MONTHLY OPERATIONS REPORT

MOR#088

Reporting period from 16-Mar-2021 to 15-Apr-2021

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1. Summary

PROBA-V's operational lifetime ended on 30 June 2020. From July 1st onwards, the mission continues to exist with emphasis of acquiring the European and African continent until October 2021 and some experiments.

In this reporting period, all of the synthesis products were nearly complete. Two transfer frame files were missing due to human errors at the Fairbanks DRS. No automatic recoveries were recorded with impact on the products. The amount of decompression errors and geometric errors remained at a low acceptable level.

No major anomalies were recorded in the radiometric and geometric quality assessment.

The timeliness of the products in now on average 17h instead of 9h as there are no quality operators available throughout the weekends and public holidays.

On March 27, 2021, The VITO datacentre experienced a severe unexpected power outage for 4 hours bringing the processing and distribution platforms down. It took a manual controlled start to bring the critical systems back into operational mode, which was achieved after another 4 hours. The user community was informed using our Twitter handle.

End-to-end testing and processing was performed in the last month for 5 selected dates to verify collection 2 processing workflows before the complete archive is reprocessed.

2. System Infrastructure

Category	% Up Time	% Down Time (*)
Switches	100.0	0.0
Database Servers	99.9	0.1
Mid Term File Servers	99.97	0.03
Short Term File Servers	99.97	0.03
Master Servers	99.9	0.1
Worker Nodes	99.9	0.1
PDF	99.9	0.1

Table 1: System Infrastructure availability for this reporting period

(*) There was a severe power outage (nearly four hours) which depleted the entire UPS systems. The whole storage, networking, computing resources were down. All systems needed to be brought up manually, but all critical systems were up and running 3-4 hours after power was available again. Users were informed on our Twitter page (PROBA_Vegetation) as other interfaces were down.

3. Image Processing Services

3.1. Ingested and archived products

Product Type	Total	Received	Missing data, ingested by VITO	Archived
METEO	248	248	0	242
TFF	92	91	1	90

Table 2: Ingested and archived products for this reporting period

3.2. Generated and archived products

Product Type	Total	Processed	Error	Archived
PROBAV_L1A - Calibration	314	314	0	314
PROBAV_L1A - Nominal	637	636	1(*)	637
PROBAV_L1C	636	636	0	635
PROBAV_L2A_100M	231	230	0	230
PROBAV_L2A_300M	636	636	0	636
PROBAV_L2A_1KM	636	636	0	636
PROBAV_L3_S1_TOA_100M	31	31	0	31
PROBAV_L3_S1_TOC_100M	31	31	0	31
PROBAV_L3_S1_TOC_NDVI_100M	31	31	0	31
PROBAV_L3_S5_TOA_100M	6	5	0	5
PROBAV_L3_S5_TOC_100M	6	5	0	5
PROBAV_L3_S5_TOC_NDVI_100M	6	5	0	5
PROBAV_L3_S1_TOA_300M	31	31	0	31
PROBAV_L3_S1_TOC_300M	31	31	0	30
PROBAV_L3_S10_TOC_300M	3	3	0	3
PROBAV_L3_S10_TOC_NDVI_300M	3	3	0	3
PROBAV_L3_S1_TOA_1KM	31	31	0	30
PROBAV_L3_S1_TOC_1KM	31	31	0	30
PROBAV_L3_S10_TOC_1KM	3	3	0	3
PROBAV_L3_S10_TOC_NDVI_1KM	3	3	0	3

Table 3: Generated and archived products for this reporting period

(*) 1 L1A error due geometric processing

3.3. Backup and archiving service

Product type	Total Files	Total File Size (GB)
TFF	89	259.11
L1A	909	466.05
Database transaction logs	672	34.45
Database incremental back-up	38	10.98
Database full back-up	7	442.85

Table 4: Back-up data volumes for this reporting period

Product type	Total Files	Total File Size (GB)
PROBAV_TRANSFERFRAMES	87	278.22
PROBAV_L1A	908	500.32
PROBAV_L1C	605	837.50
PROBAV_L2A_100M	656	623.85
PROBAV_L2A_300M	1799	329.85
PROBAV_L2A_1KM	1809	42.45
PROBAV_L3_S1_TOA_100M	89	673.06
PROBAV_L3_S1_TOC_100M	91	698.73
PROBAV_L3_S1_TOC_NDVI_100M	90	77.60
PROBAV_L3_S5_TOA_100M	18	524.19
PROBAV_L3_S5_TOC_100M	17	505.34
PROBAV_L3_S5_TOC_NDVI_100M	18	59.60
PROBAV_L3_S1_TOA_300M	93	329.73
PROBAV_L3_S1_TOC_300M	89	319.80
PROBAV_L3_S10_TOC_300M	9	52.83
PROBAV_L3_S10_TOC_NDVI_300M	9	4.73
PROBAV_L3_S1_TOA_1KM	93	42.66
PROBAV_L3_S1_TOC_1KM	90	41.74
PROBAV_L3_S10_TOC_1KM	9	6.93
PROBAV_L3_S10_TOC_NDVI_1KM	9	0.57
ICP_GEOMETRIC_CENTRE	0	0
ICP_ GEOMETRIC _LEFT	0	0
ICP_ GEOMETRIC _RIGHT	0	0
ICP_RADIOMETRIC_CENTRE	1	0.04
ICP_RADIOMETRIC_LEFT	1	0.04
ICP_RADIOMETRIC_RIGHT	1	0.04
METEO_ECMWF	240	0.30
METEO_METEOSERVICES	235	1.25
POLARMOTION	1	0.00

Table 5: Archived data volumes for this reporting period

3.4. Dissemination service

Product type	Added to catalogue	Ordered	Delivered
PROBAV_L1C	636	1614	1614
PROBAV_L2A_100M	229	7	13
PROBAV_L2A_300M	622	0	9
PROBAV_L2A_1KM	629	0	0
PROBAV_L3_S1_TOA_100M	31	64	71
PROBAV_L3_S1_TOC_100M	31	2261	2093
PROBAV_L3_S1_TOC_NDVI_100M	31	0	7
PROBAV_L3_S5_TOA_100M	6	2	9
PROBAV_L3_S5_TOC_100M	6	7	77
PROBAV_L3_S5_TOC_NDVI_100M	6	285	296
PROBAV_L3_S1_TOA_300M	30	180	181
PROBAV_L3_S1_TOC_300M	30	31	102
PROBAV_L3_S10_TOC_300M	3	17	17
PROBAV_L3_S10_TOC_NDVI_300M	3	66	386
PROBAV_L3_S1_TOA_1KM	30	399	401
PROBAV_L3_S1_TOC_1KM	30	31	88
PROBAV_L3_S10_TOC_1KM	3	6	7
PROBAV_L3_S10_TOC_NDVI_1KM	3	274	277

Table 6: Ordered and delivered products for this reporting period

3.5. End-user activity

10 new user(s) were registered in this reporting period.
The total number of users registered for PROBA-V data and that have ordered data is **1932** with **122** different nationalities representing **1396** different companies/universities.

Product type	Africa	Asia	Europe	N-America	Oceania	S-America
PROBAV_L1C	0	0	1704.21	0	0	0
PROBAV_L2A_100M	2.04	0	16.71	0	0	0
PROBAV_L2A_300M	0	0	1.80	0	0	0
PROBAV_L2A_1KM	0	0	0	0	0	0
PROBAV_L3_S1_TOA_100M	0	1.62	1298.52	0	0	0
PROBAV_L3_S1_TOC_100M	0	0	1942.46	198.91	0	0
PROBAV_L3_S1_TOC_NDVI_100M	0	0.08	0.04	0	0	0
PROBAV_L3_S5_TOA_100M	0	0	9.04	0	0	0
PROBAV_L3_S5_TOC_100M	11.29	0	95.03	0	0	0
PROBAV_L3_S5_TOC_NDVI_100M	0.52	0.52	2891.09	0	0	0
PROBAV_L3_S1_TOA_300M	0	0	90.73	0	0	1519.53
PROBAV_L3_S1_TOC_300M	0	0	157.70	95.66	0	0
PROBAV_L3_S10_TOC_300M	7.22	0	18.10	0	0	0
PROBAV_L3_S10_TOC_NDVI_300M	0	0	11.06	0	0	0
PROBAV_L3_S1_TOA_1KM	0	0	439.81	0	0	0
PROBAV_L3_S1_TOC_1KM	0	0	22.84	0	0	0
PROBAV_L3_S10_TOC_1KM	0.55	0	2.50	0	0	0
PROBAV_L3_S10_TOC_NDVI_1KM	0.00	52.49	0.00	0	0	0

Table 7: Data download (GB) in total per Origin of the User for the reporting period

Product Type	Global
L1C	1704.21
PROBAV_L2A_100M	18.75
PROBAV_L2A_300M	1.80
PROBAV_L2A_1KM	0
PROBAV_L3_S1_TOA_100M	1300.14
PROBAV_L3_S1_TOC_100M	2141.38
PROBAV_L3_S1_TOC_NDVI_100M	0.12
PROBAV_L3_S5_TOA_100M	9.04
PROBAV_L3_S5_TOC_100M	106.32
PROBAV_L3_S5_TOC_NDVI_100M	2892.13
PROBAV_L3_S1_TOA_300M	1610.26
PROBAV_L3_S1_TOC_300M	253.36
PROBAV_L3_S10_TOC_300M	25.32
PROBAV_L3_S10_TOC_NDVI_300M	11.06
PROBAV_L3_S1_TOA_1KM	439.81
PROBAV_L3_S1_TOC_1KM	22.84
PROBAV_L3_S10_TOC_1KM	3.04
PROBAV_L3_S10_TOC_NDVI_1KM	52.49

Table 8: Data download (GB) in total for the reporting period

Company	# Downloads
CESBIO	1966
EOSENSE	1611
ENVEO IT GMBH	366
OPENGEOHUB FOUNDATION	274
IGSNRR CAS	265
JOINT RESEARCH CENTRE	241
ICMBIO	148
VITO	147
UNIVERSITÉ PARIS VII	142
DESCARTES UNDERWRITING	123

Table 9: Top 10 user companies for the reporting period

Country	# Users
CHINA	202
BELGIUM	166
INDIA	95
FRANCE	90
BRAZIL	84
UNITED STATES	82
ITALY	80
NETHERLANDS	66
UNITED KINGDOM	64
GERMANY	59

Table 10: Top 10 countries with most registered users

List of issues raised by users:

- PDF: PROBA-V 1 km products - S1 TOA - 1 km [C1] - gschwaizer - 2021/4/1 - Error message during order
- Cannot access VM via x2go nor ssh

4. Image Calibration services

4.1. Radiometric Calibration

Calibration request type	Total	Processed	Not received	Error
CLOUDS	32	32	0	0
DARK CURRENT	20	19	1	0
MOON	2	2	0	0
RAYLEIGH	51	51	0	0
SNOW	0	0	0	0
SUN_GLINT	0	0	0	0

Table 11: Calibration Image requests for this reporting period

Calibration image type	Total	Valid	Invalid
PROBA_V_L1A_CALIBRATION	2	0	2
PROBA-V_L1B_CALIBRATION	312	229	80
PROBA-V_L1B_INTERSECTION	703	442	261
PROBA-V_L1B_OVERLAPREGION	0	0	0

Table 12: Processed calibration images for this reporting period

Long-term monthly Libya-4 mean plots for different cameras are given in Figure 1 and Figure 2 and Figure 3. Deep convective clouds interband calibration results are given in Figure 4.

Similarly as in previous months we observe very strong seasonal variations in the Libya-4 results for mainly the RIGHT camera. We assume that this might be due to uncertainties in the OSCAR desert model combined with the orbital drift of PROBA-V. This is not observed for the CENTER camera, while the LEFT camera a slight increasing trend is observed.

No bad pixels were identified.

Radiometric ICP file

The BLUE LEFT/CENTER absolute calibration coefficients will be updated following a linear degradation model and the dark currents will be updated.
The current ICP files are:

- PROBAV_ICP_RADIOMETRIC#LEFT_20210401_V01
- PROBAV_ICP_RADIOMETRIC#CENTER_20210401_V01
- PROBAV_ICP_RADIOMETRIC#RIGHT_20210401V01

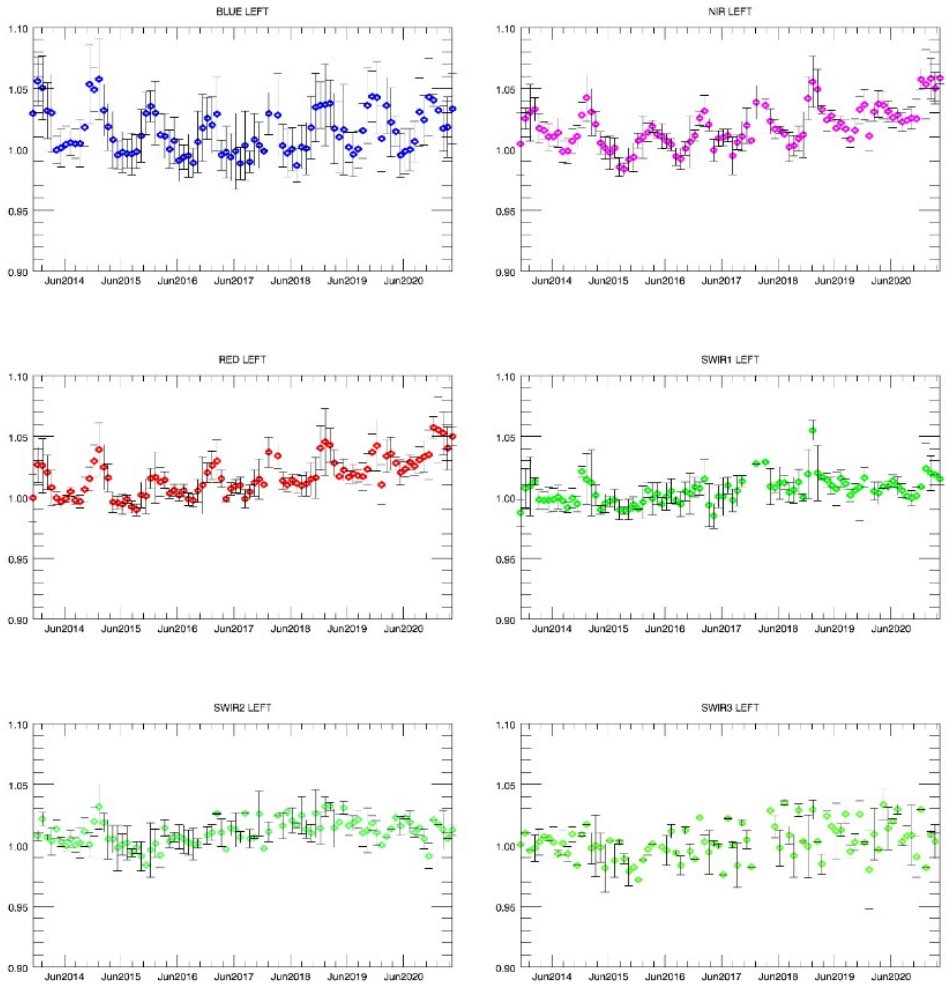

Figure 1. Libya-4 desert calibration results: LEFT monthly averaged results (collection 1)

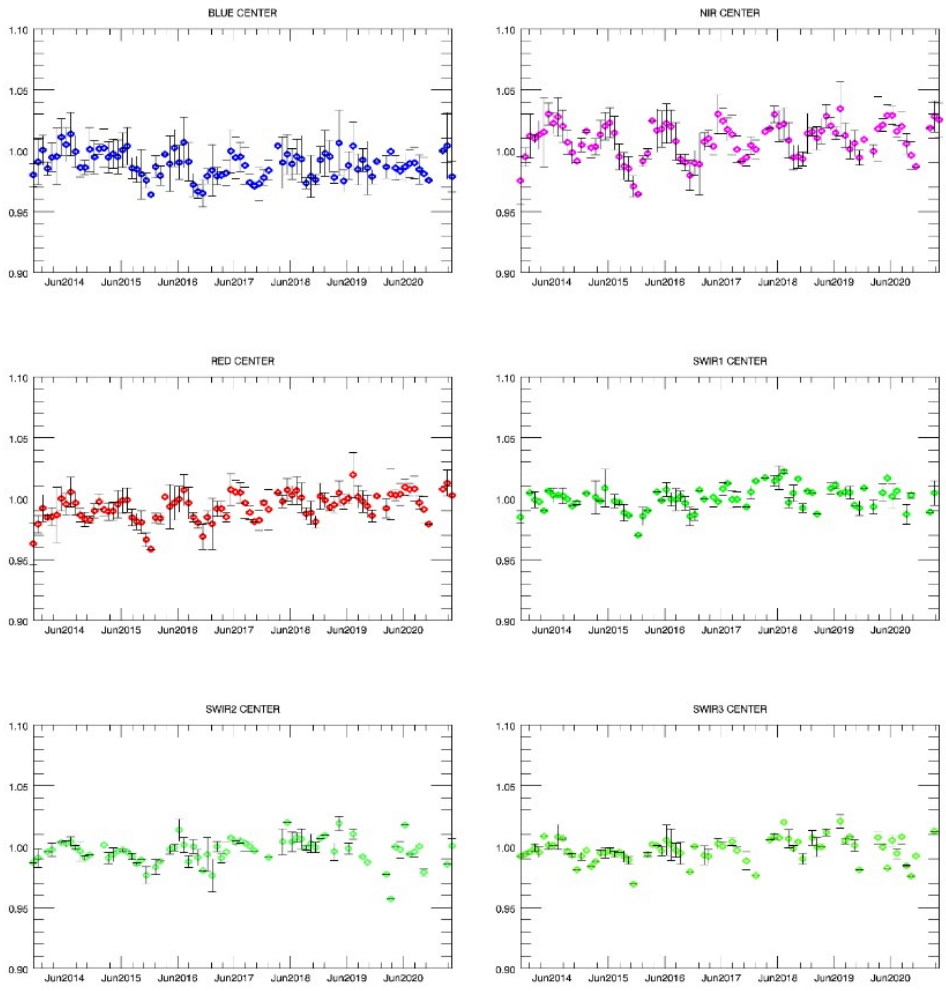

Figure 2. Libya-4 desert calibration results: CENTER monthly averaged results (collection 1)

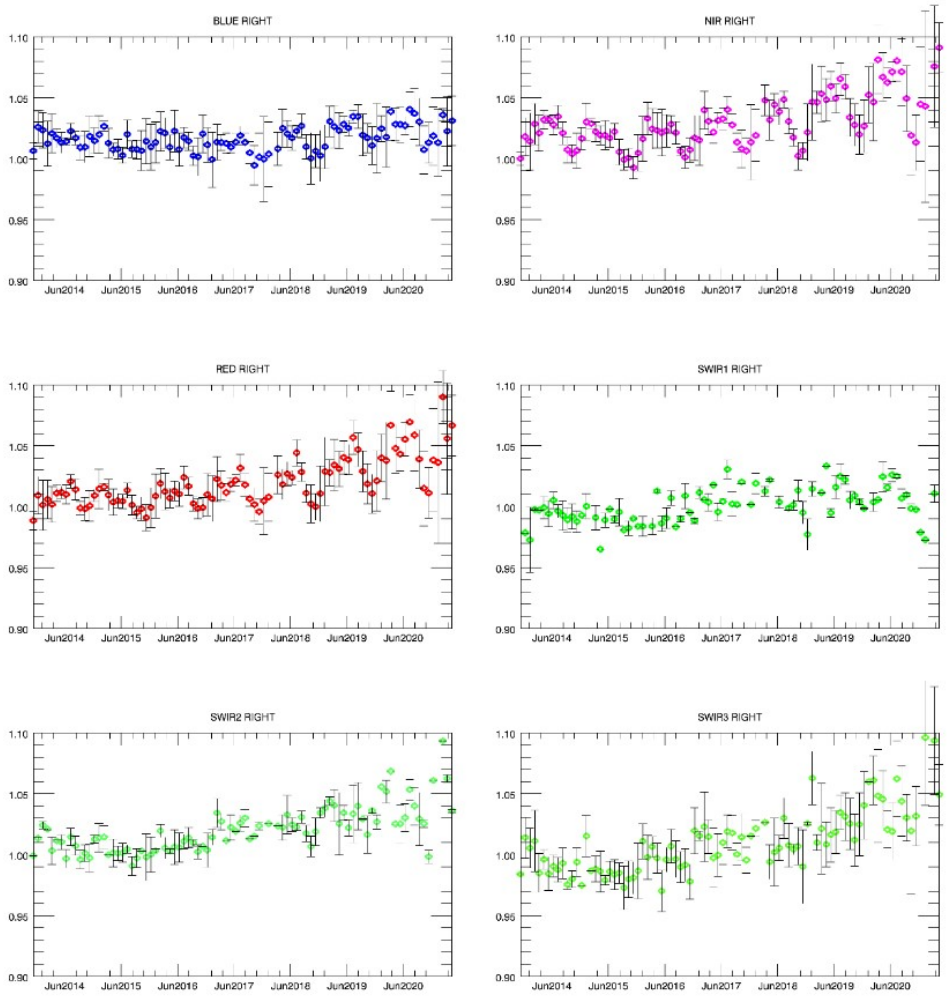

Figure 3. Libya-4 desert calibration results: RIGHT monthly averaged results (collection 1)

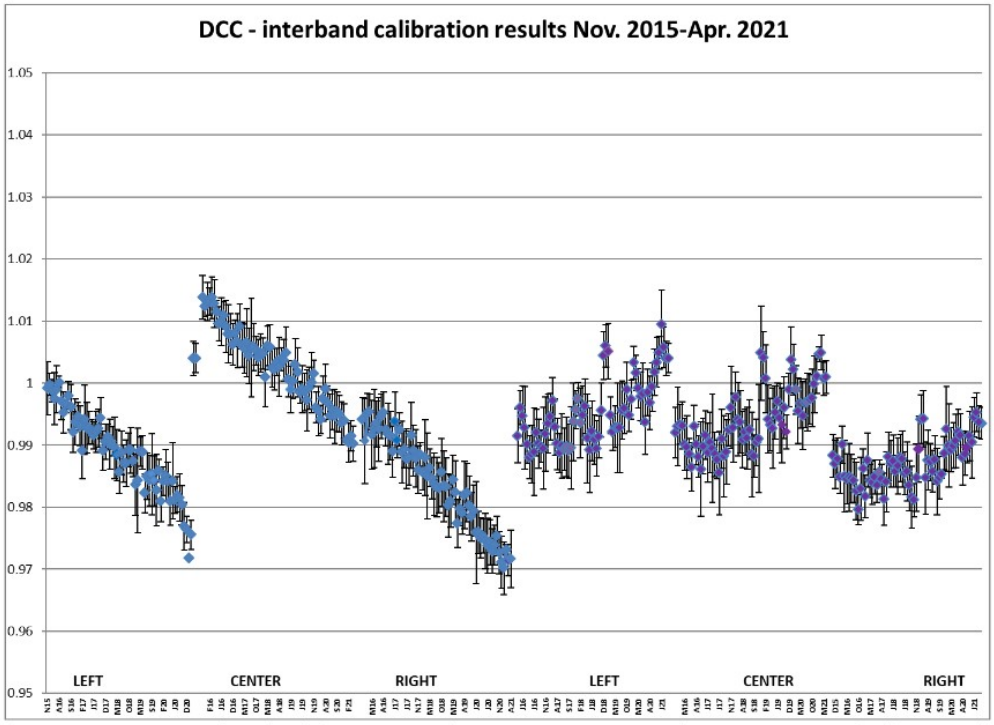

Figure 4. DCC inter-band calibration results: LEFT, CENTER and RIGHT camera (collection 1)

4.2. Geometric Calibration

Calibration image type	Total	Processed	Error
PROBA-V_L1C_INTERSECTION	4152	4152	0

Table13: Processed calibration images for this reporting period

During previous month, the average ALE was < 66 m (σ < 91 m) and values fluctuated between 53 m and 74 m.
The average compliance was 99.22% (98.75% - 99.62% for BLUE - SWIR).

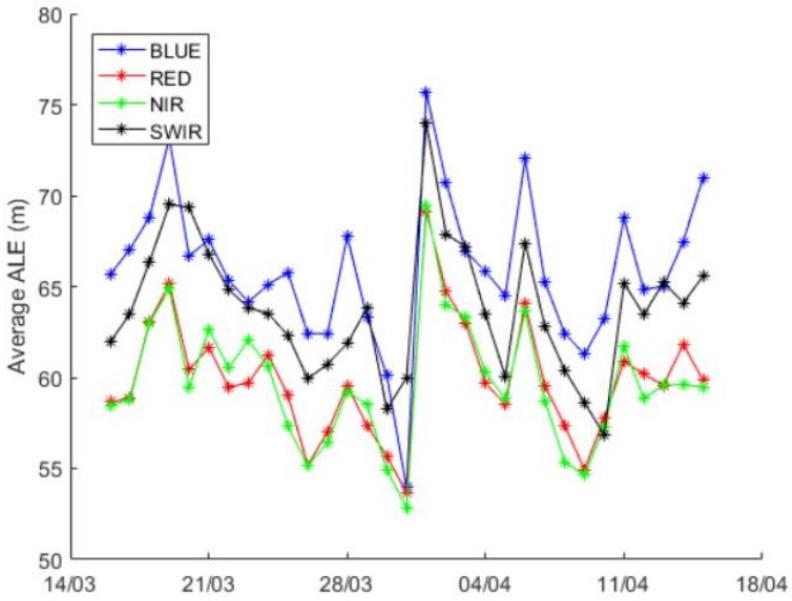

Figure 5: Daily ALE evolution for 16/3 - 15/4/2021.

5. Anomalies

5.1. Image processing issues

A detailed description of each issue is available in the Weekly Report and the image processing tracking system https://juniper.vgt.vito.be/ciptools

The below table gives an overview of the S1's of this reporting period:

	# S1	Dates
Major Gaps (> 21600 km² (missing TFF))	0	
Large Gaps (< 21600 km²)	0	
Medium Gaps (< 10000 km²)	2	10/04
Minor Gaps (< 3600 km²)	0	
Negligible Gaps (< 1000 km²)	29	29/03, 14/04, 04/04, 09/04, 12/04, 07/04, 02/04, 20/03, 25/03, 28/03, 18/03, 23/03, 15/04, 31/03, 05/04, 03/04, 13/04, 08/04, 26/03, 21/03, 16/03, 24/03, 19/03, 01/04, 06/04, 11/04, 30/03, 27/03, 22/03, 17/03
Complete synthesis (no gaps)	0	

Table14: Overview of S1 for this reporting period

Synthesis	Missing	Decom. Error	Geom. Error	Missing TFF	Autom. Recovery	VC4 Missing	Create Contours	Other
20210316	66.13%	4	7					
20210317	64.88%	3	7					
20210318	66.16%	2	5					
20210319	66.08%	3	4					
20210320	66.20%	4						
20210321	65.63%	2	2					
20210322	65.80%	1	3					
20210323	66.07%	4	6					
20210324	66.11%	5	6					
20210325	66.00%	2	1					
20210326	65.00%	1	9					
20210327	66.16%	2	6					
20210328	66.18%	7	8					
20210329	66.20%	4						1
20210330	65.76%	6	6					
20210331	65.66%	1						
20210401	66.35%	7	11					1
20210402	65.88%	9	7					
20210403	66.09%	1						
20210404	65.05%	2	1					
20210405	66.22%	5	3					
20210406	66.59%	13	17					
20210407	66.09%	11						
20210408	65.81%	2	5					
20210409	65.65%	2						
20210410	73.21%	4		1				1
20210411	72.41%	7		1				
20210412	66.07%	6						
20210413	65.20%	5	3					
20210414	66.25%	10						
20210415	66.25%	5	8					

Table 15: List of synthesis with an error overview of the missing percentages and errors for this reporting period

6. Scheduled activities for the next period(s)

- Software upgrades:
  No software upgrades planned

- Hardware:
  No hardware upgrades planned

- Development:
  End-to-end processing was ongoing for 5 dates is ongoing for the new C2 reprocessing chain. These dates were processed with and without a new set of ICP files for verification of the entire workflow.

- No other activities scheduled.

7. Operational remarks

No operational remarks