


**The EUMETSAT Satellite Application  
Facility on  
Land Surface Analysis  
(LSA SAF)**

**Operations Semester Report 2013/S2  
Version 1.1**

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# 1. Introduction

## 1.1. Purpose

The objective of this document is to provide detailed information on the LSA SAF operational performance for the second semester of 2013. This report is distributed to EUMETSAT, to the LSA Steering Group and Project Team. The document shall also be made available to LSA SAF users.


## 1.2. Document organisation

This document is organised in 7 sections:


- The Introduction indicates the purpose of the document and lists acronyms and items referenced by the Operational Semester Report;
- An overall view is given in the Executive Summary (Section 2)
- The System Performance section describes the operational performance of the LSA SAF system, with particular emphasis on the MSG chain (Section 3);
- The Algorithm Versioning section (Section 4) describes the versions of the scientific algorithms implemented in the LSA SAF system;
- The Web Site Services section (Section 5) describes the profiles of the LSA SAF web site users;
- The Helpdesk section (Section 6) describes the type of requests dealt by the Helpdesk service;
- A broad quality monitoring of Land SAF products is included in Section 7.

## 1.3. Definitions, acronyms and abbreviations

AL	Surface <u>A</u> lbedo
BRDF	Bi-directional Reflectance Distribution Function
CDOP	<u>C</u> ontinuous <u>D</u> evelopment and <u>O</u> peration <u>P</u> hase
CORBA	<u>C</u> ommon <u>O</u> bject <u>R</u> equest <u>B</u> roker <u>A</u> rchitecture
DB	<u>D</u> atabase
DIDSLF	<u>D</u> aily <u>D</u> ownward <u>S</u> urface <u>L</u> ongwave <u>F</u> lux
DIDSSF	<u>D</u> aily <u>D</u> ownward <u>S</u> urface <u>S</u> hortwave <u>F</u> lux
DMET	<u>D</u> aily <u>E</u> vapotranspiration
DM	<u>D</u> issemination <u>M</u> anager
DNS	<u>D</u> omain <u>N</u> ame <u>S</u> ystem
DSSF	<u>D</u> ownwelling <u>S</u> urface <u>S</u> hortwave Flux
DSLFL	<u>D</u> ownwelling <u>S</u> urface <u>L</u> ongwave Flux
ECMWF	<u>E</u> uropean <u>C</u> entre for <u>M</u> edium-Range <u>W</u> eather <u>F</u> orecasts
EUMETCast	<u>EUMETSAT</u> multi-service dissemination service system
EUMETSAT	<u>E</u> uropean <u>O</u> rganisation for the <u>E</u> xploitation of <u>M</u> eteorological <u>S</u> atellites
Euro	<u>E</u> urope
EPS	<u>EUMETSAT</u> Polar System
ET	Evapotranspiration
FAPAR	Fraction of <u>A</u> bsorbed <u>P</u> hotosynthetic <u>A</u> ctive <u>R</u> adiation
FRM	Fire Risk Map

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FRPPIXEL	Fire Radiative Power
FRPGRID	Fire Radiative Power
FTP	<u>F</u> ile <u>T</u> ransfer <u>P</u> rotocol
FVC	<u>F</u> raction of <u>V</u> egetation <u>C</u> over
GEO	Geostationary
HMI	<u>H</u> uman <u>M</u> achine <u>I</u> nterface
HTTP	<u>H</u> yper <u>T</u> ext <u>T</u> ransfer <u>P</u> rotocol
IM	Instituto de Meteorologia (Portuguese Meteorological Institute)
IPMA	Instituto Português do Mar e da Atmosfera (Portuguese Meteorological Institute)
ITCZ	Inter Tropical Convergence Zone
LAI	<u>L</u> eaf <u>A</u> rea <u>I</u> ndex
LSM	<u>L</u> SA SAF <u>S</u> ystem <u>M</u> anager
LSA SAF	<u>L</u> and <u>S</u> urface <u>A</u> nalysis <u>S</u> atellite <u>A</u> pplication <u>F</u> acility
LST	<u>L</u> and <u>S</u> urface <u>T</u> emperature
MSG	<u>M</u> ETEOSAT <u>S</u> econd <u>G</u> eneration
MTAL	MSG Ten Day Surface Albedo
MTG	<u>M</u> ETEOSAT <u>T</u> hird <u>G</u> eneration
N/A	<u>N</u> ot <u>A</u> pplicable or <u>N</u> ot <u>A</u> vailable
NAfr	North Africa
NRT	<u>N</u> ear <u>R</u> eal <u>T</u> ime
NWC	SAF <u>N</u> owcasting
OSR	<u>O</u> perational <u>S</u> emester <u>R</u> eport
PDU	Product Dissemination Unit
QMD	Quality Monitoring Daily
QMM	Quality Monitoring Monthly
S1	First Semester
S2	Second Semester
SAF	<u>S</u> atellite <u>A</u> pplication <u>F</u> acility
SAFMIL	<u>L</u> SA <u>S</u> AF <u>F</u> TP server ( <a href="http://safmil.ipma.pt">safmil.ipma.pt</a> )
SAfr	South Africa
SAmE	South America
SC	<u>S</u> now <u>C</u> over
SEVERI	Scanning Enhanced Visible and Infrared Imager
SSH	<u>S</u> ecure <u>S</u> hell
TSP	<u>T</u> hermal <u>S</u> urface <u>P</u> arameter
UMARF	Unified Meteorological Archive & Retrieval Facility
VCS	<u>V</u> ideo <u>C</u> omputer <u>S</u> ystem (Satellite Reception Station)
VEGA	<u>V</u> egetation
Web	<u>W</u> orld <u>W</u> ide <u>W</u> eb
WWW	<u>W</u> orld <u>W</u> ide <u>W</u> eb

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## 2. Executive summary

The overall performance of the LSA SAF operational system is summarized, both, for production and end-to-end dissemination processes (Table 1). This table presents the number of scheduled and actually generated/disseminated products.

The overall values for the period are above 95%, with the exception of MTAL production (NRT distribution not applicable).


July to December 2013							
Status	Products	Scheduled	Actually generated	Production Success Rate (%)	Actually disseminated	Dissemination Success Rate (%)	Global Success Rate (%)
Operational	LST	70,656	69,752	98.72%	69,414	99.52%	98.24%
	DSLFF	35,328	34,825	98.58%	34,665	99.54%	98.12%
	DSSF	35,328	34,812	98.54%	34,652	99.54%	98.09%
	SC	736	716	97.28%	709	99.02%	96.33%
	VEGA	2,208	2,205	99.86%	2,178	98.78%	98.64%
	ET	35,328	34,803	98.51%	34,614	99.46%	97.98%
	FRP-PIXEL	70,656	69,931	98.97%	69,400	99.24%	98.22%
	FRPGRID	4,416	4,393	99.48%	4,350	99.02%	98.51%
	DIDSSF	736	702	95.38%			
	DIDSLF	736	736	100.00%			
	DMET	736	736	100.00%			
	FRM	552	534	96.74%			
	AL	736	735	99.86%	725	98.64%	98.51%
	MTAL	720	585	81.25%			
Pre-Operational	FDem	52,992	52,771	99.58%	52,569	99.62%	99.20%
<b>Total</b>		<b>311,864</b>	<b>308,236</b>	<b>98.84%</b>	<b>303,276</b>	<b>98.39%</b>	<b>97.25%</b>

**Table 1 - MSG production and NRT EUMETCast dissemination. General overview**

The most relevant problems regarding the performance of the system (production and/or distribution) found during the reporting period are the following:

- The MTAL production performance was below the 95% threshold. The poorer performance was associated with a deficient operational monitoring (this product was not integrated in the both production and dissemination monitoring system) and with the low processing frequency. Missing MTAL products will be reprocessed as soon as possible, but not before the implementation of the new LSA SAF system. The operational monitoring system shall be updated to include this product in (late) 2014.
- The migration of the ECMWF cluster used as interface with its Member States to a new cluster, affected the LSA SAF performance during the month of December 2013.
- The dissemination was affected several times by overload of the DM (Dissemination Manager). The problem is now contained.
- The production of SC (December), DIDSSF (October, November and December) and FRM (November and December) was below 95% (Table 5).



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The statistics presented here concern all problems occurring within the LSA SAF processing chain. As such, the statistical values of the performance consider both internal and external fails, including those from EUMETSAT, ECMWF, NWC SAF or VCS receiving station at IPMA.

This report is focused on production and NRT (EUMETCast) distribution of geostationary-based products (GEO), taking into account IPMA's receiving station. It should be noticed that production and NRT dissemination statistics may differ, since a failure may occur in only one of this components. Products affected by a disruption in the NRT delivery will still be available for off-line distribution.

All products (production and dissemination) shall be integrated in the monitoring system.

During the second semester of 2013, the nominal production of MSG, was above the 95% threshold of availability of products (NRT and off line) to the users, if MTAL is not considered.

The absence of an operational archive system (foreseen for 2014) had a negative impact on the operations of LSA SAF, in particular in the Helpdesk and web services. Products are currently stored on a backup archive system. This situation, had a negative impact on the operations of LSA SAF, particularly on the automatic off-line distribution (web) and therefore on the Helpdesk support activity. As a direct consequence, UMARF and Web dissemination services were closed to users, leading to an increase in the number of queries related with data made to the Helpdesk. Off-line distribution was manually supported by the helpdesk team, with a response time longer, than the intended one.

Automatic off-line distribution (Web services) resumed service on the 3<sup>rd</sup> of December of 2013 with products made available from 2009.

A new archive system is expected to be implemented by the end of the first semester of 2014.

### **3. MSG Infrastructure**

#### **3.1. Pre-Processing Products Generation**

This subsection reports on the performance of MSG pre-processing products generation during the CDOP by the LSA SAF system from 1 July 2013 to 31 December 2013. It is important to state that all problems that occurred in the LSA SAF input sources, including EUMETSAT images distribution, are also reflected on the reported values. The figures represent the availability of LSA SAF products to the users and refer to both NRT (distributed by EUMETSAT) and off line distribution.

##### **3.1.1. Six Month Detailed Performance**

The following table provides monthly overviews for pre-processing, scheduled and actually generated, for the reported time period (1 July 2013 to 31 December 2013).

Table 2 represents the performance from the pre-processing chain, coming from the three different input data sources: Nowcasting software (NWC, version 2013), ECMWF and MSG images distribution (EUMETCast).

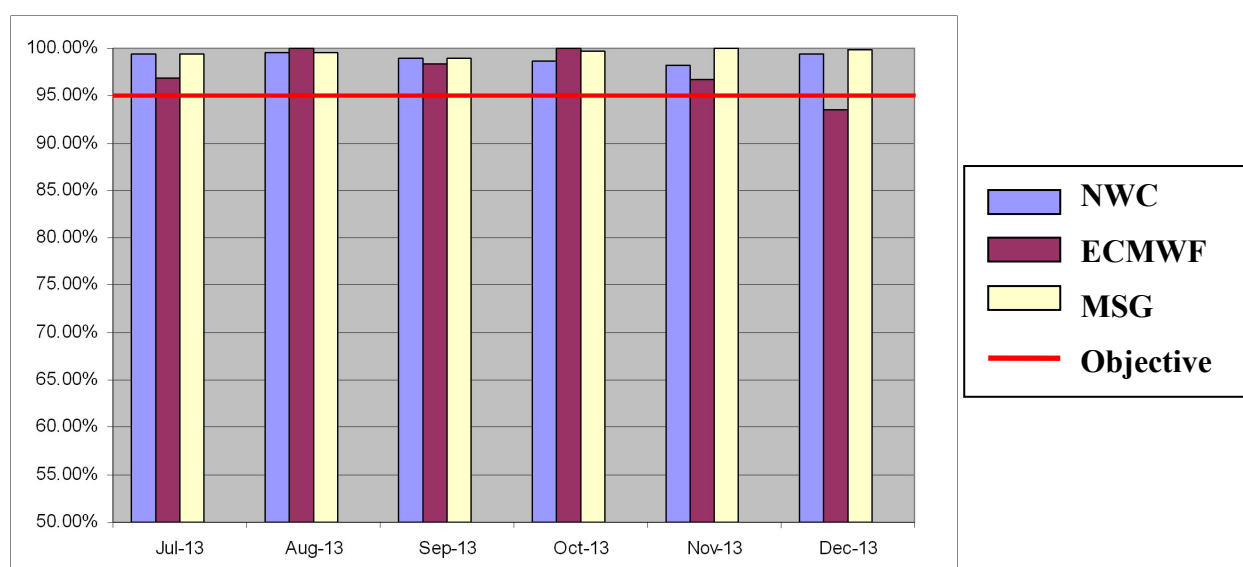
	July 2013			August 2013			September 2013		
	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)
NWC	11,904	11,828	99.36%	11,904	11,843	99.49%	11,520	11,393	98.90%
ECMWF	248	240	96.77%	248	248	100.00%	240	236	98.33%
MSG	11,904	11,840	99.46%	11,904	11,848	99.53%	11,520	11,402	98.98%
<b>Total</b>	<b>24,056</b>	<b>23,908</b>	<b>99.38%</b>	<b>24,056</b>	<b>23,939</b>	<b>99.51%</b>	<b>23,280</b>	<b>23,031</b>	<b>98.93%</b>

	October 2013			November 2013			December 2013		
	Scheduled	Successful Orders	Success Rate (%)	Scheduled	Successful Orders	Success Rate (%)	Scheduled	Successful Orders	Success Rate (%)
NWC	11,904	11,738	98.61%	11,520	11,305	98.13%	11,904	11,841	99.47%
ECMWF	248	248	100.00%	240	232	96.67%	248	232	93.55%
MSG	11,904	11,867	99.69%	11,520	11,520	100.00%	11,904	11,884	99.83%
<b>Total</b>	<b>24,056</b>	<b>23,853</b>	<b>99.16%</b>	<b>23,280</b>	<b>23,057</b>	<b>99.04%</b>	<b>24,056</b>	<b>23,957</b>	<b>99.59%</b>

**Table 2 – Pre-processing products generation (6 Months). The NWC line refers to the processing of the NWC SAF software output needed for the LSA SAF chain.**

Figure 1 shows the achieved performance for the three pre-processing algorithms on a monthly basis. Overall performance was above 95% with the exception of ECMWF for Dec 2013.



**Figure 1 – Relative pre-processing products (6 Months)**


## 3.2. Products Processing

This subsection reports on the performance of MSG products generation during the reported time period (1 July 2013 to 31 December 2013)

### 3.2.1. Six Month Detailed Performance (by product)

Table 3 shows the achieved performance for product generation on a monthly basis. Overall the performance was above 95% with the exceptions of MTAL, SC, DIDSSF and FRM.

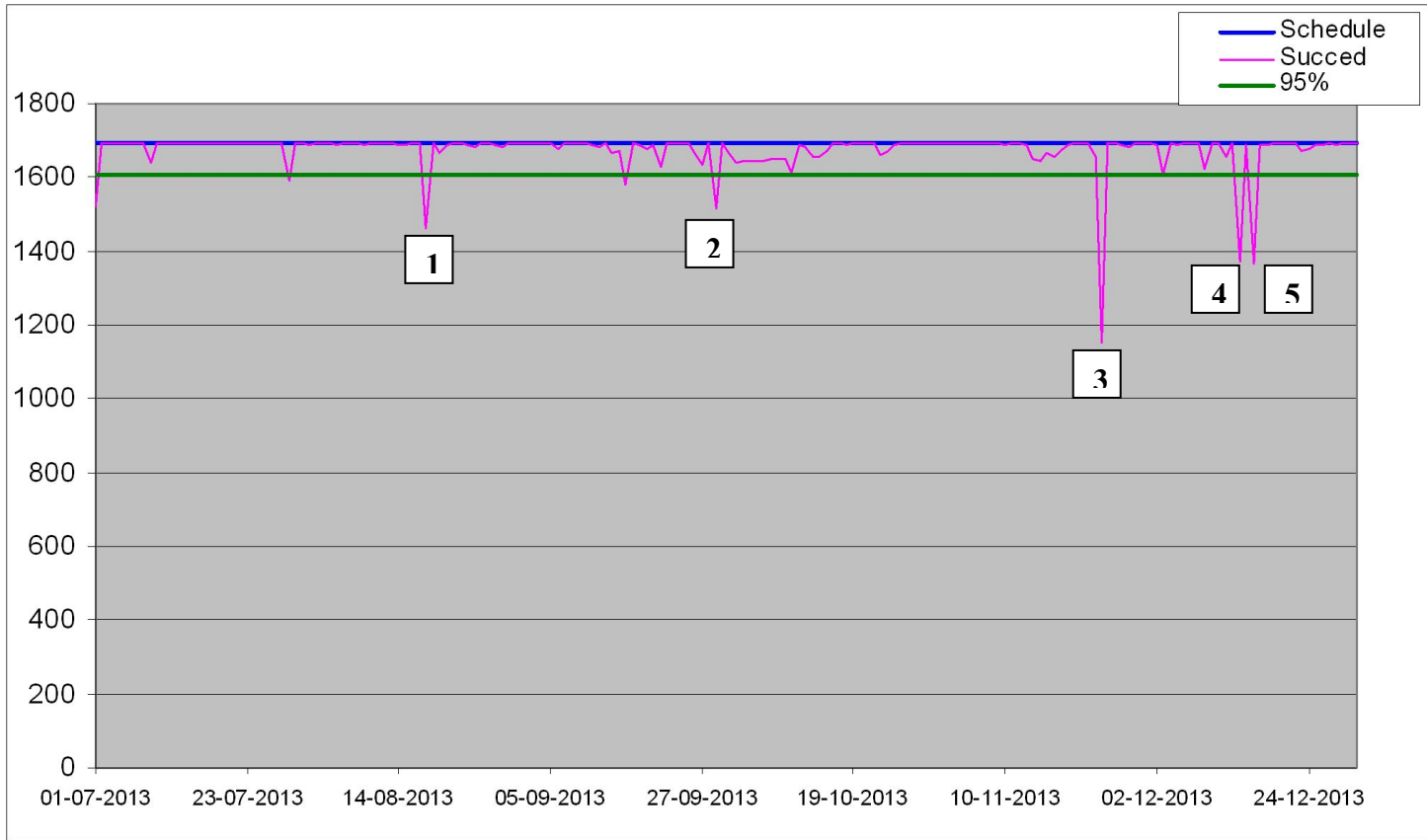
	July 2013			August 2013			September 2013		
	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)
AL	124	124	100.00%	124	123	99.19%	120	120	100.00%
LST	11,904	11,824	99.33%	11,904	11,839	99.45%	11,520	11,390	98.87%
DSLFF	5,952	5,912	99.33%	5,952	5,917	99.41%	5,760	5,699	98.94%
DSSF	5,952	5,912	99.33%	5,952	5,913	99.34%	5,760	5,698	98.92%
SC	124	123	99.19%	124	120	96.77%	120	120	100.00%
VEGA	372	372	100.00%	372	369	99.19%	360	360	100.00%
ET	5,952	5,912	99.33%	5,952	5,908	99.26%	5,760	5,698	98.92%
FRPPIXEL	11,904	11,824	99.33%	11,904	11,838	99.45%	11,520	11,390	98.87%
FRPGRID	744	744	100.00%	744	738	99.19%	720	720	100.00%
FDeM	8,928	8,880	99.46%	8,928	8,886	99.53%	8,640	8,551	98.97%
DIDSSF	124	124	100.00%	124	124	100.00%	120	117	97.50%
DIDSLF	124	124	100.00%	124	124	100.00%	120	120	100.00%
DMET	124	124	100.00%	124	124	100.00%	120	120	100.00%
FRM	93	93	100.00%	93	93	100.00%	90	90	100.00%
MTAL	120	90	75.00%	120	120	100.00%	120	100	83.33%
<b>Totals</b>	<b>52,541</b>	<b>52,182</b>	<b>99.32%</b>	<b>52,541</b>	<b>52,236</b>	<b>99.42%</b>	<b>50,850</b>	<b>50,293</b>	<b>98.90%</b>

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	October 2013			November 2013			December 2013		
	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)
AL	124	124	100.00%	120	120	100.00%	124	124	100.00%
LST	11,904	11,733	98.56%	11,520	11,305	98.13%	11,904	11,661	97.96%
DSLFF	5,952	5,871	98.64%	5,760	5,652	98.13%	5,952	5,774	97.01%
DSSF	5,952	5,867	98.57%	5,760	5,652	98.13%	5,952	5,770	96.94%
SC	124	123	99.19%	120	119	99.17%	124	111	89.52%
VEGA	372	372	100.00%	360	360	100.00%	372	372	100.00%
ET	5,952	5,867	98.57%	5,760	5,652	98.13%	5,952	5,766	96.88%
FRPPIXEL	11,904	11,733	98.56%	11,520	11,305	98.13%	11,904	11,841	99.47%
FRPGRID	744	740	99.46%	720	714	99.17%	744	737	99.06%
FDeM	8,928	8,899	99.68%	8,640	8,640	100.00%	8,928	8,915	99.85%
DIDSSF	124	112	90.32%	120	111	92.50%	124	114	91.94%
DIDSLF	124	124	100.00%	120	120	100.00%	124	124	100.00%
DMET	124	124	100.00%	120	120	100.00%	124	124	100.00%
FRM	93	92	98.92%	90	83	92.22%	93	83	89.25%
MTAL	120	90	75.00%	120	120	100.00%	120	65	54.17%
<b>Totals</b>	<b>52,541</b>	<b>51871</b>	<b>98.72%</b>	<b>50,850</b>	<b>50073</b>	<b>98.47%</b>	<b>52,541</b>	<b>51,581</b>	<b>98.17%</b>

**Table 3 - Products Generation (6 Months)**

Figure 2 shows the evolution of the daily absolute product generation. The blue and pink lines show the expected and actually generated, respectively. The numbered boxes point to the main products generation events explained in Table 4.



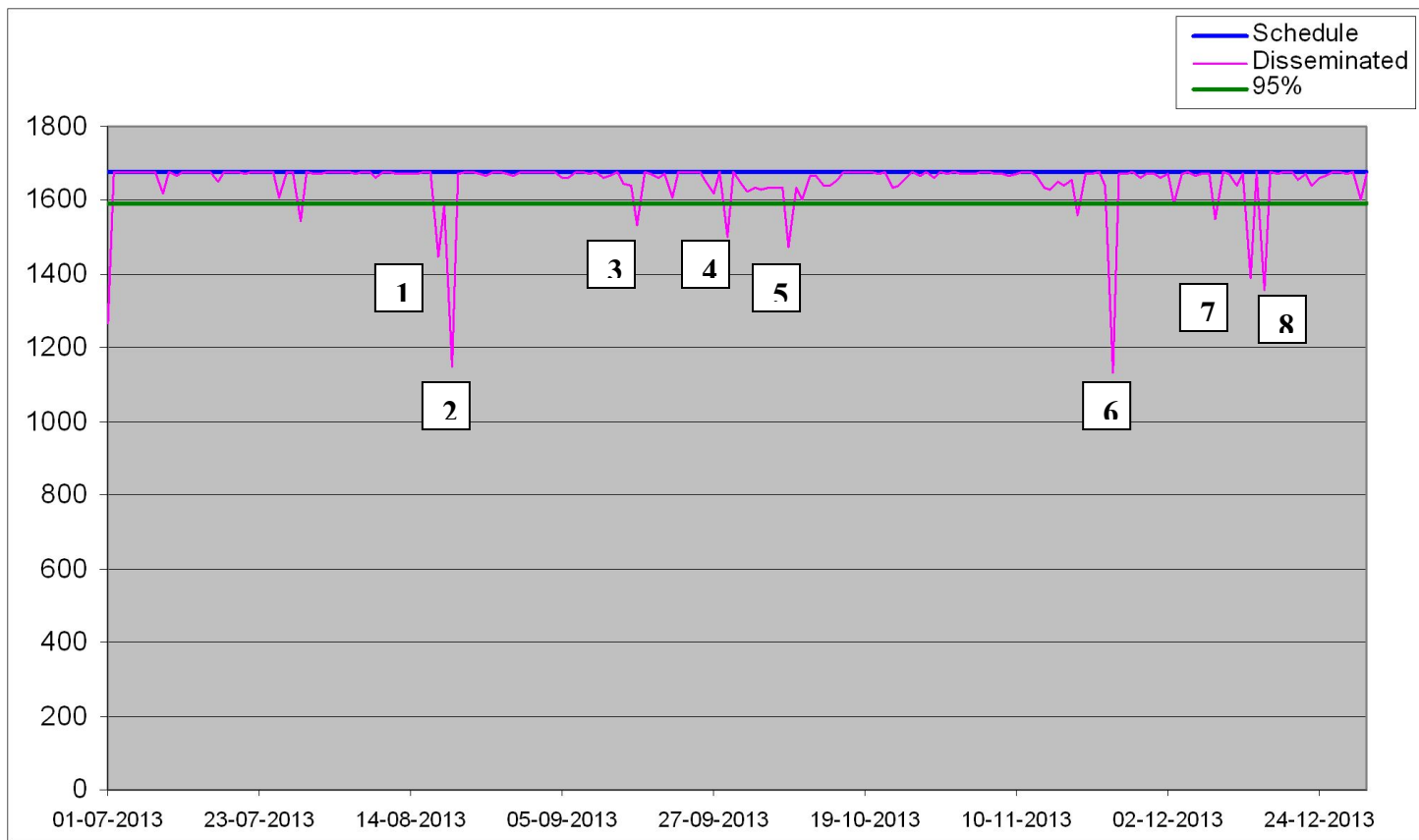
**Figure 2 – Daily absolute product generation (6 Months)**

The following table explains the most important events that affected the generation of LSA SAF products.


Event	Date	Description	Action	Status
1	18/08/2013	EUMETSAT image outage	N/A	Closed
2	29/09/2013	A blocked filesystem, caused by malfunction of the archive system	Filesystem reset	Closed
3	24/11/2013	Migration of the ECMWF to the new cluster.	Script fine-tuning.	Closed
4	14/12/2013			Closed
5	16/12/2013			Closed

**Table 4 - Description of important products generation events.**

Figure 3 shows the evolution of the end-to-end dissemination over the 6 months period. The blue and pink lines show the schedule (expected) and actual disseminated, respectively. As can be seen, from the comparison of Figure 2 and Figure 3, the dissemination failures follow the production ones, with the exception of those caused by the overload of the dissemination component and the VCS lock.



**Figure 3 – Daily NRT EUMETCast dissemination (6 Months)**

	<b>Operations Semester Report 2013/S2</b>	Doc No: <b>SAF/LAND/IPMA/OSR/02/2013/1.1</b> Issue: <b>1.1</b> Date: <b>2014/10/08</b>
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Event	Date	Description	Action	Status
1	18/08/2013	EUMETSAT image outage	N/A	Closed
2	20/08/2013	Dissemination component crash	Component reset	Closed
3	16/09/2013	Satellite reception system (VCS) service lock.	VCS services reset.	Closed
4	29/09/2013	A blocked filesystem, caused by malfunction of the archive system	Filesystem reset	Closed
5	08/10/2013	Dissemination component crash	Component reset	Closed
6	24/11/2013	Migration of the ECMWF to the new cluster.	Script fine-tuning.	Closed
7	14/12/2013			Closed
8	16/12/2013			Closed

**Table 5 – Description of important dissemination events.**



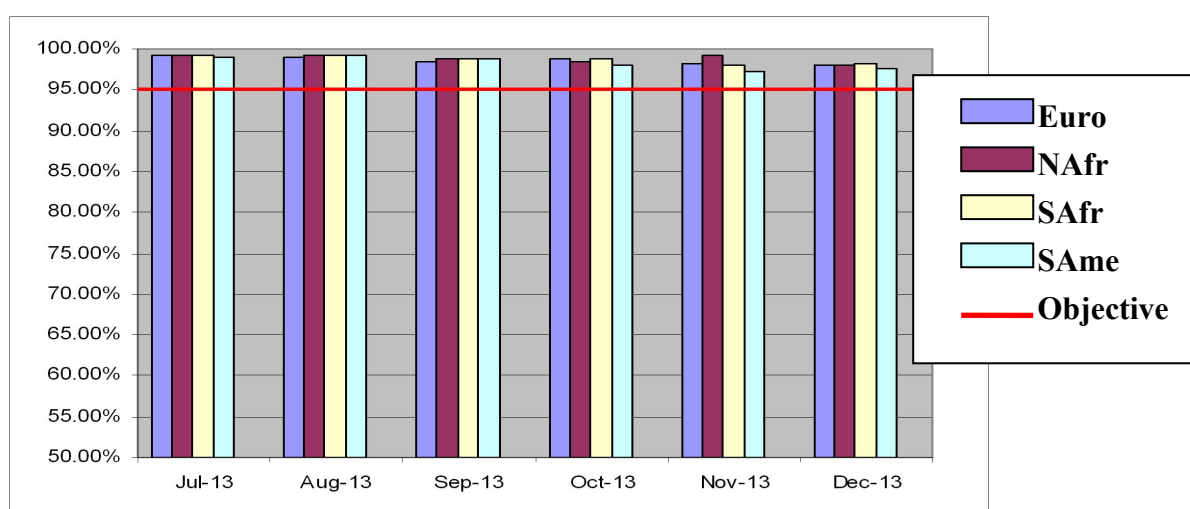
### 3.2.2. Six Month Detailed Performance (by production area)

Table 6 and Figure 4 give an overview of the LSA SAF production system performance by geographical regions. The overall result is above the nominal 95% of production and availability for distribution (NRT or off line).


	July 2013			August 2013			September 2013		
	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)	Scheduled	Actually generated	Success Rate (%)
Europe	13,674	13,558	99.15%	13,674	13,544	99.05%	13,233	13,024	98.42%
North Africa	13,581	13,462	99.12%	13,581	13,476	99.23%	13,143	12,980	98.76%
South Africa	13,581	13,465	99.15%	13,581	13,487	99.31%	13,143	12,985	98.80%
South America	10,605	10,505	99.06%	10,605	10,529	99.28%	10,263	10,132	98.72%
<b>Totals</b>	<b>51,429</b>	<b>50,990</b>	<b>99.12%</b>	<b>51,441</b>	<b>51,036</b>	<b>99.22%</b>	<b>49,782</b>	<b>49,121</b>	<b>98.68%</b>

	October 2013			November 2013			December 2013		
	Scheduled	Actually generated	Success Rate	Scheduled	Actually generated	Success Rate	Scheduled	Actually generated	Success Rate
Europe	13,674	13,507	98.78%	13,233	12,991	98.17%	13,674	13,406	98.04%
North Africa	13,581	13,367	98.42%	13,143	13,035	99.18%	13,581	13,306	97.98%
South Africa	13,581	13,415	98.78%	13,143	12,890	98.08%	13,581	13,332	98.17%
South America	10,605	10,395	98.02%	10,263	9,972	97.16%	10,605	10,361	97.70%
<b>Totals</b>	<b>51,441</b>	<b>50,684</b>	<b>98.50%</b>	<b>49,782</b>	<b>48,888</b>	<b>98.15%</b>	<b>51,441</b>	<b>50,405</b>	<b>97.97%</b>

**Table 6 - Products generation by area (6 Months)**



**Figure 4 – Products generation by area (6 Months)**

	<b>Operations Semester Report 2013/S2</b>	Doc No: <b>SAF/LAND/IPMA/OSR/02/2013/1.1</b> Issue: <b>1.1</b> Date: <b>2014/10/08</b>
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### 3.2.3. Six Month Detailed Dissemination Performance

The Table 7 shows the FTP dissemination performance of the LSA SAF divided into 4 classes: EUMETCast (NRT), Web (user requests by webpage catalogue), SAFMIL (NRT FTP server) and regular users (FTP direct dissemination to the user server, also NRT).

The UMARF dissemination remains closed to the users. Web services were resumed on the 3<sup>rd</sup> of December of 2013 allowing the automatic order of products (i.e., without written requests to the helpdesk) from 2009 onwards. This situation will change after the implementation of a new archive system (by the end of first semester of 2014.).

The EUMETCast dissemination service shows figures above 97%.

Note: not all products are distributed by EUMETCast and therefore the number of scheduled values is smaller than the production values. The problems on the DM (Dissemination Manager) are responsible for the unsuccessful values.

F T P	July 2013			August 2013			September 2013		
	Scheduled	Actually disseminated	Success Rate (%)	Scheduled	Actually disseminated	Success Rate (%)	Scheduled	Actually disseminated	Success Rate (%)
<b>EUMETCast</b>	72,685	72,614	99.90%	72,147	72,080	99.91%	70,284	70,234	99.93%
<b>Web</b>	0	0	0.00%	0	0	0.00%	0	0	0.00%
<b>SAFMIL</b>	0	0	0.00%	0	0	0.00%	0	0	0.00%
<b>UMARF</b>	0	0	0.00%	0	0	0.00%	0	0	0.00%
<b>Regular users</b>	93,839	92,165	98.22%	93,979	92,036	97.93%	91,643	89,489	97.65%
<b>TOTAL</b>	<b>166,524</b>	<b>164,779</b>	<b>98.95%</b>	<b>166,126</b>	<b>164,116</b>	<b>98.79%</b>	<b>161,927</b>	<b>159,723</b>	<b>98.64%</b>
F T P	October 2013			November 2013			December 2013		
	Scheduled	Actually disseminated	Success Rate (%)	Scheduled	Actually disseminated	Success Rate (%)	Scheduled	Actually disseminated	Success Rate (%)
<b>EUMETCast</b>	72,522	72,450	99.90%	69,856	69,825	99.96%	73,332	73,240	99.87%
<b>Web</b>	0	0	0.00%	0	0	0.00%	1625	1622	99.82%
<b>SAFMIL</b>	0	0	0.00%	0	0	0.00%	0	0	0.00%
<b>UMARF</b>	0	0	0.00%	0	0	0.00%	0	0	0.00%
<b>Regular users</b>	92,572	90,573	97.84%	88,982	87,069	97.85%	94,898	92,869	97.86%
<b>TOTAL</b>	<b>165,094</b>	<b>163,023</b>	<b>98.75%</b>	<b>158,838</b>	<b>156,894</b>	<b>98.78%</b>	<b>169,855</b>	<b>167,731</b>	<b>98.75%</b>

**Table 7 – MSG dissemination (6 Months) by method**



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Table 8 shows the end-to-end results for the MSG products, the dissemination values are above the 95 % threshold with the exception of SC for the month of December.

	July 2013			August 2013			September 2013		
	Scheduled	Actual received Orders	Success Rate (%)	Scheduled	Actual received Orders	Success Rate (%)	Scheduled	Actual received Orders	Success Rate (%)
AL	124	123	99.19%	124	118	95.16%	120	117	97.50%
LST	11,904	11,792	99.06%	11,904	11,699	98.28%	11,520	11,368	98.68%
DSLFF	5,952	5,895	99.04%	5,952	5,850	98.29%	5,760	5,687	98.73%
DSSF	5,952	5,896	99.06%	5,952	5,841	98.14%	5,760	5,688	98.75%
SC	124	123	99.19%	124	116	93.55%	120	119	99.17%
VEGA	372	372	100.00%	372	354	95.16%	360	354	98.33%
ET	5,952	5,889	98.94%	5,952	5,836	98.05%	5,760	5,681	98.63%
FRPPIXEL	11,904	11,575	97.24%	11,904	11,704	98.32%	11,520	11,372	98.72%
FRPGRID	744	725	97.45%	744	728	97.85%	720	718	99.72%
FDeM	8,928	8,859	99.23%	8,928	8,788	98.43%	8,640	8,544	98.89%
<b>Total</b>	<b>51,956</b>	<b>51,249</b>	<b>98.64%</b>	<b>51,956</b>	<b>51,034</b>	<b>98.23%</b>	<b>50,280</b>	<b>49,648</b>	<b>98.74%</b>

	October 2013			November 2013			December 2013		
	Scheduled	Actual received Orders	Success Rate (%)	Scheduled	Actual received Orders	Success Rate (%)	Scheduled	Actual received Orders	Success Rate (%)
AL	124	124	100.00%	120	119	99.17%	124	124	100.00%
LST	11,904	11,680	98.12%	11,520	11,258	97.73%	11,904	11,617	97.59%
DSLFF	5,952	5,844	98.19%	5,760	5,632	97.78%	5,952	5,757	96.72%
DSSF	5,952	5,842	98.15%	5,760	5,633	97.80%	5,952	5,752	96.64%
SC	124	123	99.19%	120	119	99.17%	124	109	<b>87.90%</b>
VEGA	372	369	99.19%	360	357	99.17%	372	372	100.00%
ET	5,952	5,833	98.00%	5,760	5,633	97.80%	5,952	5,742	96.47%
FRPPIXEL	11,904	11,688	98.19%	11,520	11,266	97.80%	11,904	11,795	99.08%
FRPGRID	744	736	98.92%	720	713	99.03%	744	730	98.12%
FDeM	8,928	8,871	99.36%	8,640	8,609	99.64%	8,928	8,897	99.65%
<b>Total</b>	<b>51,956</b>	<b>51,110</b>	<b>98.37%</b>	<b>50,280</b>	<b>49,339</b>	<b>98.13%</b>	<b>51,956</b>	<b>50,895</b>	<b>97.96%</b>


**Table 8 – MSG end-to-end dissemination (6 Months) by product;**

	<b>Operations Semester Report 2013/S2</b>	Doc No: SAF/LAND/IPMA/OSR/02/2013/1.1 Issue: 1.1 Date: 2014/10/08
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## 4. Algorithms Versioning

### 4.1. Operational and pre-operational algorithms version information

Algorithm	Version	Date	Description
AL2 (Daily Albedo)	6.2	07/07/2008	N/A
	6.1	Nov 2006	N/A.
	6.0	13/09/2006	Code generation BRDF and Albedo product files (recursive and/or one-day composition) based on daily time series of AL1 output and recursive use of the last BRDF output.
	5.1	14/12/2005	N/A
	5.0	03/08/2005	N/A
DSSF	1.13	11/4/2008	Attribute changes: spectral_channel_id attribute was corrected both for input control and output. - product_type attribute was corrected. ("LSADSSF") - time_range attribute was corrected. ("30-min") The algorithm can run with or without the output validation file, so, the relative namelist is now optional.
	1.12	13/09/2006	Differences to the new version are mainly concerned with scientific aspects of the cloudy sky method.
	1.11	21/02/2006	N/A
	1.10	25/05/2005	N/A
	1.9	08/10/2004	N/A
	1.8	23/04/2004	N/A
DSLIF	6.1	07/07/2009	For remote sensing retrievals at the pixel scale, DSLIF results from the contribution of clear and cloudy portions of atmosphere: $DSLIF = nF_{cloudy} + (1-n)F_{clear}$ where n (0=cloud free; 1=cloud filled; 0.5=partially cloudy) is the cloud fraction obtained from visible and infrared images. Both the $F_{clear}$ and $F_{cloudy}$ consist of a modified version of the bulk parameterization first proposed by Prata (1996), for clear sky only.
	5.4	07/04/2008	All attributes dynamically read from the inputs
	5.3	06/03/2008	Compliant with UMARF metadata
	5.2	13/09/2006	N/A
	5.1	12/12/2005	N/A
LST	7.7	1/08/2013	-correction of the gsw_algo comparison for BT missing values. -bug correction on errorbar coef reading.
	7.2	17/02/2009	Inland waters included
	7.1	28/08/2008	N/A
	6.2	07/04/2008	Update to generate only LST products
	4.2	08/11/2007	N/A
	5.0	19/09/2006	N/A
	4.2	17/01/2006	N/A
	4.1	08/01/2006	N/A
MTAL	1.1.1	29/04/2009	Changed product name designation to MTAL
	1.1	17/02/2009	First release on deployed.
SC	2.10.2	31/03/2009	N/A
	2.02	25/07/2007	N/A
	1.12	25/06/2006	N/A
	1.11	19/12/2005	N/A

	<b>Operations Semester Report 2013/S2</b>	<b>Doc No: SAF/LAND/IPMA/OSR/02/2013/1.1</b> <b>Issue: 1.1</b> <b>Date: 2014/10/08</b>
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Algorithm	Version	Date	Description
ET	4.0.3	9/04/2010	Implemented 2 minor modifications allowing to distinguish between sea/space pixels and non-processed pixels over land (in current version -4.0.2- non-processed pixels over land, sea and space pixels had the same QF (-1)) . Memory allocation procedure has been enhanced.
	4.0.2	8/02/2010	The values for the following attributes were changed: -PRODUCT_ALGORITHM_VERSION: 4.0.1 => PRODUCT_ALGORITHM_VERSION: 4.0.2 -SATELLITE: MSG (10 times) => SATELLITE: MSG-2 -INSTRUMENT_ID: SEVI (10 times) => INSTRUMENT_ID: SEVI
	4.0.1	23/11/2009	- Avoid negative ET values and to set missing ET values effectively to -1 instead of -10000 == ET*scaling_factor. - Account for a DLSF QF value that lead to unprocessed lines in early morning and night..
	4.0	09/09/2009	- Runs over full MSG disk(4 regions) while V03 only over Europe - Corrections of instabilities that in version 03 led to systematic non-processed areas. - Generates skin temperature as additional output.
	0.3	19/10/2006	N/A
FDeM	3.0.1	19/12/2011	The output file with METADATA in the name is now called "QualityProduct" instead.
FRPPIXEL	1.3	14/09/2009	.Modification of the FRP estimation and implementation of a new method for the estimation of the FRP error. . Global and dataset attributes checked and updated as needed. . Storing of all error terms (as requested by Martin). . Bug fix for one term of the FRP error. . Fixed bugs on the dataset labels. . Correction of some attributes value to be compliant with the UMARF specifications
	0.91	04/08/2008	N/A
	0.82	05/05/2008	N/A
FRM	0.53	14/09/2011	Problem of product's metadata corrected
	0.3	01/02/2012	The Fire Risk Map product generates forecasts for 24, 48 and 72 hours and it's now called FRM instead of RFM (Risk of Fire Mapping)
VEGA	2.1	05/05/2008	N/A
	2.0	13/09/2006	N/A
	1.2	06/03/2006	N/A
	1.1	12/01/2006	N/A
	1.0	28/09/2005	N/A

**Table 9 - Operational & Pre-operational algorithms version information (Last 24 Months)**

#### 4.2. Development algorithms version information

Algorithm	Version	Date	Description
AL1	6.1.5	17/10/2006	N/A
TSP	3.0	N/A	N/A
	2.0	N/A	N/A
	1.0	N/A	N/A

**Table 10 - Development algorithms version information (Last 24 Months)**

	<b>Operations Semester Report 2013/S2</b>	Doc No: <b>SAF/LAND/IPMA/OSR/02/2013/1.1</b> Issue: <b>1.1</b> Date: <b>2014/10/08</b>
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### 4.3. Pre-processing algorithms version information

Algorithm	Version	Date	Description
MSG	3.11	6/02/2009	N/A
	3.10	11/04/2008	Parameters for the Radiance to Brightness Temperature conversion updated
	3.8	19/12/2007	Parameters for the Radiance to Brightness Temperature conversion updated
	3.5	22/11/2006	Write dynamically "Satellite ID" attribute.
	3.2	10/04/2006	N/A
CLIMA	1.3	11/04/2008	Add RWHDF5_v7.2
	1.2	17/05/2007	N/A
NWC (concerns internal pre-processing of the output of the NWC SAF software)	1.7	7/08/2009	Correct minor bug: Initialize all dataset attributes
	1.6	11/04/2008	Add RWHDF5_v7.2
	1.5	17/05/2007	Wrapper version
	1.3	04/04/2006	N/A
	1.2	N/A	N/A
	1.1	13/04/2006	N/A
ECMWF	1.0	26/10/2005	N/A
	7.8	12/01/2012	- Reading new static file with 2 more fields: orog & lwmask @ 1.25deg - Adapted to process AOD550 data - Adapted to retrieve PACC24 up to 3-day using both runs: 00 & 12.
	7.0	7/07/2009	- An altitude correction is applied to the Temperature parameters: 2T & 2D - The scale factor of precipitation parameters changed to 10000 - Adapted to deal with Disk & Global data in 0.25X0.25deg resolution. - Now is reading a new static file with 2 fields: ECMWF LSM & Z for 2 regions: global or disk in different resolutions: 0.25, 0.5 or 1.0deg.
	6.0	17/02/2009	The code was adapted to produce a new daily field: precipitation accumulated in 24hours (PACC24), composed by LSP & CP parameters from ECMWF model.
	5.10	11/04/2008	Add RWHDF5_v7.2 Interpolation Algorithm changed
	5.8	02/08/2007	N/A
	5.5	14/12/2006	- Interpolation method used to perform spatial interpolation for parameters: 2D, 2T and TCWV changed from bicubic to bilinear. - Land/water mask is now also applied to 2D, 2T and TCWV parameters - Close PreProcessingConfigFile before return in ERROR situations. - Correct minor bugs
	5.2	14/02/2006	N/A
	5.1	N/A	N/A
	5.0	05/01/2006	N/A

**Table 11 - Pre-processing algorithms version information (Last 24 Months)**

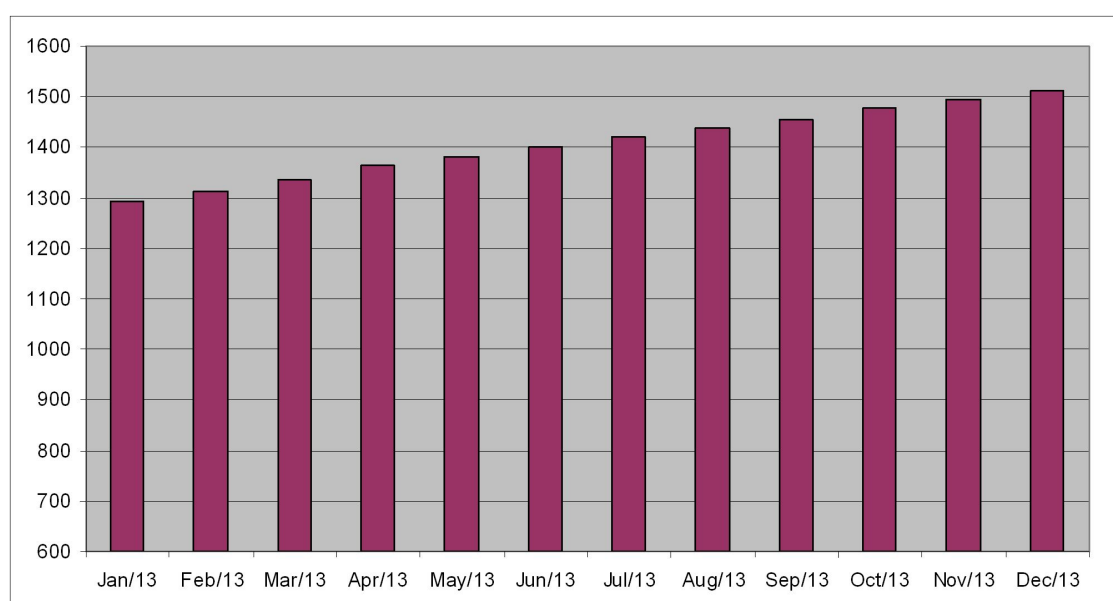
## 5. Web Site Services

This sub section shows the evolution of registered users of services provided by the LSA SAF system and EUMETSAT.

It is worth to notice that might be individual users registered services EUMETCAST and Web site.

### 5.1. Registered Users

The following figure shows the number of users of the LSA SAF web site with a total of 1512 users (external and beta users) registered at the end of the 2<sup>nd</sup> semester of 2013.



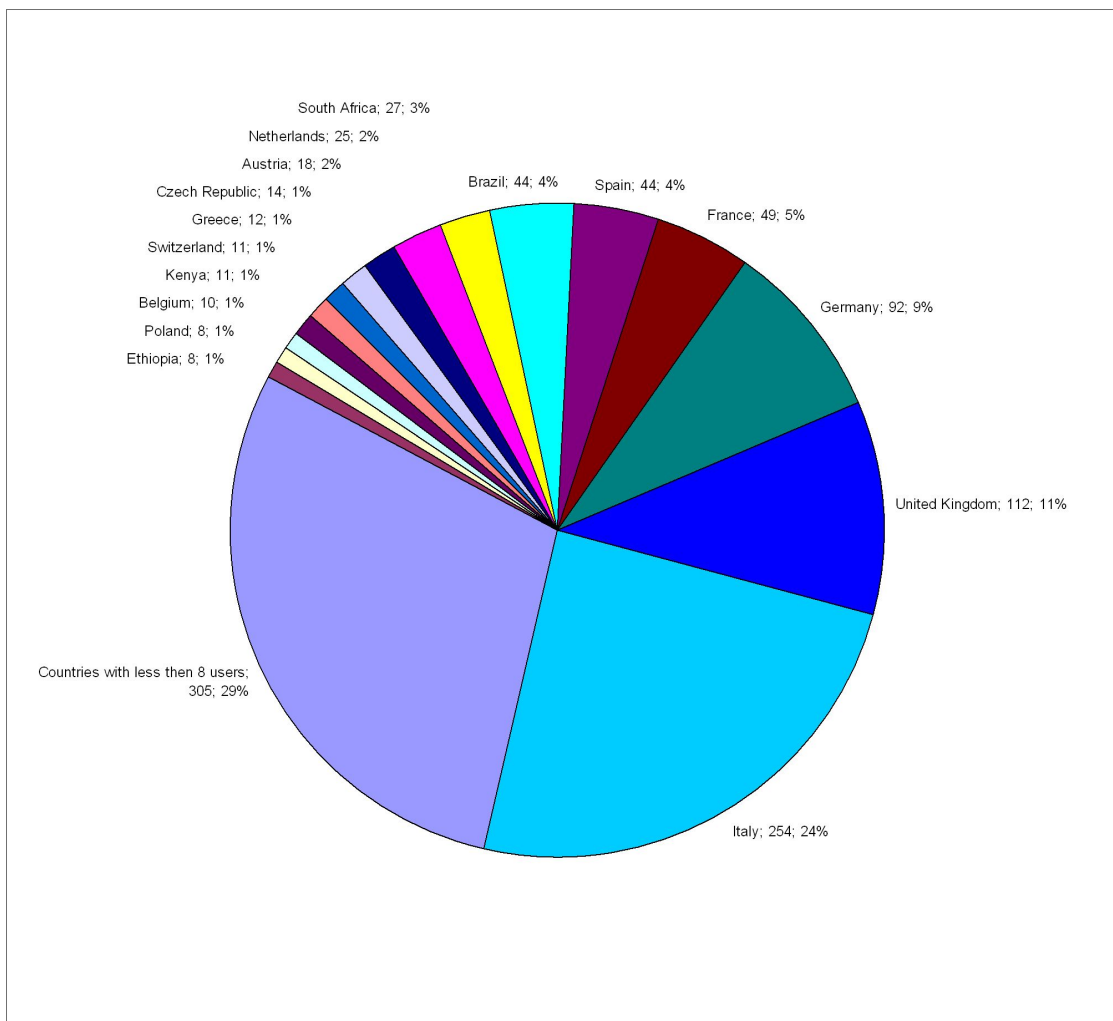
**Figure 5 – Registered Users**

### 5.2. EUMETCast Users by Country

The chart below shows the distribution of EUMETCast users by country as provided by EUMETSAT (on 15/08/2013). The group “Countries with less then 8 users” comprises the following countries:

Armenia ( 1 ); Bahrain ( 1 ); Belarus ( 1 ); Benin ( 1 ); Bolivia, Plurinational State Of ( 1 ); Bosnia And Herzegovina ( 1 ); Canada ( 1 ); Chile ( 1 ); Colombia ( 1 ); Costa Rica ( 1 ); Croatia ( 1 ); Cuba ( 1 ); Cyprus ( 1 ); Dominican Republic ( 1 ); Ecuador ( 1 ); El Salvador ( 1 ); Guatemala ( 1 ); Haiti ( 1 ); Honduras ( 1 ); Iceland ( 1 ); India ( 1 ); Isle Of Man ( 1 ); Jordan ( 1 ); Kuwait ( 1 ); Latvia ( 1 ); Libyan Arab Jamahiriya ( 1 ); Lithuania ( 1 ); Luxembourg ( 1 ); Macedonia, The Former Yugoslav Republic Of ( 1 ); Martinique ( 1 ); Mexico ( 1 ); Moldova, Republic Of ( 1 ); Nicaragua ( 1 ); Oman ( 1 ); Panama ( 1 ); Paraguay ( 1 ); Reunion ( 1 ); San Marino ( 1 ); Slovenia ( 1 ); Somalia ( 1 ); Syrian Arab Republic ( 1 ); Uruguay ( 1 ); Uzbekistan ( 1 ); Venezuela, Bolivarian Republic Of ( 1 ); Viet Nam ( 1 ); Yemen ( 1 ); Albania ( 2 ); Bulgaria ( 2 ); Burundi ( 2 ); Cameroon ( 2 ); Cape Verde ( 2 ); Central African Republic ( 2 ); China ( 2 ); Comoros ( 2 ); Congo ( 2 ); Djibouti ( 2 ); Egypt ( 2 ); Equatorial Guinea ( 2 ); Estonia ( 2 ); Gabon ( 2 ); Gambia ( 2 ); Guinea ( 2 ); Guinea-Bissau ( 2 ); Iran, Islamic Republic Of ( 2 );

Lebanon ( 2 ); Liberia ( 2 ); Malta ( 2 ); Mauritania ( 2 ); Peru ( 2 ); Qatar ( 2 ); Sao Tome And Principe ( 2 ); Saudi Arabia ( 2 ); Seychelles ( 2 ); Sierra Leone ( 2 ); Togo ( 2 ); Tunisia ( 2 ); Ukraine ( 2 ); Angola ( 3 ); Burkina Faso ( 3 ); Chad ( 3 ); Eritrea ( 3 ); Iraq ( 3 ); Kazakhstan ( 3 ); Lesotho ( 3 ); Madagascar ( 3 ); Malawi ( 3 ); Mali ( 3 ); Norway ( 3 ); Serbia ( 3 ); Swaziland ( 3 ); Sweden ( 3 ); Zambia ( 3 ); Algeria ( 4 ); Congo, The Democratic Republic Of The ( 4 );  
The number in brackets indicates the number of users of that country.



**Figure 6 – EUMETCast Users by Country, as provided by EUMETSAT (on 15/08//2013)**

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

## 6. Helpdesk

During the 2<sup>nd</sup> semester of 2013, 87 users made 117 queries to the Helpdesk namely:

- (i) 27 reports of problems related with the LSA SAF website and FTP server (FTP, password, logins, etc);
- (ii) 72 requests of data that exceeded the threshold volume for web site dissemination or that were unavailable;



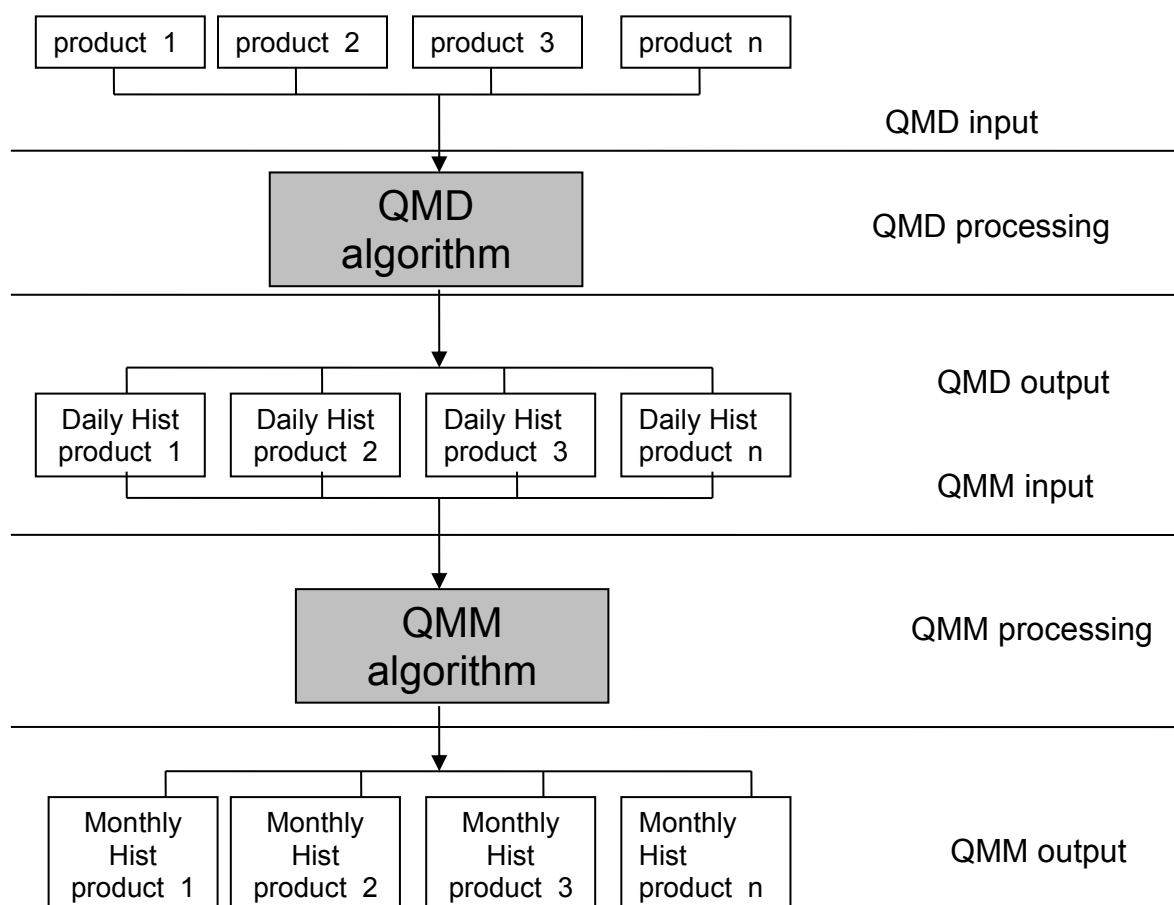
- (iii) 18 questions on data availability, data format, science and tools for manipulation and visualization of data.

The average time of first response to the users, for 95% of the cases, was 2 working days. The average time for closing a ticket was 7 working days.

## 7. Quality monitoring of LSA SAF products

### 7.1. Main characteristics:

The quality monitoring algorithm is common to all LSASAF products and follows the scheme given in Figure 7. It is based on the analysis of daily and monthly product histograms taking into consideration missing slots and non-processed pixels.



**Figure 7 – Diagram of quality monitoring processing**

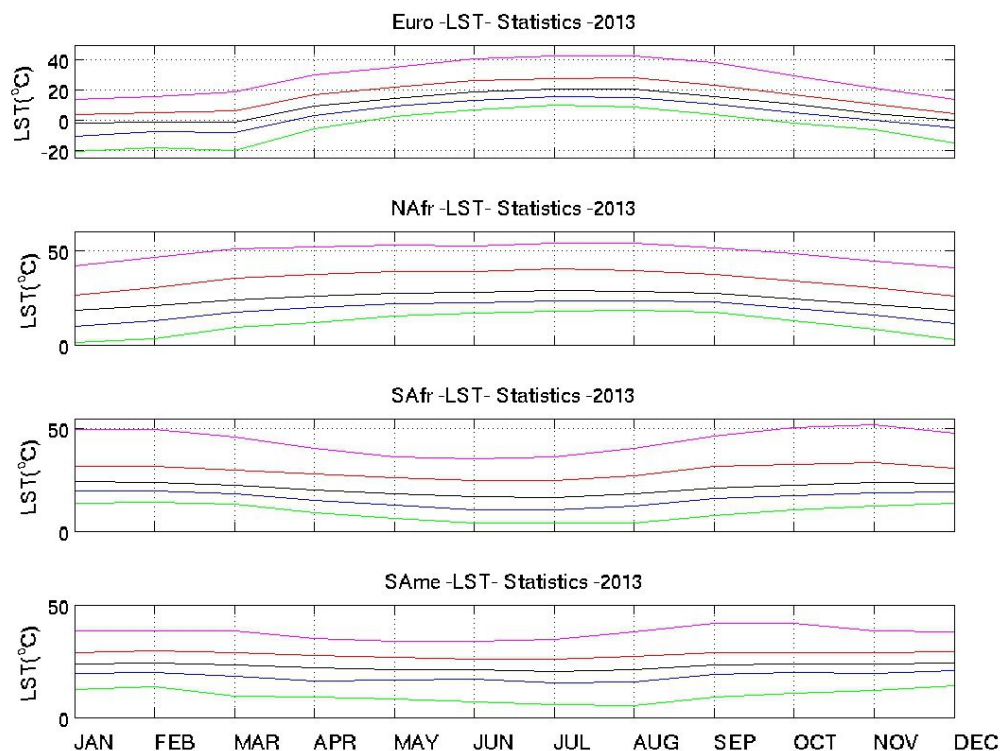
Daily ASCII files are produced with information that can be used to monitor the algorithm performance. Each file has the following information:

- 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, area 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 2013 monthly distributions of percentiles 5, 25, 50, 75 and 95 are presented for each product in the four LSASAF production areas. It should be noted that “previous statistics” concern the year of 2011, since no analysis of generated products was performed in 2012.

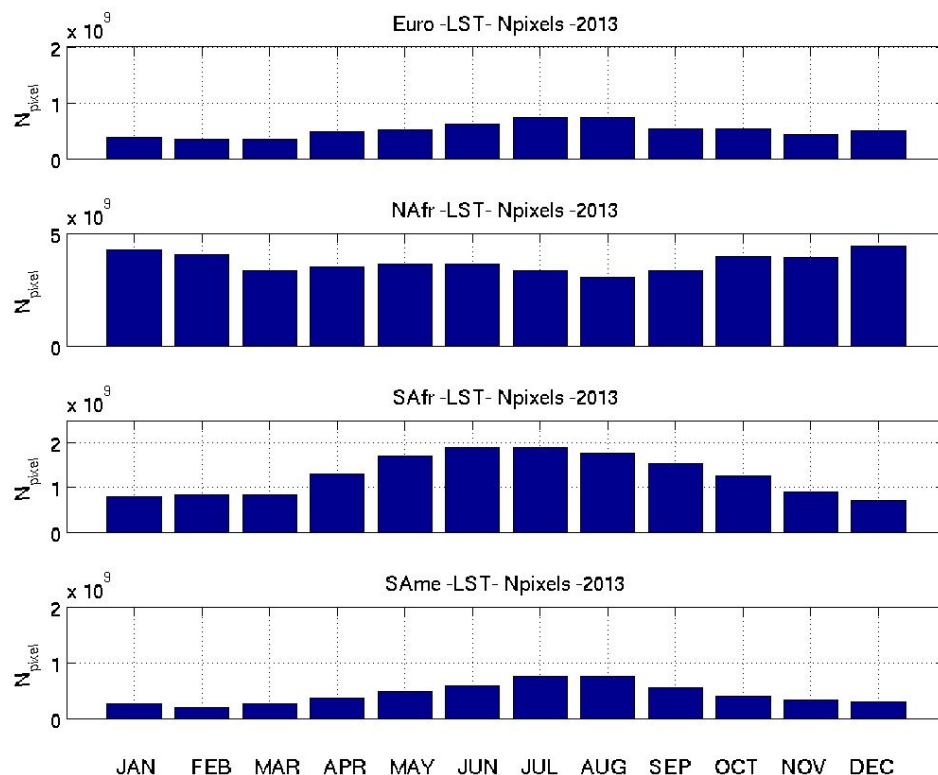
## 7.2. LST



**Figure 8 – LST statistics from January to December 2013, 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 -50°C to 70°C. Notice different scales for areas Euro and SAme**

The LST seasonal cycle is well described by the statistics. Euro LST has a more pronounced seasonal variation than the remaining areas (Figure 8). For this region the lower values of LST are found in January-February period for all statistics (Table 12). Also, in this area, the March LST percentile 25 and the median are close to the correspondent January-February values indicating, for the first month of spring, a large number of LST cold pixels. The statistics for NAfr area show lower LST values in December-January period and maximum values approximately in the same period of area Euro. However a much weaker seasonal variation is observed from NAfr statistics. As expected, the seasonal cycle is inverted in the Southern Hemisphere. The South America LSASAF region, due to the large area of rain forest covered, is characterized by a weak cycle and a small variability since all statistics are very similar.

Figure 9 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 LSASAF Southern Hemisphere areas is reflected by the comparatively low number of computed pixels in these regions for the January-February and November-December periods.

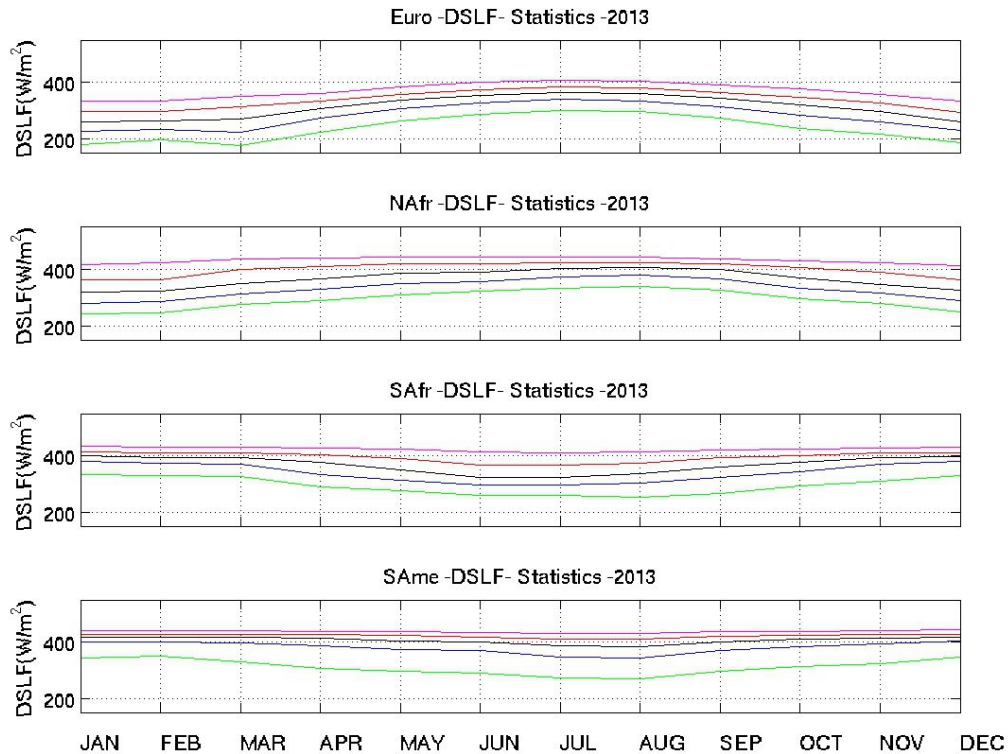


**Figure 9 – LST: total number of processed pixels (with non-missing values) from January to December 2013, for each area**

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
<b>JAN13</b>	-11.0	9.9	19.6	19.4	-1.9	18.1	24.3	23.5	3.9	26.5	31.8	28.9	-3.2	18.9	26.8	24.2
<b>FEB13</b>	-7.5	12.7	19.4	20.2	-1.1	20.8	24.0	24.0	4.6	30.2	31.6	29.4	-1.4	22.0	26.6	24.9
<b>MAR13</b>	-8.3	17.2	18.3	18.4	-1.1	23.9	22.6	23.3	6.2	35.2	29.6	28.7	-1.1	26.4	24.8	23.4
<b>APR13</b>	3.1	19.9	15.0	16.2	9.0	25.9	20.1	22.2	16.7	37.0	27.8	27.4	10.2	28.6	21.9	22.0
<b>MAY13</b>	9.0	21.9	12.8	16.6	14.1	27.5	18.3	21.3	22.0	38.8	26.0	26.6	15.9	30.4	19.6	21.3
<b>JUN13</b>	13.3	22.5	10.6	17.0	18.8	27.7	16.7	21.1	26.4	39.0	24.8	25.9	20.5	30.8	17.8	21.0
<b>JUL13</b>	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
<b>AUG13</b>	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
<b>SEP13</b>	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
<b>OCT13</b>	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
<b>NOV13</b>	-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
<b>DEC13</b>	-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

**Table 12 - LST statistics for 2013, for each area**

### 7.3. DSLF

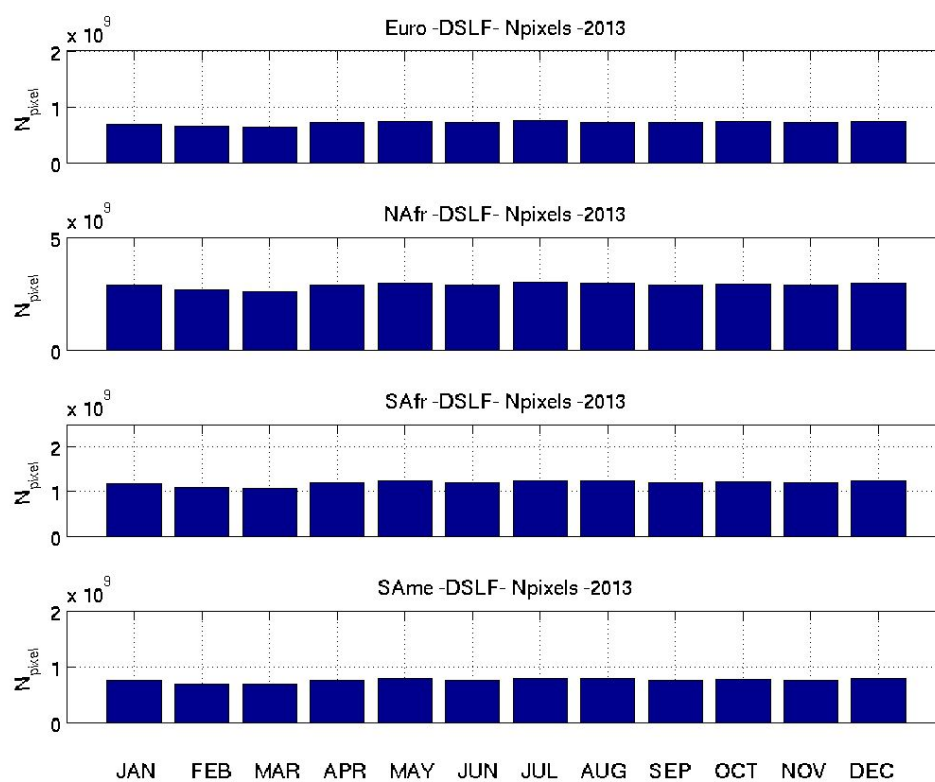


**Figure 10 – DSLF statistics from January to December 2013, for each area. Green – percentile 5, Blue – percentile 25, Black – Median, Red – percentile 75 and Magenta percentile 95 computed from 200 histogram classes from 100 W/m<sup>2</sup> to 600 W/m<sup>2</sup>**

DSLF statistics have the expected behaviour: a smooth seasonal cycle with increasing values, in the Northern Hemisphere, from March to June and decreasing values in Southern Hemisphere for the same months (Figure 10 and Table 13). 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 11) 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.

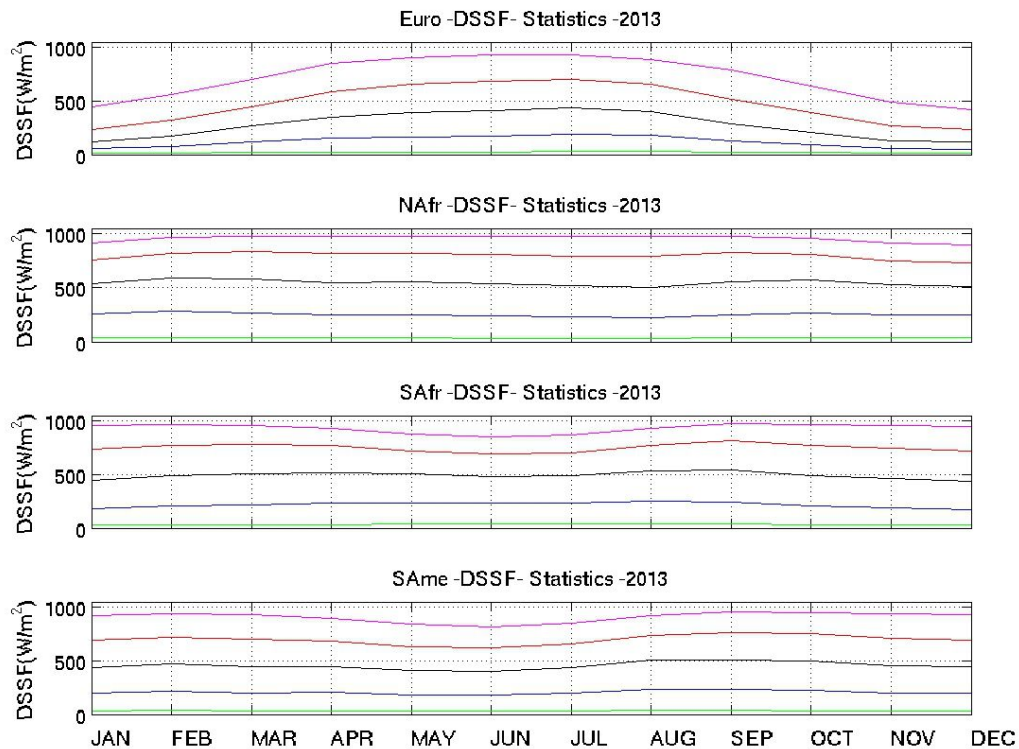


**Figure 11 – As in Figure 9, but for DSLF**

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
<b>JAN13</b>	224	280	380	401	258	319	399	418	295	361	414	428	257	321	392	408
<b>FEB13</b>	232	285	374	400	262	321	395	418	295	363	411	428	262	324	389	408
<b>MAR13</b>	224	313	369	398	268	348	393	418	313	399	410	428	265	352	386	405
<b>APR13</b>	272	328	335	386	305	365	376	414	333	410	405	426	299	365	367	397
<b>MAY13</b>	305	347	314	374	336	384	349	405	358	417	390	423	329	379	349	390
<b>JUN13</b>	327	355	295	369	353	389	324	399	374	418	366	418	347	384	329	385
<b>JUL13</b>	338	371	295	348	364	402	324	387	384	421	366	412	359	394	329	372
<b>AUG13</b>	333	378	303	344	359	406	337	383	379	423	375	412	354	397	336	370
<b>SEP13</b>	314	365	323	369	343	398	359	400	363	418	393	419	336	388	353	387
<b>OCT13</b>	283	331	342	384	321	368	378	410	347	406	402	424	313	365	368	397
<b>NOV13</b>	260	314	369	393	298	346	393	414	327	388	409	426	291	348	384	402
<b>DEC13</b>	229	288	379	403	259	324	398	418	294	362	412	429	259	324	391	409

**Table 13 – As in Table 12, but for DSLF**

## 7.4. DSSF

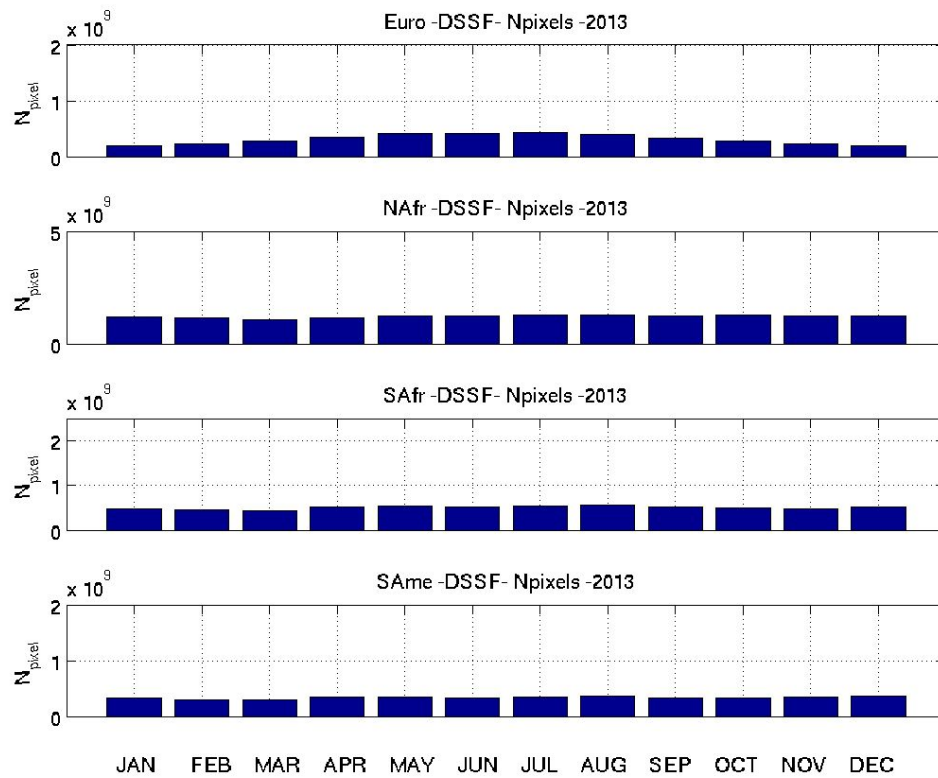


**Figure 12 – DSSF statistics from January to December 2013, for each area. Green – percentile 5, Blue – percentile 25, Black – Median, Red – percentile 75 and Magenta percentile 95 computed from 200 histogram classes from 0.1 W/m<sup>2</sup> to 1000 W/m<sup>2</sup>**

DSSF statistics puts into evidence the seasonal cycle of short-wave radiation flux (Figure 12, Table 14). 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, or high aerosol loads, which tend to smoothen the time-series.

DSSF computed pixels above 0.1 W/m<sup>2</sup> (Figure 13), 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.



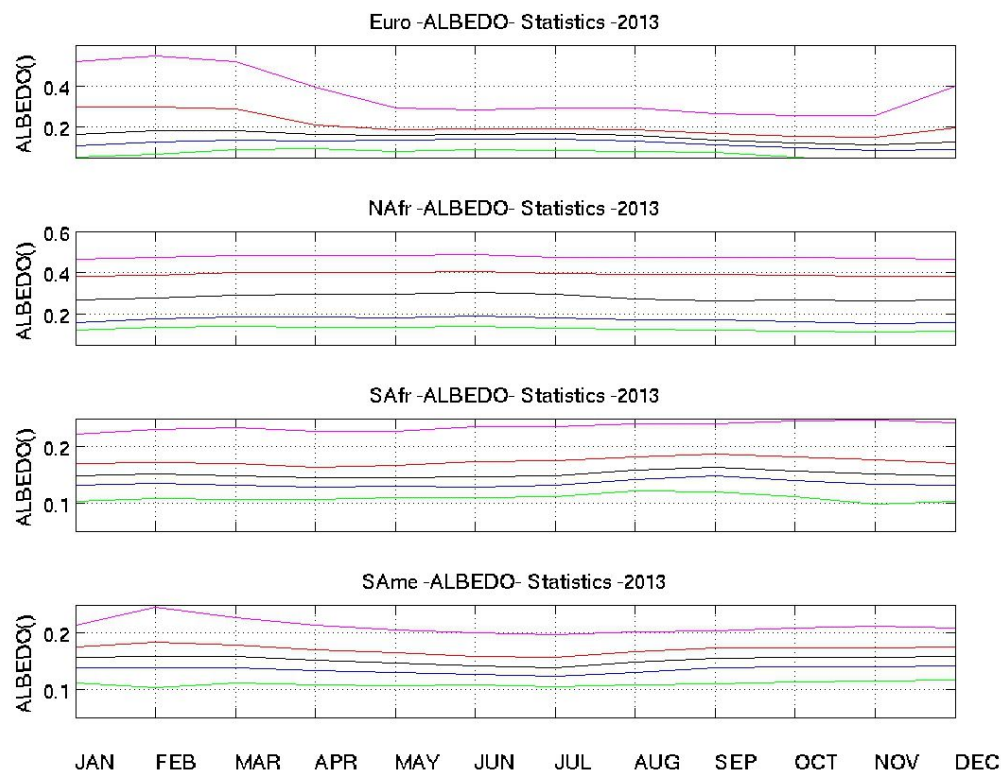


**Figure 13 – DSSF: total number of processed pixels with DSSF above 0.1 W/m<sup>2</sup> from January to December 2013, for each area. Notice the different y-axis scale for area Euro**

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
<b>JAN13</b>	54	261	182	197	118	542	447	438	233	756	736	689	158	507	462	448
<b>FEB13</b>	78	285	204	219	170	593	488	470	320	821	769	720	214	548	487	471
<b>MAR13</b>	122	267	219	201	266	578	508	446	450	833	777	697	299	543	497	454
<b>APR13</b>	151	247	233	205	346	550	520	450	587	815	768	686	379	527	499	450
<b>MAY13</b>	165	248	238	183	388	552	505	406	653	817	717	632	416	528	476	413
<b>JUN13</b>	172	241	231	181	411	538	483	405	682	808	689	619	434	520	460	405
<b>JUL13</b>	186	228	233	202	435	517	488	440	704	796	703	661	449	508	467	434
<b>AUG13</b>	179	222	250	234	405	506	534	503	658	788	775	739	424	502	509	486
<b>SEP13</b>	130	252	246	232	284	557	546	510	516	824	817	766	333	532	525	498
<b>OCT13</b>	95	267	211	221	206	572	493	495	393	809	774	753	255	534	492	488
<b>NOV13</b>	61	250	191	202	132	532	462	456	271	752	746	713	178	500	470	462
<b>DEC13</b>	51	246	175	194	115	515	433	442	235	727	720	696	153	486	451	451

**Table 14 – As in Table 12, but for DSSF**

## 7.5. ALBEDO

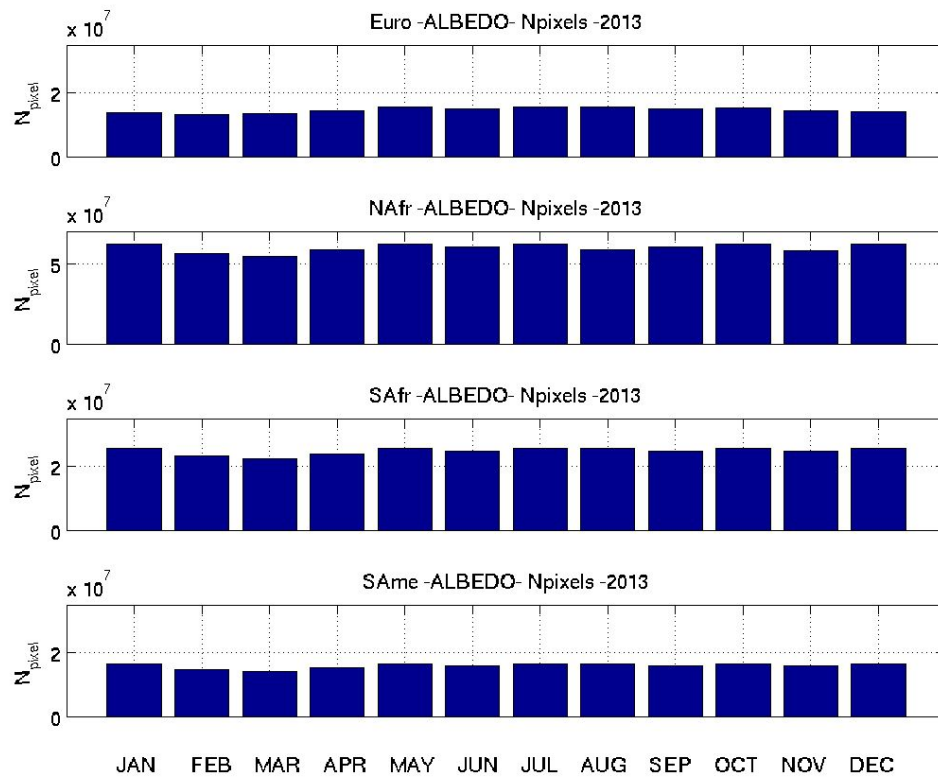


**Figure 14 – ALBEDO (white sky) statistics from January to December 2013, for each area. Green – percentile 5, Blue – percentile 25, Black – Median, Red – percentile 75 and Magenta percentile 95 computed from 100 histogram classes from 0.001 to 0.999. Notice the different y-scales**

The ALBEDO statistics (Figure 14 and Table 15), 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 SAm and SAfr;
- The presence of the Sahara desert in NAfr is responsible for the high values of percentile 75 and 95. Lower ALBEDO values expressed by percentiles 5 and 25 correspond to the vegetated region in the southern part of NAfr;
- The high ALBEDO values in winter months in Europe are likely to correspond to snow cover pixels.

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.

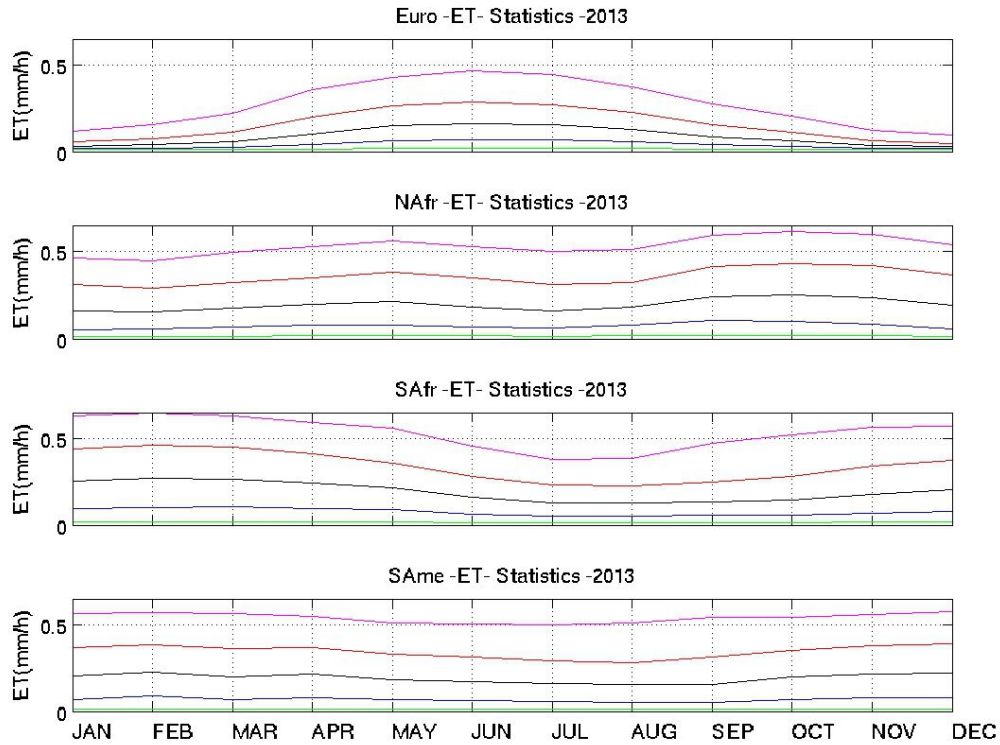


**Figure 15 – As in Figure 9, but for ALBEDO**

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
<b>JAN13</b>	0.11	0.16	0.13	0.14	0.16	0.27	0.15	0.16	0.30	0.38	0.17	0.18	0.21	0.27	0.15	0.16
<b>FEB13</b>	0.13	0.18	0.13	0.14	0.18	0.28	0.15	0.16	0.30	0.39	0.17	0.18	0.22	0.28	0.15	0.16
<b>MAR13</b>	0.13	0.19	0.13	0.14	0.18	0.29	0.15	0.16	0.29	0.40	0.17	0.18	0.22	0.29	0.15	0.16
<b>APR13</b>	0.13	0.18	0.13	0.13	0.16	0.29	0.14	0.15	0.21	0.40	0.16	0.17	0.18	0.29	0.15	0.15
<b>MAY13</b>	0.13	0.18	0.13	0.13	0.16	0.29	0.14	0.15	0.18	0.40	0.17	0.16	0.16	0.29	0.15	0.14
<b>JUN13</b>	0.14	0.19	0.13	0.13	0.17	0.30	0.15	0.14	0.19	0.41	0.17	0.16	0.17	0.30	0.15	0.14
<b>JUL13</b>	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
<b>AUG13</b>	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
<b>SEP13</b>	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
<b>OCT13</b>	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
<b>NOV13</b>	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
<b>DEC13</b>	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

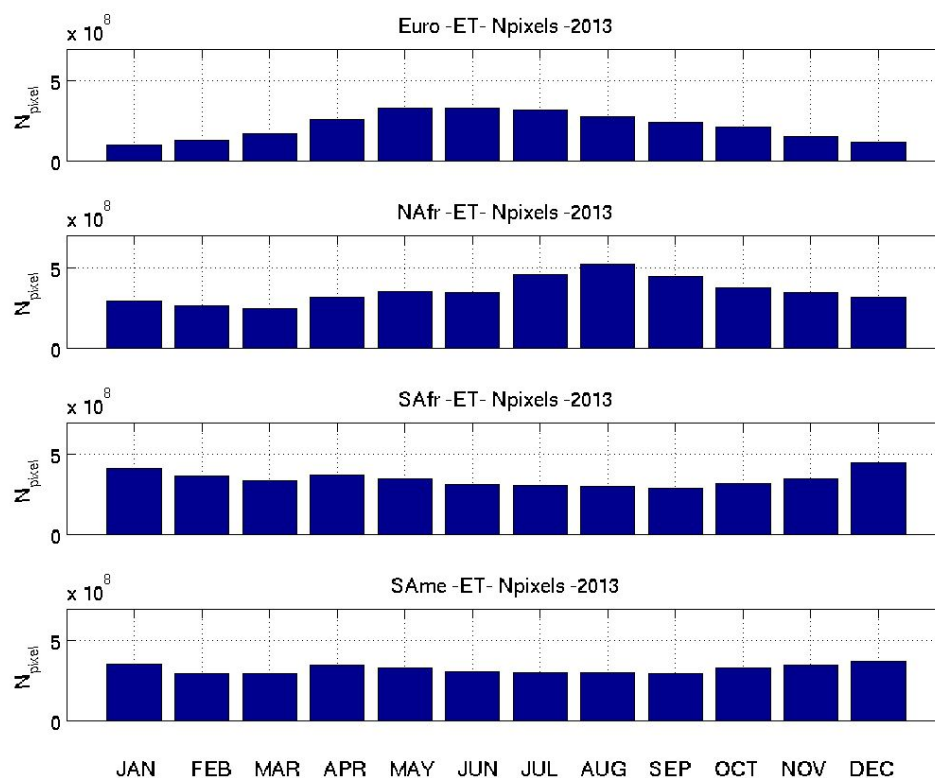
**Table 15 – As in Table 12, but for ALBEDO (white sky).**

## 7.6. ET



**Figure 16 – ET statistics from January to December 2013, 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 12), although ET is also influenced by the vegetation state and soil moisture.



**Figure 17 – As in Figure 9, but for ET**

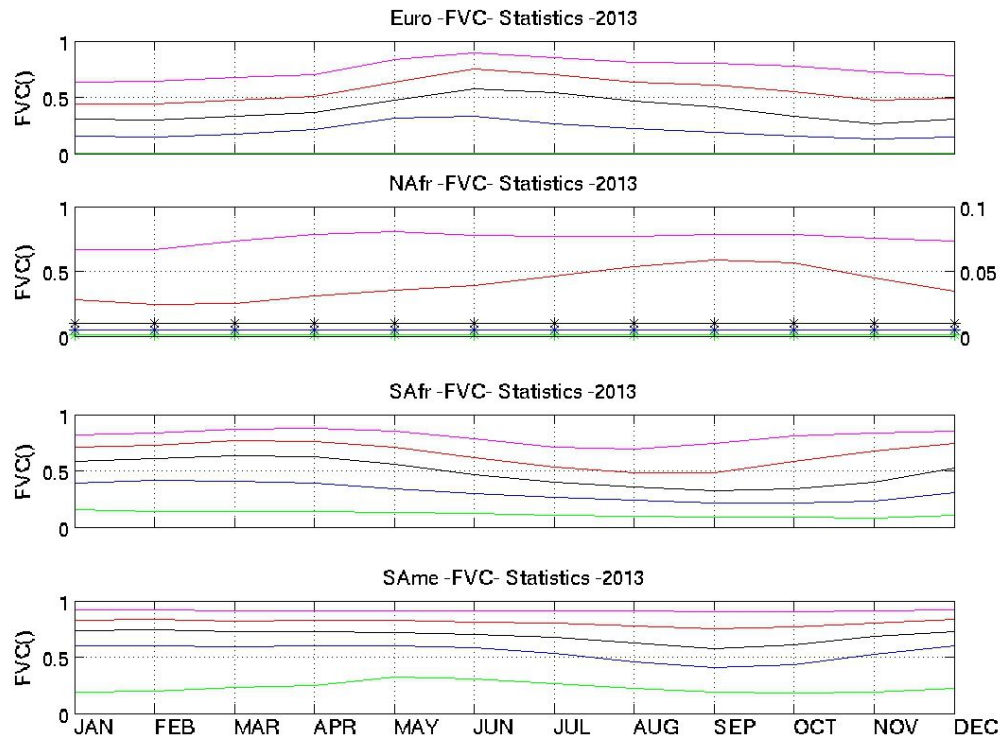
ET should not be affected by, e.g., the occurrence of cloud cover. The seasonal fluctuation in the number of processed pixels in the Euro region is closely associated to snow cover. Snow sublimation is not currently modelled, leading to an increase in the number of non-processed pixels in mid-latitudes winter. The 2013 seasonal cycle does not show significant differences to that observed in 2011.

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
<b>JAN13</b>	0.02	0.05	0.10	0.07	0.03	0.16	0.25	0.21	0.06	0.31	0.44	0.37	0.04	0.19	0.27	0.23
<b>FEB13</b>	0.02	0.05	0.10	0.09	0.04	0.15	0.27	0.23	0.08	0.29	0.46	0.38	0.05	0.18	0.29	0.24
<b>MAR13</b>	0.03	0.07	0.10	0.07	0.06	0.18	0.27	0.20	0.11	0.32	0.45	0.36	0.07	0.20	0.28	0.23
<b>APR13</b>	0.04	0.08	0.09	0.08	0.10	0.20	0.24	0.21	0.20	0.35	0.41	0.37	0.13	0.22	0.26	0.23
<b>MAY13</b>	0.06	0.08	0.09	0.07	0.15	0.21	0.22	0.18	0.26	0.38	0.36	0.33	0.17	0.24	0.23	0.21
<b>JUN13</b>	0.07	0.07	0.06	0.06	0.16	0.18	0.16	0.17	0.29	0.35	0.28	0.31	0.19	0.21	0.18	0.20
<b>JUL13</b>	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
<b>AUG13</b>	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
<b>SEP13</b>	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
<b>OCT13</b>	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
<b>NOV13</b>	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
<b>DEC13</b>	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

**Table 16 – As in Table 12, but for ET**



## 7.7. FVC



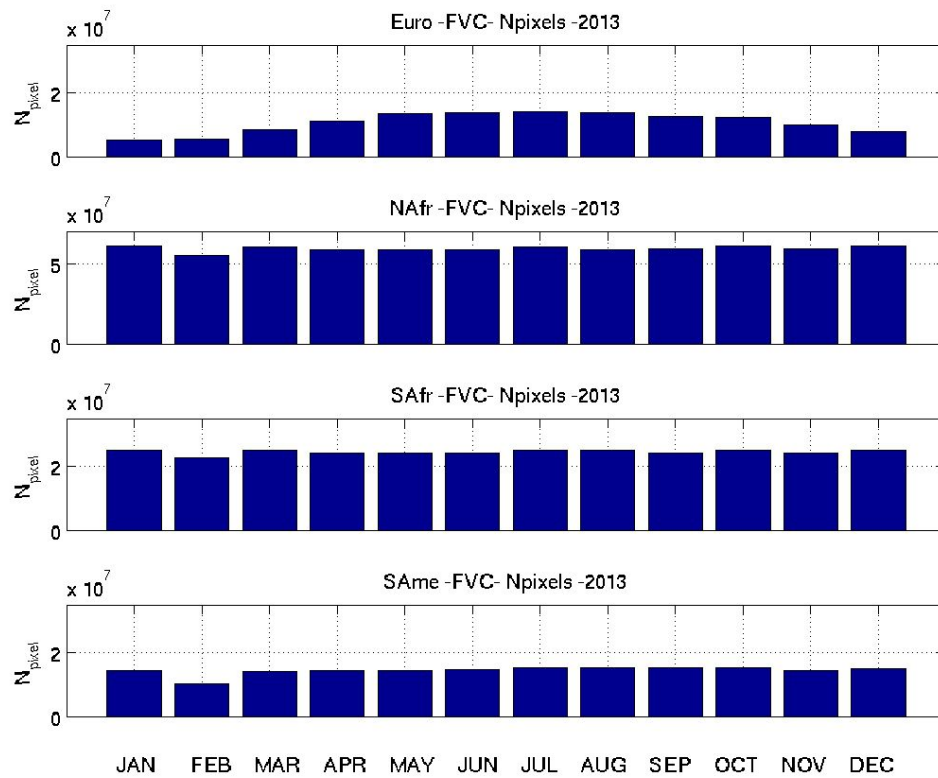
**Figure 18 – FVC statistics from January to December 2013, for each area. Green – percentile 5, Blue – percentile 25, Black – Median, Red – percentile 75 and Magenta percentile 95 computed from 100 histogram classes from 0 to 1. Notice that for NAfr area the median, percentile 5 and percentile 25 have a different y axis scale (on the left hand side of the respective panel)**

The statistics of FVC (Figure 18 and Table 17) 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. In fact about 50% of NAfr area is bare soil and this explains the low values of percentiles 5, 25 and 50. Percentile 75 shows a growing trend, from July to October corresponding to vegetated regions. The seasonal variation of percentile 95 is very smooth and probably corresponds to the evergreen forest areas in NAfr region.
- In South America the presence of the large 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 with high error

bars and are thus classified as missing values. In addition, 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.

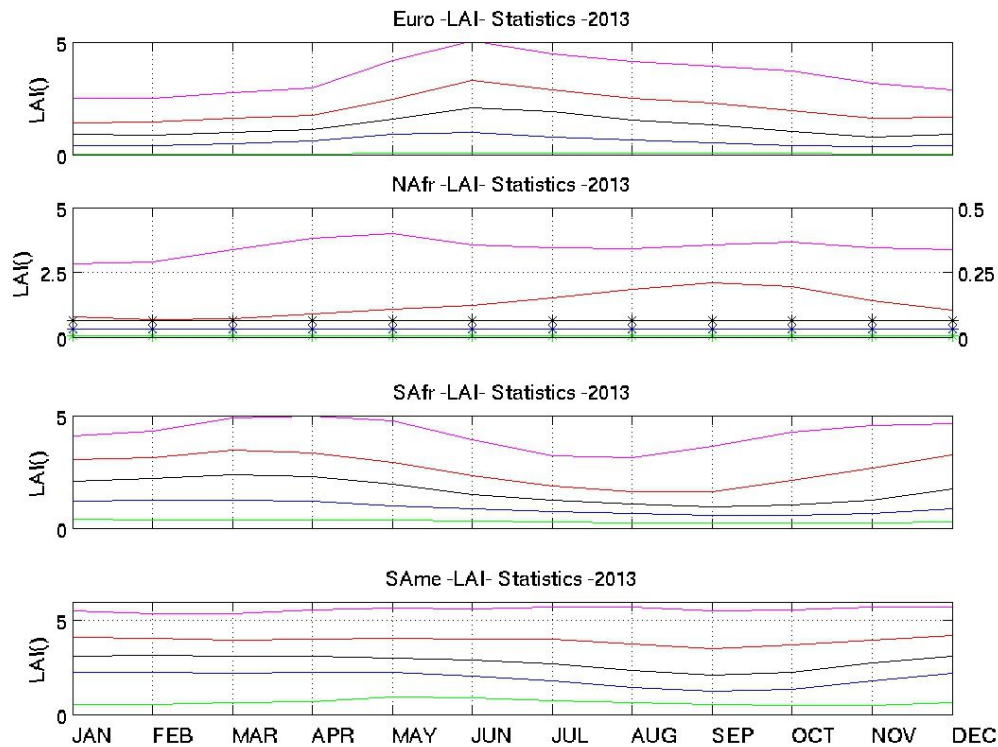


**Figure 19 – As in Figure 9, but for FVC**

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
<b>JAN13</b>	0.15	0.00	0.39	0.60	0.31	0.01	0.59	0.73	0.44	0.28	0.71	0.83	0.30	0.16	0.54	0.67
<b>FEB13</b>	0.15	0.00	0.41	0.60	0.30	0.01	0.61	0.74	0.44	0.25	0.73	0.84	0.30	0.15	0.55	0.68
<b>MAR13</b>	0.17	0.00	0.41	0.59	0.33	0.01	0.64	0.73	0.48	0.25	0.77	0.82	0.32	0.16	0.57	0.67
<b>APR13</b>	0.21	0.00	0.39	0.60	0.37	0.01	0.62	0.73	0.51	0.31	0.76	0.82	0.36	0.18	0.56	0.68
<b>MAY13</b>	0.31	0.00	0.34	0.60	0.47	0.01	0.56	0.72	0.63	0.36	0.71	0.83	0.46	0.20	0.52	0.68
<b>JUN13</b>	0.33	0.00	0.30	0.58	0.57	0.01	0.47	0.70	0.75	0.39	0.62	0.81	0.52	0.21	0.45	0.67
<b>JUL13</b>	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
<b>AUG13</b>	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
<b>SEP13</b>	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
<b>OCT13</b>	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
<b>NOV13</b>	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
<b>DEC13</b>	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

**Table 17 – As in Table 12, but for FVC**

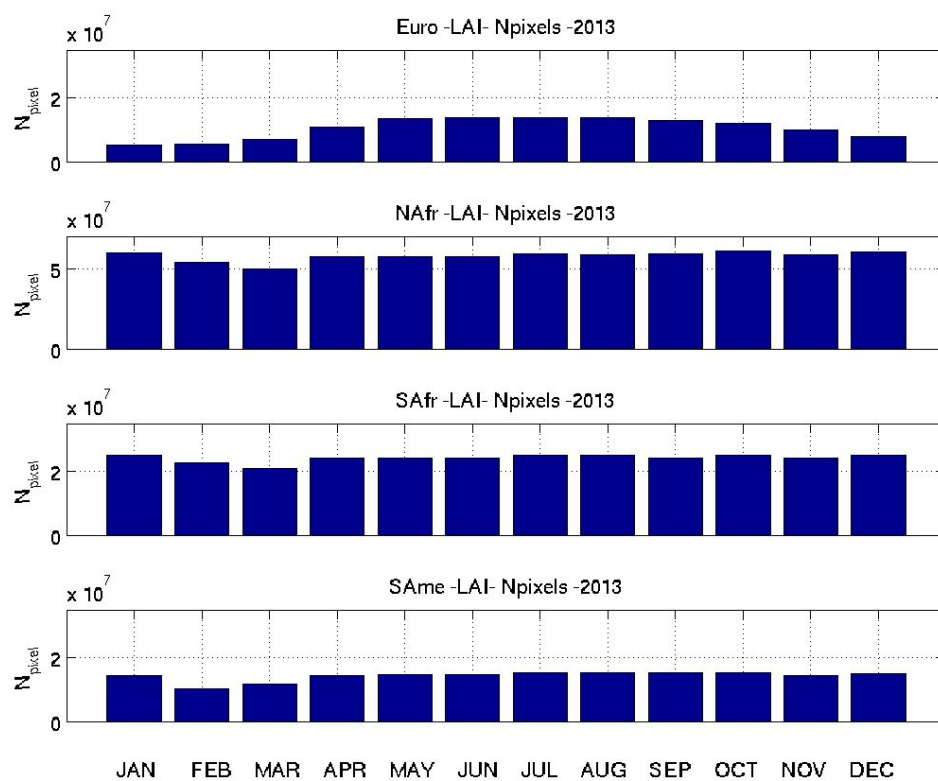
## 7.8. LAI



**Figure 20 – LAI statistics from January to December 2013, 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 20 and Table 18), 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 21).

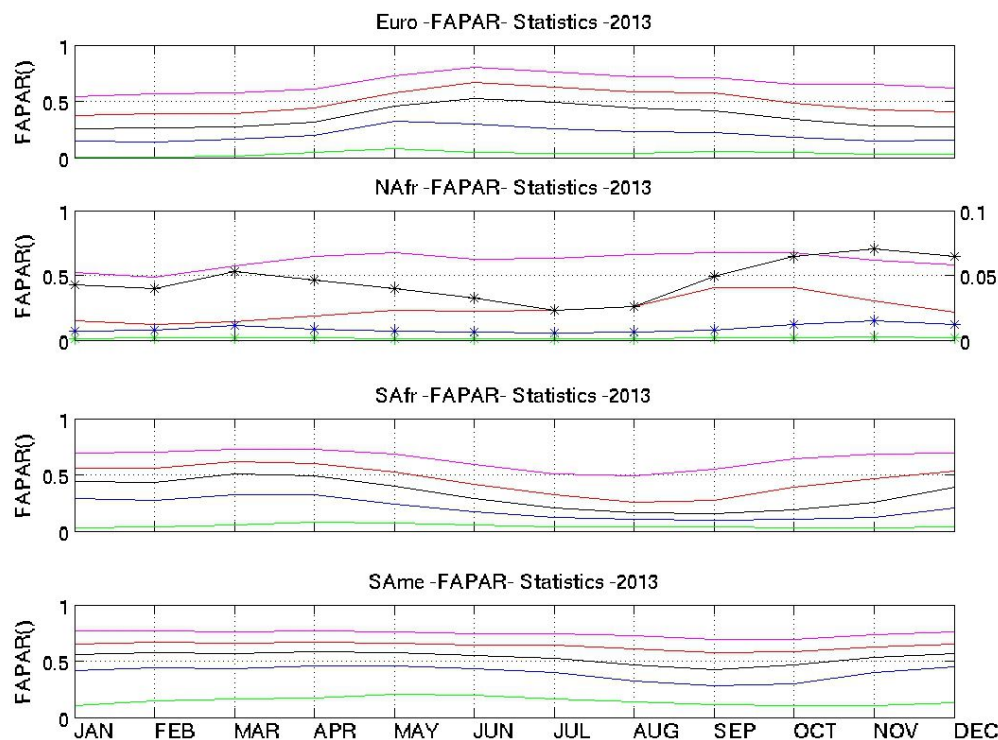


**Figure 21 – As in Figure 9, but for LAI**

	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
<b>JAN13</b>	0.4	0.0	1.2	2.2	0.9	0.1	2.1	3.1	1.4	0.8	3.0	4.1	1.0	0.6	2.1	3.1
<b>FEB13</b>	0.4	0.0	1.3	2.3	0.9	0.1	2.2	3.2	1.4	0.7	3.1	4.1	1.0	0.5	2.2	3.1
<b>MAR13</b>	0.5	0.0	1.2	2.2	1.0	0.1	2.4	3.1	1.6	0.7	3.5	3.9	1.1	0.6	2.4	3.0
<b>APR13</b>	0.6	0.0	1.2	2.2	1.1	0.1	2.3	3.1	1.8	0.9	3.3	4.0	1.2	0.7	2.3	3.1
<b>MAY13</b>	0.9	0.0	1.0	2.2	1.6	0.1	1.9	3.0	2.4	1.1	2.9	4.1	1.7	0.8	2.1	3.1
<b>JUN13</b>	1.0	0.0	0.8	2.1	2.1	0.1	1.5	2.9	3.3	1.2	2.3	4.0	2.2	0.8	1.7	3.0
<b>JUL13</b>	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
<b>AUG13</b>	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
<b>SEP13</b>	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
<b>OCT13</b>	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
<b>NOV13</b>	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
<b>DEC13</b>	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

**Table 18 – As in Table 12, but for LAI**

## 7.9. FAPAR



**Figure 22 – FAPAR statistics from January to December 2013, 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 left hand side of the respective panel)**

The conclusions for FVC percentiles 75 and 95 can be extended to FAPAR (Figure 22 and Table 19). However in NAfr region, FAPAR values show a seasonal cycle. Note that, in arid regions, FAPAR is computed for all pixels and so there is a lower number of FAPAR=0. Thus, for some "bare areas", oppositely to FVC and LAI products, FAPAR values are distinct from 0 (although close to 0). In fact, a seasonal cycle, with two growing seasons (Figure 22), is present both for median and for percentile 25 in NAfr area.

The conclusions drawn for the computed pixels of the FVC product also apply to FAPAR product (Figure 23).



**Figure 23 – As in Figure 9, but for FAPAR**

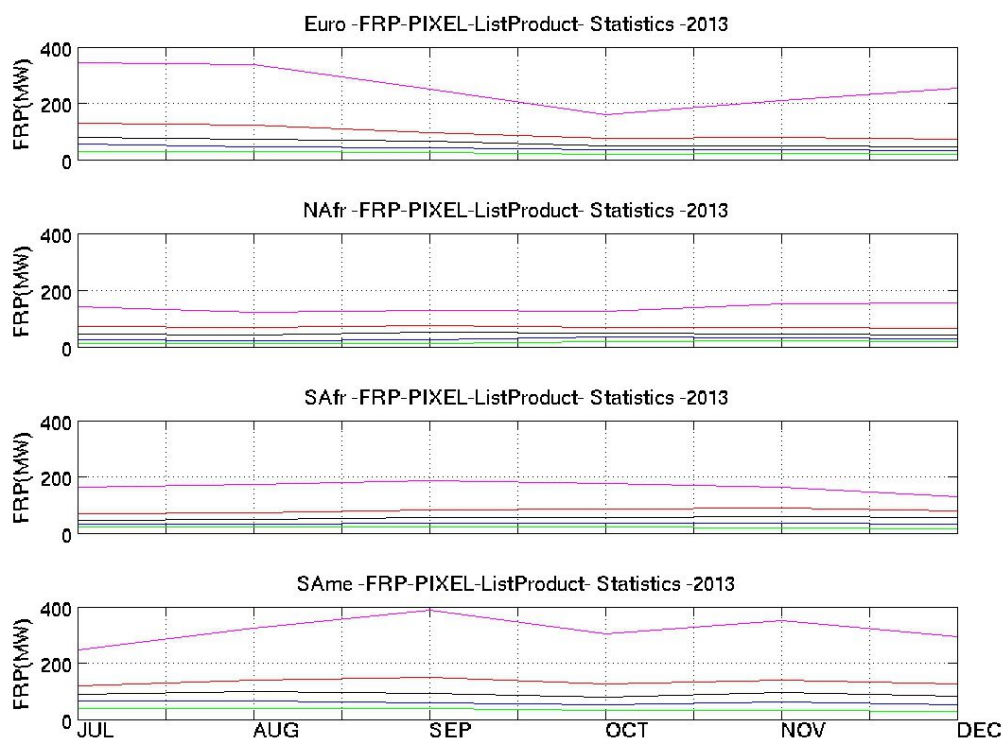


	PERCENTIL25				MEDIAN				PERCENTIL75				MEAN			
	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same	Euro	NAfr	SAfr	Same
<b>JAN13</b>	0.14	0.01	0.29	0.42	0.26	0.04	0.44	0.56	0.38	0.15	0.56	0.65	0.26	0.11	0.41	0.51
<b>FEB13</b>	0.14	0.01	0.28	0.44	0.26	0.04	0.43	0.58	0.39	0.12	0.56	0.66	0.26	0.10	0.41	0.53
<b>MAR13</b>	0.16	0.01	0.32	0.43	0.27	0.05	0.51	0.57	0.39	0.15	0.62	0.66	0.28	0.12	0.45	0.52
<b>APR13</b>	0.20	0.01	0.32	0.45	0.31	0.05	0.49	0.58	0.44	0.19	0.60	0.67	0.32	0.15	0.45	0.54
<b>MAY13</b>	0.32	0.01	0.24	0.46	0.45	0.04	0.40	0.57	0.58	0.23	0.53	0.66	0.43	0.16	0.38	0.54
<b>JUN13</b>	0.30	0.01	0.17	0.44	0.52	0.03	0.29	0.55	0.67	0.23	0.41	0.64	0.47	0.14	0.29	0.52
<b>JUL13</b>	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
<b>AUG13</b>	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
<b>SEP13</b>	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
<b>OCT13</b>	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
<b>NOV13</b>	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
<b>DEC13</b>	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

**Table 19 – As in Table 12, but for FAPAR**

## 7.10. FRP-PIXEL

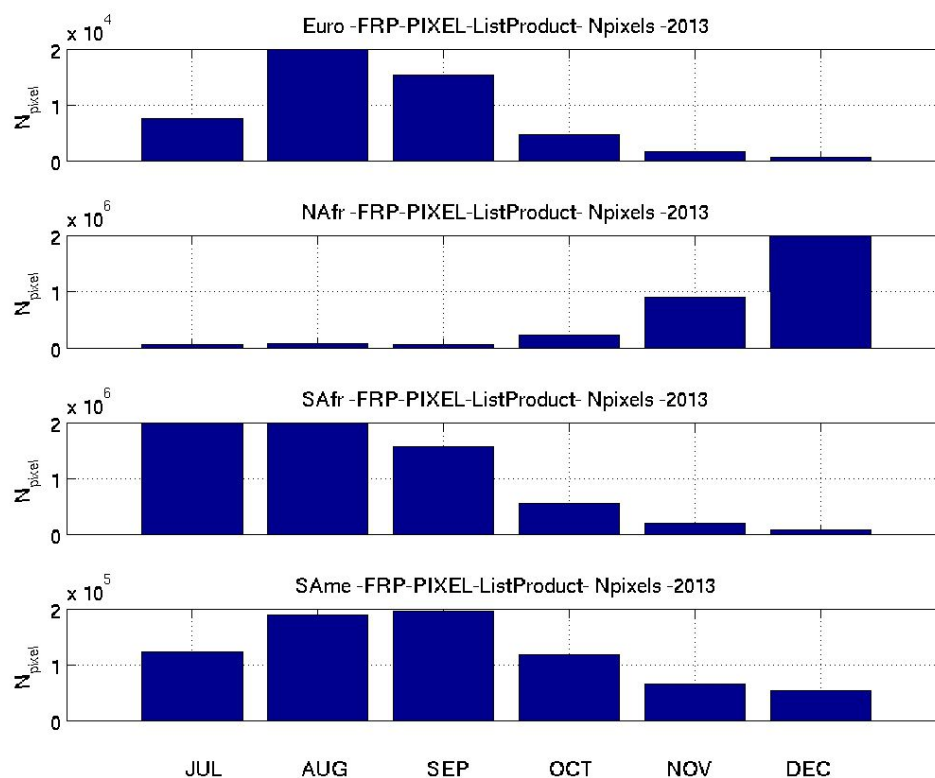
FRP files were only available for statistics from June to December, thus the analysis is restricted to 2<sup>nd</sup> semester 2013.



**Figure 24 FRP-PIXEL statistics from July to December 2013, 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 24 and Table 20) reflect the differences of fire distribution and power in each area. Over Europe fires have a strong intensity in the summer months from July to September. 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 and Balkan Peninsula are evident both in the number of fire pixels computed (Figure 25) and in the values of percentile 95 (Figure 24) in Europe for these months.


For NAfr, SAfr and SAme, the number of detected fires events (Figure 25) shows a half-annual cycle that probably reflects agricultural practices over the mentioned areas, where a large number of controlled fires are common agriculture practices.



**Figure 25 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
<b>JUL13</b>	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
<b>AUG13</b>	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
<b>SEP13</b>	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
<b>OCT13</b>	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
<b>NOV13</b>	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
<b>DEC13</b>	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

**Table 20 – FRP-PIXEL statistics for July to December 2013, for each area**

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