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**EUMETSAT Satellite Application Facility  
on Support to Operational Hydrology  
and Water Management  
(H SAF)**

**Operations Report  
2022 S1/S2**




Reference Number: SAF/HSAF/OR/2022\_S1\_S2  
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<b>DOCUMENT CHANGE RECORD</b>
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Issue / Revision	Date	Description
1.0	23/06/2023	Version Prepared for OR-12
2.0	13/10/2023	Version updated according to rids raised during the review. In particular: <ul style="list-style-type: none"> <li>- RID003: added Table 1 caption and tables summary updated</li> <li>- RI004 and RID005: Products listed in Table 2, Table 3 and Table 4 aligned</li> <li>- RID0022: Figure 2 – added meaning of SP acronyms in the context of the figure</li> <li>- RID022,RID015,RID008,RID010,RID024 and RID026: modified Table 5,Table 6,Table 7,Table 8,Table 9 and Table 10 according to rids disposition</li> <li>- RID017 and RID027: tables header in English</li> <li>- -RID005: Section 5 – rephrase of sentence related to IC checks as per rid disposition</li> <li>- RID023: corrected seSpe versione referenced in the document</li> <li>- RID031: Table 21 missing anomalies justification added as per rid disposition</li> <li>- RID0016: in section 4.2 added sentence for justifying delay in some help desk responses</li> <li>- RID009: Table 2 H02B input modified as requested</li> <li>- RID012: corrected statistics for the help desk responses</li> <li>- RID019: added the comment to Table 23 as specified by the Author response to the rid.</li> </ul>

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# 1 Introduction

## 1.1 Purpose of the document

The purpose of the document is to provide a report of the engineering aspects of the H SAF operations for the first and second semester of 2022 (from 01/01/2022 to 31/12/2022). It includes performance statistics of H SAF operational products. This report also provides integrity check statistics for the period 01/10/2022 – 31/12/2022.


As presented in the Integrity Monitoring Protocol document [AD 1] and reported also in table below, the IMP will be applied on all operational/pre-operational products distributed within H SAF and the results will be included, systematically, in all the Operation Review (OR) reports, starting from this OR-12, while the QA and HV will be performed every two years for OR-11, OR-13 and OR-15 only on Target Products, of which definition is described in a dedicated H SAF document. The results will be presented for the full two years period if the dataset for the two years is available, otherwise the widest possible extension will be valid since the product is operational / pre-operational.

It has to be noted that, at the time of this report, the IMP is still under development. This justifies the limited time period (01/10/2022 – 31/12/2022) covered by the IC for the 2022 and presented in this report in section 5.

Moreover, it must be also clarified that, only for this OR-12, the filters defined by the development clusters and reported in the Integrity Monitoring Protocol document [AD 1] have been applied to the H SAF products as a post-processing analysis.

The approach described above it is summarized by the following table:

OR#	Year	Operation Report						Hydrovalidation Report	
		Statistics on Engineering Performances		Statistics on Integrity Check		Quality Assessment			
		Delivery	Applicability	Delivery	Applicability	Delivery	Applicability	Delivery	Applicability
OR11	2022	YES	All Operational/Pre-operational Products	NO	-	YES	Target Products	YES	Target Products
OR12	2023	YES	All Operational/Pre-operational Products	YES	All Operational/Pre-operational Products	NO	-	NO	-
OR13	2024	YES	All Operational/Pre-operational	YES	All Operational/Pre-	YES	Target Products on two-years	YES	Target Products on two-years

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			Products		operational Products		period		period
OR14	2025	YES	All Operational/Pre-operational Products	YES	All Operational/Pre-operational Products	NO	-	NO	-
OR15	2026	YES	All Operational/Pre-operational Products	YES	All Operational/Pre-operational Products	YES	Target Products on two years period	YES	Target Products on two-years period

**Table 1 – Operational Reviews approach**

## 1.2 **Document overview**

The following sections compose the present document:

Section 1 (this section): provides an introduction to the document.

Section 2: provides an overview of the operations in the relevant period.


Section 3: reports the performances of the system in terms of products availability, archiving, dissemination and problems.

Section 4: reports the users' feedback received from the communities and from the web site.

Section 5: reports the integrity check statistics for the period 01/10/2022 – 31/12/2022.

### 1.2.1 **Applicable documents**

[AD 1]      hsa-cdop4-Integrity-Monitoring-Protocol\_1\_0.docx

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## 2 Operations overview

### 2.1 *Operation commitments: the service specification*

Reference for the operations is the H SAF Service Specification (current baseline release: SAF/HSAF/SeSp/1.15).

An overview of the operations commitments is reported in this section, for a clear view of the expected product performances.

### 2.2 *Reference period*

The Operation Report covers both the semesters of the year, reflected in following name convention:

**SAF\_HSAF\_OpRep\_<YYYY>\_S<x>\_<v>\_<r>**

where <YYYY> is the year, <x> the semester (or semesters, if both) of the year, <v> version and <r> the revision.

The period of observation is related to system performance (e.g. dissemination, archive, statistics on user accesses etc.).

The scientific aspects of H SAF cannot be monitored with the same frequency as the engineering ones, due to specific reasons, such as the need of cover a complete snow season for a significant quality assessment of snow products, or the duration of a consistent hydrovalidation campaign: this implies that only at mid-year these aspects are included in the report.

Current report (2022 S1/S2) covers following periods:


Operations aspect in this report	Covered period
Engineering aspects (system performances)	from 01/01/2022 to 31/12/2022
integrity check statistics*	01/10/2022 – 31/12/2022

(\*) The integrity check for the mentioned period has been applied in post-processing since still under development by the development clusters


### 2.3 *Products list*

Table 2 lists all products with operational or pre-operational status for the entire period under review.

Identifier	Acronym	Name	Type	Operational Status history
<b>Precipitation products</b>				
H01 new rel.	PR-OBS-1 new rel.	Precipitation rate at ground by MW conical scanner	NRT	Operational since July 2013


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Identifier	Acronym	Name	Type	Operational Status history
H02B	PR-OBS-2B	Precipitation rate at ground by MW cross-track scanners	NRT	Operational since October 2019
H03B	PR-OBS-3B	Precipitation rate at ground by GEO/IR supported by LEO/MW	NRT	Operational since April 2019
H05B	PR-OBS-5B	Accumulated precipitation at ground by blended MW and IR	NRT	Operational since April 2019
H15A	PR-OBS-6A	Blended SEVIRI Convection area / LEO MW Convective Precipitation	NRT	Pre-operational since mid-June 2015
H18	P-IN-ATMS	Precipitation rate at ground by MW cross track scanners	NRT	Operational since February 2020
H60B	P-IN-SEVIRIPMW	Precipitation rate at ground by blended SEVIRI IR / LEO MW precipitation and morphologic information	NRT	Operational from June 2022
H61B	P-AC-SEVIRIPMW	Accumulated Precipitation at ground by blended SEVIRI IR / LEO MW precipitation and morphologic information	NRT	Operational from June 2022
H63	P-IN-SEVIRI_E	Precipitation rate at ground by GEO/IR supported by LEO/MW IODC	NRT	Operational from June 2022
H64	P-AC-SM2RPMW	Accumulated Precipitation from PassiveMicrowave/Soil Moisture integrated rainfall product	Offline	Operational from June 2022
H68	P-IN-PMW	Gridded MW instantaneous precipitation rate based on intercalibrated PMW instantaneous precipitation rate estimates	NRT	Operational from June 2022
H90	P-AC-SEVIRI_E	Accumulated Precipitation at ground by blended MW and IR IODC	NRT	Operational from June 2022
<b>Soil Moisture products</b>				

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Identifier	Acronym	Name	Type	Operational Status history
H08	SM-OBS-2	Small-scale surface soil moisture by radar scatterometer	NRT	Pre-operational since H SAF Development Phase
H16	SSM ASCAT-B NRT O12.5	Metop-B ASCAT NRT SSM orbit geometry 12.5 km sampling	NRT	Operational since June 2016
H26	RZSM-ASCAT-NRT-10	Metop ASCAT NRT Root Zone Soil Moisture Profile Index 10km resolution	NRT	Operational since March 2022
H103	SSM ASCAT-B NRT O25	Metop-B ASCAT NRT SSM orbit geometry 25 km sampling	NRT	Operational since June 2016
H14	SM-DAS-2	Soil Moisture Profile Index in the roots region retrieved by surface wetness scatterometer assimilation method	NRT	Operational since June 2012
<b>Snow products</b>				
H10	SN-OBS-1	Snow detection (snow mask) by VIS/IR radiometry	NRT	Operational since November 2011
H11	SN-OBS-2	Snow status (dry/wet) by MW radiometry	NRT	Operational since mid-December 2013
H12	SN-OBS-3	Effective snow cover by VIS-IR radiometry	NRT	Pre-operational since November 2012
H13	SN-OBS-4	Snow water equivalent by MW radiometry	NRT	Operational since November 2012
H31	SE-D-SEVIRI	Snow detection for flat land (snow mask) by VIS/NIR of SEVIRI	NRT	Operational in H SAF since February 2019 (previously operational in LSA SAF)
H32	SE-G-AVHRR	Snow detection for flat land (snow mask) by VIS/NIR of AVHRR	NRT	Operational in H SAF since February 2019 (previously operational in LSA SAF)
H34	SE-D-SEVIRI	Snow detection (snow mask) by VIS/IR radiometry covering full MSG Disk	NRT	Pre-operational since June 2021
H35	ESC-H	Effective snow cover by VIS/IR of AVHRR	NRT	Pre-operational since June 2021

**Table 2: H SAF operational or pre-operational products list**

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## 2.4 *Commitments related to Product Requirements and NRT Production*

Table 3 list all the operational and pre-operational products in the covered period with their main characteristics:

Type	ID	Product Name	Acronym	Operational Satellite Input Data	Other Operational Input Data	Format	Spatial Coverage	Spatial Resolution	Threshold Accuracy	Target Accuracy	Optimal Accuracy
PR	H01 new rel.	Precipitation rate at ground by MW conical scanner	PR-OBS-1 new rel.	SSM/I and SSMIS on DMSP (SSM/I on DMSP until Nov. 2011 – no longer available)	SSM/I (on DMSP-15) and AMSR-E (on EOS-Aqua)	BUFR	H SAF area extended to Africa and southern Atlantic	Resolution changing with precipitation type: 30 km in average Sampling: 16 km	Changing with precipitation type: • 90% for > 10 mm/h, • 120% for 1-10 mm/h, • 240% for < 1 mm/h	Changing with precipitation type: • 80% for > 10 mm/h, • 105% for 1-10 mm/h, • 145% for < 1 mm/h	Changing with precipitation type: • 25% for > 10 mm/h, • 50% for 1-10 mm/h, • 90% for < 1 mm/h
PR	H02B	Precipitation rate at ground by MW cross-track scanners	PR-OBS-2B	Metop and NOAA (AMSU/MHS)		BUFR	H SAF area extended to Africa and southern Atlantic: LAT 60°S - 75°N, LON 60°W - 60°E	Resolution changing along the scan: varying from 16 x 16 km <sup>2</sup> / circular at nadir to 26 x 52 km <sup>2</sup> / oval at scan edge Sampling 16 km	RR > 1 mm/h FSE% = 200%	RR > 1 mm/h FSE% = 150%	RR > 1 mm/h FSE% = 100%
PR	H03B	Precipitation rate at ground by GEO/IR supported by LEO/MW	P-IN-SEVIRI	SEVIRI on MSG Precipitation rate at ground by MW (e.g. P-IN-SSMIS, P-IN-MHS)		GRIB-2	H SAF area extended to Africa and southern Atlantic: LAT 60°S - 67.5°N, LON 60°W - 60°E	Resolution changes across the Full Disk from 3 km near the sub-satellite point to 8 km on average over Europe. Sampling dependent of SEVIRI IFOV	RR > 1 mm/h FSE% = 200%	RR > 1 mm/h FSE% = 150%	RR > 1 mm/h FSE% = 100%

Type	ID	Product Name	Acronym	Operational Satellite Input Data	Other Operational Input Data	Format	Spatial Coverage	Spatial Resolution	Threshold Accuracy	Target Accuracy	Optimal Accuracy
PR	H05B	Accumulated precipitation at ground by blended MW+IR	P-AC-SEVIRI		Precipitation rate at ground (e.g. P-IN-SEVIRI)	GRIB-2	H SAF area with extension to Africa and southern Atlantic: LAT 60°S - 67.5°N, LON 60°W - 60°E	Resolution: ~ 30 km Sampling: 5 km in average Sampling dependent of SEVIRI IFOV	RR > 1 mm/24h FSE% = 200%	RR > 1 mm/24h FSE% = 150%	RR > 1 mm/24h FSE% = 100%
PR	H15A	Blended SEVIRI Convection area / LEO MW Convective Precipitation	PR-OBS-6A	SEVIRI on MSG	Precipitation rate at ground by MW (eg. PR-OBS1, PR-OBS2) Convective cloud Mask (NEFODINA)	GRIB-2	H SAF area	Resolution changing cross Europe: 8 km in average Sampling: 5 km in average Sampling dependent of SEVIRI IFOV	Changing with precipitation type: • 90% for > 10 mm/h, • 120% for 1-10 mm/h, • 240% for < 1 mm/h	Changing with precipitation type: • 80% for > 10 mm/h, • 105% for 1-10 mm/h, • 145% for < 1 mm/h	Changing with precipitation type: • 25% for > 10 mm/h, • 50% for 1-10 mm/h, • 90% for < 1 mm/h
PR	H18	Precipitation rate at ground by MW cross track scanners	P-IN-ATMS		P-IN-SSMIS (H01), P-IN-MHS (H02B), P-IN-ATMS (H18), H-AUX-17, H-AUX-20	NetCDF	MSG Full disk: LAT 60°S - 75°N, LON 80°W - 80°E	Resolution changing along the scan: varying from 15.8 x 15.8 km <sup>2</sup> / circular at nadir to 30 x 68.4 km <sup>2</sup> / oval at scan edge	RR > 1 mm/h	FSE% = 200%	RR > 1 mm/h


Type	ID	Product Name	Acronym	Operational Satellite Input Data	Other Operational Input Data	Format	Spatial Coverage	Spatial Resolution	Threshold Accuracy	Target Accuracy	Optimal Accuracy
PR	H60B	Precipitation rate at ground by blended SEVIRI IR / LEO MW precipitation and morphologic information	P-IN-SEVIRIPMW	SEVIRI MSG on	P-IN-SSMIS (H01), P-IN-MHS (H02B), P-IN-ATMS (H18), H-AUX-17, H-AUX-20 NEFODINA	NetCDF	Full SEVIRI disk LAT 60°S - 67.5°N, LON 80°W - 80°E	MSG-SEVIRI grid	RR > 1 mm/h FSE% = 200%	RR > 1 mm/h FSE% = 150%	RR > 1 mm/h FSE% = 100%
PR	H61B	Accumulated Precipitation at ground by blended SEVIRI IR / LEO MW precipitation and morphologic information	P-AC-SEVIRIPMW		P-IN-SEVIRI (H60B)	NetCDF	Full SEVIRI disk LAT 60°S - 67.5°N, LON 80°W - 80°E	MSG-SEVIRI grid	> 1 mm/24h FSE% = 200%	> 1 mm/24h FSE% = 150%	> 1 mm/24h FSE% = 100%
PR	H63	Precipitation rate at ground by GEO/IR supported by LEO/MW IODC	P-IN-SEVIRI_E	SEVIRI MSG operated over IODC	P-IN-SSMIS (H01), P-IN-MHS (H02B), P-IN-ATMS (H18), H-AUX-17, H-AUX-20	NetCDF	Full SEVIRI disk IODC	MSG-SEVIRI grid	RR > 1 mm/24h CC = 0.50	RR > 1 mm/24h CC = 0.60	RR > 1 mm/24h CC = 0.65

Type	ID	Product Name	Acronym	Operational Satellite Input Data	Other Operational Input Data	Format	Spatial Coverage	Spatial Resolution	Threshold Accuracy	Target Accuracy	Optimal Accuracy
PR	H64	Accumulated Precipitation from PassiveMicrowave/Soil Moisture integrated rainfall product	P-AC- SM2RPMW		Daily precipitation from H-AUX- 23, soil moisture values from SSMASCAT- A/B- NRT012.5 (H16 and H101) and SSM ASCAT- C NRT 012.5 (H104)	NetCDF	LAT 60°S - 75°N, LON 60°W - 60°E	Resolution: 0.25°x0.25°	> 1 mm/24h CC = 0.50	> 1 mm/24h CC = 0.60	> 1 mm/24h CC = 0.65
PR	H68	Gridded MW instantaneous precipitation rate based on intercalibrated PMW instantaneous precipitation rate estimates	P-IN-PMW		P-IN-SSMIS (H01), P-IN- MHS (H02B), P-IN-ATMS (H18), H- AUX-17, H- AUX-20	NetCDF	LAT: 60°S - 75°N, LON: 60°W - 60°E	Regular grid at 0.25°x0.25° resolution	RR > 1 mm/h FSE% = 200%	RR > 1 mm/h FSE% = 150%	RR > 1 mm/h FSE% = 100%
PR	H90	Accumulated Precipitation at ground by blended MW and IR IODC	P-AC- SEVIRI_E		P-IN- SEVIRI_E (H63)	NetCDF	Full SEVIRI disk IODC	MSG-SEVIRI grid	RR > 1 mm/24h CC = 0.50	RR > 1 mm/24h CC = 0.60	RR > 1 mm/24h CC = 0.65

Type	ID	Product Name	Acronym	Operational Satellite Input Data	Other Operational Input Data	Format	Spatial Coverage	Spatial Resolution	Threshold Accuracy	Target Accuracy	Optimal Accuracy
PR	H08	Small-scale surface soil moisture by radar scatterometer	SM-OBS-2	ASCAT on Metop	SAR imagery	BUFR	H SAF area	Resolution resulting from disaggregation starting from 25 km Sampling: 0.5 km	Correlation coefficient (CC): 0.50	Correlation coefficient (CC): 0.65	Correlation coefficient (CC): 0,80
SM	H14	Soil Moisture Profile Index in the roots region retrieved by surface wetness scatterometer assimilation method	SM-DAS-2	ASCAT on Metop	SAFH/H-16	Values in grid points on a Gaussian grid	Global	Horizontal resolution: 25km Vertical resolution: 4 layers in the range surface to 2.89m: layer-1 (0-7cm), layer-2 (7-28cm), layer-3 (28-100cm) and layer-4 (100-289cm).	Correlation coefficient (CC): 0.50	Correlation coefficient (CC): 0.65	Correlation coefficient (CC): 0,80
SM	H16	Metop-B ASCAT NRT SSM orbit geometry 12.5 km sampling	SSM ASCAT-B NRT O12.5	ASCAT on Metop B		BUFR	Global	Resolution: 25-34 km x 25-34 km Spatial sampling: 12.5 km	Signal to noise ratio: 0 dB	Signal to noise ratio: 3 dB	Signal to noise ratio: 6 dB
SM	H103	Metop-B ASCAT NRT SSM orbit geometry 25 km sampling	SSM ASCAT-B NRT O25	ASCAT on Metop B		BUFR	Global	Resolution: 50 km x 50 km Spatial sampling: 25 km	Signal to noise ratio: 0 dB	Signal to noise ratio: 3 dB	Signal to noise ratio: 6 dB

Type	ID	Product Name	Acronym	Operational Satellite Input Data	Other Operational Input Data	Format	Spatial Coverage	Spatial Resolution	Threshold Accuracy	Target Accuracy	Optimal Accuracy
SM	H26	Metop ASCAT NRT Root Zone Soil Moisture Profile Index 10km resolution	RZSMASCAT-NRT-10	none	H102 (ASCAT-A) and H103 (ASCAT-B); and H105 (ASCAT-C) when available	netCDF	Global	Horizontal resolution: 0.1 degrees (~10km) Vertical resolution: 4 layers in the range surface to 2.89m: layer-1 (0-7cm), layer-2 (7-28cm), layer-3 (28-100cm) and layer-4 (100-289cm).	Correlation coefficient (CC): 0.50	Correlation coefficient (CC): 0.65	Correlation coefficient (CC): 0.80
SP	H10	Snow detection (snow mask) by VIS/IR radiometry	SN-OBS-1	SEVIRI on MSG Meteosat-9		HDF5	H SAF area	SEVIRI pixel resolution and grid	POD: Flat/Forested areas: 80 % Mountainous areas: 60% FAR: Flat / Forested areas: 20 % Mountainous areas: 30%	POD: Flat/Forested areas: 85 % Mountainous areas: 70% FAR: Flat/Forested areas: 15 % Mountainous areas: 20%	POD: 99 % FAR: 5 %
SP	H11	Snow status (dry/wet) by MW radiometry	SN-OBS-2	AMSR-E on EOS-Aqua		HDF5	H SAF area	Resolution: ~ 20 km Sampling: 20 km	Hit Rate (HR): 60 % False Alarm Rate (FAR): 20 %	Hit Rate (HR): 80 % False Alarm Rate (FAR): 10 %	Hit Rate (HR): 90 % False Alarm Rate (FAR): 5 %
SP	H12	Effective snow cover by VIS/IR radiometry	SN-OBS-3	AVHRR on NOAA and Metop		HDF5	H SAF area	Resolution: 1 - 2 km, Sampling: 0.01 degrees	45% (Overall accuracy)	65% (Overall accuracy)	95% (Overall accuracy)

Type	ID	Product Name	Acronym	Operational Satellite Input Data	Other Operational Input Data	Format	Spatial Coverage	Spatial Resolution	Threshold Accuracy	Target Accuracy	Optimal Accuracy
SP	H13	Snow water equivalent by MW radiometry	SN-OBS-4	SSMIS on DMSP		HDF5	H SAF area	Resolution: ~ 20 km Sampling: 0.25 degrees	<ul style="list-style-type: none"> <li>• Flat / Forested areas: 20mm</li> <li>• Mountainous areas: 45mm</li> </ul>	<ul style="list-style-type: none"> <li>• Flat / Forested areas: 20mm</li> <li>• Mountainous areas: 25mm</li> </ul>	<ul style="list-style-type: none"> <li>• Flat / Forested areas: 10mm</li> <li>• Mountainous areas: 15mm</li> </ul>
SP	H31	Snow detection for flat land by VIS/NIR of SEVIRI	SE-D-SEVIRI-F	SEVIRI on MSG		HDF5, NetCDF	MSG Disk	SEVIRI pixel resolution and grid	<ul style="list-style-type: none"> <li>• False Alarm: 25%</li> <li>• Hit Rate: 70%</li> </ul>	<ul style="list-style-type: none"> <li>• False Alarm: 15%</li> <li>• Hit Rate: 80%</li> </ul>	<ul style="list-style-type: none"> <li>• False Alarm: 5%</li> <li>• Hit Rate: 90%</li> </ul>
SP	H32	Snow detection by VIS/NIR of AVHRR	H32	AVHRR on Metop, and AVHRR on NOAA, if feasible		HDF5	Global	0.01° x 0.01°	<ul style="list-style-type: none"> <li>• FAR: 25%</li> <li>• POD: 70%</li> </ul>	<ul style="list-style-type: none"> <li>• FAR: 15%</li> <li>• POD: 80%</li> </ul>	<ul style="list-style-type: none"> <li>• FAR: 5%</li> <li>• POD: 90%</li> </ul>
SP	H34	Snow detection (snow mask) by VIS/NIR of SEVIRI	SE-DH-SEVIRI	SEVIRI on MSG		HDF5	MSG disk	SEVIRI pixel resolution and grid	Probability Of Detection (POD): <ul style="list-style-type: none"> <li>• Flat / Forested areas: 80 %</li> <li>• Mountainous areas: 60%</li> </ul> False Alarm Rate (FAR): <ul style="list-style-type: none"> <li>• Flat / Forested areas: 20 %</li> <li>• Mountainous areas: 30%</li> </ul>	Probability Of Detection (POD): <ul style="list-style-type: none"> <li>• Flat / Forested areas: 85 %</li> <li>• Mountainous areas: 70%</li> </ul> False Alarm Rate (FAR): <ul style="list-style-type: none"> <li>• Flat / Forested areas: 15 %</li> <li>• Mountainous areas: 20%</li> </ul>	Probability Of Detection (POD): 99 % False Alarm Rate (FAR): 5 %

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Type	ID	Product Name	Acronym	Operational Satellite Input Data	Other Operational Input Data	Format	Spatial Coverage	Spatial Resolution	Threshold Accuracy	Target Accuracy	Optimal Accuracy
SP	H35	Snow detection (snow mask) and Effective snow cover by VIS/NIR of AVHRR	FSC-H-AVHRR	AVHRR (NOAA, Metop)		GRIB2	Northern Hemisphere	Resolution: ~ 8 km Sampling: ~ 5 km	Flat areas: 40 % (RMSE in SCA units) Mountainous areas: 50% (RMSE)	Flat areas: 20 % (RMSE in SCA units) Mountainous areas: 30% (RMSE)	Flat areas: 10 % (RMSE in SCA units) Mountainous areas: 10% (RMSE)

**Table 3: Commitments related to Product Requirements – Main characteristics**




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Table 4 lists all the operational and pre-operational products in the covered period with their performance requirements in terms of generation frequency and timeliness:

Type	ID	Product Name	Acronym	Generation frequency	Timeliness
PR	H01 new rel.	Precipitation rate at ground by MW conical scanner	PR-OBS-1 new rel.	Up to six passes/day in the intervals 06-12 and 18-24 UTC Observing cycle over Europe: ~ 10 h	2,5 hours
PR	H02B	Precipitation rate at ground by MW cross-track scanners	P-IN-MHS	Up to six passes/day with somewhat irregular distribution across the day. Observing cycle over Europe: ~ 5 h	2.5 hours
PR	H03B	Precipitation rate at ground by GEO/IR supported by LEO/MW	P-IN-SEVIRI	Every new SEVIRI image (at 15 min intervals) Observing cycle over Europe: 15 min	30 min
PR	H05B	Accumulated precipitation at ground by blended MW+IR	P-AC-SEVIRI	Four products (integrals over 3, 6, 12 and 24 h) every three hours (rolling) Observing cycle over Europe: 3 h	30 min
PR	H15A	Blended SEVIRI Convection area / LEO MW Convective Precipitation	PR-OBS-6A	Every new SEVIRI image (at 15 min intervals) Observing cycle over Europe: 15 min	15 min
PR	H18	Precipitation rate at ground by MW cross-track scanners ATMS	P-IN-ATMS	Observing cycle 12 h (on average, lower when ATMS will be available also on JPSS-1) irregular distribution each day and across MSG full disk region.	1.5 h
PR	H60B	Precipitation rate at ground by blended SEVIRI IR / LEO MW precipitation and morphologic information	P-IN-SEVIRIPMW	15 min	15 min
PR	H61B	Accumulated Precipitation at ground by blended SEVIRI IR / LEO MW precipitation and morphologic information	P-AC-SEVIRIPMW	1h accumulated precipitation every hour 24h accumulated precipitation every 6 hours	30 min
PR	H63	Precipitation rate at ground by GEO/IR supported by LEO/MW IODC	P-IN-SEVIRI_E	15 min	30 min.
PR	H64	Accumulated Precipitation from PassiveMicrowave/Soil Moisture integrated rainfall product	P-AC-SM2RPMW	Once daily	N. A.
PR	H68	Gridded MW instantaneous	P-IN-PMW	0.5 h	4 hours

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Type	ID	Product Name	Acronym	Generation frequency	Timeliness
		precipitation rate based on intercalibrated PMW instantaneous precipitation rate estimates			
PR	H90	Accumulated Precipitation at ground by blended MW and IR IODC	P-AC- SEVIRI_E	1h accumulated precipitation every hour 24h accumulated precipitation once a day	30 min.
SM	H08	Small-scale surface soil moisture by radar scatterometer	SM-OBS-2	On completion of each orbit at 100 min intervals, through the intervals 07-11 and 17-23 UTC Observing cycle over Europe: 36 h	130 min
SM	H14	Soil Moisture Profile Index in the roots region retrieved by surface wetness scatterometer assimilation method	SM-DAS-2	Model output at 24-h intervals Observing cycle ~ 24 h (NWP model assimilation / stabilisation process)	24 to 36 hours
SM	H16	Metop-B ASCAT NRT SSM orbit geometry 12.5 km sampling	SSM ASCAT-B NRT O12.5	On completion of each orbit. Each orbit lasts 101 minutes (orbital period), resulting in ca. 14	2 hours
SM	H26	Metop ASCAT NRT Root Zone Soil Moisture Profile Index 10km resolution	RZSM- ASCAT- NRT-10	Model output at 24-h intervals Observing cycle ~ 24 h (NWP model assimilation / stabilisation process)	12h
SM	H103	Metop-B ASCAT NRT SSM orbit geometry 25 km sampling	SSM ASCAT-B NRT O25	orbits/day. Observing cycle over Europe: 36 h (full geographical coverage).	2 hours
SP	H10	Snow detection (snow mask) by VIS/IR radiometry	SN-OBS-1	Output result every 24 h	3 hours
SP	H11	Snow status (dry/wet) by MW radiometry	SN-OBS-2	Output result every 24 h	6 hours
SP	H12	Effective snow cover by VIS/IR radiometry	SN-OBS-3	Output result every 24 h After each AVHRR pass, then multi- temporal analysis for cloud-free pixels	3 hours
SP	H13	Snow water equivalent by MW radiometry	SN-OBS-4	Output result every 24 h Assimilation of SSMI/S brightness temperatures in a background field	6 hours
SP	H31	Snow detection for flat land (snow mask) by VIS/NIR of SEVIRI	SE-D- SEVIRI	Output result every 24 h	3 hours
SP	H32	Snow detection for flat land (snow mask) by VIS/NIR of AVHRR	SE-G- AVHRR	Output result every 24 h	3 hours

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Type	ID	Product Name	Acronym	Generation frequency	Timeliness
SP	H34	Snow detection (snow mask) by VIS/IR radiometry	SE-D-SEVIRI	Output result every 24 h	3 hours
SP	H35	Effective snow cover by VIS/IR radiometry	FSC-H-AVHRR	After each AVHRR pass, then multi-temporal analysis for cloud-free pixels Output result every 24 h	3 hours

**Table 4: Commitments related to Product Requirements – Generation frequency and Timeliness (only for NRT products)**

### 3 System performance

#### 3.1 Products availability

The availability (end-to-end) of the products was evaluated through the analysis of some data related to the production and dissemination of the products in relation to the maximum theoretical value. Here below a detailed description of the parameters to generate the metrics:

The Expected Production (EP) counts the amount of products expected to be generated (the results will be shown both on a monthly and semi-annual basis).

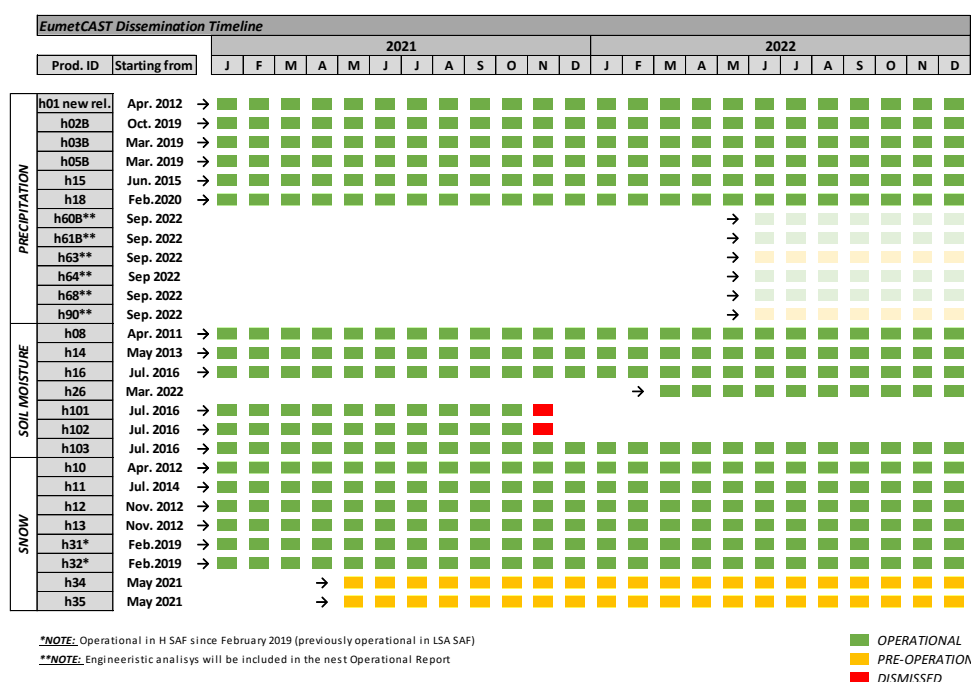
The Successful Production (SP) counts the amount of products successfully generated and disseminated within the expected timeliness of each NRT product (the results will be shown both on a monthly and semi-annual basis). For the off-line products the value of timeliness will not be taken into account for the computation of SP value. In this case the SP represents the total amount of products generated and disseminated via FTP.

The Success Rate (SR) is calculated as SP/EP. It is expressed as a percentage value with a defined colour code to better identify results below, above or close to the threshold of 95%. The used colour code is the following:


$SR < 95\%$	$95\% \leq SR \leq 96\%$	$96\% \leq SR \leq 100\%$
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#### 3.2 EUMETCast Dissemination Timeline

Here below the detailed history of activation/deactivation of the dissemination via EUMETCast is shown.



**Figure 1: EUMETCast Dissemination Timeline - in green the dissemination period via EUMETCast**

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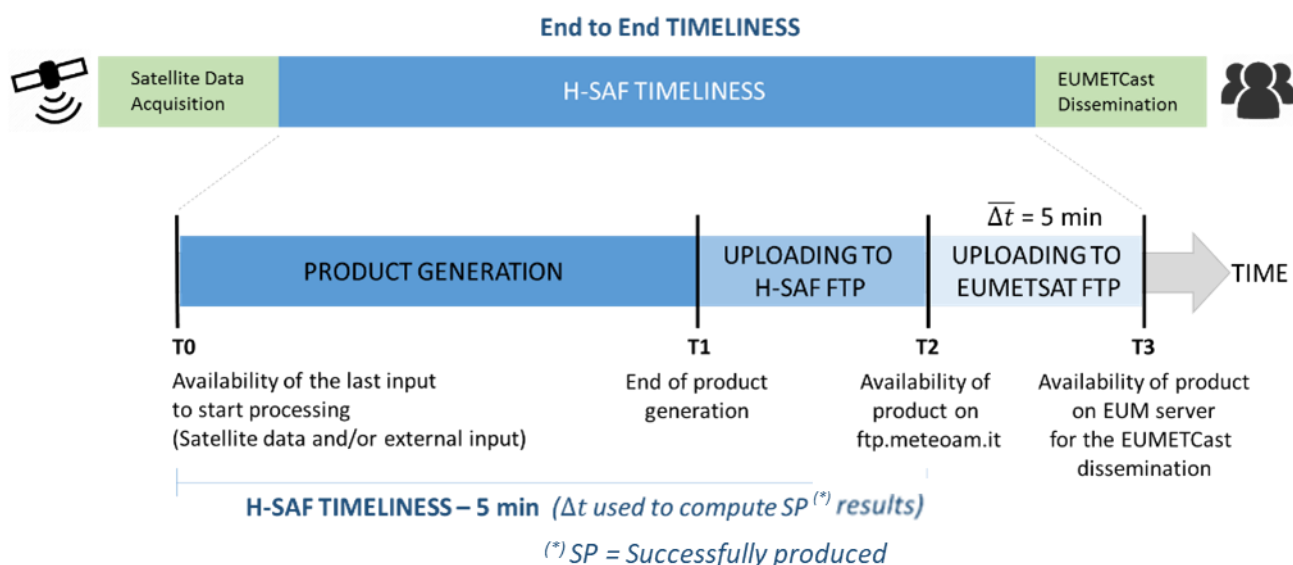
### 3.2.1 EUMETCast dissemination

The product dissemination here reported is referred to the amount of products, which have been uploaded (in and out of timeliness), by the H SAF central facilities, to EUMETSAT FTP server for the dissemination via EUMETCast.

### 3.2.2 Monthly performance

This section reports the availability of H SAF products on a monthly basis. Please note that the values of SP in the table are calculated on the basis of the time reported by the dissemination tool (AFD tool) within the expected timeliness. All NRT products disseminated after the expected timeliness have not been included in the sum to obtain the related SP value.


Concerning the value of the timeliness used to compute the SP results, it has been considered the values reported in Table 4 (as defined in "SAF/HSAF/SeSpe/1.13") with a fixed offset of five minutes (as the estimated average time for uploading data on the EUMETSAT FTP server). In Figure 2, it is shown the sequence of events that contribute to the definition of the value of H-SAF timeliness ( $T_3 - T_0$ ) and the time range used to compute the SP results ( $T_2 - T_0$ ). More in detail, an NRT product is considered "successfully produced" (participating to the SP final result) if it is successfully uploaded on the H SAF FTP server within ( $T_2 - T_0$ ) time range.




**Figure 2: H-SAF Timeliness decomposition**

Where:

- $T_0$  is the starting processing time (it is extracted from the outputs of operational chain – note that the “time tag” in each file name cannot be considered as the starting processing);
- $T_1$  is the end of data processing;

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- *T2* is the time when the product is completely uploaded on the H SAF FTP server (it is extracted from the FTP logs);
- *T3* is the time when the product is completely uploaded on the EUMETSAT FTP server.

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**NB:**

- For Snow products H11 and H12 also the Quality Flag is disseminated: the next tables consider only product files.

Table 5 and Table 6 report, for each product and for each month (1-12), the number of expected files along with the number of files that have been actually disseminated. The percentage of disseminated wrt expected files is also reported.

		TOTAL number of files disseminated VS Expected																		
		1			2			3			4			5			6			
Type	Prod Id	Exp	Diss.	%	Exp	Diss.	%	Exp	Diss.	%	Exp	Diss.	%	Exp	Diss.	%	Exp	Diss.	%	
PR	h01	1502	1502	100,00%	1075	1075	100,00%	1135	1135	100,00%	1162	1162	100,00%	1260	1260	100,00%	1068	1068	100,00%	
PR	h02B	938	938	100,00%	1190	1190	100,00%	1181	1181	100,00%	1260	1260	100,00%	1256	1256	100,00%	1261	1261	100,00%	
PR	h03B	2976	2976	100,00%	2688	2673	99,44%	2976	2970	99,80%	2880	2863	99,41%	2976	2971	99,83%	2880	2874	99,79%	
PR	h05B	992	992	100,00%	896	894	99,78%	992	992	100,00%	960	959	99,90%	992	992	100,00%	960	960	100,00%	
PR	h15	2976	2974	99,93%	2688	2671	99,37%	2976	2888	97,04%	2880	2777	96,42%	2976	2899	97,41%	2880	2774	96,32%	
PR	h18	2719	2719	100,00%	1053	1053	100,00%	935	935	100,00%	831	831	100,00%	900	900	100,00%	793	793	100,00%	
PR	h60B	NOT OPERATIONAL															2880	2875	99,83%	
PR	h61B																840	840	100,00%	
PR	h63																2880	2852	99,03%	
PR	h64																30	30	100,00%	
PR	h68																1440	1439	99,93%	
PR	h90																840	833	99,17%	
SM	h08 (netCDF)	1426	1382	96,91%	1288	1253	97,28%	1426	1388	97,34%	1380	1344	97,39%	1426	1385	97,12%	1380	1332	96,52%	
SM	h08 (bufr)	1426	1382	96,91%	1288	1253	97,28%	1426	1388	97,34%	1380	1344	97,39%	1426	1385	97,12%	1380	1332	96,52%	
SM	h14	31	30	96,77%	28	28	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%	
SM	h16	14880	14866	99,91%	13440	13438	99,99%	14880	14878	99,99%	14400	14365	99,76%	14880	14874	99,96%	14400	14304	99,33%	
SM	h103	14880	14866	99,91%	13440	13438	99,99%	14880	14878	99,99%	14400	14365	99,76%	14880	14874	99,96%	14400	14304	99,33%	
SM	h26	Operational starting from 23/3/2022									30	30	100,00%	31	28	90,32%	30	30	100,00%	
SP	h10	31	31	100,00%	28	28	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	29	96,67%	
NOTE #1	SP	h11	31	31	100,00%	28	28	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	29	96,67%
NOTE #1	SP	h12	31	31	100,00%	28	28	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	29	96,67%
	SP	h13	31	31	100,00%	28	28	100,00%	31	30	96,77%	30	30	100,00%	31	31	100,00%	30	29	96,67%
	SP	h34	31	30	96,77%	28	28	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%
	SP	h35	31	30	96,77%	28	28	100,00%	31	31	100,00%	30	29	96,67%	31	28	90,32%	30	27	90,00%
	SP	h31	31	31	100,00%	28	28	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%
	SP	h32	31	31	100,00%	28	28	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%

**NOTE #1:** For Snow products H11 and H12 also the Quality Flag is disseminated. In this table only product files are considered

**Table 5: Product dissemination statistics (1st semester 2022)**

		TOTAL number of files disseminated VS Expected																	
		7			8			9			10			11			12		
Type	Prod Id	Exp	Diss.	%	Exp	Diss.	%	Exp	Diss.	%	Exp	Diss.	%	Exp	Diss.	%	Exp	Diss.	%
PR	h01	1156	1156	100,00%	1195	1195	100,00%	1150	1150	100,00%	1235	1235	100,00%	1075	1075	100,00%	1153	1153	100,00%
PR	h02B	1301	1301	100,00%	1303	1303	100,00%	1262	1262	100,00%	1292	1292	100,00%	1275	1275	100,00%	1311	1311	100,00%
PR	h03B	2976	2966	99,66%	2976	2971	99,83%	2880	2877	99,90%	2976	2965	99,63%	2880	2874	99,79%	2976	2968	99,73%
PR	h05B	992	992	100,00%	992	992	100,00%	960	960	100,00%	992	992	100,00%	960	960	100,00%	992	992	100,00%
PR	h15	2976	2945	98,96%	2976	2963	99,56%	2880	2833	98,37%	2976	2941	98,82%	2880	2860	99,31%	2976	2950	99,13%
PR	h18	940	940	100,00%	593	593	100,00%	814	814	100,00%	878	878	100,00%	851	851	100,00%	874	874	100,00%
PR	h60B	2976	2972	99,87%	2976	2971	99,83%	2880	2875	99,83%	2976	2924	98,25%	2880	2873	99,76%	2976	2968	99,73%
PR	h61B	868	868	100,00%	868	868	100,00%	840	840	100,00%	868	854	98,39%	840	840	100,00%	868	868	100,00%
PR	h63	2976	2971	99,83%	2976	2966	99,66%	2880	2878	99,93%	2976	2971	99,83%	2880	2875	99,83%	2976	2974	99,93%
PR	h64	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	27	87,10%	30	30	100,00%	31	31	100,00%
PR	h68	1488	1488	100,00%	1488	1488	100,00%	1440	1440	100,00%	1488	1488	100,00%	1440	1432	99,44%	1488	1480	99,46%
PR	h90	868	868	100,00%	868	868	100,00%	840	840	100,00%	868	868	100,00%	840	840	100,00%	868	868	100,00%
SM	h08 (netCDF)	1384	1426	97,05%	1394	1426	97,76%	1342	1380	97,25%	1385	1426	97,12%	1315	1380	95,29%	1367	1426	95,86%
SM	h08 (bufr)	1384	1426	97,05%	1394	1426	97,76%	1342	1380	97,25%	1385	1426	97,12%	1315	1380	95,29%	1367	1426	95,86%
SM	h14	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%
SM	h16	14880	14818	99,58%	14480	14877	102,74%	14400	14395	99,97%	14880	14878	99,99%	14400	14144	98,22%	14880	14736	99,03%
SM	h103	14880	14818	99,58%	14480	14877	102,74%	14400	14395	99,97%	14880	14878	99,99%	14400	14144	98,22%	14880	14736	99,03%
SM	h26	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%
SP	h10	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	29	96,67%	31	30	96,77%
SP	h11	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	28	93,33%	31	30	96,77%
SP	h12	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%	31	29	93,55%
SP	h13	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	29	93,55%	30	30	100,00%	31	30	96,77%
SP	h34	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%	31	30	96,77%
SP	h35	31	30	96,77%	31	29	93,55%	30	30	100,00%	31	31	100,00%	30	28	93,33%	31	30	96,77%
SP	h31	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%
SP	h32	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%

NOTE #1  
NOTE #1

NOTE #1: For Snow products H11 and H12 also the Quality Flag is disseminated. In this table only product files are considered

Table 6: Product dissemination statistics (2nd semester 2022)

Table 7 and Table 8 report, for each product and for each month (second row numbers from 1 to 12), the number of on-time deliveries. The percentage of on-time deliveries wrt the number of disseminations is also reported.

TOTAL number of files disseminated in Timelines VS Generated													
Type	Prod Id	1		2		3		4		5		6	
		Diss.	%	Diss.	%	Diss.	%	Diss.	%	Diss.	%	Diss.	%
PR	h01	1465	97,54%	974	90,60%	1101	97,00%	1157	99,57%	1254	99,52%	1064	99,63%
PR	h02B	852	90,83%	1188	99,83%	1181	100,00%	1258	99,84%	1246	99,20%	1239	98,26%
PR	h03B	2323	78,06%	2673	100,00%	2970	100,00%	2863	100,00%	2971	100,00%	2874	100,00%
PR	h05B	992	100,00%	894	100,00%	992	100,00%	959	100,00%	992	100,00%	960	100,00%
PR	h15	1819	61,16%	2671	100,00%	2888	100,00%	2774	99,89%	2899	100,00%	2774	100,00%
PR	h18	2698	99,23%	935	88,79%	930	99,47%	824	99,16%	899	99,89%	793	100,00%
PR	h60B	NOT OPERATIONAL										2864	99,62%
PR	h61B											840	100,00%
PR	h63											2824	99,02%
PR	h64											30	100,00%
PR	h68											1439	100,00%
PR	h90											833	100,00%
SM	h08 (netCDF)	1346	97,40%	1253	100,00%	1388	100,00%	1300	96,73%	1290	93,14%	1203	90,32%
SM	h08 (bufr)	1346	97,40%	1253	100,00%	1388	100,00%	1300	96,73%	1290	93,14%	1203	90,32%
SM	h14	30	100,00%	28	100,00%	31	100,00%	30	100,00%	31	100,00%	30	100,00%
SM	h16	14866	100,00%	13438	99,99%	14878	100,00%	14365	100,00%	14874	100,00%	14304	100,00%
SM	h103	14866	100,00%	13438	99,99%	14878	100,00%	14365	100,00%	14874	100,00%	14304	100,00%
SM	h26	Operational starting from 23/3/2022						30	100,00%	28	100,00%	28	93,33%
SP	h10	31	100,00%	28	100,00%	31	100,00%	30	100,00%	31	100,00%	29	100,00%
SP	h11	31	100,00%	28	100,00%	31	100,00%	30	100,00%	31	100,00%	29	100,00%
SP	h12	31	100,00%	28	100,00%	31	100,00%	30	100,00%	31	100,00%	27	93,10%
SP	h13	31	100,00%	28	100,00%	26	86,67%	30	100,00%	31	100,00%	29	100,00%
SP	h34	30	100,00%	28	100,00%	31	100,00%	29	96,67%	29	93,55%	26	86,67%
SP	h35	30	100,00%	28	100,00%	30	96,77%	29	100,00%	28	100,00%	27	100,00%
SP	h31	31	100,00%	28	100,00%	31	100,00%	30	100,00%	31	100,00%	30	100,00%
SP	h32	31	100,00%	28	100,00%	31	100,00%	30	100,00%	31	100,00%	30	100,00%

Table 7: On-time product dissemination statistics (1st semester 2022)

TOTAL number of files disseminated in Timelines VS Generated													
		7		8		9		10		11		12	
Type	Prod Id	Diss.	%	Diss.	%	Diss.	%	Diss.	%	Diss.	%	Diss.	%
PR	h01	1150	99,48%	1187	99,33%	1139	99,04%	1227	99,35%	1037	96,47%	1141	98,96%
PR	h02B	1285	98,77%	1295	99,39%	1258	99,68%	1289	99,77%	1275	100,00%	1309	99,85%
PR	h03B	2966	100,00%	2971	100,00%	2877	100,00%	2965	100,00%	2874	100,00%	2968	100,00%
PR	h05B	992	100,00%	992	100,00%	960	100,00%	992	100,00%	960	100,00%	992	100,00%
PR	h15	2943	99,93%	2960	99,90%	2829	99,86%	2933	99,73%	2860	100,00%	2940	99,66%
PR	h18	936	99,57%	592	99,83%	814	100,00%	878	100,00%	851	100,00%	874	100,00%
PR	h60B	2968	99,87%	2971	100,00%	2875	100,00%	2917	99,76%	2873	100,00%	2967	99,97%
PR	h61B	868	100,00%	868	100,00%	840	100,00%	854	100,00%	840	100,00%	868	100,00%
PR	h63	2965	99,80%	2960	99,80%	2866	99,58%	2954	99,43%	2858	99,41%	2948	99,13%
PR	h64	31	100,00%	31	100,00%	30	100,00%	27	100,00%	29	96,67%	31	100,00%
PR	h68	1488	100,00%	1488	100,00%	1440	100,00%	1488	100,00%	1432	100,00%	1480	100,00%
PR	h90	868	100,00%	868	100,00%	840	100,00%	868	100,00%	840	100,00%	868	100,00%
SM	h08 (netCDF)	1277	92,27%	1319	94,62%	1258	93,74%	1349	97,40%	1305	99,24%	1367	100,00%
SM	h08 (bufr)	1277	92,27%	1319	94,62%	1258	93,74%	1349	97,40%	1305	99,24%	1367	100,00%
SM	h14	31	100,00%	31	100,00%	30	100,00%	31	100,00%	30	100,00%	31	100,00%
SM	h16	14818	100,00%	14877	100,00%	14395	100,00%	14878	100,00%	14144	100,00%	14736	100,00%
SM	h103	14818	100,00%	14877	100,00%	14395	100,00%	14878	100,00%	14144	100,00%	14736	100,00%
SM	h26	31	100,00%	31	100,00%	30	100,00%	31	100,00%	30	100,00%	31	100,00%
SP	h10	31	100,00%	31	100,00%	30	100,00%	31	100,00%	29	100,00%	30	100,00%
SP	h11	31	100,00%	31	100,00%	30	100,00%	31	100,00%	28	100,00%	31	103,33%
SP	h12	31	100,00%	31	100,00%	29	96,67%	31	100,00%	30	100,00%	29	100,00%
SP	h13	30	96,77%	30	96,77%	30	100,00%	28	96,55%	29	96,67%	30	100,00%
SP	h34	31	100,00%	31	100,00%	30	100,00%	31	100,00%	30	100,00%	30	100,00%
SP	h35	30	100,00%	29	100,00%	30	100,00%	31	100,00%	28	100,00%	30	100,00%
SP	h31	31	100,00%	31	100,00%	30	100,00%	31	100,00%	30	100,00%	31	100,00%
SP	h32	31	100,00%	31	100,00%	30	100,00%	31	100,00%	30	100,00%	31	100,00%

Table 8: On-time product dissemination statistics (2nd semester 2022)


	<p>Operations Report</p> <p>2022 S1/S2</p>	<p>Doc. No: SAF/HSAF/OpRep/2022_S1_S2</p> <p>Version: 2.0</p> <p>Date: 13/10/2023</p> <p>Page: 29/58</p>
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Table 9 and Table 10 report the percentage of on-time disseminations wrt the number of expected files.

TYPE	PRODUCT ID	2022-01			2022-02			2022-03			2022-04			2022-05			2022-06			
		Exp.	OT diss.	SR	Exp.	OT diss.	SR	Exp.	OT diss.	SR	Exp.	OT diss.	SR	Exp.	OT diss.	SR	Exp.	OT diss.	SR	
PR	h01	1502	1465	97,54%	1075	974	90,60%	1135	1101	97,00%	1162	1157	99,57%	1260	1254	99,52%	1068	1064	99,63%	
PR	h02B	938	852	90,83%	1190	1188	99,83%	1181	1181	100,00%	1260	1258	99,84%	1256	1246	99,20%	1261	1239	98,26%	
PR	h03B	2976	2323	78,06%	2688	2673	99,44%	2976	2970	99,80%	2880	2863	99,41%	2976	2971	99,83%	2880	2874	99,79%	
PR	h05B	992	992	100,00%	896	894	99,78%	992	992	100,00%	960	959	99,90%	992	992	100,00%	960	960	100,00%	
PR	h15	2976	1819	61,12%	2688	2671	99,37%	2976	2888	97,04%	2880	2774	96,32%	2976	2899	97,41%	2880	2774	96,32%	
PR	h18	2719	2698	99,23%	1053	935	88,79%	935	930	99,47%	831	824	99,16%	900	899	99,89%	793	793	100,00%	
PR	h60B	NOT OPERATIONAL															2880	2864	99,83%	
PR	h61B																840	840	100,00%	
PR	h63																2880	2824	99,03%	
PR	h64																30	30	100,00%	
PR	h68																1440	1439	99,93%	
PR	h90																840	833	99,17%	
SM	h08 (netCDF)	1426	1346	94,39%	1288	1253	97,28%	1426	1388	97,34%	1380	1300	94,20%	1426	1290	90,46%	1380	1203	87,17%	
SM	h08 (bufr)	1426	1346	94,39%	1288	1253	97,28%	1426	1388	97,34%	1380	1300	94,20%	1426	1290	90,46%	1380	1203	87,17%	
SM	h14	31	30	96,77%	28	28	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%	
SM	h16	14880	14866	99,91%	13440	13438	99,99%	14880	14878	99,99%	14400	14365	99,76%	14880	14874	99,96%	14400	14304	99,33%	
SM	h26	Operational starting from 23/3/2022										30	30	100,00%	31	28	90,32%	30	28	93,33%
SM	h103	14880	14866	99,91%	13440	13438	99,99%	14880	14878	99,99%	14400	14365	99,76%	14880	14874	99,96%	14400	14304	99,33%	
SP	h10	31	31	100,00%	28	28	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	29	96,67%	
SP	h11	31	31	100,00%	28	28	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	29	96,67%	
SP	h12	31	31	100,00%	28	28	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	27	90,00%	
SP	h13	31	31	100,00%	28	28	100,00%	31	26	83,87%	30	30	100,00%	31	31	100,00%	30	29	96,67%	
SP	h31	31	31	100,00%	28	28	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%	
SP	h32	31	31	100,00%	28	28	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%	
SP	h34	31	30	96,77%	28	28	100,00%	31	31	100,00%	30	29	96,67%	31	29	93,55%	30	26	86,67%	
SP	h35	31	30	96,77%	28	28	100,00%	31	30	96,77%	30	29	96,67%	31	28	90,32%	30	27	90,00%	

Table 9: On-time disseminations vs. expected products statistics (1st semester 2022)

TYPE	PRODUCT ID	2022-07			2022-08			2022-09			2022-10			2022-11			2022-12		
		Exp.	OT diss.	SR	Exp.	OT diss.	SR	Exp.	OT diss.	SR	Exp.	OT diss.	SR	Exp.	OT diss.	SR	Exp.	OT diss.	SR
PR	h01	1156	1150	99,48%	1195	1187	99,33%	1150	1139	99,04%	1235	1227	99,35%	1075	1037	96,47%	1153	1141	98,96%
PR	h02B	1301	1285	98,77%	1303	1295	99,39%	1262	1258	99,68%	1292	1289	99,77%	1275	1275	100,00%	1311	1309	99,85%
PR	h03B	2976	2966	99,66%	2976	2971	99,83%	2880	2877	99,90%	2976	2965	99,63%	2880	2874	99,79%	2976	2968	99,73%
PR	h05B	992	992	100,00%	992	992	100,00%	960	960	100,00%	992	992	100,00%	960	960	100,00%	992	992	100,00%
PR	h15	2976	2943	98,89%	2976	2960	99,46%	2880	2829	98,23%	2976	2933	98,56%	2880	2860	99,31%	2976	2940	98,79%
PR	h18	940	936	99,57%	593	592	99,83%	814	814	100,00%	878	878	100,00%	851	851	100,00%	874	874	100,00%
PR	h60B	2976	2968	99,73%	2976	2971	99,83%	2880	2875	99,83%	2976	2917	98,02%	2880	2873	99,76%	2976	2967	99,70%
PR	h61B	868	868	100,00%	868	868	100,00%	840	840	100,00%	868	854	98,39%	840	840	100,00%	868	868	100,00%
PR	h63	2976	2965	99,63%	2976	2960	99,46%	2880	2866	99,51%	2976	2954	99,26%	2880	2858	99,24%	2976	2948	99,06%
PR	h64	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	27	87,10%	30	29	96,67%	31	31	100,00%
PR	h68	1488	1488	100,00%	1488	1488	100,00%	1440	1440	100,00%	1488	1488	100,00%	1440	1432	99,44%	1488	1480	99,46%
PR	h90	868	868	100,00%	868	868	100,00%	840	840	100,00%	868	868	100,00%	840	840	100,00%	868	868	100,00%
SM	h08 (netCDF)	1426	1277	89,55%	1426	1319	92,50%	1380	1258	91,16%	1426	1349	94,60%	1380	1305	94,57%	1426	1367	95,86%
SM	h08 (bufr)	1426	1277	89,55%	1426	1319	92,50%	1380	1258	91,16%	1426	1349	94,60%	1380	1305	94,57%	1426	1367	95,86%
SM	h14	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%
SM	h16	14880	14818	99,58%	14480	14480	100,00%	14400	14395	99,97%	14880	14878	99,99%	14400	14144	98,22%	14880	14736	99,03%
SM	h26	31	31	100,00%	31	31	100,00%	30,00	30,00	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%
SM	h103	14880	14818	99,58%	14480	14480	100,00%	14400	14395	99,97%	14880	14878	99,99%	14400	14144	98,22%	14880	14736	99,03%
SP	h10	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	29	96,67%	31	30	96,77%
SP	h11	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	28	93,33%	31	31	100,00%
SP	h12	31	31	100,00%	31	31	100,00%	30	29	96,67%	31	31	100,00%	30	30	100,00%	31	29	93,55%
SP	h13	31	30	96,77%	31	30	96,77%	30	30	100,00%	31	28	90,32%	30	29	96,67%	31	30	96,77%
SP	h31	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%
SP	h32	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%
SP	h34	31	31	100,00%	31	31	100,00%	30	30	100,00%	31	31	100,00%	30	30	100,00%	31	30	96,77%
SP	h35	31	30	96,77%	31	29	93,55%	30	30	100,00%	31	31	100,00%	30	28	93,33%	31	30	96,77%

Table 10: On-time disseminatons vs. expected products statistics (2nd semester 2022)

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TYPE	PRODUCT	Expected (A)	Disseminated (B)	On Time (C)	Diss. vs Exp. (B/A)	OT vs Diss. (C/B)	OT vs Exp. (C/A)
PR	h01	14.166	14.166	13.896	100,00%	98,09%	98,09%
PR	h02B	14.830	14.830	14.675	100,00%	98,95%	98,95%
PR	h03B	35.040	34.948	34.295	99,74%	98,13%	97,87%
PR	h05B	11.680	11.677	11.677	99,97%	100,00%	99,97%
PR	h15	35.040	34.475	33.290	98,39%	96,56%	95,01%
PR	h18	12.181	12.181	12.024	100,00%	98,71%	98,71%
PR	h60B	20.544	20.458	20.435	99,58%	99,89%	99,47%
PR	h61B	5.992	5.978	5.978	99,77%	100,00%	99,77%
PR	h63	20.544	20.487	20.375	99,72%	99,45%	99,18%
PR	h64	214	210	209	98,13%	99,52%	97,66%
PR	h68	10.272	10.255	10.255	99,83%	100,00%	99,83%
PR	h90	5.992	5.985	5.985	99,88%	100,00%	99,88%
SM	h08 (netCDF)	16.790	16.271	15.655	96,91%	96,21%	93,24%
SM	h08 (bufr)	16.790	16.271	15.655	96,91%	96,21%	93,24%
SM	h14	365	364	364	99,73%	100,00%	99,73%
SM	h16	175.200	174.573	174.573	99,64%	100,00%	99,64%
SM	h103	175.200	174.573	174.573	99,64%	100,00%	99,64%
SM	h26	275	272	270	98,91%	99,26%	98,18%
SP	h10	365	362	362	99,18%	100,00%	99,18%
SP	h11	365	361	362	98,90%	100,28%	99,18%
SP	h12	365	362	359	99,18%	99,17%	98,36%
SP	h13	365	360	352	98,63%	97,78%	96,44%
SP	h34	365	363	356	99,45%	98,07%	97,53%
SP	h35	365	351	350	96,16%	99,72%	95,89%
SP	h31	365	365	365	100,00%	100,00%	100,00%
SP	h32	365	365	365	100,00%	100,00%	100,00%

Table 11 resumes for the whole 2022 the same figures reported above.

TYPE	PRODUCT	Expected (A)	Disseminated (B)	On Time (C)	Diss. vs Exp. (B/A)	OT vs Diss. (C/B)	OT vs Exp. (C/A)
PR	h01	14.166	14.166	13.896	100,00%	98,09%	98,09%
PR	h02B	14.830	14.830	14.675	100,00%	98,95%	98,95%
PR	h03B	35.040	34.948	34.295	99,74%	98,13%	97,87%
PR	h05B	11.680	11.677	11.677	99,97%	100,00%	99,97%
PR	h15	35.040	34.475	33.290	98,39%	96,56%	95,01%
PR	h18	12.181	12.181	12.024	100,00%	98,71%	98,71%
PR	h60B	20.544	20.458	20.435	99,58%	99,89%	99,47%
PR	h61B	5.992	5.978	5.978	99,77%	100,00%	99,77%
PR	h63	20.544	20.487	20.375	99,72%	99,45%	99,18%
PR	h64	214	210	209	98,13%	99,52%	97,66%
PR	h68	10.272	10.255	10.255	99,83%	100,00%	99,83%
PR	h90	5.992	5.985	5.985	99,88%	100,00%	99,88%
SM	h08 (netCDF)	16.790	16.271	15.655	96,91%	96,21%	93,24%
SM	h08 (bufr)	16.790	16.271	15.655	96,91%	96,21%	93,24%
SM	h14	365	364	364	99,73%	100,00%	99,73%
SM	h16	175.200	174.573	174.573	99,64%	100,00%	99,64%
SM	h103	175.200	174.573	174.573	99,64%	100,00%	99,64%
SM	h26	275	272	270	98,91%	99,26%	98,18%
SP	h10	365	362	362	99,18%	100,00%	99,18%
SP	h11	365	361	362	98,90%	100,28%	99,18%
SP	h12	365	362	359	99,18%	99,17%	98,36%
SP	h13	365	360	352	98,63%	97,78%	96,44%
SP	h34	365	363	356	99,45%	98,07%	97,53%
SP	h35	365	351	350	96,16%	99,72%	95,89%
SP	h31	365	365	365	100,00%	100,00%	100,00%
SP	h32	365	365	365	100,00%	100,00%	100,00%

Table 11: Overall 2022 statistics


	<p style="text-align: center;">Operations Report</p> <p style="text-align: center;">2022 S1/S2</p>	<p>Doc. No: SAF/HSAF/OpRep/2022_S1_S2</p> <p>Version: 2.0</p> <p>Date: 13/10/2023</p> <p>Page: 33/58</p>
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Table 12 and Table 13 report the percentage of lost and OOT (out of timeliness) files wrt the number of expected files (i.e. the complement to 100% of success rates shown in the previous tables).

TYPE	PRODUCT	01-2022		02-2022		03-2022		04-2022		05-2022		06-2022	
		Lost	OOT	Lost	OOT	Lost	OOT	Lost	OOT	Lost	OOT	Lost	OOT
PR	h01	0,00%	2,46%	0,00%	9,40%	0,00%	3,00%	0,00%	0,43%	0,00%	0,48%	0,00%	0,37%
PR	h02B	0,00%	9,17%	0,00%	0,17%	0,00%	0,00%	0,00%	0,16%	0,00%	0,80%	0,00%	1,74%
PR	h03B	0,00%	21,94%	0,56%	0,56%	0,20%	0,20%	0,59%	0,59%	0,17%	0,17%	0,21%	0,21%
PR	h05B	0,00%	0,00%	0,22%	0,22%	0,00%	0,00%	0,10%	0,10%	0,00%	0,00%	0,00%	0,00%
PR	h15	0,07%	38,88%	0,63%	0,63%	2,96%	2,96%	3,58%	3,68%	2,59%	2,59%	3,68%	3,68%
PR	h18	0,00%	0,77%	0,00%	11,21%	0,00%	0,53%	0,00%	0,84%	0,00%	0,11%	0,00%	0,00%
PR	h60B	<b>NOT OPERATIONAL</b>										0,17%	0,56%
PR	h61B											0,00%	0,00%
PR	h63											0,97%	1,94%
PR	h64											0,00%	0,00%
PR	h68											0,07%	0,07%
PR	h90											0,83%	0,83%
SM	h08 (netCDF)	3,09%	5,61%	2,72%	2,72%	2,66%	2,66%	2,61%	5,80%	2,88%	9,54%	3,48%	12,83%
SM	h08 (bufr)	3,09%	5,61%	2,72%	2,72%	2,66%	2,66%	2,61%	5,80%	2,88%	9,54%	3,48%	12,83%
SM	h14	3,23%	3,23%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
SM	h16	0,09%	0,09%	0,01%	0,01%	0,01%	0,01%	0,24%	0,24%	0,04%	0,04%	0,67%	0,67%
SM	h26	Operational starting from 23/3/2022							0,00%	0,00%	9,68%	9,68%	0,00%
SM	h103	0,09%	0,09%	0,01%	0,01%	0,01%	0,01%	0,24%	0,24%	0,04%	0,04%	0,67%	0,67%
SP	h10	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	3,33%	3,33%
SP	h11	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	3,33%	3,33%
SP	h12	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	3,33%	10,00%
SP	h13	0,00%	0,00%	0,00%	0,00%	3,23%	16,13%	0,00%	0,00%	0,00%	0,00%	3,33%	3,33%
SP	h31	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
SP	h32	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
SP	h34	3,23%	3,23%	0,00%	0,00%	0,00%	0,00%	0,00%	3,33%	0,00%	6,45%	0,00%	13,33%
SP	h35	3,23%	3,23%	0,00%	0,00%	0,00%	0,00%	3,33%	3,33%	9,68%	9,68%	10,00%	10,00%

Table 12: Fault rates (1<sup>st</sup> semester 2022)

TYPE	PRODUCT	07-2022		08-2022		09-2022		10-2022		11-2022		12-2022	
		Lost	OOT	Lost	OOT	Lost	OOT	Lost	OOT	Lost	OOT	Lost	OOT
PR	h01	0,00%	0,52%	0,00%	0,67%	0,00%	0,96%	0,00%	0,65%	0,00%	3,53%	0,00%	1,04%
PR	h02B	0,00%	1,23%	0,00%	0,61%	0,00%	0,32%	0,00%	0,23%	0,00%	0,00%	0,00%	0,15%
PR	h03B	0,10%	0,34%	0,17%	0,17%	0,10%	0,10%	0,37%	0,37%	0,21%	0,21%	0,27%	0,27%
PR	h05B	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
PR	h15	1,63%	1,11%	0,44%	0,54%	1,63%	1,77%	1,18%	1,44%	0,69%	0,69%	0,87%	1,21%
PR	h18	0,00%	0,43%	0,00%	0,17%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
PR	h60B	0,13%	0,27%	0,17%	3,39%	0,17%	1,98%	1,75%	1,98%	0,24%	0,24%	0,27%	0,30%
PR	h61B	0,00%	0,00%	0,00%	3,23%	0,00%	1,61%	1,61%	1,61%	0,00%	0,00%	0,00%	0,00%
PR	h63	0,17%	0,37%	0,34%	3,70%	0,07%	0,74%	0,17%	0,74%	0,17%	0,76%	0,07%	0,94%
PR	h64	0,00%	0,00%	0,00%	3,23%	0,00%	12,90%	12,90%	12,90%	0,00%	3,33%	0,00%	0,00%
PR	h68	0,00%	0,00%	0,00%	3,23%	0,00%	0,00%	0,00%	0,00%	0,56%	0,56%	0,54%	0,54%
PR	h90	0,00%	0,00%	0,00%	3,23%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
SM	h08 (netCDF)	2,75%	10,45%	2,24%	7,50%	2,75%	8,84%	2,88%	5,40%	4,71%	5,43%	4,14%	4,14%
SM	h08 (bufr)	2,75%	10,45%	2,24%	7,50%	2,75%	8,84%	2,88%	5,40%	4,71%	5,43%	4,14%	4,14%
SM	h14	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
SM	h16	0,03%	0,42%	0,00%	0,00%	0,03%	0,03%	0,01%	0,01%	1,78%	1,78%	0,97%	0,97%
SM	h26	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
SM	h103	0,03%	0,42%	0,00%	0,00%	0,03%	0,03%	0,01%	0,01%	1,78%	1,78%	0,97%	0,97%
SP	h10	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	3,33%	3,33%	3,23%	3,23%
SP	h11	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	6,67%	6,67%	3,23%	0,00%
SP	h12	0,00%	0,00%	0,00%	0,00%	0,00%	3,33%	0,00%	0,00%	0,00%	0,00%	6,45%	6,45%
SP	h13	0,00%	3,23%	0,00%	3,23%	0,00%	0,00%	6,45%	9,68%	0,00%	3,33%	3,23%	3,23%
SP	h31	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
SP	h32	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
SP	h34	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	3,23%	3,23%
SP	h35	0,00%	3,23%	6,45%	6,45%	0,00%	0,00%	0,00%	0,00%	6,67%	6,67%	3,23%	3,23%

Table 13: Fault rates (2<sup>nd</sup> semester 2022)

	Operations Report 2022 S1/S2	Doc. No: SAF/HSAF/OpRep/2022_S1_S2 Version: 2.0 Date: 13/10/2023 Page: 34/58
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### 3.3 ***Product archiving and dissemination***

Central systems at Leading Entity facilities are receiving products at regular basis. Products are primarily received from the generation chains at the FTP front end, which is a 2-months “on-line” time slot of availability of the products.

Operational and pre-operational products are also archived centrally in a complete-period “off-line” archive. The H SAF archive is accessible by means of a web-based application "H SAF Data Centre" available at <http://hsaf.meteoam.it/download-products.php> on the H SAF website. This service allows all registered users to place an order and receive the access on required data by dedicated FTP server within three business days.


#### ***3.3.1 Product archiving***

Product archiving information is here provided. Note that this table lists the number of products generated and successfully uploaded on the H SAF FTP considering in the total amount also products delivered after the expected timeliness (e.g. products generated and/or uploaded with a delay or reprocessed).

The information referred to “Start of period”, consists of the initial amount of products present at the front-end and archive hosts.

Tables below shows the central archive capacity (off-line storage area), in terms of amount of products stored in the archive. An incremental accumulation of products is expected for this storage area.

Please note: as established in the related Service Level Agreement, products H31 and H32 are archived in LSA SAF.

	<p style="text-align: center;"><b>Operations Report</b></p> <p style="text-align: center;"><b>2022 S1/S2</b></p>	<p>Doc. No: SAF/HSAF/OpRep/2022_S1_S2</p> <p>Version: 2.0</p> <p>Date: 13/10/2023</p> <p>Page: 35/58</p>
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### Central archive capacity (off-line storage area)


*Amount of products stored in the archive (continuous accumulation)*

	Product			Start of period (31/12/2021)	2022	
type	Identifier	Acronym	new Acronym		1st Semester	2nd Semester
PR	H01 new rel.	PR-OBS-1 new rel.	P-IN-SSMIS	139172	8094	6964
PR	H02B	P-IN-MHS		113856	7622	7750
PR	H03B	P-IN-SEVIRI		270531	17344	17622
PR	H05B	P-AC-SEVIRI		74227	5790	5888
PR	H15A	PR-OBS-6A	P-IN-SEVIRI-CO	455725	33698	34956
PR	H18	P-IN-ATMS		108227	7242	4953
PR	h60B	P-IN-SEVIRI-PMW		0	2875	14224
PR	h61B	P-AC-SEVIRI-PMW		0	840	4131
PR	h63	P-IN-SEVIRI_E		0	2852	14412
PR	h64	P-AC-SM2R-PMW		0	30	148
PR	h68	P-IN-PMW		0	1439	7246
PR	h90	P-AC-SEVIRI_E		0	833	4218
TOTAL PRECIPITATION				1161738	88659	78133
SM	H08*	SM-OBS-2	SSM-ASCAT-B NRT DIS	228918	16175	16382
SM	H14	SM-DAS-2		3505	180	184
SM	H16	SSM-ASCAT-B NRT 012.5		977402	86732	87848
SM	H26	RZSM-ASCAT-NRT-10		120	180	182
SM	H103	SSM-ASCAT-B NRT 025		976314	86733	84857
TOTAL SOIL MOISTURE				2186259	190000	189453
SP	H10	SN-OBS-1	SE-E-SEVIRI	3900	181	183
SP	H11	SN-OBS-2	WS-E	2881	181	182
SP	H12	SN-OBS-3	FSC-E	3223	181	183
SP	H13	SN-OBS-4	SWE-E	3283	180	182
SP	H34	SE-D-SEVIRI		938	181	184
SP	H35	ESC-H		933	181	179
TOTAL SNOW PARAMETER				15158	1085	1093

<b>Total</b>	<b>3363155</b>	<b>279744</b>	<b>268679</b>
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*\*NOTE: both format NetCDF and bufr files are reported*

**Table 14: Central archive capacity - 1<sup>st</sup> and 2<sup>nd</sup> Semester 2022**

	<p>Operations Report</p> <p>2022 S1/S2</p>	<p>Doc. No: SAF/HSAF/OpRep/2022_S1_S2</p> <p>Version: 2.0</p> <p>Date: 13/10/2023</p> <p>Page: 36/58</p>
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*Table 15 and*

PRODUCT		07-2022		08-2022		09-2022		10-2022		
TYPE	ID	OT Diss	Arch.	OT Diss	Arch.	OT Diss	Arch.	OT Diss	Arch.	OT D
PR	h01	1.150	1.156	1.187	1.195	1.139	1.150	1.227	1.235	1
PR	h02B	1.285	1.301	1.295	1.303	1.258	1.262	1.289	1.292	1
PR	h03B	2.966	2.966	2.971	2.971	2.877	2.877	2.965	2.965	2
PR	h05B	992	992	992	992	960	960	992	992	
PR	h15	2.943	2.945	2.960	2.963	2.829	2.833	2.933	2.941	2
PR	h18	936	940	592	593	814	814	878	878	
PR	h60B	2.968	2.972	2.971	2.971	2.875	2.875	2.917	2.961	2
PR	h61B	868	868	868	868	840	840	854	867	
PR	h63	2.965	2.971	2.960	2.966	2.866	2.878	2.954	2.971	2
PR	h64	31	31	31	31	30	30	27	31	
PR	h68	1.488	1.488	1.488	1.488	1.440	1.440	1.488	1.488	1
PR	h90	868	868	868	868	840	840	868	868	
SM	h08 (netCDF)	1.277	1.384	1.319	1.396	1.258	1.342	1.349	1.385	1
SM	h08 (bufr)	1.277	1.384	1.319	1.396	1.258	1.342	1.349	1.385	1
SM	h14	31	31	31	31	30	30	31	31	
SM	h16	14.818	14.818	14.480	14.877	14.395	14.395	14.878	14.878	14
SM	h26	31	31	31	31	30	30	31	31	
SM	h103	14.818	14.825	14.480	14.878	14.395	14.395	14.878	14.878	14
SP	h10	31	31	31	31	30	30	31	31	
SP	h11	31	31	31	31	30	30	31	31	
SP	h12	31	31	31	31	29	30	31	31	
SP	h13	30	31	30	31	30	30	28	29	
SP	h34	31	31	31	31	30	30	31	31	
SP	h35	31	30	31	29	30	30	31	31	

Table 16 show the number of archived products, the number of products successfully disseminated on time is also reported for reference.

PRODUCT		01-2022		02-2022		03-2022		04-2022		05-2022		06-2022	
TYPE	ID	OT Diss	Arch.	OT Diss	Arch.	OT Diss	Arch.	OT Diss	Arch.	OT Diss	Arch.	OT Diss	Arch.
PR	h01	1.465	1.502	974	1.075	1.101	1.135	1.157	1.163	1.254	1.260	1.064	1.069
PR	h02B	852	938	1.188	1.190	1.181	1.181	1.258	1.264	1.246	1.256	1.239	1.266
PR	h03B	2.323	2.976	2.673	2.673	2.970	2.970	2.863	2.879	2.971	2.971	2.874	2.875
PR	h05B	992	992	894	894	992	992	959	960	992	992	960	960
PR	h15	1.819	2.974	2.671	2.671	2.888	2.888	2.774	2.777	2.899	2.899	2.774	2.775
PR	h18	2.698	2.719	935	1.053	930	935	824	840	899	900	793	795
PR	h60B	NOT OPERATIONAL										2.864	2.875
PR	h61B											840	840
PR	h63											2.824	2.852
PR	h64											30	30
PR	h68											1.439	1.439
PR	h90											833	833
SM	h08 (netCDF)	1.253	1.382	1.253	1.253	1.388	1.388	1.300	1.344	1.290	1.385	1.203	1.332
SM	h08 (bufr)	1.253	1.382	1.253	1.253	1.388	1.388	1.300	1.344	1.290	1.385	1.203	1.332
SM	h14	30	30	28	28	31	31	30	30	31	31	30	30
SM	h16	14.866	14.866	13.438	13.438	14.878	14.878	14.365	14.365	14.874	14.881	14.304	14.304
SM	h26	Operational starting from 23/3/2022						30	30	28	29	28	30
SM	h103	14.866	14.866		13.438	14.878	14.878	14.365	14.365	14.874	14.878	14.304	14.308
SP	h10	31	31	28	28	31	31	30	30	31	31	29	30
SP	h11	31	31	28	28	31	31	30	30	31	31	29	30
SP	h12	31	31	28	28	31	31	30	30	31	31	27	30
SP	h13	31	31	28	28	26	30	30	30	31	31	29	30
SP	h34	30	31	28	28	31	31	29	30	29	31	26	30
SP	h35	30	31	28	28	30	31	29	29	28	28	27	28

Table 15: archiving integrity – 1<sup>st</sup> Semester 2022

PRODUCT		07-2022		08-2022		09-2022		10-2022		11-2022		12-2022	
TYPE	ID	OT Diss	Arch.	OT Diss	Arch.	OT Diss	Arch.	OT Diss	Arch.	OT Diss	Arch.	OT Diss	Arch.
PR	h01	1.150	1.156	1.187	1.195	1.139	1.150	1.227	1.235	1.037	1.075	1.141	1.153
PR	h02B	1.285	1.301	1.295	1.303	1.258	1.262	1.289	1.292	1.275	1.275	1.309	1.316
PR	h03B	2.966	2.966	2.971	2.971	2.877	2.877	2.965	2.965	2.874	2.874	2.968	2.969
PR	h05B	992	992	992	992	960	960	992	992	960	960	992	992
PR	h15	2.943	2.945	2.960	2.963	2.829	2.833	2.933	2.941	2.860	2.860	2.940	2.951
PR	h18	936	940	592	593	814	814	878	878	851	851	874	877
PR	h60B	2.968	2.972	2.971	2.971	2.875	2.875	2.917	2.961	2.873	2.873	2.967	2.969
PR	h61B	868	868	868	868	840	840	854	867	840	840	868	868
PR	h63	2.965	2.971	2.960	2.966	2.866	2.878	2.954	2.971	2.858	2.875	2.948	2.974
PR	h64	31	31	31	31	30	30	27	31	29	30	31	31
PR	h68	1.488	1.488	1.488	1.488	1.440	1.440	1.488	1.488	1.432	1.432	1.480	1.480
PR	h90	868	868	868	868	840	840	868	868	840	840	868	868
SM	h08 (netCDF)	1.277	1.384	1.319	1.396	1.258	1.342	1.349	1.385	1.305	1.315	1.367	1.367
SM	h08 (bufr)	1.277	1.384	1.319	1.396	1.258	1.342	1.349	1.385	1.305	1.315	1.367	1.367
SM	h14	31	31	31	31	30	30	31	31	30	30	31	31
SM	h16	14.818	14.818	14.480	14.877	14.395	14.395	14.878	14.878	14.144	14.144	14.736	14.736
SM	h26	31	31	31	31	30	30	31	31	30	30	31	31
SM	h103	14.818	14.825	14.480	14.878	14.395	14.395	14.878	14.878	14.144	14.144	14.736	14.737
SP	h10	31	31	31	31	30	30	31	31	29	29	30	31
SP	h11	31	31	31	31	30	30	31	31	28	28	31	31
SP	h12	31	31	31	31	29	30	31	31	30	30	29	30
SP	h13	30	31	30	31	30	30	28	29	29	30	30	31
SP	h34	31	31	31	31	30	30	31	31	30	30	31	31
SP	h35	31	30	31	29	30	30	31	31	30	28	31	31

Table 16: archiving integrity – 2<sup>nd</sup> Semester 2022

### 3.3.2 FTP dissemination

The access to the restricted area of the web site and the access to the FTP server are possible using the same account. Users can also access and download products generated in the last 60 days directly via the web site without the need of a dedicated FTP client (<http://hsaf.meteoam.it/download-products.php>). The new H-SAF FTP server <ftp://ftphsaf.meteoam.it> is accessible to authorized users for product download.

Starting from December 2022 a functionality for monitoring the HSAF users downloads from the HSAF ftp server (<ftp://ftphsaf.meteoam.it>) has been implemented. Hereafter these statistics are reported as an example of what will be included in the next operations report.

Table 17 and Table 18 show respectively the number of downloads and their total volumes in GB for the period **from 1<sup>st</sup> December 2022 to mid April 2023**. About volumes, you may notice that some zero values appear in bold. This means that the product has been downloaded in the relevant month but the data volume is too small to be represented. For example, the product H15 was downloaded in February (as per Table 17) but not in January, and indeed the February zero appears in bold and the January zero does not.

TYPE	PRODUCT	12-2022	01-2023	02-2023	03-2023	04-2023	TOTAL
PR	h01	4.974	0	4.471	0	0	<b>9.445</b>
PR	h02B	5.932	0	5.486	0	0	<b>11.418</b>
PR	h03B	69.825	88.435	23.139	145	4	<b>181.548</b>
PR	h05B	9.750	1.434	778	61	2	<b>12.025</b>
PR	h15	0	0	6	2	0	<b>8</b>
PR	h18	0	2	7	0	0	<b>9</b>
SM	h08	4.155	48	4	5.895	0	<b>10.102</b>
SM	h14	2.266	1.732	1.108	1.317	960	<b>7.383</b>
SM	h16	38.362	75.878	62.954	84.670	65.635	<b>327.499</b>
SM	h26	164	327	249	1.112	74	<b>1.926</b>
SM	h103	0	0	0	0	0	<b>0</b>
SP	h10	416	59	25	2	64	<b>566</b>
SP	h11	0	7	13	0	0	<b>20</b>
SP	h12	17	52	27	0	0	<b>96</b>
SP	h13	388	603	574	850	518	<b>2.933</b>
SP	h31	0	1	1	0	0	<b>2</b>
SP	h32	0	0	0	0	0	<b>0</b>
SP	h34	0	0	1	0	0	<b>1</b>
SP	h35	0	40	14	0	0	<b>54</b>
N/A	Others	37.332	39.393	64.030	84.166	68.745	<b>293.666</b>

Table 17: Product downloads - operations

TYPE	PRODUCT	12-2022	01-2023	02-2023	03-2023	04-2023
PR	h01	1,62	0,00	1,32	0,00	0,00
PR	h02B	1,96	0,00	1,80	0,00	0,00
PR	h03B	146,65	191,52	50,27	0,31	0,00
PR	h05B	22,66	6,16	3,10	0,23	0,00
PR	h15	0,00	0,00	0,00	0,00	0,00
PR	h18	0,00	0,00	0,00	0,00	0,00
SM	h08	19,70	0,30	0,01	22,32	0,00
SM	h14	0,29	3,71	2,34	2,83	2,11
SM	h16	9,36	18,49	15,34	20,65	16,01
SM	h26	2,43	4,79	3,65	19,02	1,20
SM	h103	0,00	0,00	0,00	0,00	0,00
SP	h10	0,62	0,09	0,04	0,00	0,10
SP	h11	0,00	0,00	0,00	0,00	0,00
SP	h12	0,02	0,06	0,03	0,00	0,00
SP	h13	0,00	0,00	0,01	0,00	0,00
SP	h31	0,00	0,00	0,00	0,00	0,00
SP	h32	0,00	0,00	0,00	0,00	0,00
SP	h34	0,00	0,00	0,00	0,00	0,00
SP	h35	0,00	0,42	0,18	0,00	0,00
N/A	Others	88,38	238,71	559,77	5.061,73	231,70

Table 18: Product downloads – volumes (GB)

Table 19 shows product downloads by country.

COUNTRY	PR						SM				SP								Others	
	h01	h02B	h03B	h05B	h15	h18	h08	h14	h16	h26	h10	h11	h12	h13	h31	h34	h35	Others		
Austria	0	0	20	0	0	0	0	157	35.264	854	0	0	0	0	0	0	0	158	16	
Belgium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	
Bulgaria	0	0	2.999	32	0	0	0	0	0	0	0	0	0	0	0	0	0	10.980	4	
Brazil	0	0	0	2	0	0	0	0	0	0	0	0	0	0	8	0	0	3	0	
Canada	0	0	71	0	0	0	4	0	0	0	0	0	0	0	3	0	0	2.630	0	
Switzerland	0	0	10	0	0	0	0	324	0	0	0	0	0	0	0	0	0	325	0	
China	4.974	5.932	16.485	9.958	0	0	4.153	1.570	0	4	0	0	0	0	0	0	0	34.202	30	
Cyprus	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
Czechia	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2	0	
Germany	701	0	5.671	1.059	0	0	0	5	0	3	2	0	0	0	4	0	0	11.236	2	
Denmark	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	9	0	
Egypt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	7	
Spain	0	0	0	1	0	0	0	0	0	551	0	0	0	0	0	0	0	1	0	
Finland	0	0	2	0	0	0	0	0	0	0	0	0	0	0	56	0	0	11	33	
France	0	0	10.867	0	0	0	0	165	0	0	0	0	0	0	0	0	0	19.394	13	
UK	0	0	0	69	0	0	5.928	0	0	0	8	0	0	0	0	0	0	12.201	0	
Greece	0	0	1.119	0	0	0	0	12	0	0	0	0	0	0	32	0	0	14	0	
Hong Kong	0	0	26.606	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Indonesia	0	0	0	0	0	0	11	0	0	510	0	0	0	0	0	0	0	11.050	0	
Ireland	1	5	22	2	5	6	0	6	0	0	0	0	0	0	13	0	0	113	18	
Israel	0	0	0	0	0	0	0	154	0	0	0	0	0	0	0	0	0	154	0	
Italy	0	0	31.862	0	0	0	0	2	0	2	5	0	5	0	0	0	0	20.934	0	
Jordan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.323	0	
Japan	262	0	2.900	0	0	0	0	347	0	0	0	0	0	0	0	0	25	15.575	25	
South Korea	3.504	5.479	2.682	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.963	29	
Netherlands	0	0	5.627	71	0	0	0	153	10.073	0	0	0	0	0	422	0	0	5	24.594	
Norway	0	0	0	0	0	0	0	0	0	0	64	0	0	0	0	0	0	0	0	
New Zealand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	923	0	
Poland	0	0	1.841	21	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	
Puerto Rico	0	0	32.474	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.431	0	
Portugal	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
Romania	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	1	0	5	0	
Russia	2	0	1.614	17	1	2	2	0	0	0	182	0	2	2	0	0	3	1.668	59	
Sweden	1	2	3	569	0	1	3	3.839	1	1	1	1	1	0	1	1	2	5.123	40	
Singapore	0	0	0	70	0	0	0	169	0	0	0	0	0	0	1.926	0	0	169	0	
Syria	0	0	0	0	0	0	0	0	0	0	19	19	21	21	0	0	19	4	1	
Turkey	0	0	241	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	4	
Taiwan	0	0	0	0	0	0	0	0	0	0	39	0	0	0	0	0	0	0	0	
USA	0	0	6.457	144	2	0	0	472	98.843	0	235	0	67	446	0	0	0	87.635	9	
Others	0	0	31.974	0	0	0	0	0	183.318	0	11	0	0	0	0	0	0	9.792		

Table 19: Product downloads via FTP by country


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Table 20 shows the number of (different) users that downloaded product during the covered period (December 2022 – April 2023).

TYPE	PRODUCT	USERS
PR	h01	1
PR	h02B	1
PR	h03	2
PR	h03B	14
PR	h05	0
PR	h05B	12
PR	h15	1
PR	h18	1
SM	h08	3
SM	h103	0
SM	h16	6
SM	h26	4
SP	h10	3
SP	h11	1
SP	h12	2
SP	h13	5
SP	h31	0
SP	h32	0
SP	h34	0
SP	h35	2
OTHER		67
utilities		11

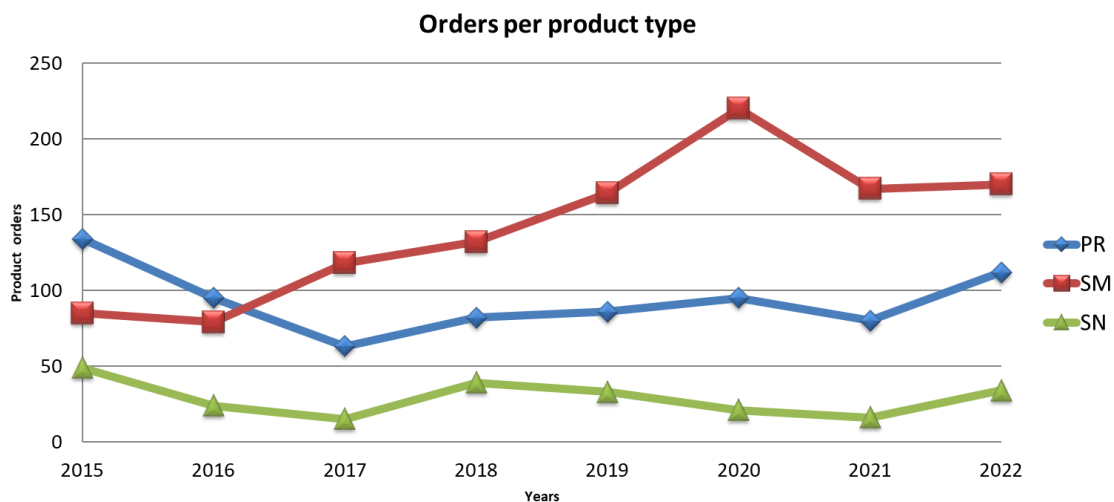
*Table 20: Number of different Users that downloaded products (December 2022 – April 2023)*

### 3.3.3 Dissemination on-demand (H SAF Data Centre)

On March 2015 the product dissemination on-demand has been activated via a web application named “H SAF Data Centre” accessible at <http://hsaf.meteoam.it/download-products.php> to all registered users. This tool provides all basic functions to carry out orders on H SAF historical archives. The orders placed are submitted for approval by the Central Services Staff, and processed within three working days. Since August 2015, some restrictions to the order requests have been introduced to avoid an overload of FTP server and to optimize the data storage: the total amount of data required by a single user cannot exceed 20 GB per day.

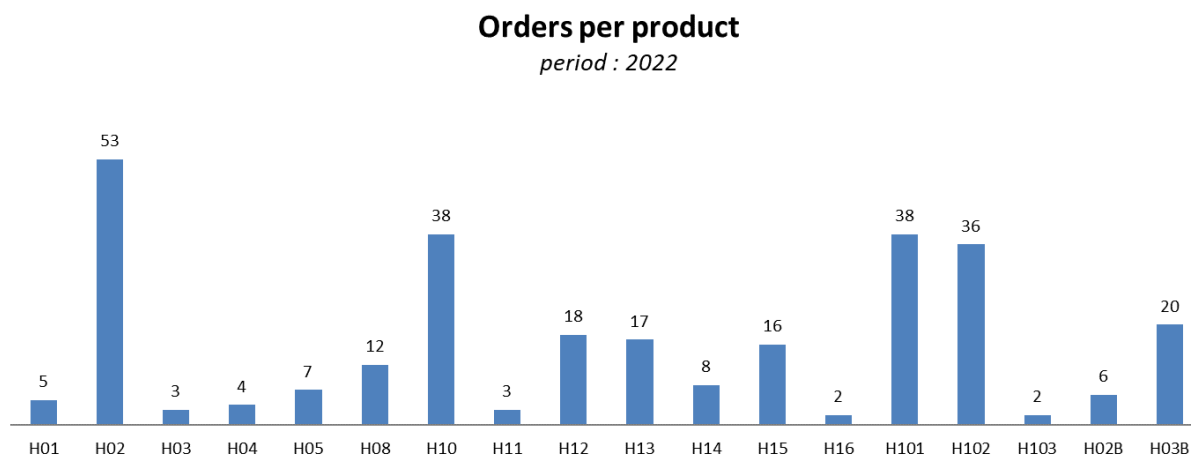
During 2022, 288 orders have been processed with an average of 24 orders per month. Figure 3 illustrates the number of orders processed along the past years (an error on the count of SP products has been fixed).

Among the processed orders 12 orders have been aborted, all failures was due to misalignments between time limits shown by the web order tool and the real operational time range of products. The problem has been fixed updating the time limits in the tool.



**Figure 3: Number of orders per product type**

Figure 4 reports the number of orders per product in 2022.




**Figure 4: Number of orders per product (year 2022)**

### 3.4 **Anomalies and problems report**

Main problems encountered in the reporting period at the generation chains or at central facilities are here reported. Table 21 lists problems that have determined an unsuccessful product generation and/or a decay of the product quality/performances.

Product / Chain / System / Service	Period	Description and Planned Solution
H01 new rel. and h18	February 2022	Out of timeliness due to delays in input reception
H02B , H03B and H15	January 2022	Out of timeliness due to delays in input reception
H08	Whole 2022	During the specified period Metop-B data that became unavailable due to alerts for planned or rescheduled maintenance activities, affected the SSM ASCAT-B NRT product generation as described in the Eumetsat user notification service: <a href="http://oiswww.eumetsat.int/uns/webapps/index.html?filter=currentalerts">http://oiswww.eumetsat.int/uns/webapps/index.html?filter=currentalerts</a>
H26	May and June 2022	Problem in the FTP transfer
h11	November 2022	20221108 are 20221109 missing. There was an anomaly in the Ground Segment concerning SSMIS availability. Neither EUMETCAST nor MeteoAM ftp provided any data.
h12	June 2022	OOT files: 20220609 and 20220610 have been reproduced on 20220613. Most likely due to issues with availability of AVHRR data.
h12	December 2022	Two files missing: -one file probably missing due to transfer issue. -FMI encountered a major malfunction in one core IT component on Dec 25th and AVHRR data was not available.
h13	march 2023	4 dates delayed (nominal generation time 09:00:00 +0200): 20220314: 2022-03-15 11:44:17.363958821 +0200 20220316: 2022-03-17 11:49:23.187500814 +0200 20220317: 2022-03-18 09:50:34.550162487 +0200 20220323: 2022-03-24 10:46:57.574938941 +0200  A possible explanation is dissemination hanging due to ftp and rerun by operator solved the issue.
h13	October 2022	One missing day probably in dissemination. In addition, there was an issue with SSMIS data availability.
h34	May - June 2022	Dates in the June are caused by problem in the flat product generation, as the H31 (flat part of H34) was not generated in Portugal and this lead to the delay. Dates in May, we see that flat and mountainous products were produced on time as usual however merged product was produced late. This seems to be caused by a problem in the scheduling system (ecflow).
h35	May and June 2022	issue with AVHRR availability
h35	Aug 2022	Two files missing: -one file probably missing due to transfer issues. -20220830 probably is missing due to AVHRR issues.
h35	November 2022	Two files missing: -one file probably missing due to transfer issues -20221129 probably is missing due to AVHRR issues.

**Table 21: Anomalies and problems report**

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In the following table are reported all the anomalies related to user feedback and contacts:

Anomaly description	Period	Description
Registration Problem on the H SAF web site	May 2022	<p>Hsaf Database machine was down for unexpected reasons.</p> <p>The machine has been restarted and the user account recovered</p>
Registration Problem on the H SAF web site	September 2022	<p>Problem in the use of the uppercase for register the user email address.</p> <p>Problem fixed implemententing a conversion of the uppercase to lowercase</p>
Unable to place an order for H35 product	April 2022	<p>Wrong settings for the time rage to be selected on the download website page</p> <p>The problem has been fixed and the user order reprocessed</p>

## 4 H SAF Users

### 4.1 Users community

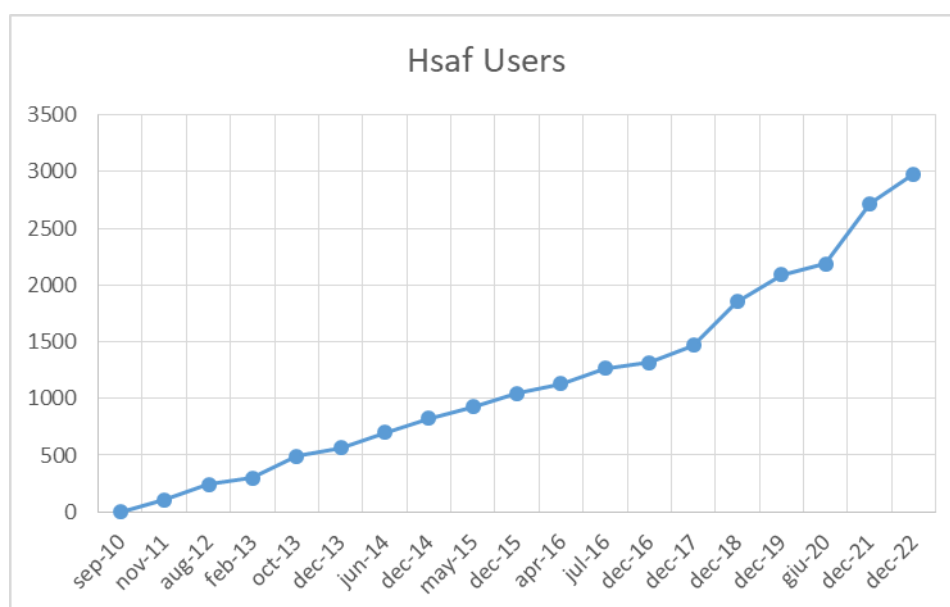
The current total number of H SAF Users from different sources, either registered through the H SAF Web Portal and downloading products (last 60 days) using the H SAF FTP or subscribed to the EUMETCast service, is 2980 up to 31<sup>st</sup> December 2022. The detail is reported in the table below.

User Type	Number of Users
H SAF Web / FTP	2280 up to 31 <sup>th</sup> December 2022
EUMETCast	700 up to 31 <sup>th</sup> December 2022

**Table 22: Number of H SAF Users**

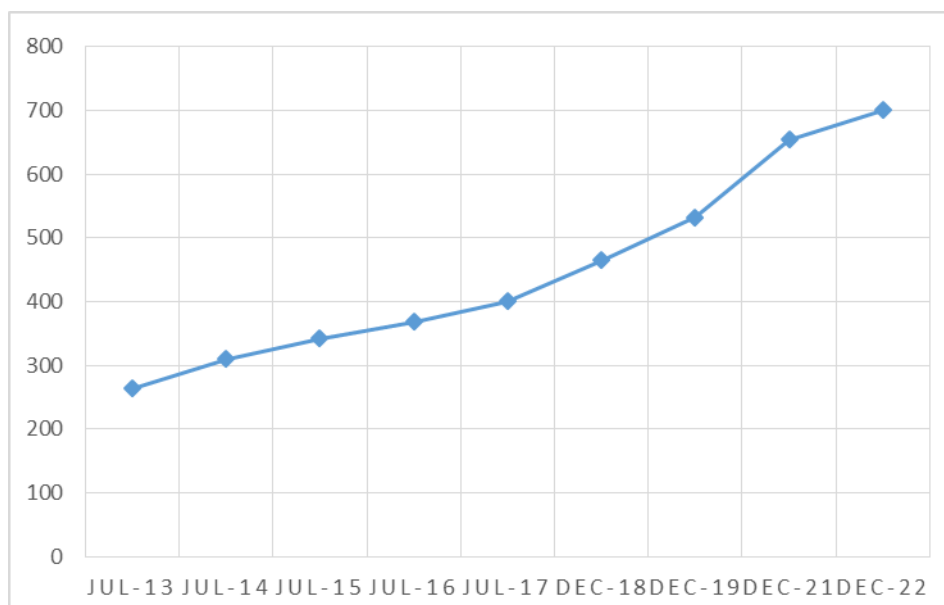
In the following Figure 5 the diagram of the H SAF Users increase (web, ftp and EUMETCast) is depicted. It can be noted how the H SAF Users community has kept increasing on a constant and continuous basis.

It is noted that a check on the validity of web/ftp users is continuously performed and no more valid users are removed from the users list.



**Figure 5: Trend of increase in number of H SAF users (web/ftp/EUMETCast data up to December 2022)**

In the following graphic, instead, is reported the trend focused on EUMETCast users, in order to show the increase of the trend during the reference period for this subset of users.



**Figure 6: Trend of increase in number of H SAF EUMETCast (data up to December 2022)**

## 4.2 Help desk response

In the reporting period 57 requests have been submitted to help desk which required a response. All responses have been provided, with following response time:


Number of requests: 57

Responsiveness (avg days): 2,25

- within 1 days: 26 (44%)
- within 3 days: 24 (42%)
- within 5 days: 5 (9%)
- over 5 days: 2 (4%)

Even though the average response time is in line with the requirements, in some cases the responses to users requests are still above the requirements.

Starting from the 2023 we are adopting a automatic forwards of the users requests directly to the people in charge for replying to specific topics. Unfortunately the 2022 is still affected by problems related to the old approach that required a manual check of the email box and a manual forward to the right people able to provide an answer. This old approach caused delay in the answers and for this reason has been decided to implement starting from the 2023 the automatic forward that is giving good results in term of responsiveness. the results will be presented in the next OR13.

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### 4.3 **Web-site**

(Link to the web site: <http://hsaf.meteoam.it>)

The new version of the website has been released on January 2021. During the 2021 and part of the 2022 the actions opened during the previous OR10 have been implemented.

Some minor improvements have been implemented like for example the new presentation of the cases studies in the home page banner. Some bug fixing activities have been also implemented.

Summary of the main activities on the website:

- Maintenance activities;
- Several pending issues has been resolved;
- adding more people in the mailing list of help desk;
- introducing mailing list for each cluster
- Updating of the case study page of website. It contains the list of case studies, each is shown by title, a brief abstract and an image.
- Home page banner showing the news of the latest case studies.

## 5 Integrity Check

Starting from January 2023, the clusters carry out a real-time quality checks on the products. This allows to avoid the distribution of products of insufficient quality / performances. In the event that a product is rejected following the checks defined in the Integrity Monitoring Protocol document [AD 1], a ".nok" (i.e. not ok) file with the same name is generated in its place and used for:

1. Tracing the (missing) product within the operative chains;
2. Generate yearly performance statistics.

As further development to be performed during the CDOP4 phase, the integrity check outcomes collected in a dedicated Database will be use to provide an NRT user notification service of the H SAF products generation, available through a webpage on the H SAF website.


For the three months of October, November and December 2022 the same quality checks have been **initially performed in post processing**.

For this period 260 .nok files were generated, as per the following Table 23.

TYPE	PROD	ott-22	nov-22	dic-22
PR	h01	9	50	65
PR	h02	1	0	0
PR	h18	0	0	3
PR	h60	10	7	7
PR	h61	9	2	2
PR	h63	20	21	28
PR	h64	0	0	0
PR	h90	4	6	6
SM	h08	0	0	0
SM	h14	0	0	3
SM	h103	0	0	0
SM	h16	0	0	0
SM	h26	1	1	0
SP	h10	0	1	0
SP	h11	0	2	0
SP	h12	0	0	1
SP	h13	1	0	0
SP	h34	0	0	0
SP	h35	0	0	0

**Table 23: Nok files**

The presence of a .nok file should mean that the corresponding product has never been distributed and, consequently, has not been disseminated. In some cases, however, a product for which a .nok file was generated has been distributed (and then disseminated).


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The high numbers of .nok files for products H01 and H63 have to be considered physiological since they depend on the nature of the satellite data considered, and the structure of the scientific algorithm, coded for the reconstruction of atmospheric parameter considered. As for all products, in rare cases, a combination of anomalies at sensor level presenting unrealistic values, in the raw data, causes the failure by the algorithm in reconstructing realistic hydro parameters.

Table 24 lists the products that have been distributed despite existence of a corresponding .nok file; this can be reasonably explained as for the mentioned period the quality checks have been calculated in post processing.

S-HSAF-h01_20221024_0016_DMSP16_98120_rom.nc.gz
S-HSAF-h01_20221024_2158_DMSP18_67142_rom.nc.gz
S-HSAF-h01_20221025_2315_DMSP18_67157_rom.nc.gz
S-HSAF-h02B_20221020_104921_NOAA19_70610_fdk.nc.gz
S-HSAF-h26_2022100800_R01.nc
S-HSAF-h26_2022110100_R01.nc
S-HSAF-h61_20221229_1100_01_fdk.nc.gz
S-HSAF-h61_20221229_1200_01_fdk.nc.gz
S-HSAF-h63_20221213_1500_fdk.nc.gz
S-HSAF-h63_20221215_1630_fdk.nc.gz
S-HSAF-h63_20221216_1500_fdk.nc.gz
S-HSAF-h63_20221216_1515_fdk.nc.gz
S-HSAF-h63_20221217_0945_fdk.nc.gz
S-HSAF-h63_20221217_1500_fdk.nc.gz
S-HSAF-h63_20221217_1615_fdk.nc.gz
S-HSAF-h63_20221219_1515_fdk.nc.gz
S-HSAF-h63_20221219_1600_fdk.nc.gz
S-HSAF-h63_20221224_1515_fdk.nc.gz
S-HSAF-h63_20221227_1500_fdk.nc.gz
S-HSAF-h63_20221227_1530_fdk.nc.gz
S-HSAF-h63_20221228_1415_fdk.nc.gz
S-HSAF-h63_20221228_1500_fdk.nc.gz
S-HSAF-h63_20221228_1530_fdk.nc.gz
S-HSAF-h63_20221229_1530_fdk.nc.gz
S-HSAF-h63_20221231_1515_fdk.nc.gz
S-HSAF-h14_20221221_0000.grib.bz2
S-HSAF-h14_20221227_0000.grib.bz2
S-HSAF-h14_20221229_0000.grib.bz2
S-HSAF-h90_20221216_1600_01_fdk.nc.gz
S-HSAF-h90_20221217_1000_01_fdk.nc.gz


**Table 24: Products distributed despite existence of .nok file**

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## 5.1 ***Integrity Check Fault Analysis***


As stated in the previous sections, the Integrity check protocol has been implemented as a post-processing analysis on the period starting from October 2022 to December 2022.

Starting from the 2023, the Integrity check protocol has been implemented in NRT on the operative chains. In the next OR, this section will be dedicated to analyze in details all the nok files, reporting also the reasons stopping the products as described by [AD 1], and to cross check the IC analysis with the engineering statistics.


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## Appendix 1      Glossary


AAPP	AVHRR and ATOVS Processing Package
ADEOS	Advanced Earth Observation Satellite (I and II)
ALOS	Advanced Land Observing Satellite
AMIR	Advanced Microwave Imaging Radiometer
AMSR	Advanced Microwave Scanning Radiometer (on ADEOS-II)
AMSR-E	Advanced Microwave Scanning Radiometer - E (on EOS-Aqua)
AMSU-A	Advanced Microwave Sounding Unit - A (on NOAA satellites and EOS-Aqua)
AMSU-B	Advanced Microwave Sounding Unit - B (on NOAA satellites up to NOAA-17)
API	Application Program(ming) Interface
ASAR	Advanced SAR (on ENVISAT)
ASCAT	Advanced Scatterometer (on MetOp)
ASI	Agenzia Spaziale Italiana
ATDD	Algorithms Theoretical Definition Document
ATMS	Advanced Technology Microwave Sounder (on NPP and NPOESS)
ATOVS	Advanced TIROS Operational Vertical Sounder (on NOAA and MetOp)
AU	Anatolian University
AVHRR	Advanced Very High Resolution Radiometer (on NOAA and MetOp)
BAMPR	Bayesian Algorithm for Microwave Precipitation Retrieval
BfG	Bundesanstalt für Gewässerkunde
BRDF	Bi-directional Reflectance Distribution Function
BVA	Boundary Value Analysis
CASE	Computer Aided System Engineering
CBA	Component-Based Architecture
CBSD	Component-based Software Development
CDA	Command and Data Acquisition (EUMETSAT station at Svalbard)
CDD	Component Design Document
CDR	Critical Design Review
CESBIO	Centre d'Etudes Spatiales de la BIOSphere (of CNRS)
CETP	Centre d'études des Environnements Terrestres et Planétaires (of CNRS)
CI	Configuration Item
CMIS	Conical-scanning Microwave Imager/Sounder (on NPOESS)
CMP	Configuration Management Plan
COMET	Centro Nazionale di Meteorologia e Climatologia Aeronautica
CNR	Consiglio Nazionale delle Ricerche
CNRM	Centre Nationale de la Recherche Météorologique (of Météo-France)
CNRS	Centre Nationale de la Recherche Scientifique
COM	Component Object Model
CORBA	Common Object Request Broker Architecture

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COTS	Commercial-off-the-shelf
CPU	Central Processing Unit
CR	Component Requirement
CRD	Component Requirement Document
CVERF	Component Verification File
CVS	Concurrent Versions System
DCOM	Distributed Component Object Model
DEM	Digital Elevation Model
DFD	Data Flow Diagram
DMSP	Defense Meteorological Satellite Program
DOF	Data Output Format
DPC	Dipartimento della Protezione Civile
DWD	Deutscher Wetterdienst
E&T	Education and Training
EARS	EUMETSAT Advanced Retransmission Service (station)
ECMWF	European Centre for Medium-range Weather Forecasts
ECSS	European Cooperation on Space Standardization
EGPM	European contribution to the GPM mission
EOS	Earth Observing System
EPS	EUMETSAT Polar System
ERS	European Remote-sensing Satellite (1 and 2)
ESA	European Space Agency
EUR	End-User Requirements
FMI	Finnish Meteorological Institute
FOC	Full Operational Chain
FTP	File Transfer Protocol
GEO	Geostationary Earth Orbit
GIS	Geographical Information System
GMES	Global Monitoring for Environment and Security
GOMAS	Geostationary Observatory for Microwave Atmospheric Sounding
GOS	Global Observing System
GPM	Global Precipitation Measurement mission
GPROF	Goddard Profiling algorithm
GTS	Global Telecommunication System
GUI	Graphical User Interface
HMS	Hungarian Meteorological Service
HRU	Hydrological Response Unit
H SAF	SAF on support to Operational Hydrology and Water Management
HSB	Humidity Sounder for Brazil (on EOS-Aqua)

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HTML	Hyper Text Markup Language
HTTP	Hyper Text Transfer Protocol
HUT/LST	Helsinki University of Technology / Laboratory of Space Technology
HV	Hydrovalidation (referred to Hydro Validation Subsystem items, e.g.: reports, components etc.)
HVR	Hydrological Validation Review
HYDRO	Preliminary results of Hydrological validation
HYDROS	Hydrosphere State Mission
HW	Hardware
ICD	Interface Control Document
ICT	Information and Communication Technology
IEEE	Institute of Electrical and Electronics Engineers
IFS	Integrated Forecast System
INF	Progress reports in between meetings
INWM	Institute of Meteorology and Water Management (of Poland)
IPF	Institut für Photogrammetrie und Fernerkundung
ISAC	Istituto di Scienze dell'Atmosfera e del Clima (of CNR)
ISO	International Standards Organization
IT	Information Technology
ITU	Istanbul Technical University
JPS	Joint Polar System (MetOp + NOAA/NPOESS)
J2EE	Java 2 Enterprise Edition
KIDS	Kestrel Interactive Development System
KLOC	Thousand (Kilo) Lines Of Code
KOM	Kick-Off Meeting
LAI	Leaf Area Index
LAN	Local Area Network
LEO	Low Earth Orbit
LIS	Lightning Imaging Sensor (on TRMM)
LLS	Lower Level Specifications
LOC	Lines Of Code
LST	Solar Local Time (of a sun-synchronous satellite)
MARS	Meteorological Archive and Retrieval System
MetOp	Meteorological Operational satellite
METU	Middle East Technical University (of Turkey)
MHS	Microwave Humidity Sounder (on NOAA N/N' and MetOp)
MIMR	Multi-frequency Imaging Microwave Radiometer
MIN	Minutes of Meetings/Reviews
MODIS	Moderate-resolution Imaging Spectro-radiometer (on EOS Terra and Aqua)
MSG	Meteosat Second Generation

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MTBF	Mean Time Between Failure
MTG	Meteosat Third Generation
MTTR	Mean Time To Repair
MVIRI	Meteosat Visible Infra-Red Imager (on Meteosat 1 to 7)
N/A	Not Available
N.A.	Not Applicable
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organisation
NDI	Non-developmental Items
NIMH	National Institute for Meteorology and Hydrology (of Hungary)
NMS	National Meteorological Service
NOAA	National Oceanic and Atmospheric Organisation (intended as a satellite series)
NPOESS	National Polar-orbiting Operational Environmental Satellite System
NPP	NPOESS Preparatory Programme
NRT	Near-Real Time
NWP	Numerical Weather Prediction
OAR	Options Analysis for Reengineering
OFL	Off-line
OM	Offline Monitoring (referred to Offline Monitoring Subsystem items, e.g.: components)
OMG	Object Management Group
OO	Object Oriented
OP	Proposal for H SAF Operational phase
OPS	Operational Product Segment
ORB	Object Request Broker
ORR	Operations Readiness Review
OWL	Web Ontology Language
PAC	Prototype Algorithm Code
PALSAR	Phased Array L-band Synthetic Aperture Radar (on ALOS)
PAW	Plant Available Water
PDR	Preliminary Design Review
POP	Precipitation Observation Production
PP	Project Plan
PPR	Products Prototyping Reports
PR	Precipitation (referred to Precipitation Subsystem items, e.g.: products, components etc.)
PRB	Problem Review Board
PRD	Product Requirements Document
QoS	Quality of Service
R&D	Research and Development
RCS	Revision Control System

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REP	Report
RMI	Royal Meteorological Institute (of Belgium)
RR	Requirements Review
RT	Real Time
SAAM	Simulation, Analysis and Modeling
SAF	Satellite Application Facility
SAG	Science Advisory Group
SAOCOM	Argentinean Satellite for Observation and Communication
SAR	Synthetic Aperture Radar
SA/SD	Structured Analysis / Structured Design
SCA	Snow Covered Area
SCAT	Scatterometer (on ERS-1 and 2)
SCM	Source Configuration Management
SD	Snow depth
SDAS	Surface Data Assimilation System
SDD	System Design Document
SDP	Software Development Plan
SEI	Software Engineering Institute
SEVIRI	Spinning Enhanced Visible Infra-Red Imager (on MSG)
SHW	State Hydraulic Works of Turkey
SHFWG	SAF Hydrology Framework Working Group
SHMI	Slovakian Hydrological and Meteorological Institute
SIRR	System Integration Readiness Review
SIVVP	System Integration, Verification & Validation Plan
SLAs	Service-Level Agreements
SM	Soil Moisture (referred to Soil Moisture Subsystem items, e.g.: products, components etc.)
SMART	Service Migration and Reuse Technique
SMMR	Scanning Multichannel Microwave Radiometer (on SeaSat and Nimbus VII)
SMOS	Soil Moisture and Ocean Salinity
SN	Snow Parameters (referred to Snow Parameters Subsystem products)
SOA	Service-Oriented Architecture
SoS	System of Systems
SP	Snow Parameters (referred to Snow Parameters Subsystem items, e.g.: components)
SQL	Structured Query Language
SR	System Requirement
SRD	System Requirements Document
SSM/I	Special Sensor Microwave / Imager (on DMSP up to F-15)
SSMIS	Special Sensor Microwave Imager/Sounder (on DMSP starting with F-16)
SSVD	System/Software Version Document
STRR	System Test Results Review

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SVALF	System Validation File
SVERF	System Verification File
SVRR	System Validation Results Review
SW	Software
SWE	Snow Water Equivalent
SYKE	Finnish Environment Institute
TBC	To be confirmed
TBD	To be defined
TC	Test Case
TKK/LST	Helsinki University of Technology / Laboratory of Space Technology
TLE	Two-line-element (telemetry data format)
TMI	TRMM Microwave Imager (on TRMM)
TP	Test Procedure
TR	Test Report
TRMM	Tropical Rainfall Measuring Mission
TSMS	Turkish State Meteorological Service
TU Wien	Technische Universität Wien
UM	User Manual
U-MARF	Unified Meteorological Archive and Retrieval Facility
UML	Unified Modelling Language
UR	User Requirement
VIIRS	Visible/Infrared Imager Radiometer Suite (on NPP and NPOESS)
VS	Visiting Scientist
WBS	Work Breakdown Structure
WMO	World Meteorological Organization
WP	Work Package
WPD	Work Package Description
WS	Workshop
W3C	World Wide Web Consortium
XMI	XML (eXtensible Markup Language ) Metadata Interchange
XML	eXtensible Markup Language
ZAMG	Zentral Anstalt für Meteorologie und Geodynamik

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