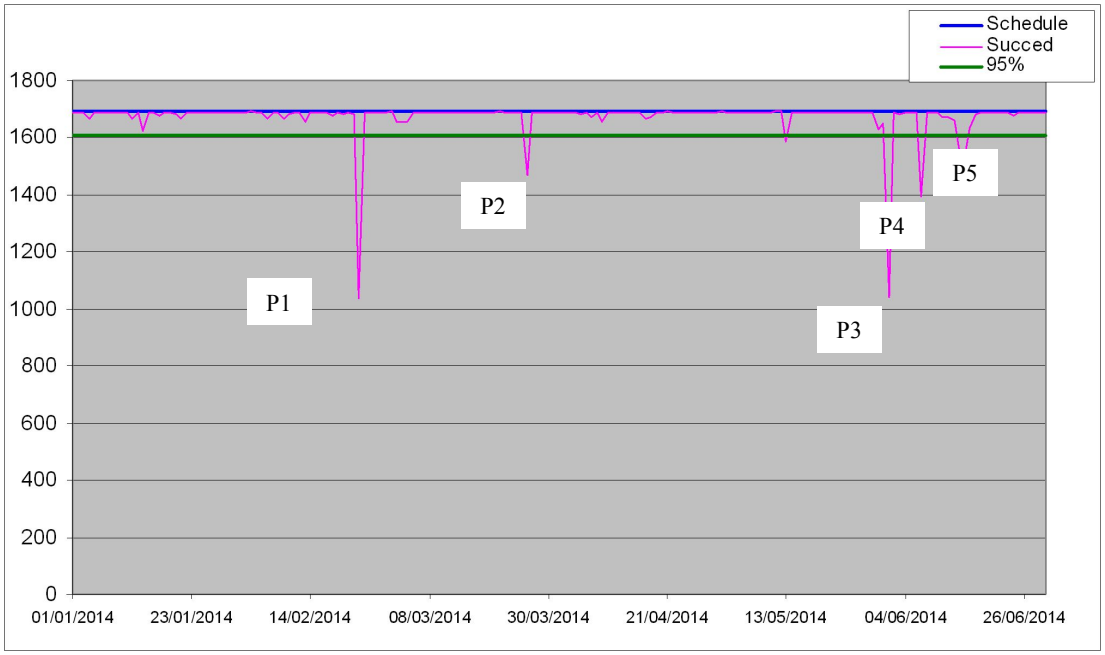

Figure 2 – Number of scheduled (blue) and successfully (pink) generated products per day. Significant production failures are identified with enumerated boxes.

Event	Date	Description	Action	Status
P1	23/02/2014	**Software failure**: the ARDRP pre-processing component has crashed affecting production of all the downstream products.	Reset of the component	Close
P2	26/03/2014	**Missing input data**: due to MSG service interruption.	N/A	Close
P3	01/06/2014	**Human failure**: Most of the system components were not successfully updated after annual re-schedule affecting the production of most of the products during part of the day.	Components updated	Close
P4	07/06/2014	**Hardware failure**: Electric power supply broke down	Hardware replaced	Close
P5	15/06/2014	**Human failure**: mistakes in the schedule file (after annual re-schedule) affected the production of some products, namely FRP-NAfr & ET-Euro.	Schedule file corrected	Close

Table 2 – Main events that impacted the production (identified in the Figure 2).

3.2.1. Monthly Performance - detailed by product

Table 3 shows the monthly performance of operational and pre-operational products generation. The overall performance was above 95% for all products with the exception of MTAL which presented the poorer performance among all MSG products.

The cause of the lower performance of MTAL was twofold:

- an incorrect load management, i.e., the products were being processed in machines that was not adequate (low memory or too many simultaneous processes) to this very demanding algorithm;

- a tight system schedule which prevented the processes to end properly before reach the latest end time.

Adjustments have been made to the schedule of MTAL product, and also to the system load management, to minimize the failures leading to a gradual increase on the performance during the reporting period.

	January 2014			February 2014			March 2014		
	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)
AL	124	124	100.0%	112	112	100.0%	124	124	100.0%
LST	11,904	11,872	99.7%	10,752	10,541	98.0%	11,904	11,827	99.3%
DSLF	5,952	5,937	99.7%	5,376	5,274	98.1%	5,952	5,916	99.4%
DSSF	5,952	5,929	99.6%	5,376	5,274	98.1%	5,952	5,916	99.4%
SC	124	121	97.6%	112	111	99.1%	124	124	100.0%
VEGA	372	372	100.0%	336	336	100.0%	372	372	100.0%
ET	5,952	5,929	99.6%	5,376	5,274	98.1%	5,952	5,916	99.4%
FRPPIXEL	11,904	11,872	99.7%	10,752	10,547	98.1%	11,904	11,827	99.3%
FRPGRID	744	734	98.7%	672	637	94.8%	744	737	99.1%
FDeM	8,928	8,905	99.7%	8,064	8,058	99.9%	8,928	8,871	99.4%
DIDSSF	124	124	100.0%	112	112	100.0%	124	124	100.0%
DIDSLF	124	122	98.4%	112	108	96.4%	124	124	100.0%
DMET	124	124	100.0%	112	112	100.0%	124	124	100.0%
FRM	93	93	100.0%	84	79	94.0%	93	93	100.0%
MTAL	120	0	0.0%	120	40	33.3%	120	50	41.7%
Totals	52,541	52,258	99.5%	47,468	46,615	98.2%	52,541	52,145	99.2%

	April 2014			May 2014			June 2014		
	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)
AL	120	119	99.17%	124	122	98.39%	120	118	98.33%
LST	11,520	11,501	99.84%	11,904	11,877	99.77%	11,520	11,254	97.69%
DSLF	5,760	5,755	99.91%	5,952	5,943	99.85%	5,760	5,681	98.63%
DSSF	5,760	5,753	99.88%	5,952	5,911	99.31%	5,760	5,632	97.78%
SC	120	118	98.33%	124	121	97.58%	120	117	97.50%
VEGA	360	357	99.17%	372	366	98.39%	360	354	98.33%
ET	5,760	5,739	99.64%	5,952	5,903	99.18%	5,760	5,533	96.06%
FRPPIXEL	11,520	11,496	99.79%	11,904	11,869	99.71%	11,520	11,070	96.09%
FRPGRID	720	716	99.44%	744	739	99.33%	720	703	97.64%
FDeM	8,640	8,630	99.88%	8,928	8,907	99.76%	8,640	8,439	97.67%
DIDSSF	120	120	100.00%	124	120	96.77%	120	120	100.00%
DIDSLF	120	119	99.17%	124	118	95.16%	120	120	100.00%
DMET	120	120	100.00%	124	120	96.77%	120	120	100.00%
FRM	90	90	100.00%	93	93	100.00%	90	89	98.89%
MTAL	120	80	66.67%	120	110	91.67%	120	80	66.67%
Totals	50,850	50,713	99.73%	52,541	52,319	99.58%	50,850	49,430	97.21%

Table 3 - Monthly performance of operational and pre-operational products generation.

3.2.2. Monthly Performance - detailed by geographical area

Table 4 shows the monthly performance of product generation separated by geographical area. A homogeneous performance above 95% was achieved for all the areas. The production for NAfr area during June showed the poorer performance mainly due to the production break of two products (FRP & ET) during the event identified as P5 in Table 2.

	January 2014			February 2014			March 2014		
	Scheduled	Actually generated	Success Rate	Scheduled	Actually generated	Success Rate	Scheduled	Actually generated	Success Rate
Europe	13,674	13,630	99.7%	12,351	12,113	98.1%	13,674	13,585	99.3%
North Africa	13,581	13,537	99.7%	12,267	12,033	98.1%	13,581	13,494	99.4%
South Africa	13,581	13,536	99.7%	12,267	12,248	99.9%	13,581	13,494	99.4%
South America	10,605	10,569	99.7%	9,579	9,320	97.3%	10,605	10,537	99.4%
Totals	**51,429**	**51,272**	**99.7%**	**46,464**	**45,714**	**98.4%**	**51,429**	**51,110**	**99.4%**

	April 2014			May 2014			June 2014		
	Scheduled	Actually generated	Success Rate	Scheduled	Actually generated	Success Rate	Scheduled	Actually generated	Success Rate
Europe	13,233	13,223	99.9%	13,674	13,642	99.8%	13,233	12,907	97.5%
North Africa	13,143	13,130	99.9%	13,581	13,541	99.7%	13,233	12,608	95.3%
South Africa	13,143	13,086	99.6%	13,581	13,516	99.5%	13,143	12,861	97.8%
South America	10,263	10,243	99.8%	10,605	10,547	99.4%	10,263	10,045	97.9%
Totals	**49,782**	**49,682**	**99.8%**	**51,441**	**51,246**	**99.6%**	**49,872**	**48,421**	**97.1%**

Table 4 - Monthly performance of the generation of operational and pre-operational products detailed by geographical area.

3.3. Products Dissemination

This section is dedicated to describe the dissemination performance of the LSA SAF products during the period under analysis. The main constrains to the dissemination are also presented here. The monthly performance of MSG dissemination mean and by product are presented in the sub-sections 3.3.1 and 3.3.2, respectively.

Figure 3 shows the temporal evolution of the end-to-end Eumetcast dissemination over the period under analysis. The blue and pink lines show the scheduled and actually disseminated products, respectively. The main reasons for the decrease on the dissemination performance are linked with the production failures enumerated before (Figure 2 and Table 2). Though, during the same period other events affected exclusively the dissemination. Those are identified by the enumerated boxes in Figure 3 and explained in Table 5.

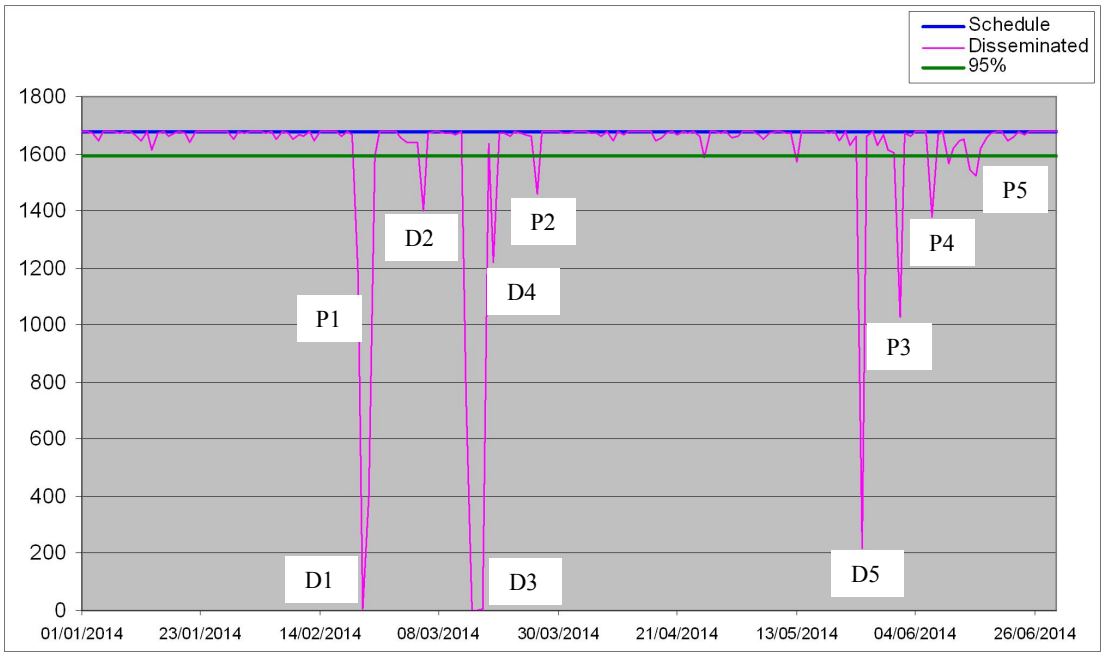

Figure 3 – Number of scheduled (blue) and successfully (pink) disseminated products per day through EUMETCast.

Event	Date	Description	Action	Status
D1	22/02/2014	**Software failure**: the RM component has crashed affecting the dissemination	Component reset	Close
D2	05/03/2014	**Maintenance**: Migration of LSA SAF EUMETCast data delivery	N/A	Close
D3 & D4	14/03/2014 to 16/03/2014 & 18/03/2014	**Maintenance**: Non-critical hardware, such as the one responsible to the dissemination monitoring, was switched off during the building works at IPMA's facilities. During this period the dissemination was not affected.	N/A	Close
D5	25/05/2014	**Hardware/Software failure**: A Filesystem used by the dissemination procedure has reached the full capacity.	Filesystem cleaned up and automatic clean process reactivated.	Close

Table 5 – Main events that impacted the product dissemination (identified in the Figure 3).

3.3.1. Dissemination Performance - detailed by dissemination type

The possibility of users to search for and download LSA SAF products through EUMETSAT Data Centre (former UMARF) remains unavailable due to a mismatch between the LSA SAF products DB and the EUMETSAT Data Centre catalogue – about 20% of the generated products are missing from the catalogue. The ingestion of the missing metadata is foreseen for the second half of 2014. Once the catalogues become synchronised the LSA SAF products from 2009 to the present will again be available to the users.

Table 6 presents the product dissemination performance detailed by dissemination type:

- EUMETCast (NRT) - corresponding to end-to-end dissemination,
- Web (user requests through the webpage catalogue),
- SAFMIL (NRT FTP server),
- EUMETSAT Data Centre and
- regular users (NRT direct dissemination to user servers).

Note that not all the LSA SAF products are meant to be disseminated via EUMETCast, thus the number of products scheduled to be disseminated is less than the number of products scheduled to be processed.

	January 2014			February 2014			March 2014		
	Scheduled	Actually disseminated	Success Rate	Scheduled	Actually disseminated	Success Rate	Scheduled	Actually disseminated	Success Rate
EUMETCast	51,956	51,718	99.5%	46,928	43,253	92.2%	51,956	44,832	*86.3%**
Web	50,948	50,948	100%	66,810	66,810	100%	90,172	90,074	99.9%
SAFMIL**	0	0	0.0%	0	0	0.0%	0	0	0.0%
EUMETSAT Data Centre	0	0	0.0%	0	0	0.0%	0	0	0.0%
Regular users	90.657	83.705	92,3%	84.033	82.392	98,1%	92.184	90.465	98,1%
TOTAL	-	-	-	-	-	-	-	-	-

	April 2014			May 2014			June 2014		
	Scheduled	Actually disseminated	Success Rate	Scheduled	Actually disseminated	Success Rate	Scheduled	Actually disseminated	Success Rate
EUMETCast	50,280	50,050	99.5%	51,956	50,021	96.3%	50,280	48,659	96.8%
Web	122,344	122,344	100%	125,350	124,340	99.2%	19,541	19,541	100%
SAFMIL**	0	0	0.0%	0	0	0.0%	0	0	0.0%
EUMETSAT Data Centre	0	0	0.0%	0	0	0.0%	0	0	0.0%
Regular users	90.622	89.004	98,2%	76.691	70.830	92,4%	69.962	69.788	99,8%
TOTAL	-	-	-	-	-	-	-	-	-

* The value reflects the absence of monitoring during part of the month – not the dissemination itself
** Dissemination monitoring not available

Table 6 – Monthly performance of the dissemination of operational and pre-operational products detailed by dissemination type.

The dissemination to the dedicated LSA SAF FTP server (SAFMIL) was removed from the core system. An independent process is now responsible for transferring not only the end products but also internal products and pre-processed data – what has been requested by beta-users and project team members. This process is not yet being monitored and as such the respective statistics are also not available, explaining the null values in Table 6.

As explained before the users were not able to make requests of LSA SAF products via EUMETSAT Data Centre thus the scheduled dissemination requests were null during the period under analysis as stated in the Table 6.

3.3.2. Dissemination Performance - detailed by product

Table 7 that presents the monthly dissemination performance detailed by product, shows that the overall performance was above the threshold of 95% for all the disseminated products. The exceptions are observed in the table columns for February and March. The first corresponding to an effective decrease on both production and dissemination (see events D1 in Table 5 & P1 in Table 2) and the second corresponding to a period in which only the monitoring of the dissemination was not being done (see event D3 & D4 in Table 5) but the dissemination was not affected.

	January 2014			February 2014			March 2014		
	Scheduled	Actually	Success	Scheduled	Actually	Success	Scheduled	Actually	Success
AL	124	124	100.0%	112	100	89.3%	124	100	*80.6%**
LST	11,904	11,851	99.6%	10,752	9,954	92.6%	11,904	10,259	*86.2%**
DSLF	5,952	5,929	99.6%	5,376	4,958	92.2%	5,952	5,172	*86.9%**
DSSF	5,952	5,924	99.5%	5,376	4,955	92.2%	5,952	5,172	*86.9%**
SC	124	121	97.6%	112	99	88.4%	124	100	*80.6%**
VEGA	372	372	100.0%	336	300	89.3%	372	300	*80.6%**
ET	5,952	5,917	99.4%	5,376	4,956	92.2%	5,952	5,114	*85.9%**
FRPPIXEL	11,904	11,857	99.6%	10,752	9,909	92.2%	11,904	10,271	*86.3%**
FRPGRID	744	732	98.4%	672	591	87.9%	744	637	*85.6%**
FDeM	8,928	8,891	99.6%	8,064	7,431	92.1%	8,928	7,707	*86.3%**
Total	**51,956**	**51,718**	**99.5%**	**46,928**	**43,253**	**92.1%**	**51,956**	**44,832**	***86.3%****

	April 2014			May 2014			June 2014		
	Scheduled	Actually	Success	Scheduled	Actually	Success	Scheduled	Actually	Success
AL	120	116	96.7%	124	121	97.6%	120	117	97.5%
LST	11,520	11,476	99.6%	11,904	11,476	96.4%	11,520	11,200	97.2%
DSLF	5,760	5,743	99.7%	5,952	5,745	96.5%	5,760	5,660	98.3%
DSSF	5,760	5,739	99.6%	5,952	5,716	96.0%	5,760	5,596	97.1%
SC	120	117	97.5%	124	117	94.3%	120	115	95.8%
VEGA	360	344	95.6%	372	348	93.5%	360	351	97.5%
ET	5,760	5,722	99.3%	5,952	5,703	95.8%	5,760	5,497	95.4%
FRPPIXEL	11,520	11,464	99.5%	11,904	11,465	96.3%	11,520	11,011	95.6%
FRPGRID	720	714	99.2%	744	711	95.6%	720	701	97.4%
FDeM	8,640	8,615	99.7%	8,928	8,619	96.5%	8,640	8,411	97.3%
Total	**50,280**	**50,050**	**99.5%**	**51,956**	**50,021**	**96.3%**	**50,280**	**48,659**	**96.8%**

* The values reflect the absence of monitoring – not the dissemination itself

Table 7 – Monthly performance of the EUMETCast dissemination of operational and pre-operational products detailed by product.

4. Algorithms Versioning

During the period under analysis none of the algorithms were updated nor were new products added to the operational system. As such the algorithms version information remains the same as in the last Operations report and was not included in the present document.

5. User Services

This section shows the evolution on the number of users registered in the LSA SAF web page and on the EUMETCast service.

The status of the helpdesk activities is also presented here.

5.1. Webpage Registered Users

The following figure shows the evolution on the number of LSA SAF web site users during 12 months (from Jul/2013 to Jun/2014). The total number of registered users at the end of the 1st semester of 2014 was 1620.

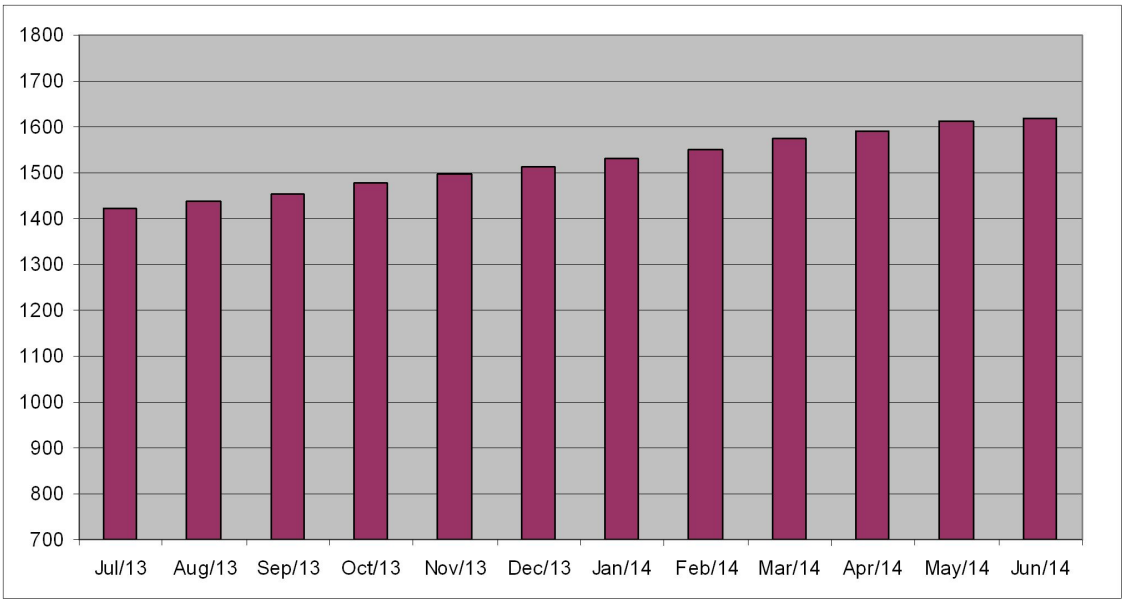

Figure 4 – LSA SAF Registered Users.

5.2. EUMETCast Registerd Users

The chart below shows the distribution of EUMETCast users by country. The group “Countries with less then 8 users” comprises the following countries:

Armenia (1);Bahrain (1);Belarus (1);Bolivia,PlurinationalStateOf (1);BosniaAndHerzegovina (1);Chile (1);Colombia (1);CostaRica (1);Croatia (1);Cyprus (1);DominicanRepublic (1);Ecuador (1);ElSalvador (1);Guatemala (1);Haiti (1);Honduras (1);Iceland (1);India (1);IsleOfMan (1);Jordan (1);Kuwait (1);Kyrgyzstan (1);Latvia (1);LibyanArabJamahiriya (1);Lithuania (1);Luxembourg (1);Macedonia,TheFormerYugoslavRepublicOf (1);Martinique (1);Mexico (1);Moldova,RepublicOf (1);Nicaragua (1);Oman (1);Panama (1);Paraguay (1);Reunion (1);SanMarino (1);Slovenia (1);Somalia (1);SyrianArabRepublic (1);Tajikistan (1);Turkmenistan (1);Uruguay (1);Uzbekistan (1);Venezuela,BolivarianRepublicOf (1);VietNam

(1);Yemen (1);Benin (2);Bulgaria (2);Burundi (2);Cameroon (2);Canada (2);CapeVerde (2);CentralAfricanRepublic (2);China (2);Comoros (2);Congo (2);Cuba (2);Djibouti (2);EquatorialGuinea (2);Estonia (2);Gabon (2);Gambia (2);Guinea (2);Guinea-Bissau (2);Lebanon (2);Liberia (2);Malta (2);Mauritania (2);Peru (2);Qatar (2);SaoTomeAndPrincipe (2);Seychelles (2);SierraLeone (2);Togo (2);Ukraine (2);Angola (3);BurkinaFaso (3);Chad (3);Egypt (3);Eritrea (3);Iran,IslamicRepublicOf (3);Iraq (3);Kazakhstan (3);Lesotho (3);Madagascar (3);Malawi (3);Mali (3);Norway (3);SaudiArabia (3);Serbia (3);Swaziland (3);Sweden (3);Tunisia (3);Zambia (3);Algeria (4);Congo,TheDemocraticRepublicOfThe (4);Finland (4);Romania (4);Slovakia (4);Sudan (4);Turkey (4);Uganda (4);UnitedArabEmirates (4);Albania (5);Argentina (5);Botswana (5);CoteD'Ivoire (5);Denmark (5);Ghana (5);Morocco (5);Mozambique (5);Nigeria (5);Portugal (5);Rwanda (5);Tanzania,UnitedRepublicOf (5);Zimbabwe (5);Ireland (6);Israel (6);Namibia (6);Niger (6);Senegal (6);Hungary (7);Mauritius (7);RussianFederation (7);

The number in brackets indicates the number of users of that country.

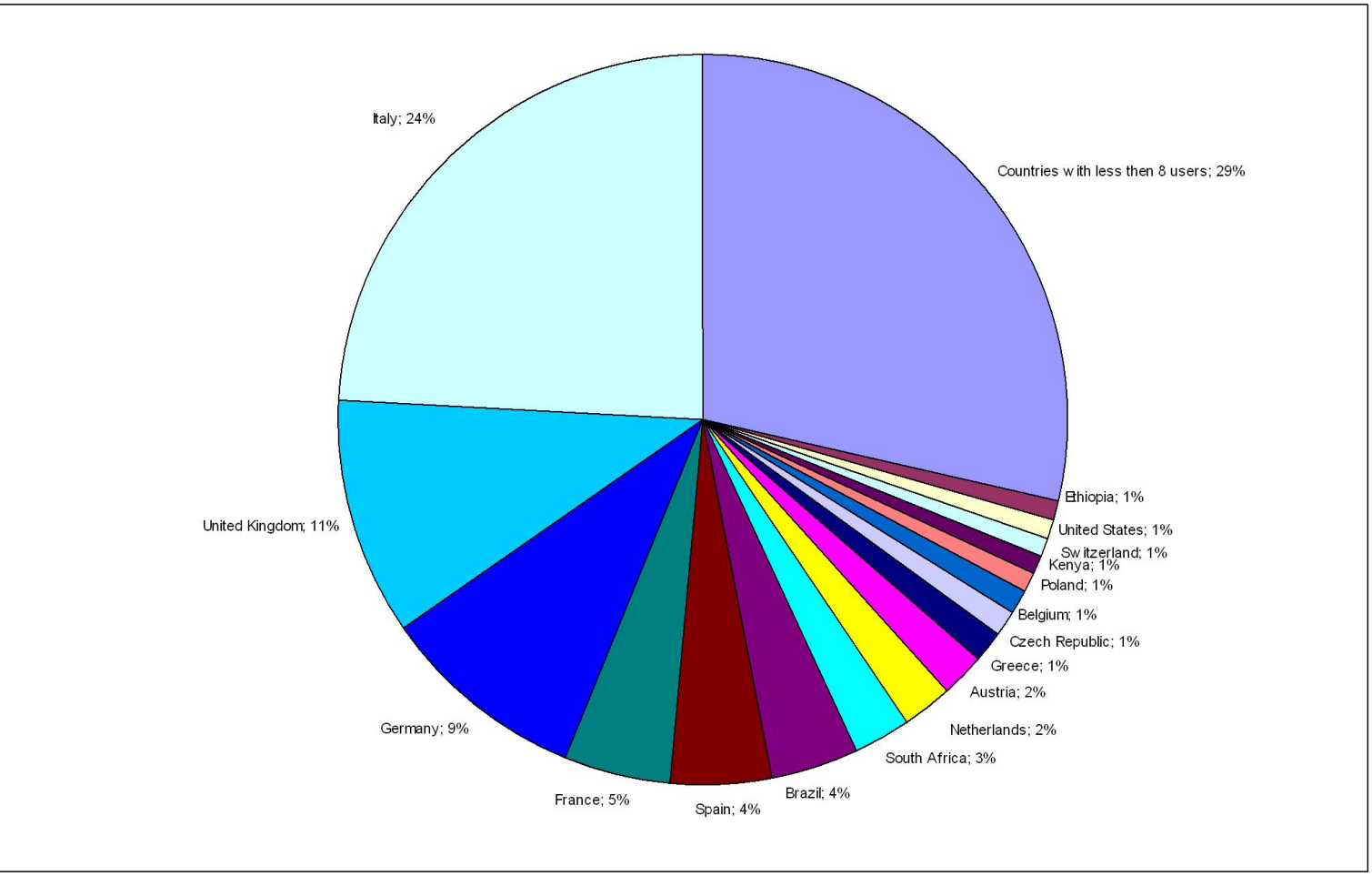

Figure 5 – EUMETCast Users by Country

The total number of EUMETCast users interested in LSA SAF products is 1044.

5.3. Helpdesk

The user help-desk service is based on a direct contact via e-mail with LSA SAF team available during working hours.

During the 1st semester of 2014, 81 users made 115 queries to the Helpdesk namely:

(i) 16 reports of problems related with the LSA SAF website and FTP server (FTP, password, logins, etc);

(ii) 75 requests of data that exceeded the threshold volume for web site dissemination or that were unavailable;

(iii) 24 questions on data availability, data format, science and tools for manipulation and visualization of data.

The products prior to 2009 are still not available in an on-line archive leading to a delay on the dissemination of the LSA SAF offline products.

The average time of first response to the users, in 95% of the cases, was 1 working day. The average time for closing a ticket was 12 working days.

6. Quality monitoring of LSA SAF MSG products

6.1. Main characteristics

The quality monitoring algorithm is common to all LSA SAF products and follows the scheme given in Figure 6. It is based on the analysis of daily and monthly product histograms taking into consideration missing slots and non-processed pixels.

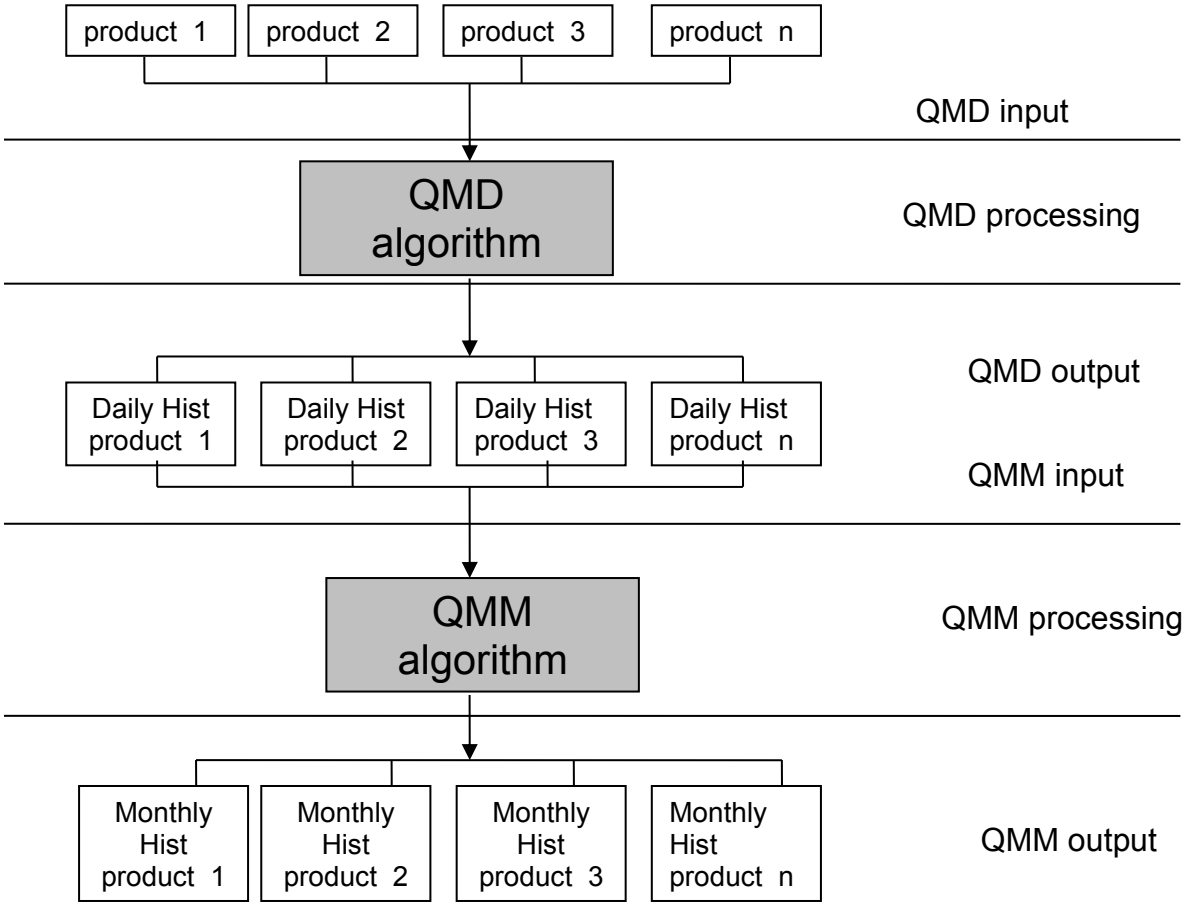

Figure 6 – Diagram of quality monitoring processing. QMD and QMM stands for Daily and Monthly Quality Monitoring, respectively

Daily ASCII files are produced with information that can be used to monitor the algorithm performance. Each file has the following information:

- area name,
- total number of processed land pixels,
- total number of missing values (that are not sea or out of disk values),
- total number of possible daily slots,
- total number of daily slots used
- centre of histogram bins

- absolute frequency of the product per bin

For each product and for each of the LSA SAF production areas, monthly syntheses are regularly produced from daily files. The monthly and daily histograms allow the monitoring of several statistics such as those presented below.

In the next sections the July 2013 to June 2014 monthly distributions of percentiles 5, 25, 50, 75 and 95 are presented for each product in the four LSA SAF production areas. Further information (other periods and product quality indicators/error bars) are also available in the LSA SAF webpage: https://LSA SAF.ipma.pt/products/prods.jsp; chose "Quality Monitoring" under any specified product.

6.2. LST

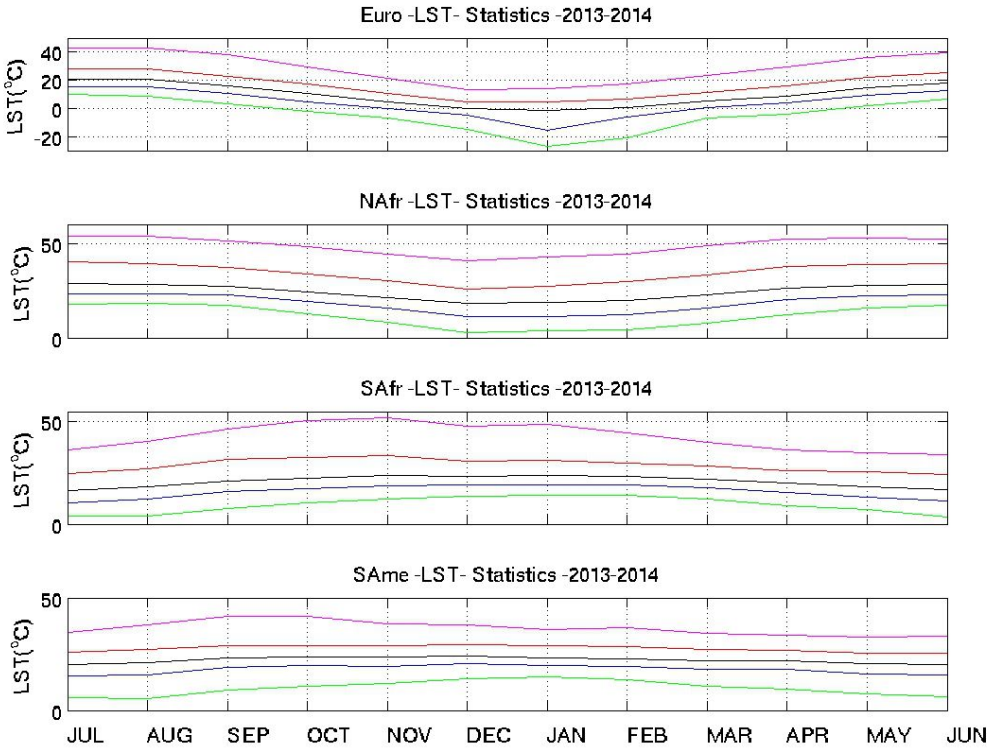

Figure 7 – LST statistics from July2013 to June 2014, for each area. Green – percentile 5, Blue – percentile 25, Black – Median, Red – percentile 75 and Magenta percentile 95 computed from 600 histogram classes ranging from -50ºC to 70ºC. Notice different scales for areas Euro and SAme

The LST seasonal cycle is well described by the statistics. The LST over Euro region has a more pronounced seasonal variation than the remaining areas (Figure 7). For this region the lower values of LST are found in December-February period for all statistics (Table 8). Comparing with the previous year (2013), the January-March period presents higher values of both percentile 25 and median, indicating a smaller

number of LST cold pixels in 2014 over Euro region. The statistics for NAfr area show lower LST values in December-January period and maximum values approximately in the same period as in the Euro region. As expected, the seasonal cycle is inverted in the Southern Hemisphere. The LST over South America LSA SAF region is characterized by a weak seasonal cycle, due to the large area of rain forest covered, which is reflected in the small variability of all statistics.
Figure 88 shows the number of processed pixels for each area. In the case of LST, these are essentially driven by the monthly cloud cover cycle and to a lesser extent by the availability of input data. Accordingly, in Europe the winter months showed, have less computed pixels. The passage of ITCZ in LSA SAF Southern Hemisphere areas is reflected by the comparatively low number of computed pixels in these regions for the January-February.

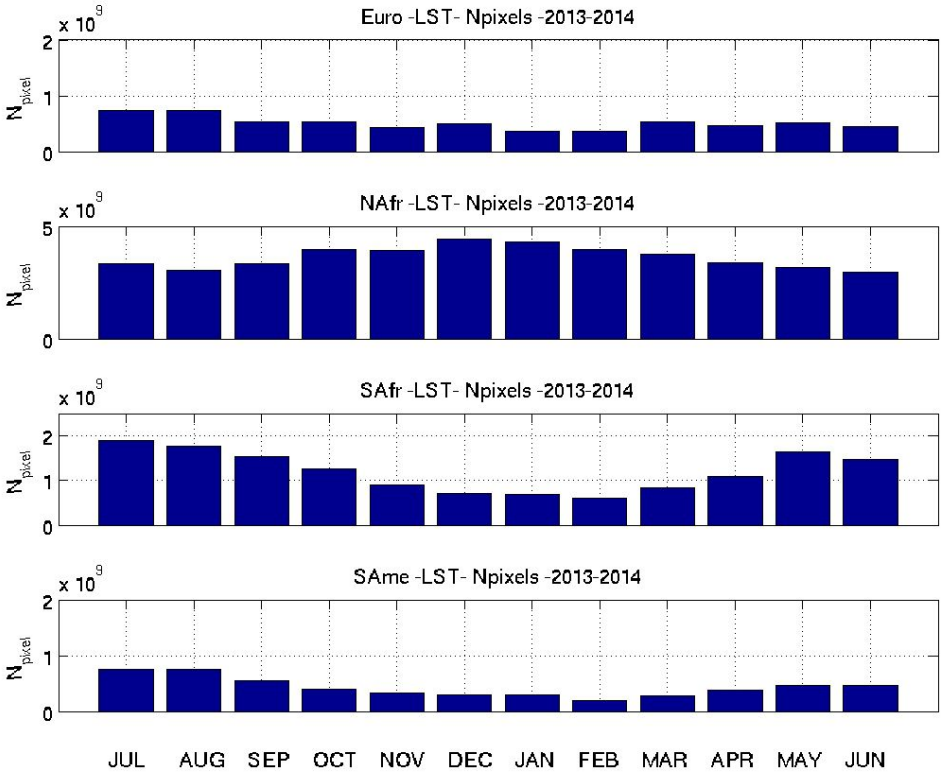

Figure 8 – LST: total number of processed pixels (with non-missing values) from July 2013 to June 2014, for each area

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	SAme	Euro	NAfr	SAfr	SAme	Euro	NAfr	SAfr	SAme	Euro	NAfr	SAfr	SAme
JUL13	15.5	23.4	10.5	15.5	20.7	28.7	16.3	20.3	27.9	40.4	24.5	25.9	22.6	31.9	17.8	20.3
AUG13	15.1	23.4	12.4	15.8	20.5	28.3	18.1	21.2	28.3	39.3	27.1	27.1	22.4	31.6	19.9	21.3
SEP13	10.3	22.6	15.8	19.2	15.9	27.3	21.1	23.4	23.0	37.3	31.5	29.0	17.5	30.3	23.8	24.1
OCT13	4.7	19.5	17.1	19.8	10.6	24.5	22.3	23.7	17.2	33.8	32.6	28.8	11.5	27.0	25.6	24.5
NOV13	-0.3	15.8	18.9	19.5	4.5	21.4	23.9	23.7	10.6	30.2	33.4	29.0	5.5	23.3	27.1	24.3
DEC13	-4.8	11.4	19.0	20.8	-0.3	18.3	23.3	24.2	4.4	25.9	30.5	29.1	-0.5	19.2	25.8	24.9
JAN14	-15.4	11.2	19.4	20.0	-1.4	18.7	23.8	23.4	4.5	27.3	31.3	28.7	-4.8	20.0	26.4	24.3
FEB14	-6.1	12.3	19.0	19.5	0.7	19.9	23.1	23.1	6.4	29.6	29.9	28.5	-0.4	21.4	25.2	24.0
MAR14	0.4	15.6	18.0	18.2	5.0	22.8	22.1	22.2	11.7	33.5	28.4	27.0	6.3	25.0	23.6	22.3
APR14	3.8	20.1	15.4	18.1	9.0	26.3	20.0	22.2	16.3	37.9	26.1	26.8	10.4	29.0	21.0	22.0
MAY14	9.2	22.1	13.3	16.0	14.6	27.5	18.4	20.8	22.3	38.9	25.6	25.6	16.2	30.6	19.6	20.5
JUN14	12.6	22.9	11.1	15.8	17.9	28.0	17.0	20.3	25.4	39.1	24.2	25.3	19.7	31.1	17.7	20.1

Table 8 - LST statistics for July 2013 to June 2014, for each geographical area

6.3. DSLF

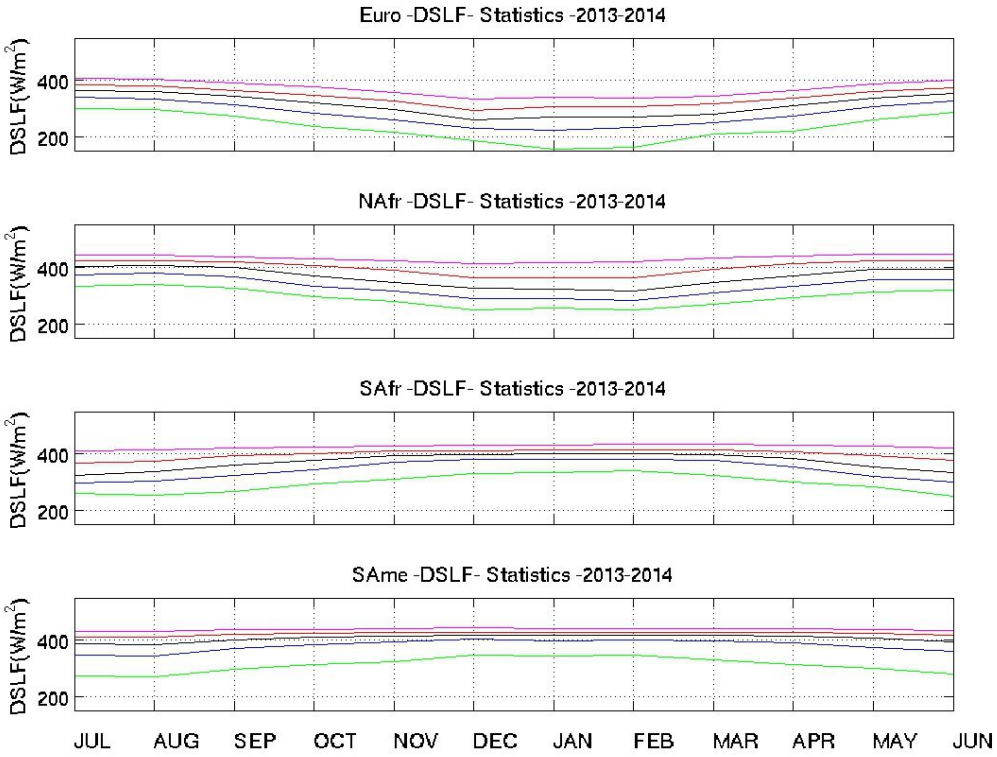

Figure 9 – DSLF statistics from July 2013 to June 2014, for each area. Green – percentile 5, Blue – percentile 25, Black – Median, Red – percentile 75 and Magenta percentile 95 computed from 200 histogram classes from 100 W/m^2 to 600 W/m^2

DSLF statistics have the expected behaviour: a smooth seasonal cycle with decreasing values, in the Northern Hemisphere, from November to February and increasing values in Southern Hemisphere for the same months (Figure 99 and Table 9). In contrast with LST distributions, which present shifts throughout the months, the range of DSLF values does not change significantly. The variety of cloudy and clear sky conditions, atmospheric water content and near surface temperature within a given region and month determine the amplitude of long-wave fluxes at the surface.

The number of computed pixels (Figure 10) is, as expected, nearly constant for each area for the all period considered, since DSLF is an all-sky product and the missing values should reflect only the operational conditions in which the product is

generated.

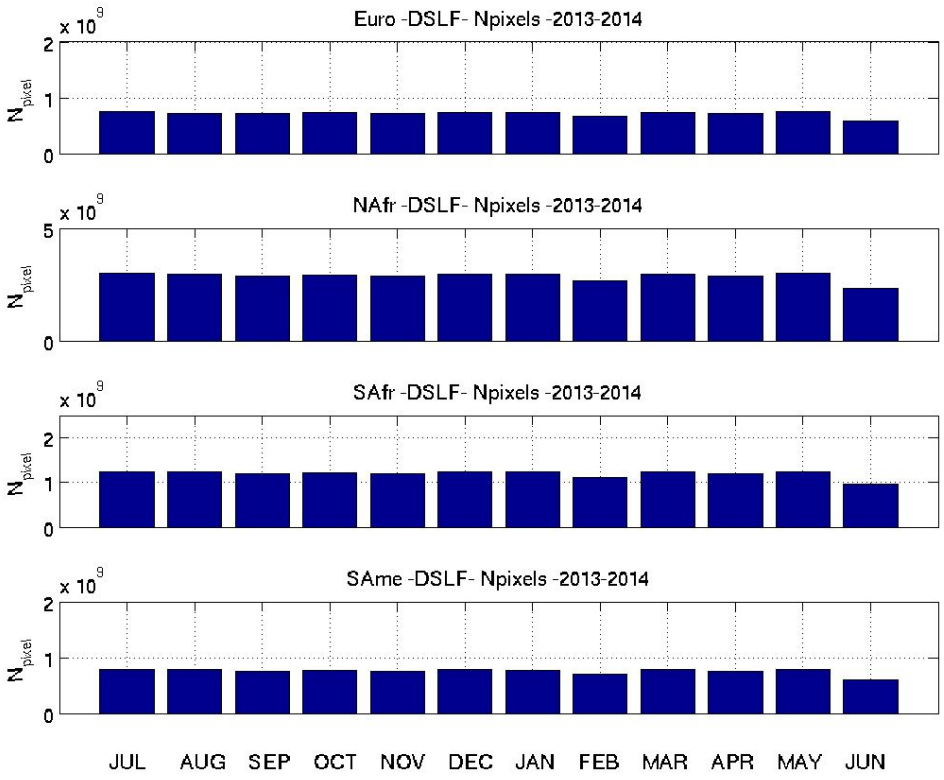

Figure 10 – As in Figure 8, but for DSLF

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
JUL13	338	371	295	348	364	402	324	387	384	421	366	412	359	394	329	372
AUG13	333	378	303	344	359	406	337	383	379	423	375	412	354	397	336	370
SEP13	314	365	323	369	343	398	359	400	363	418	393	419	336	388	353	387
OCT13	283	331	342	384	321	368	378	410	347	406	402	424	313	365	368	397
NOV13	260	314	369	393	298	346	393	414	327	388	409	426	291	348	384	402
DEC13	229	288	379	403	259	324	398	418	294	362	412	429	259	324	391	409
JAN14	223	288	380	397	269	322	399	416	305	361	414	427	259	325	392	406
FEB14	233	283	381	401	271	316	399	418	305	363	414	428	264	323	393	408
MAR14	249	307	375	398	280	344	396	416	315	393	413	427	279	347	389	404
APR14	274	331	353	392	311	370	384	414	338	413	407	426	302	368	375	400
MAY14	306	355	319	373	337	393	354	406	359	421	394	423	329	385	354	390
JUN14	326	356	298	360	352	392	332	393	372	421	378	418	346	386	334	380

Table 9 – As in Table 8, but for DSLF

6.4. DSSF

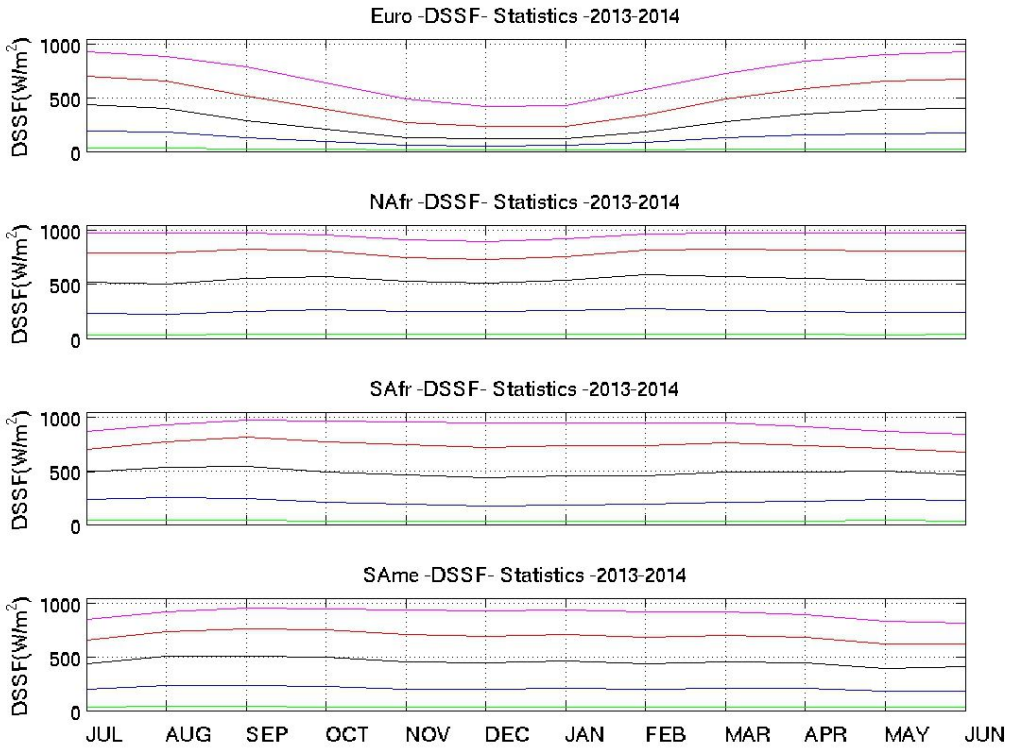

Figure 11 – DSSF statistics from July 2013 to June 2014, for each area. Green – percentile 5, Blue – percentile 25, Black – Median, Red – percentile 75 and Magenta percentile 95 computed from 200 histogram classes from 0.1 W/m2 to 1000 W/m2

DSSF statistics puts into evidence the seasonal cycle of short-wave radiation flux (Figure 111, Table 10). The seasonal cycle for percentiles 5 and 25 is less pronounced in all areas. Low percentile values of solar radiation at the surface are always related to periods with high persistence of cloud cover, which tend to smoothen the time-series. The variation of aerosol properties along the year is not reflected in the DSSF seasonal cycle because the current DSSF algorithm considers constant aerosol load and type.

DSSF computed pixels above 0.1 W/m2 (Figure 12), reflect the availability of input data, but also, the length of the solar day, this is particular evident for area Euro which shows a relatively low number of computed pixels in winter months.

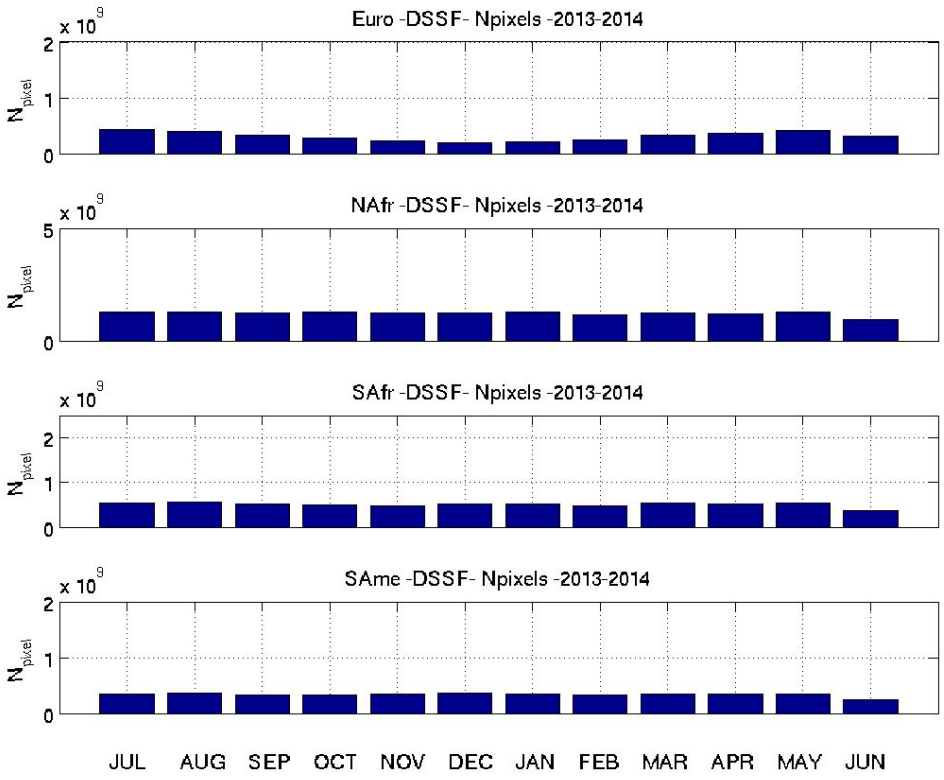

Figure 12 – DSSF: total number of processed pixels with DSSF above 0.1 W/m^2 from July 2013to June 2014, for each area. Notice the different y-axis scale for area Euro

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
JUL13	186	228	233	202	435	517	488	440	704	796	703	661	449	508	467	434
AUG13	179	222	250	234	405	506	534	503	658	788	775	739	424	502	509	486
SEP13	130	252	246	232	284	557	546	510	516	824	817	766	333	532	525	498
OCT13	95	267	211	221	206	572	493	495	393	809	774	753	255	534	492	488
NOV13	61	250	191	202	132	532	462	456	271	752	746	713	178	500	470	462
DEC13	51	246	175	194	115	515	433	442	235	727	720	696	153	486	451	451
JAN14	54	255	183	209	119	537	450	460	230	755	736	714	155	504	462	465
FEB14	82	280	188	202	183	587	459	439	344	817	741	686	226	544	467	449
MAR14	126	261	209	204	279	569	493	454	493	828	763	702	317	538	487	458
APR14	157	249	217	203	351	552	487	448	583	817	734	683	379	528	475	448
MAY14	166	239	232	178	389	537	497	396	654	805	710	623	417	519	470	406
JUN14	171	242	222	185	404	540	468	407	675	808	673	623	430	521	447	408

Table 10 – As in Table 8, but for DSSF

6.5. ALBEDO

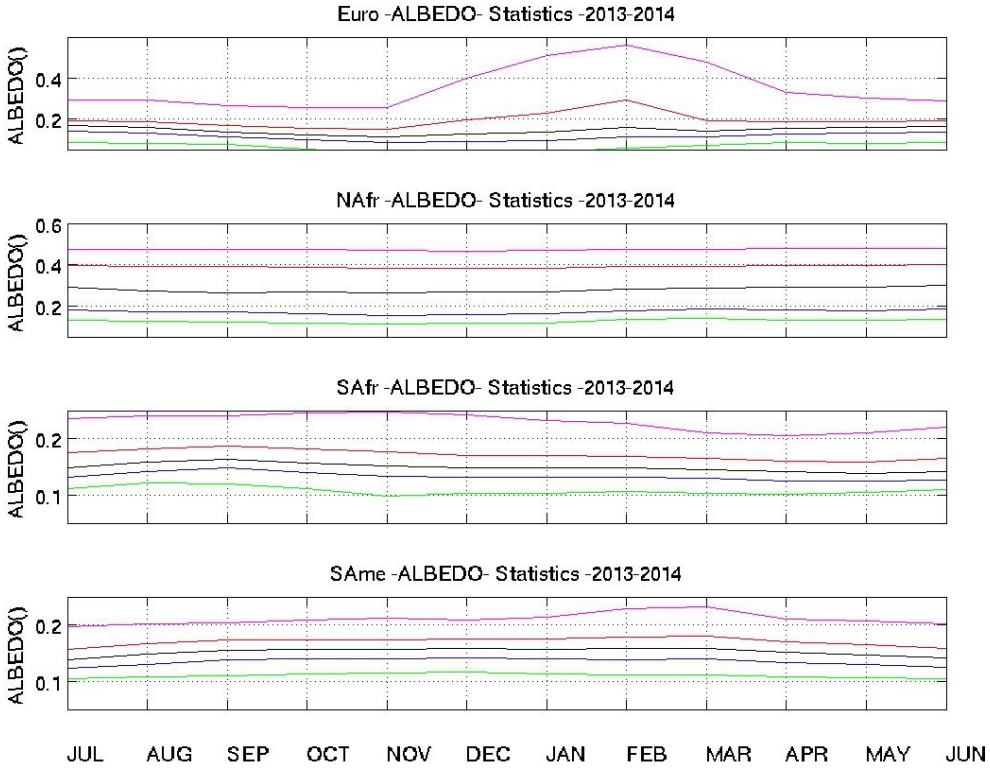

Figure 13 – ALBEDO (white sky) statistics from July 2013 to June 2014, for each area. Green – percentile 5, Blue – percentile 25, Black – Median, Red – percentile 75 and Magenta percentile 95 computed from 100 histogram classes from 0.001 to 0.999. Notice the different y-scales

The ALBEDO statistics (Figure 13 and Table 11), for broad-band white sky albedo, show mainly the land cover characteristics of each region:

- Low ALBEDO values in regions with large areas covered by vegetation as SAme and SAfr;
- The presence of the Sahara desert in NAfr is responsible for the high values of percentile 75 and 95 throughout the year. Lower ALBEDO values expressed by percentiles 5 and 25 correspond to the vegetated Sudan Savannah in the southern part of NAfr;
- The high ALBEDO values in winter months in Europe are likely to correspond to snow covered pixels. Comparing with the previous year, the values of percentiles 75 and 95 are 10-15% lower for March and April 2014 than they were for the same months in 2013. This is in agreement with the heavy snow falls that happened over Europe in the first trimester of 2013 and the early thaw of snow in 2014 (see http://climate.rutgers.edu/snowcover/chart_vis.php?ui_year=2013&ui_month=3&ui_set=2 and

http://climate.rutgers.edu/snowcover/chart_vis.php?ui_year=2014&ui_month=3&ui_set=2).

The presence of extremely low ALBEDO values of percentile 5 in Europe is currently being investigated by Météo-France. The most likely hypothesis at the moment is the overcorrection of the atmospheric effects by the ALBEDO algorithm.

The number of ALBEDO processed pixels does not present any significant annual cycle, since it essentially reflects problems in the operational chain (e.g., missing input data, system stops). In fact, those values are almost constant through the year. The overall statistics for black sky albedo reveal very similar features to those presented here.

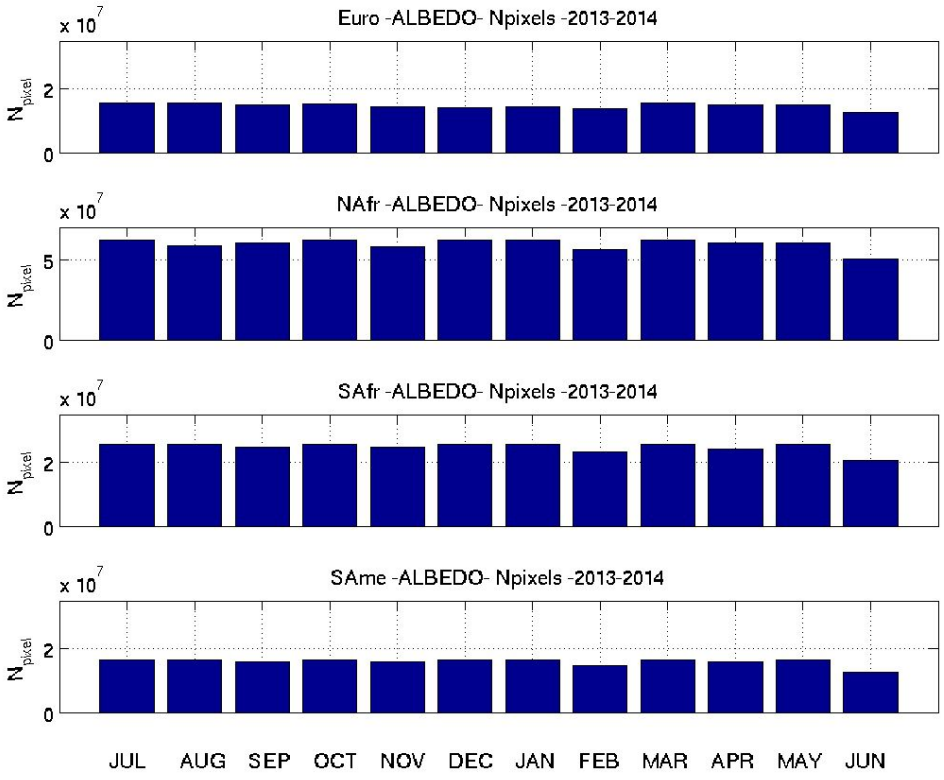

Figure 14 – As in Figure 8, but for ALBEDO

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
JUL13	0.14	0.18	0.13	0.12	0.17	0.29	0.15	0.14	0.19	0.40	0.18	0.16	0.17	0.29	0.15	0.14
AUG13	0.13	0.17	0.14	0.13	0.16	0.27	0.16	0.15	0.19	0.39	0.18	0.17	0.17	0.28	0.16	0.15
SEP13	0.11	0.17	0.15	0.14	0.14	0.26	0.16	0.16	0.17	0.39	0.19	0.17	0.14	0.28	0.17	0.15
OCT13	0.10	0.16	0.14	0.14	0.12	0.27	0.16	0.16	0.15	0.39	0.18	0.17	0.13	0.27	0.16	0.15
NOV13	0.09	0.15	0.13	0.14	0.11	0.26	0.15	0.16	0.15	0.38	0.18	0.17	0.12	0.27	0.15	0.15
DEC13	0.09	0.16	0.13	0.14	0.13	0.27	0.15	0.16	0.19	0.38	0.17	0.18	0.15	0.27	0.15	0.15
JAN14	0.10	0.16	0.13	0.14	0.14	0.27	0.15	0.16	0.23	0.38	0.17	0.17	0.18	0.27	0.15	0.15
FEB14	0.11	0.18	0.13	0.14	0.16	0.28	0.15	0.16	0.29	0.39	0.17	0.18	0.22	0.28	0.15	0.16
MAR14	0.11	0.18	0.13	0.14	0.14	0.29	0.15	0.16	0.19	0.39	0.16	0.18	0.17	0.29	0.14	0.16
APR14	0.13	0.18	0.13	0.13	0.15	0.29	0.14	0.15	0.18	0.39	0.16	0.17	0.16	0.29	0.14	0.15
MAY14	0.13	0.18	0.12	0.13	0.16	0.29	0.14	0.15	0.19	0.40	0.16	0.16	0.16	0.29	0.14	0.15
JUN14	0.14	0.19	0.13	0.13	0.16	0.30	0.14	0.14	0.19	0.40	0.16	0.16	0.17	0.29	0.14	0.14

Table 11 – As in Table 8, but for ALBEDO (white sky).

6.6. ET

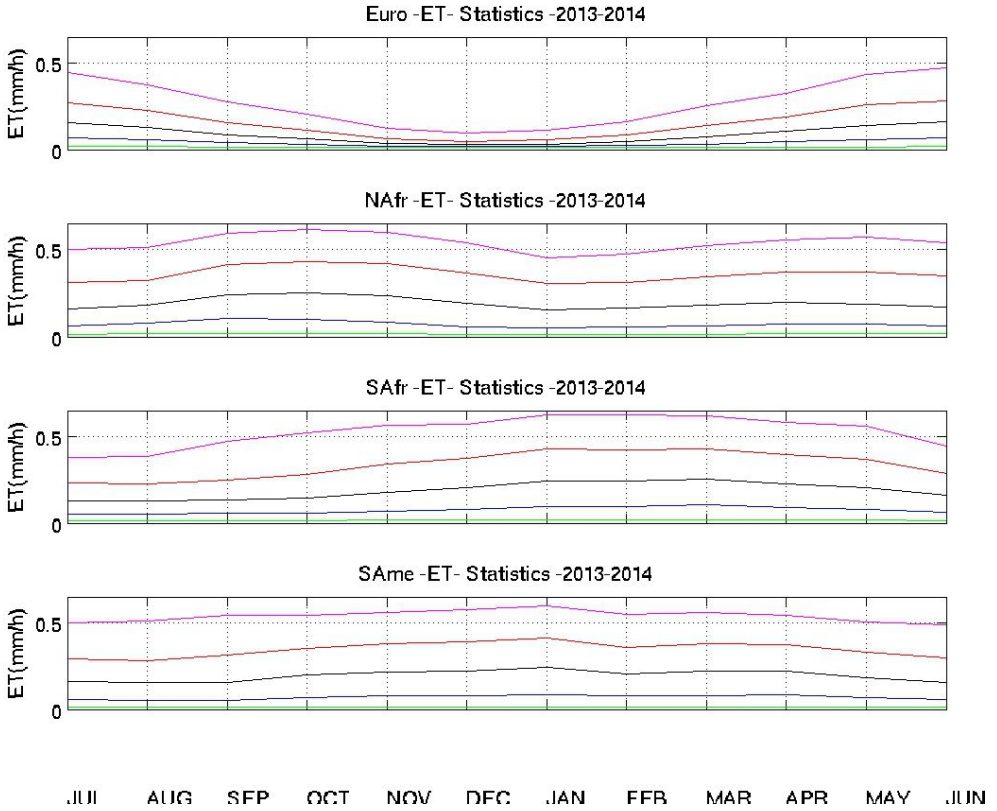

Figure 15 – ET statistics from July 2013 to June 2014, for each area. Green – percentile 5, Blue – percentile 25, Black – Median, Red – percentile 75 and Magenta percentile 95 computed from 100 histogram classes from 0.01 mm/h to 1 mm/h

ET percentiles 5, 25, 75, 95 and the median are within expected values. The seasonal cycle of ET follows closely that of DSSF (Figure 111), although ET is also influenced by the vegetation state and soil moisture.

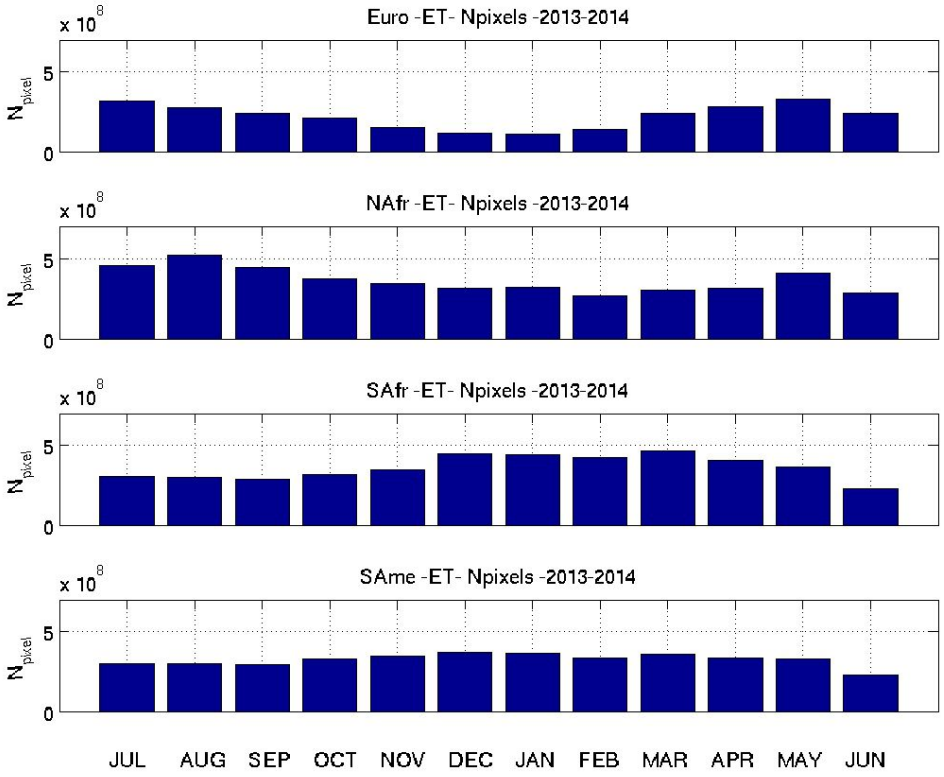

Figure 16 – As in Figure 8, but for ET

ET should not be affected by, e.g., the occurrence of cloud cover. The seasonal fluctuation in the number of processed pixels in the Euro region is closely associated to snow cover. Snow sublimation is not currently modelled, leading to an increase in the number of non-processed pixels in mid-latitudes winter. The 2014 seasonal cycle does not show significant differences to that observed in 2013.

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
JUL13	0.07	0.06	0.05	0.06	0.15	0.16	0.13	0.16	0.27	0.31	0.23	0.29	0.18	0.19	0.15	0.19
AUG13	0.06	0.08	0.05	0.05	0.13	0.18	0.13	0.16	0.23	0.32	0.23	0.28	0.15	0.21	0.15	0.18
SEP13	0.04	0.11	0.05	0.05	0.09	0.24	0.13	0.16	0.15	0.41	0.25	0.31	0.10	0.26	0.17	0.20
OCT13	0.03	0.10	0.06	0.07	0.06	0.25	0.14	0.20	0.11	0.43	0.28	0.35	0.07	0.27	0.18	0.22
NOV13	0.02	0.09	0.07	0.08	0.03	0.23	0.18	0.22	0.06	0.42	0.34	0.38	0.04	0.26	0.22	0.24
DEC13	0.02	0.06	0.08	0.08	0.03	0.19	0.20	0.22	0.05	0.37	0.37	0.39	0.03	0.22	0.23	0.24
JAN14	0.02	0.05	0.09	0.09	0.03	0.15	0.24	0.24	0.05	0.30	0.43	0.41	0.04	0.18	0.27	0.26
FEB14	0.02	0.06	0.10	0.08	0.04	0.17	0.24	0.21	0.08	0.31	0.42	0.36	0.06	0.19	0.27	0.23
MAR14	0.03	0.06	0.11	0.08	0.07	0.18	0.25	0.22	0.14	0.34	0.43	0.38	0.09	0.21	0.27	0.24
APR14	0.04	0.07	0.09	0.08	0.10	0.20	0.23	0.22	0.19	0.37	0.40	0.37	0.12	0.23	0.25	0.23
MAY14	0.06	0.07	0.08	0.07	0.14	0.18	0.21	0.18	0.26	0.37	0.37	0.33	0.17	0.23	0.23	0.21
JUN14	0.07	0.06	0.06	0.06	0.16	0.17	0.16	0.16	0.28	0.35	0.28	0.30	0.18	0.21	0.18	0.19

Table 12 – As in Table 8, but for ET

6.7. FVC

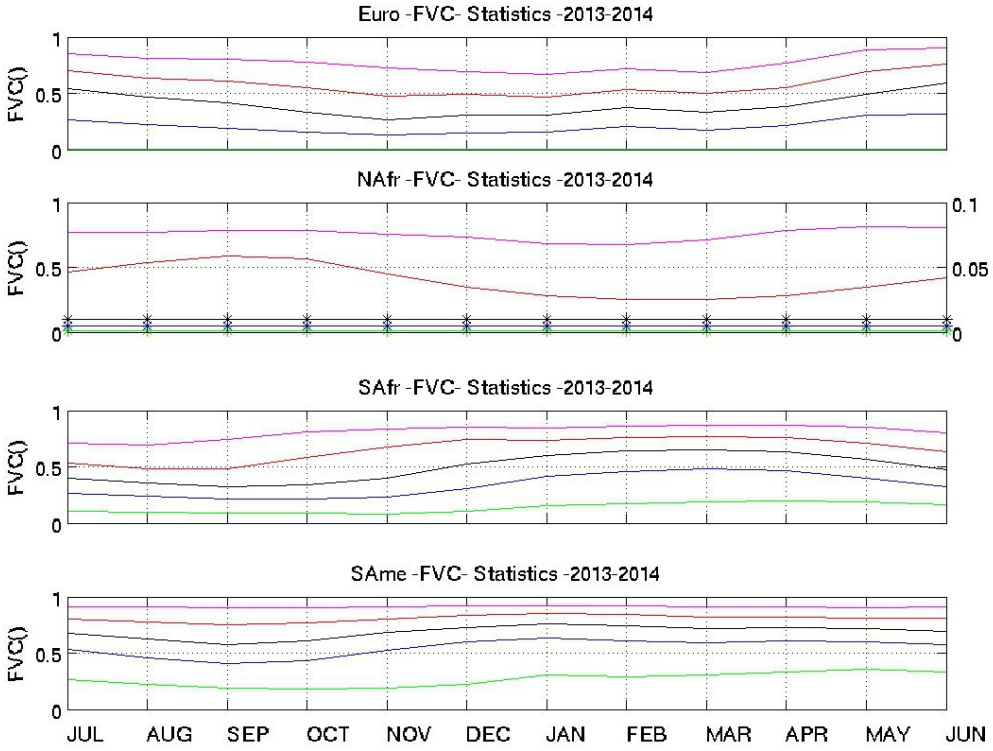

Figure 17 – FVC statistics from July 2013 to June 2014, for each area. Green – percentile 5, Blue – percentile 25, Black – Median, Red – percentile 75 and Magenta percentile 95 computed from 100 histogram classes from 0 to 1. Notice that for NAfr area the median, percentile 5 and percentile 25 have a different y axis scale (on the left hand side of the respective panel)

The statistics of FVC (Figure 177 and Table 13) reflect the seasonal and geographical characteristics of vegetation cover in each area:

- In Europe the vegetation life cycle is marked by the crescent values of FVC during the growing season of vegetation, from April to June
- In North Africa the presence of the large Sahara desert is evident in the low values of FVC for all statistics, particularly in percentiles 5 and 25. The low median values are due to the Sahel region. In general, no significant differences are found in percentiles 5, 25 and 50 between 2014 and the previous years. Percentile 75 shows a growing trend, from July to October corresponding to vegetated regions. The seasonal variation of percentile 95 is very smooth although not negligible and corresponds to the seasonality of the evergreen forest areas in NAfr region.
- In South America the presence of the large are of Amazon forest is the main characteristic with high values of FVC for all statistics.

The number of computed FVC pixels is expected to show some dependence of permanent cloud cover because those pixels are frequently associated to high error bars and are thus classified as missing values. FVC (and other vegetation parameters) are not retrieved in the presence of snow. Both effects explain the lower number of processed pixels in Europe for the winter months. This seasonal effect is not evident in the remaining areas.

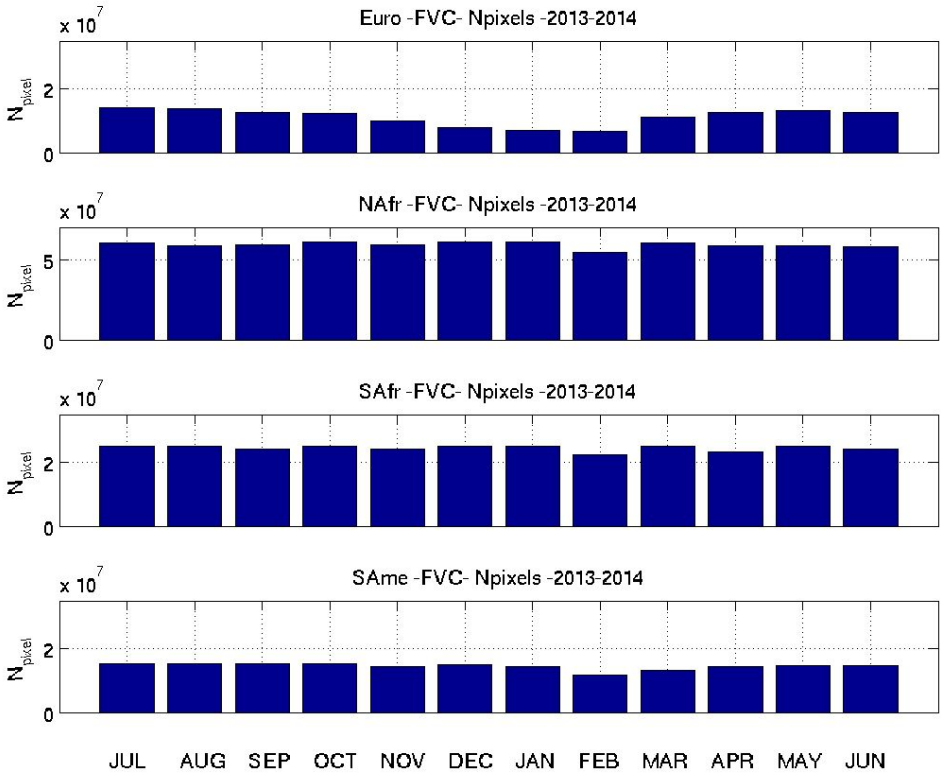

Figure 18 – As in Figure 8, but for FVC

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
JUL13	0.27	0.00	0.26	0.54	0.54	0.01	0.40	0.68	0.70	0.46	0.54	0.81	0.48	0.22	0.40	0.64
AUG13	0.22	0.00	0.24	0.46	0.47	0.01	0.35	0.62	0.64	0.54	0.48	0.78	0.43	0.24	0.36	0.60
SEP13	0.19	0.00	0.22	0.41	0.42	0.01	0.33	0.58	0.61	0.59	0.49	0.75	0.40	0.26	0.36	0.56
OCT13	0.15	0.00	0.22	0.43	0.33	0.01	0.34	0.61	0.55	0.56	0.58	0.77	0.35	0.24	0.39	0.58
NOV13	0.13	0.00	0.23	0.53	0.26	0.01	0.40	0.68	0.47	0.45	0.67	0.80	0.31	0.22	0.44	0.63
DEC13	0.15	0.00	0.31	0.60	0.31	0.01	0.52	0.73	0.49	0.34	0.74	0.83	0.32	0.19	0.51	0.68
JAN14	0.16	0.00	0.41	0.64	0.30	0.01	0.60	0.76	0.47	0.28	0.74	0.86	0.31	0.16	0.55	0.71
FEB14	0.20	0.00	0.46	0.61	0.38	0.01	0.64	0.74	0.53	0.25	0.76	0.84	0.37	0.15	0.58	0.69
MAR14	0.18	0.00	0.48	0.59	0.33	0.01	0.65	0.72	0.50	0.25	0.77	0.82	0.34	0.16	0.60	0.68
APR14	0.21	0.00	0.47	0.61	0.38	0.01	0.64	0.73	0.55	0.28	0.76	0.82	0.38	0.18	0.59	0.69
MAY14	0.30	0.00	0.40	0.60	0.49	0.01	0.57	0.72	0.69	0.35	0.71	0.81	0.48	0.20	0.54	0.68
JUN14	0.32	0.00	0.32	0.58	0.59	0.01	0.48	0.70	0.76	0.42	0.63	0.81	0.53	0.21	0.47	0.67

Table 13 – As in Table 8, but for FVC

6.8. LAI

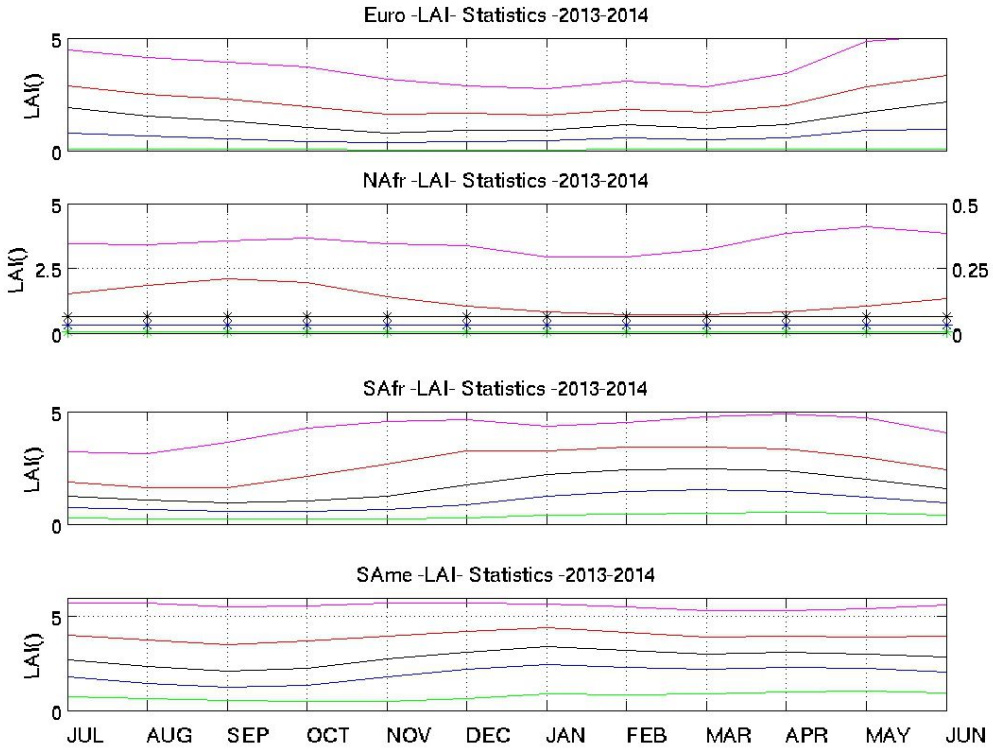

Figure 19 – LAI statistics from July 2013 to June 2014, for each area. Green – percentile 5, Blue – percentile 25, Black – Median, Red – percentile 75 and Magenta percentile 95 computed from 100 histogram classes from 0 to 6.6. Notice that for NAfr area the median, percentile 25 and 5 have different y axis scale (on the left hand side of the respective panel). Area Same as a different y-axis scale

The same conclusions for FVC statistics can be inferred for LAI (Figure 1919 and Table 14), although the seasonal aspects of the vegetation cycle are more evident for LAI namely for percentiles 95 and 75 in North Africa and South Africa.

The conclusions drawn for the computed pixels of the FVC product also apply to those of the LAI product (Figure 20).

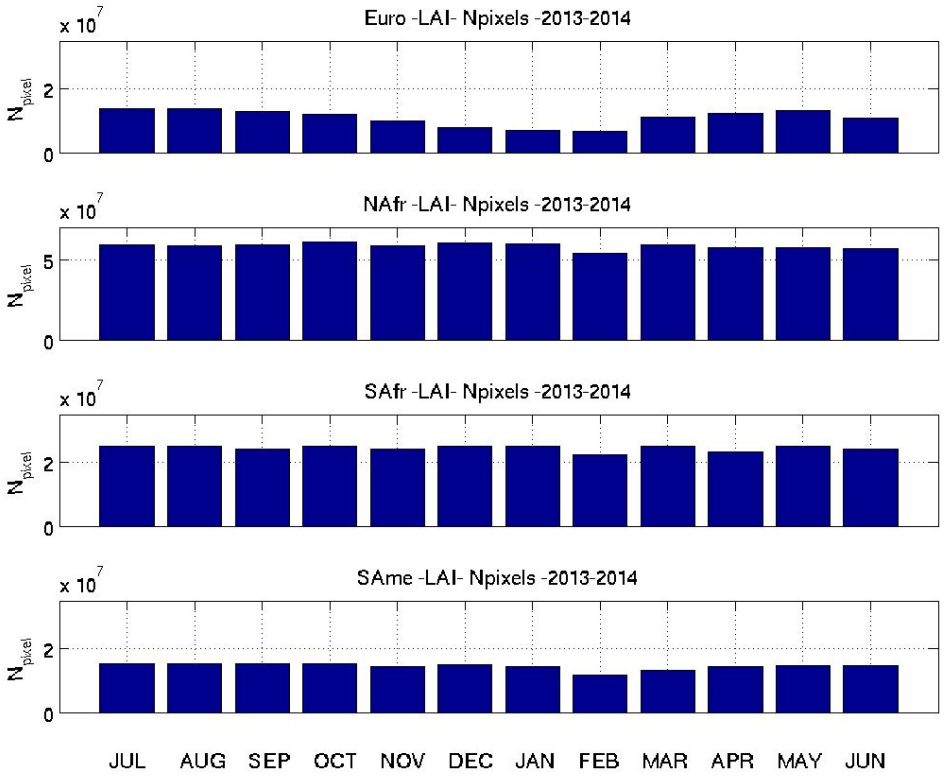

Figure 20 – As in Figure 8, but for LAI

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
JUL13	0.8	0.0	0.7	1.8	1.9	0.1	1.2	2.7	2.9	1.5	1.9	4.0	1.9	0.8	1.4	2.9
AUG13	0.6	0.0	0.6	1.5	1.6	0.1	1.1	2.4	2.5	1.8	1.6	3.8	1.7	0.9	1.2	2.7
SEP13	0.5	0.0	0.6	1.2	1.3	0.1	1.0	2.1	2.3	2.1	1.6	3.5	1.5	1.0	1.2	2.4
OCT13	0.4	0.0	0.6	1.3	1.0	0.1	1.0	2.3	2.0	2.0	2.1	3.7	1.3	1.0	1.5	2.5
NOV13	0.3	0.0	0.6	1.8	0.8	0.1	1.2	2.7	1.6	1.4	2.7	4.0	1.1	0.8	1.7	2.8
DEC13	0.4	0.0	0.9	2.2	0.9	0.1	1.8	3.1	1.6	1.0	3.2	4.2	1.1	0.7	2.1	3.1
JAN14	0.4	0.0	1.3	2.4	0.9	0.1	2.2	3.4	1.6	0.8	3.3	4.4	1.1	0.6	2.2	3.3
FEB14	0.6	0.0	1.4	2.3	1.2	0.1	2.4	3.2	1.8	0.7	3.4	4.2	1.3	0.5	2.4	3.2
MAR14	0.5	0.0	1.5	2.2	1.0	0.1	2.4	3.0	1.7	0.7	3.4	3.9	1.1	0.6	2.5	3.0
APR14	0.6	0.0	1.5	2.3	1.2	0.1	2.4	3.1	2.0	0.8	3.3	3.9	1.4	0.7	2.4	3.1
MAY14	0.9	0.0	1.2	2.3	1.7	0.1	2.0	3.0	2.8	1.1	3.0	3.9	1.9	0.8	2.2	3.1
JUN14	0.9	0.0	0.9	2.1	2.2	0.1	1.6	2.8	3.4	1.3	2.4	4.0	2.2	0.9	1.8	3.0

Table 14 – As in Table 8, but for LAI

6.9. FAPAR

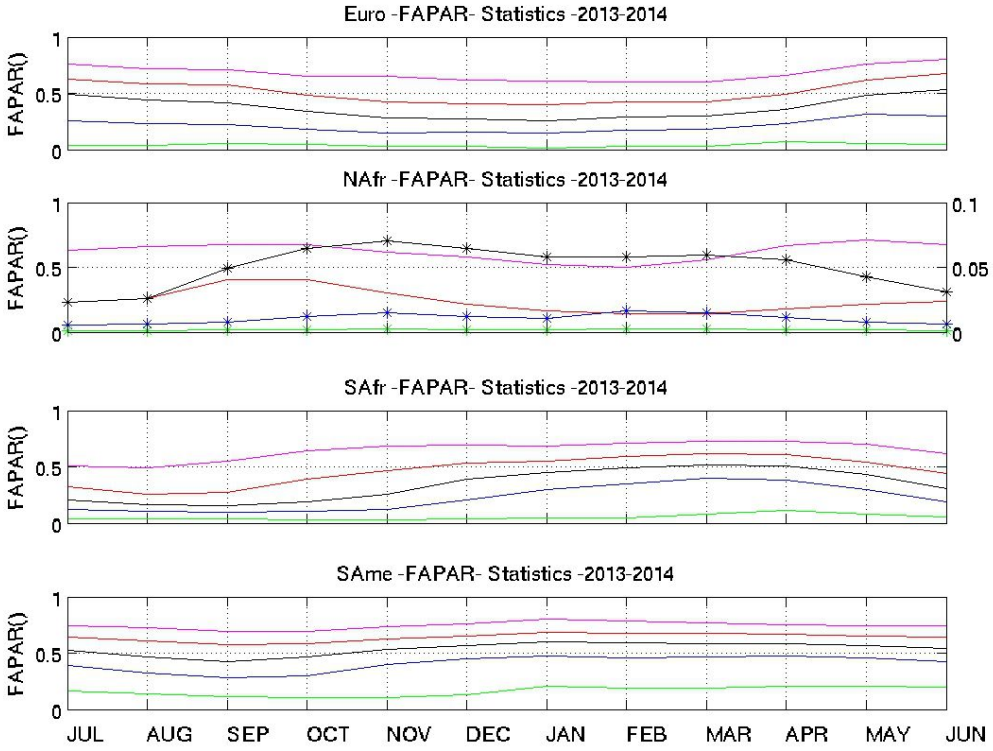

Figure 21 – FAPAR statistics from July 2013 to June 2014, for each area. Green – percentile 5, Blue – percentile 25, Black – Median, Red – percentile 75 and Magenta percentile 95 computed from 100 histogram classes from 0 to 1. Notice that for NAfr area the median, percentile 25 and 5 have different y axis scale (on the right hand side of the respective panel)

The same conclusions for FVC 25, 75 and 95 percentiles can be extended to FAPAR (Figure 21 and Table 15), although the seasonal aspects of the vegetation are more evident for FAPAR in NAfr region. The median values of FAPAR present relatively high values from October to April.

The conclusions drawn for the computed pixels of the FVC product also apply to those of the FAPAR product (Figure 22).

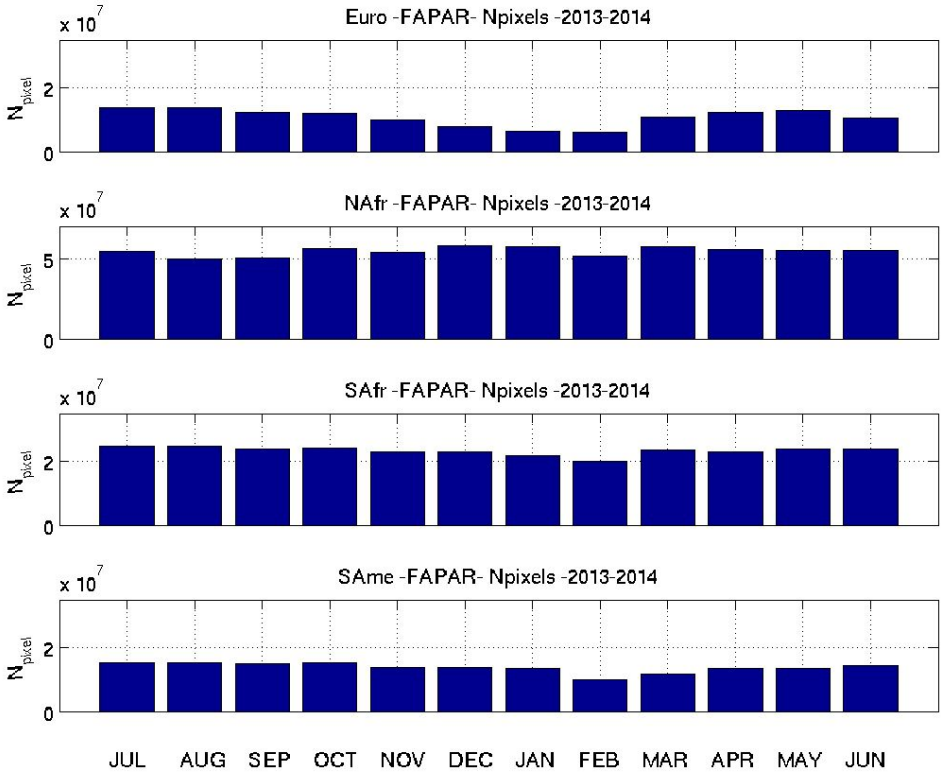

Figure 22 – As in Figure 8, but for FAPAR

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
JUL13	0.26	0.01	0.12	0.40	0.49	0.02	0.21	0.52	0.62	0.23	0.32	0.64	0.44	0.14	0.23	0.50
AUG13	0.23	0.01	0.10	0.33	0.44	0.03	0.16	0.47	0.59	0.26	0.26	0.61	0.40	0.15	0.19	0.45
SEP13	0.22	0.01	0.10	0.28	0.42	0.05	0.15	0.43	0.57	0.41	0.27	0.58	0.39	0.19	0.20	0.42
OCT13	0.18	0.01	0.11	0.30	0.34	0.06	0.19	0.46	0.48	0.40	0.39	0.59	0.33	0.20	0.25	0.43
NOV13	0.15	0.02	0.13	0.40	0.28	0.07	0.26	0.54	0.42	0.31	0.47	0.63	0.29	0.17	0.30	0.49
DEC13	0.15	0.01	0.20	0.45	0.27	0.06	0.39	0.57	0.41	0.22	0.54	0.65	0.28	0.15	0.37	0.52
JAN14	0.14	0.01	0.30	0.47	0.26	0.06	0.45	0.60	0.40	0.16	0.55	0.69	0.27	0.12	0.41	0.56
FEB14	0.17	0.02	0.35	0.46	0.29	0.06	0.49	0.59	0.42	0.14	0.59	0.68	0.30	0.11	0.45	0.55
MAR14	0.18	0.01	0.40	0.46	0.30	0.06	0.52	0.59	0.42	0.15	0.62	0.67	0.30	0.12	0.48	0.54
APR14	0.23	0.01	0.38	0.48	0.36	0.06	0.51	0.59	0.49	0.18	0.61	0.67	0.36	0.15	0.48	0.55
MAY14	0.31	0.01	0.30	0.46	0.48	0.04	0.43	0.57	0.62	0.21	0.54	0.65	0.45	0.16	0.41	0.53
JUN14	0.30	0.01	0.19	0.43	0.54	0.03	0.31	0.54	0.68	0.24	0.44	0.64	0.48	0.15	0.32	0.52

Table 15 – As in Table 8, but for FAPAR

6.10. FRP-PIXEL

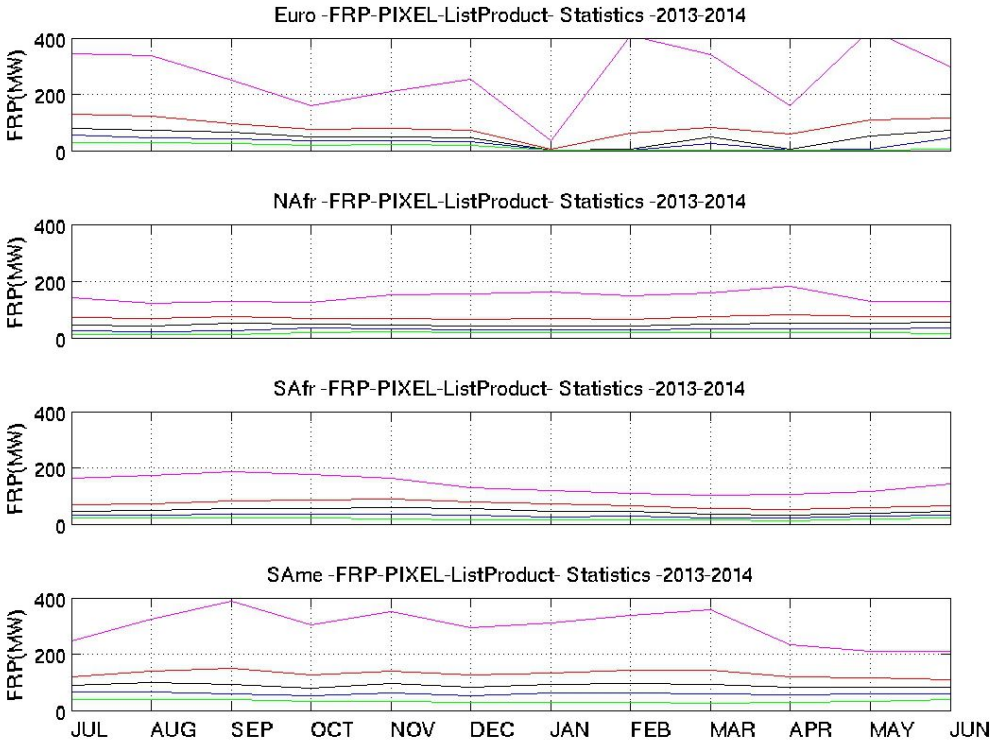

Figure 23 FRP-PIXEL statistics from July 2013 to June 2014, for each area. Green – percentile 5, Blue – percentile 25, Black – Median, Red – percentile 75 and Magenta percentile 95 computed from 200 histogram classes from 1 to 751 MW.

The FRP-PIXEL statistics (Figure 23 and Table 16) reflect the differences of fire distribution and power in each area. Over Europe fires have a strong intensity in the summer months. The distribution of radiative power is directly related to the number of fires, in fact for July and August the large number of fires that occurred in the Iberian Peninsula are evident both in the number of fire pixels computed (Figure 24) and in the values of percentile 95 (Figure 23). Also for Europe, March 2014 was characterized by a large number of fires in southern Europe (Figure 24) one of which, located in the south of Spain at the end of the month, affected a large area (with a brunt area superior to 4000 ha according to http://forest.jrc.ec.europa.eu/effis/applications/current-situation/). For the other 3 areas the FRP shows seasonal variability that probably reflects agricultural practices over the mentioned areas, where a large number of controlled fires are common practices.

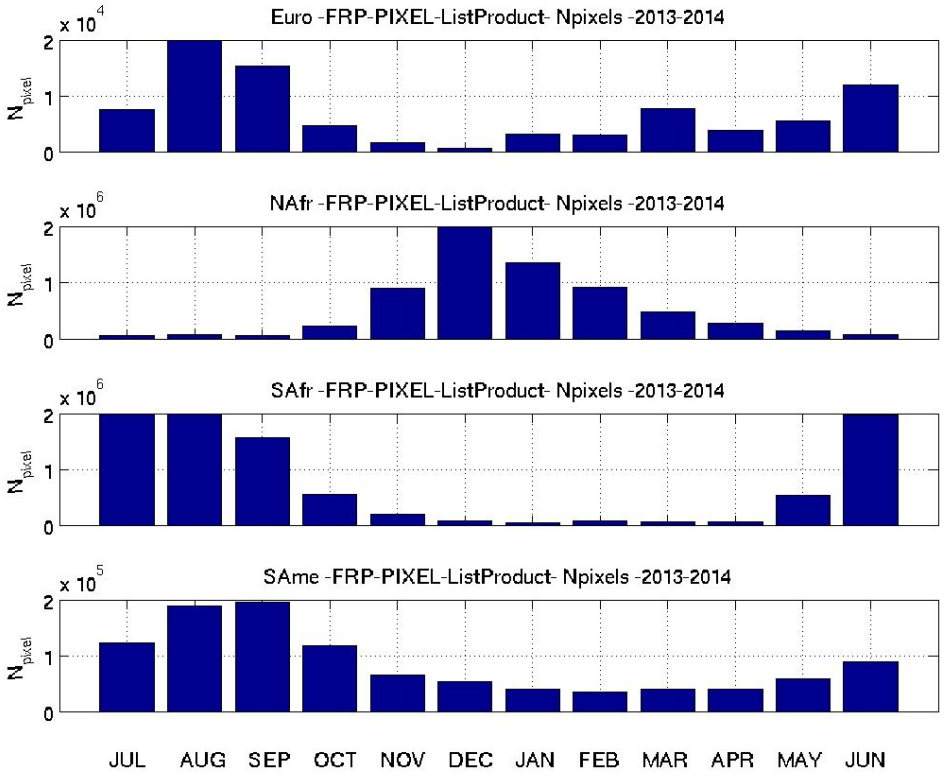

Figure 24 The total number of fire events detected per month

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
JUL13	55.1	24.3	30.6	64.9	80.1	45.8	44.1	89.4	128.8	70.2	67.2	118.9	116.3	54.4	59.4	107.4
AUG13	46.8	22.8	32.5	65.7	72.8	41.2	47.5	98.7	123.6	69.6	73.1	141.0	110.6	50.1	63.4	124.9
SEP13	42.7	24.8	36.8	60.2	64.7	51.8	54.4	92.4	95.7	76.2	82.8	148.0	85.5	55.3	70.1	130.2
OCT13	35.0	33.4	36.0	50.9	49.3	48.0	56.4	80.1	75.4	69.0	85.4	126.4	62.6	55.8	70.0	110.0
NOV13	34.2	32.4	35.7	61.7	48.8	46.3	58.9	94.3	77.7	69.5	88.8	138.7	74.4	59.1	70.0	124.1
DEC13	32.1	29.7	32.8	51.4	45.3	42.6	56.2	83.3	72.3	66.3	80.0	125.7	80.1	57.2	62.4	109.7
JAN14	2.0	29.5	26.7	62.6	3.0	42.5	46.1	93.2	4.0	66.7	72.5	131.6	6.0	58.2	53.7	113.6
FEB14	2.4	29.6	28.9	63.0	3.8	42.8	45.9	94.9	61.2	65.8	66.5	141.2	73.1	55.7	51.9	119.7
MAR14	26.5	31.8	21.8	58.6	48.6	47.4	35.3	93.8	81.6	73.4	56.3	141.5	79.2	60.7	43.9	121.0
APR14	2.6	33.3	21.2	54.8	4.3	52.2	32.9	81.5	58.5	80.6	51.3	119.0	41.0	66.0	43.2	100.2
MAY14	3.9	33.1	28.6	58.6	52.9	52.5	40.1	83.5	110.7	73.8	58.3	115.3	100.5	58.3	48.8	97.4
JUN14	46.3	33.5	30.3	59.3	71.1	54.6	43.8	81.2	116.4	75.4	65.7	108.6	105.0	58.7	56.1	95.5

Table 16 – FRP-PIXEL statistics for July2013 to June 2014, for each geographical area.

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