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

Product Requirement Document

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DOCUMENTATION CHANGE RECORD

Issue / Revision	Date	Description :
Version 0.0	12/06/2007	Draft Version
Version 0.2	25/07/2007	Baseline for CDOP
Version 1.0	11/01/2008	Update following comments from SG members
Version 1.3	22/10/2008	Update following comments from SG: new subsections 3.1-to-3.9 with detailed LSA SAF requirements. Product requirements table now also included in the text (section 4).
Version 1.4	30/10/2008	Update following comments from SG: (i) PRT is not a Reference document; (ii) Explicit statement referring that Table 1 is an embedded Excel Table; (iii) PRD details the commitments of the LSA SAF towards EUMETSAT (1st Paragraph)
Version 1.5	17/4/2009	Dissemination means of products with generation frequency higher than daily - ftp
Version 1.6	24/4/2009	LSA SAF referred to as EUMETSAT SAF on Land Surface Analysis (throughout document)
Version 1.7	25/6/2009	New logo; Revision of PRT
Version 1.8	2/7/2009	Re-formatting of PRT; editorial changes (LSA SAF instead of Land-SAF throughput the text)
Version 1.9	16/7/2009	Version 1.9 (based on the 1.8 draft) was approved by the SG with the date 30 July 2009
Version 1.10	9/112009	Added accuracy requirements for FRPGrid product (LSA-32)
Version 1.11	18/112009	Spatial resolution of FRPGrid product (LSA-32) corrected: 5ºx5º and not 1ºx1º; Spatial coverage of RFM better specified (LSA-30) Approved by SG (Decision no. 5 of SG #5).

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Applicable Documents

[AD 1] Cooperation agreement between EUMETSAT and Instituto de Meteorologia, I.P., on the CDOP of the SAF. March 2007.

Reference Documents

1. Introduction

The main purpose of the EUMETSAT Satellite Application Facility on Land Surface Analysis (LSA SAF) is to take full advantage of data available from EUMETSAT sensors, or others to describe/derive land surface properties/variables. The LSA SAF shall then generate, archive and disseminate either in near real time (NRT) or off-line a set of products, which are compliant with user requirements. This document specifies the requirements for the Satellite Application Facility on Land Surface Analysis (LSA SAF) regarding the characteristics of the products to be developed and/or maintained during the Continuous Development and Operations Phase (CDOP). As such, the PRD details the commitment of the LSA SAF towards EUMETSAT, as part of its ground segment.

By the beginning of the CDOP, the LSA SAF shall have two operational chains dedicated to SEVIRI/Meteosat and AVHRR/Metop processing, respectively. The Consortium shall also have a processing chain for validation and testing of new algorithm versions, before these are transferred to one of the operational suites. The LSA SAF operational system shall be generating, archiving and disseminating 8 pre-operational or demonstration products, detailed in section 2, based on SEVIRI data. AVHRR derived products are expected to become (pre-)operational during the CDOP.

User requirements evolve with the availability of improved/new data sources, and the rise of potential applications for new products. The design of LSA SAF products was initially driven by the needs of the meteorological, particularly NWP, community, considered the priority user for LSA SAF services. There is, however, a growing number of other important areas, including agricultural and forestry applications, land use, and the broader topics of climate and environment monitoring.

Programmes such as GCOS (WMO), GEOSS, and GMES (EC and ESA) have established important guidelines for monitoring of climate and environment, stressing the need for global, long-term, high quality and reliable products. The life-cycle of EUMETSAT satellites, and the participation of LSA SAF consortium members (IM, M-F) in the *geoland* project – the land component of GMES – put the LSA SAF in a privilege position as a product/service provider for those programmes. The proactive role of LSA SAF in establishing a close dialogue with European Partners and supporters for a future operational GMES service has been initiated during the IOP and will be further reinforced during the CDOP. Within this framework, the 2nd LSA SAF workshop (March 2006) included a section dedicated to the subject "The LSA SAF assets for GMES", where the views of the LSA SAF and other European supporters were presented (http://landsaf.meteo.pt).

The involvement of the user community in the design of LSA SAF products, already established during the IOP, shall be a priority throughout its whole lifecycle. The targeted users include operational or research groups within

(i) NWP community;

(ii) agriculture and forest applications,

(iii) food management,

(iv) environment monitoring and risk assessment

(v) hydrological applications

(vi) climate modelling and monitoring

(vii) other remote sensing applications

During the IOP, the LSA SAF pre-operational and demonstration products have been made available on a regular basis to a wide number of users, such as the JRC, the AMMA community, European NMS or environmental agencies (M-F, Slovenia).

Contacts with the user community make the PRD a live document to be upgraded whenever necessary. In particular, the LSA SAF Team shall involve beta-users in validation activities; and promote inquiries and workshops to discuss the adequacy of LSA SAF list products, and respective characteristics. Taking into account the LSA SAF experience during the IOP and development phases, it is expected that the interaction with users and beta-users will provide a large sample of new user request/requirements.

2. LSA SAF Products

The LSA SAF has been especially designed to exploit the capabilities of EUMETSAT satellites for the retrieval of land surface variables/parameters. The LSA SAF shall deliver NRT products (and not software). The products (Table 2) retrieved from Meteosat and EPS satellites may be grouped into:

(i) "Surface Radiation Budget" parameters, which include downward long- (DSLF) and short-wave (DSSF) surface fluxes, albedo (AL), land surface temperature (LST), and emissivity (EM);

(ii) "Biogeophysical - water" parameters related to water exchanges at the surface, such as snow cover (SC), soil moisture and evapotranspiration (SMET)

(iii) "Biogeophysical - vegetation" parameters related to the state of vegetation (e.g., fraction of vegetation cover, LAI, FAPAR) and to wild fire related products.

The initial definition of the products to be developed was mostly driven by the needs of the NWP community. However, the growing number of users in agricultural and forestry applications, land use, and the broader topics of climate and environment

monitoring, supported the extension and redesign of LSA SAF products, in particular of biogeophysical parameters.

The LSA SAF generates land surface variables on a pixel-by pixel basis. These are made available to users in the satellite nominal resolution (e.g., 3 km at nadir in the case of SEVIRI/Meteosat, centred at 0ºE), or re-mapped to previously specified projections. Furthermore, an indication of the expected accuracy of each retrieved value is also given, either in the form of quality flags, or as estimated error bars.

2.1. LSA SAF Requirements: Overview

The products to be developed by the LSA SAF consortium shall be **generated**, **archived** and **disseminated** by **IM**, the Leading Entity.

When declared **operational**, the LSA SAF products shall be available within the specified timeliness for more than 95% of the cases where input satellite data are available. The LSA SAF shall also deliver Product User Manuals, Product Output Format documents or others necessary to use the generated and disseminated products.

Quality Control checks shall be performed regularly and automatically. Each product shall contain information (e.g., quality flags) on the conditions under which the product has been derived.

The LSA SAF products shall be **validated** for representative subsets of the areas where they have generated.

User support and **training** relies essentially on:

1. Regular information on the progress of the SAF activities by means of maintenance of a WWW based SAF Report.

2. The organisation of workshops (every 2 years), in collaboration with the EUMETSAT Secretariat, with the aim of promoting the latest development and to get feedback from the users

3. A user helpdesk to address problems reported by users.

LSA SAF products shall be delivered to users in **NRT** via **EUMETCast**, or **off-line** through the LSA SAF webpage; other suitable and up-to-date media may also be used for off-line dissemination. The LSA SAF products to be disseminated via EUMETCast shall be encoded into **HDF5** format.

Archived products may be **requested** via the LSA SAF website, through the helpdesk, or via the UMARF User Service.

A detailed list of user requirements is provided in the sub-sections below.

2.2. Requirements from the Co-operation Agreement

UR-GR-0010 IM shall carry out the activities described in the Cooperation Agreement [AD 1] and shall deliver the (pre-)operational data and products therein described.

UR-GR-0020 IM shall also deliver User Manuals, Algorithm Specification Documents and any associated documentation necessary to configure and operate the LSA SAF system [AD 1].

2.3. Constraint requirements

UR-GR-0030 During the CDOP, LSA SAF products shall be available for distribution within the specified time in more than 95% of the cases where input satellite data are available with the nominal level of quality [OPS].

UR-GR-0060 The dependence of the LSA SAF products on NWP models data shall be limited to the amount that is absolutely necessary to extract the products, i.e. the parameters derived from NWP models output shall not dominate the final products.

2.4. Capability requirements

UR-GR-0080 LSA SAF shall be able to process all disseminated MSG and EPS images.

UR-GR-0090 All near real time LSA SAF products shall be available for distribution within 3 hours after the last satellite data acquisition-

UR-GR-0100 Algorithms to derive LSA SAF products shall be able to process near real time and off-line data, i.e. it shall be possible to process archived data for case studies and verification campaigns.

UR-GR-0110 The occurrence of missing channels shall not interfere with any specific product generation unless the channel(s) is a (are) mandatory input(s) for the generation of a specific product.

UR-GR-0120 When mandatory input data are missing, generation of nominal products should restart as soon as available input data makes it possible.

UR-GR-0130 If mandatory data, are available too late, the correspondent products shall be calculated as soon as possible, not interfering with the nominal product calculation and, if necessary, with operator intervention.

2.5. Documentation requirements

UR-GR-0140 For all external interfaces that are not described in other documents (e.g. in WMO documents), the SAF shall provide an Interface Control Document (ICD)

UR-GR-0150 The documentation shall include a product manual providing a detailed product scientific description (Algorithm Theoretical Basis Documents ATBDs) and Validation Reports(s).

UR-GR-0160 All scientific results of the LSA SAF development activities, including the Visiting Scientists activities, shall be properly documented either in scientific journals or in internal scientific progress reports.

2.6. Quality control requirements

UR-GR-0170 For each product, quality control check shall be performed regularly and automatically accordingly to the scientific plan. The way as the quality control shall be performed shall be established during the development phase.

UR-GR-0180 Each product, shall contain information on the conditions under which the product has been derived.

UR-GR-0190 Whenever possible, statistical quality indicators (e.g., errorbars) should include a quantitative information as compared to the reference data set used in the validation of the product (e.g. NWP model output, radiosonde data, etc.)

2.7. Validation requirements

UR-GR-0200 LSA SAF products shall be validated for representative subsets of the areas where they have been generated.

UR-GR-0210 The LSA SAF Consortium shall build up a validation database. In particular, the LSA SAF Consortium should collect any auxiliary data not measured by MSG and/or EPS but needed for validation.

UR-GR-0220 Data sets for test and validation shall be defined during the development design phase.

2.8. Archiving requirements

UR-GR-0230 The LSA SAF shall maintain a record of all algorithms, modules and documentation developed during the whole life.

UR-GR-0240 The catalogue of the LSA SAF products archive should regularly be transmitted to update the central UMARF catalogue [OPS].

UR-GR-0250 All archived LSA SAF products should be available on request from external users via the UMARF User Service [OPS].

UR-GR-0260 The LSA SAF should archive all distributed products, as well as product control reports, at least for the duration of the MSG and METOP programmes [OPS].

2.9. User Support and Training requirements

UR-GR-0270 The LSA SAF Consortium shall organise, in collaboration with the EUMETSAT Secretariat, at least one workshop every two years on the SAF products with the aim of introducing products/updates and to get feedback from users.

UR-GR-0280 The LSA SAF shall give regular information on the progress of the SAF activities by means of maintenance of a WWW based Electronic Bulletin Board.

2.10. Distribution requirements

UR-GR-0290 LSA SAF products shall be delivered to users using EUMETCast, Internet, DVD-CDROM, and other suitable and up-to-date media.

UR-GR-0300 Other envisaged ways of product dissemination should include FTP, CD-ROM (media archiving) and other media.

UR-GR-0310 The LSA SAF products to be disseminated through EUMETCast shall be encoded into a standard HDF5 format.

UR-GR-0320 It shall be possible to select different regional areas (pre-defined for Meteosat disk) to disseminate LSA SAF products according to user needs.

3. LSA SAF Product Requirements

This section describes user requirements regarding LSA SAF products, including specifications on spatial resolution and coverage, generation frequency, and timeliness. The latter corresponds to the time elapsed from beginning of sensing time to reception by the user, assuming EUMETCast as dissemination means. Three accuracy measurements are considered per product: (i) an accuracy threshold, as the minimum accuracy limit which is needed so that the product is considered being useful; (ii) target accuracy, as the accuracy that is targeted in the development and the reference in product quality before the (pre-)operational product generation and dissemination; and (iii) an optimal accuracy, that can be reached under optimum conditions.

UR-PR-0010 The LSA SAF products to be developed, maintained, generated, disseminated and archived during the CDOP are those with the required characteristics detailed in Table 1

Table 1 – Detailed description of LSA SAF products foreseen to be developed, maintained and generated during the CDOP.

LSA-01	MSG Daily Surface Albedo		MDAL
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models		
Characteristics and Methods	5-day composites of spectral & broad-band AL		
Comments	Pre-Operational		
Generation frequency	1 day		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
20%	AL>0.15: 20% AL<0.15: 0.03	7.5%	
Verification method	BSRN data / MODIS AL		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		3 h

LSA-02	MSG 10-day Surface Albedo		MTAL
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models		
Characteristics and Methods	30-day composites of spectral & broad-band AL		
Comments	DRI planned for Oct 2009		
Generation frequency	10 day		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	FTP, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
20%	AL>0.15: 10% AL<0.15: 0.015	5%	
Verification method	BSRN data / MODIS AL		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		3 h

LSA-03	EPS Surface Albedo		EAL
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models		
Characteristics and Methods	30-day composites of spectral & broad-band AL		
Comments	2010		
Generation frequency	10 day		
Input satellite data	Metop: AVHRR		
Dissemination			
Format	Means	Type	
HDF5	FTP, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
20%	AL>0.15: 10% AL<0.15: 0.015	5%	
Verification method	BSRN data / MODIS AL		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	0.01° x 0.01°		3 h

LSA-04	MSG Land Surface Temperature		MLST
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models Agriculture		
Characteristics and Methods	Split-window based; clear sky only		
Comments	Operational		
Generation frequency	15 min		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
4K	2 K	1K	
Verification method	In situ / MODIS LST		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		1 h

LSA-05	EPS Land Surface Temperature		ELST
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models Agriculture		
Characteristics and Methods	Split-window based; clear sky only		
Comments	Pre-Operational		
Generation frequency	1/2 day		
Input satellite data	Metop: AVHRR		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
4K	2 K	1K	
Verification method	In situ / MODIS LST		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	0.01° x 0.01°		

LSA-06	Derived Products Land Surface Temperature		DLST
Type	Product		
Applications and users	Research or Environmental monitoring Agriculture		
Characteristics and Methods	mean, minimum, maximum daily LST, degree days		
Comments	End of 2009		
Generation frequency	1 day		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	HTTP	Offline	
Accuracy			
Threshold	Target	Optimal	
4K	2 K	1K	
Verification method			
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	MSG pixel resolution		1 day

LSA-07	MSG Downward Surface Shortwave Flux		MDSSF
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models Agriculture		
Characteristics and Methods			
Comments	Operational		
Generation frequency	30 min		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT	
Accuracy			
Threshold	Target	Optimal	
20%	DSSF>200W/m2: 10% DSSF<200W/m2: 20W/m2	5%	
Verification method	BSRN		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		1 h

LSA-08	EPS Downward Surface Shortwave Flux		EDSSF
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models Agriculture		
Characteristics and Methods			
Comments			
Generation frequency	1/2 day		
Input satellite data	Metop: AVHRR		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
20%	DSSF>200W/m2: 10% DSSF<200W/m2: 20W/m2	5%	
Verification method	BSRN		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	0.01° x 0.01°		1h

LSA-09	Daily Downward Surface Shortwave Flux		DIDSSF
Type	Product		
Applications and users	Agriculture		
Characteristics and Methods	Daily Integration of MDSSF		
Comments	End of 2009		
Generation frequency	1 day		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
20%	10%	5%	
Verification method	BSRN		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		1 day

LSA-10	MSG Downward Surface Longwave Flux		MDSLF
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models		
Characteristics and Methods	Bulk para-meterization		
Comments	Operational		
Generation frequency	30 min		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
20%	10%	5%	
Verification method	BSRN		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		1 h

LSA-11	EPS Downward Surface Longwave Flux		EDSLF
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models		
Characteristics and Methods	Bulk para-meterization		
Comments	Pre-Operational		
Generation frequency	1/2 day		
Input satellite data	Metop: AVHRR		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
20%	10%	5%	
Verification method	BSRN		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	0.01° x 0.01°		1h

LSA-12	Daily Downward Surface Longwave Flux		DIDSLF
Type	Product		
Applications and users	Climate Monitoring		
Characteristics and Methods	Daily Integration of MDSLF		
Comments	End of 2009		
Generation frequency	1 day		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5			
Accuracy			
Threshold	Target	Optimal	
20%	10%	5%	
Verification method	BSRN		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		1 day

LSA-13	MSG Snow Cover		MSC
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models		
Characteristics and Methods	Multichannel (VIS, NIR, IR) analysis		
Comments	Operational		
Generation frequency	1 day		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
False Alarm: 25%; Hit Rate: 70%	False Alarm: 15%; Hit Rate: 80%	False Alarm: 5%; Hit Rate: 90%	
Verification method	Synop; MODIS		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		3 h

LSA-14	EPS Snow Cover		ESC
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models		
Characteristics and Methods	Multichannel (VIS, NIR, IR) analysis		
Comments	2010		
Generation frequency	1 day		
Input satellite data	Metop: AVHRR		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
False Alarm: 25%; Hit Rate: 70%	False Alarm: 15%; Hit Rate: 80%	False Alarm: 5%; Hit Rate: 90%	
Verification method	Synop; MODIS		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	0.01° x 0.01°		3 h

LSA-15	Merged MSG and EPS Snow Cover		MESC
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models		
Characteristics and Methods	Multichannel (VIS, NIR, IR), multisensor analysis		
Comments	2011		
Generation frequency	1 day		
Input satellite data	Metop: AVHRR MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
False Alarm: 25%; Hit Rate: 70%	False Alarm: 15%; Hit Rate: 80%	False Alarm: 5%; Hit Rate: 90%	
Verification method	Synop; MODIS		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Europe & High Latitudes	0.05° x 0.05°		3h

LSA-16	MSG Evapotranspiration		MET
Type	Product		
Applications and users	Research or Environmental monitoring NWP Agriculture		
Characteristics and Methods	SEVIRI radiation products + ECMWF soil moisture used as input to ET estimations		
Comments	Pre-Operational		
Generation frequency	30 min		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
30%	MET>0.4 mm/h: 25% MET<0.4 mm/h: 0.1 mm/h	10%	
Verification method	In situ; GLDAS		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		3 h

LSA-17	Daily MSG Evapotranspiration		DMET
Type	Product		
Applications and users	Research or Environmental monitoring Agriculture		
Characteristics and Methods	Daily Integration of MET		
Comments	End of 2009		
Generation frequency	1 day		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
30%	20%	10%	
Verification method	In situ; GLDAS		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		3 h

LSA-18	Merged MSG EPS Evapotranspiration		MEET
Type	Product		
Applications and users	Research or Environmental monitoring NWP Agriculture		
Characteristics and Methods	SEVIRI radiation products + ASCAT Soil moisture used as input to SEVIRI ET estimations		
Comments	2012		
Generation frequency	30 min		
Input satellite data	MSG: SEVIRI Metop: ASCAT		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
30%	MET>0.4 mm/h: 25% MET<0.4 mm/h: 0.1 mm/h	10%	
Verification method	In situ; GLDAS		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		3 h

LSA-19	Daily Merged MSG EPS Evapotranspiration		DMEET
Type	Product		
Applications and users	Research or Environmental monitoring Agriculture		
Characteristics and Methods	Daily Integration of MEET		
Comments	2012		
Generation frequency	1 day		
Input satellite data	Metop: ASCAT MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
30%	20%	10%	
Verification method	In situ; GLDAS		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		3 h

LSA-20	MSG Daily Fraction of Vegetation Cover		MDFVC
Type	Product		
Applications and users	Research or Environmental monitoring NWP Climate Monitoring Carbon Models		
Characteristics and Methods	5-day composites of FVC		
Comments	Operational		
Generation frequency	1 day		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
20%	15%	10%	
Verification method	MODIS; VEGETATION		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		3 h

LSA-21	MSG 10-days Fraction of Vegetation Cover		MTFVC
Type	Product		
Applications and users	Research or Environmental monitoring NWP Climate Monitoring Carbon Models		
Characteristics and Methods	30-day composites of FVC		
Comments	End of 2009		
Generation frequency	10 day		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	FTP, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
20%	15%	10%	
Verification method	MODIS; VEGETATION		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		3 h

LSA-22	EPS Fraction of Vegetation Cover		EDFVC
Type	Product		
Applications and users	Research or Environmental monitoring NWP Climate Monitoring Carbon Models		
Characteristics and Methods	30-day composites of FVC		
Comments	2010		
Generation frequency	10 day		
Input satellite data	Metop: AVHRR		
Dissemination			
Format	Means	Type	
HDF5	FTP, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
20%	15%	10%	
Verification method	MODIS; VEGETATION		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	0.01° x 0.01°		3 h

LSA-23	MSG Daily Leaf Area Index		MDLAI
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models		
Characteristics and Methods	5-day composites of LAI		
Comments	Operational		
Generation frequency	1 day		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
1.5	1	0.5	
Verification method	MODIS; VEGETATION		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		3 h

LSA-24	MSG 10-days Leaf Area Index		MTLAI
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models		
Characteristics and Methods	30-day composites of LAI		
Comments	End of 2009		
Generation frequency	10 day		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	FTP, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
1.5	1	0.5	
Verification method	MODIS; VEGETATION		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		3 h

LSA-25	EPS Leaf Area Index		EDLAI
Type	Product		
Applications and users	Research or Environmental monitoring NWP Climate Monitoring Carbon Models		
Characteristics and Methods	30-day composites of LAI		
Comments	2010		
Generation frequency	10 day		
Input satellite data	Metop: AVHRR		
Dissemination			
Format	Means	Type	
HDF5	FTP, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
1.5	1	0.5	
Verification method	MODIS; VEGETATION		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	0.01° x 0.01°		3 h

LSA-26	MSG Daily Fraction of photosynthetically active Radiation		MDfAPAR
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models		
Characteristics and Methods	5-day composites of FAPAR		
Comments	Operational		
Generation frequency	1 day		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
20%	15%	10%	
Verification method	MODIS; VEGETATION		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		3 h

LSA-27	MSG 10-days Fraction of photosynthetically active Radiation		MTfAPAR
Type	Product		
Applications and users	Research or Environmental monitoring NWP Climate Monitoring Carbon Models		
Characteristics and Methods	30-day composites of FAPAR		
Comments	End of 2009		
Generation frequency	10 day		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	FTP, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
20%	15%	10%	
Verification method	MODIS; VEGETATION		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		3 h

LSA-28	EPS Fraction of photosynthetically active Radiation		EDfAPAR
Type	Product		
Applications and users	NWP Climate Monitoring Carbon Models		
Characteristics and Methods	30-day composites of LAI		
Comments	2010		
Generation frequency	10 day		
Input satellite data	Metop: AVHRR		
Dissemination			
Format	Means	Type	
HDF5	FTP, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
20%	15%	10%	
Verification method	MODIS; VEGETATION		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	0.01° x 0.01°		3 h

LSA-29	Fire Detection and Monitoring		FD&M
Type	Product		
Applications and users	Research or Environmental monitoring		
Characteristics and Methods	Contextual analysis of IR3.9 and IR10.8		
Comments	End of 2009		
Generation frequency	15-min		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
100% (missing detections)	45% (missing detections)	10% (missing detections)	
Verification method	MODIS		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		3 h

LSA-30	Risk of Fire Map		RFM
Type	Product		
Applications and users	Civil Protection Resources management		
Characteristics and Methods	Merge of NWP & remote sensed (VEGA) data		
Comments	End of 2009		
Generation frequency	1 day		
Input satellite data	Metop: AVHRR MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
TBD	TBD	TBD	
Verification method	Analysis of time-series of fire occurences vs estimated risk		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Europe (south of 48ºN; between 9.5ºW and 45ºE)	SEVIRI pixel Resolution		3 h

LSA-31	Fire Radiative Power		FRPPixel
Type	Product		
Applications and users	Research or Environmental monitoring Climate Monitoring Air Quality Carbon Models		
Characteristics and Methods	Based on IR3.9		
Comments	Pre-Operational		
Generation frequency	15m		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
successful detection of a significant fraction of fires reproducing the spatial and temporal distribution	70% of retrieved FRP within 50% of "true" values as defined by MODIS on a fire basis	70% of retrieved FRP within 20% of "true" values as defined by MODIS10% on a fire basis	
Verification method	MODIS		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	SEVIRI pixel Resolution		3 h

LSA-32	Fire Radiative Power - Gridded		FRPGrid
Type	Product		
Applications and users	Research or Environmental monitoring Climate Monitoring Air Quality Carbon Models		
Characteristics and Methods	Based on IR3.9		
Comments	2nd quarter of 2009		
Generation frequency	1h		
Input satellite data	MSG: SEVIRI		
Dissemination			
Format	Means	Type	
HDF5	EUMETCast, HTTP	NRT, Offline	
Accuracy			
Threshold	Target	Optimal	
anything is useful as long as not biased: NAfr/SAfr: 20% of predictions within 100% of MODIS measurement of FRP SAme: 15% of predictions within 100% of MODIS measurement of FRP Euro: 5% of predictions within 100% of MODIS measurement of FRP	NAfr/sAfr: 50% of predictions within 100% of MODIS measurement of FRP SAme/Euro: 25% of predictions within 100% of MODIS measurement of FRP	50% of predictions within 30% of MODIS measurement of FRP	
Verification method	MODIS		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
MSG disk	5ºx5º		3 h

Acronyms

AL	Albedo
AMMA	African Monsoon Multidisciplinary Analysis
ASCAT	Advanced Scatterometer
AVHRR	Advanced Very High Resolution Radiometer
BRDF	Bi-directional Reflectance Distribution Function
BSRN	Baseline Surface Radiation Network
CDOP	Continuous Development and Operations Phase
DSLF	Downwelling Surface Long-Wave Flux
DSSF	Downwelling Surface Short-Wave Flux
EC	European Commission
EM	Emissivity
EPS	EUMETSAT Polar System
ESA	European Space Agency
ET	Evapotranspiration
EUMETSAT	European Meteorological Satellite Organisation
fAPAR	Fraction of Absorbed Photosynthetic Active Radiation
FD&M	Fire Detection and Monitoring
FMI	Finnish Meteorological Institute (Finland)
FOV	Field of View
FVC	Fraction of Vegetation Cover
FZK	Forschungszentrum (Karlsruhe, Germany)
GCOS	Global Climate Observing System
GEMS	Global Earth- system Monitoring using Satellite and in-situ data
GEOSS	Global Earth Observation System of Systems
GMES	Global Monitoring for Environment and Security
HIRS/4	High-resolution Infrared Radiation Sounder
IASI	Improved Atmospheric Sounding Interferometer
IDL	Instituto Dom Luiz
IM	Instituto de Meteorologia (Portugal)
IOP	Initial Operational Phase
JRC	Joint Research Centre
LAI	Leaf Area Index
LSA	Land Surface Analysis
LST	Land Surface Temperature
Metop	Meteorological Operational Polar satellite of EUMETSAT
MF	Météo France (France)
MPEF:	Meteorological Products Extraction Facility
MSG	Meteosat Second Generation
NESDIS	National Environmental Satellite Data and Information Service
NMS	National Meteorological Service
NOAA	National Oceanic and Atmospheric Administration
NPOESS	National Polar-orbiting Operational Environmental Satellite System
NWC SAF	Nowcasting and Very Short Range Forecasting SAF
NWP	Numerical Weather Prediction
PCDOP	Proposal for CDOP

PRD	Product Requirements Document
PRT	Product Requirements Table
QC	Quality Control
RFM	Risk of Fire Mapping
SAF	Satellite Application Facility
SMET	Soil Moisture Evapotranspiration
SVAT	Soil-Vegetation-Atmosphere Transfer model
UMARF	Unified Meteorological Archive and Retrieval Facility
UV	University of Valencia (Spain)
VEGA	Vegetation Products
VIS	Visible
VS	Visiting Scientist
WCRP	World Climate Research Programme
WMO	World Meteorological Organization