MONTHLY OPERATIONS REPORT

MOR#037

Reporting period from 16-Dec-2016 to 15-Jan-2017

DOCUMENT CONTROL

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1. Summary

In this reporting period, the majority of the synthesis products were nearly complete, but we see a slight increase of 'geometric errors' on a daily basis, which needs to be monitored. These geometric instabilities result in small lines of data being set to 'no data' if they exceed a certain ALE threshold. Other factors that resulted data gaps were a missing transfer frame file, automatic recoveries, some missing VC4 data and decompression errors.

On the system infrastructure side, one database servers has been upgraded and an issue with a PDU has been solved causing some worker nodes to experience downtime.

In terms of user registrations the past month has been quite slow counting only 8 user registrations.

There were no major issues with the image quality during this reporting period for the radiometric or geometric quality.

The reprocessing campaign to collection 1 (C1) is still ongoing. At the time of reporting data of July 2016 is being reprocessed onwards. Data to December 5th, 2016 will be reprocessed to complete collection 1, which is currently foreseen early February 2017. Once finished, the entire user community will receive an announcement.

No new developments are expected in the coming period.

2. System Infrastructure

Category	% Up Time	% Down Time
Switches	100.0	0.0
Database Servers	99.96	0.04[*]
Mid Term File Servers	100.0	0.0
Short Term File Servers	99.9	0.01[**]
Master Servers	100.0	0.0
Worker Nodes	99.95	0.05[***]
PDF	100.0	0.0

Table 1: System Infrastructure availability for this reporting period

[*] poracle4 down 0.23%: system disk update
[**] pstfs3 down: to be investigated
[***] worker nodes: PDU-problem (about 2 hours)

3. Image Processing Services

3.1. Ingested and archived products

Product Type	Total	Received	Missing data, ingested by VITO	Archived
METEO	248	248	0	248
TFF	310	309	1[*]	309

Table 2: Ingested and archived products for this reporting period

[*] TFF 12055 missing due to no data from pass at USAK DRS.

3.2. Generated and archived products

Product Type	Total	Processed	Error	Archived
PROBAV_L1A - Calibration	393	393	0	393
PROBAV_L1A - Nominal	2609[*]	2547	2[**]	2547
PROBAV_L1C	2547	2547	0	2546
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	6	0	6
PROBAV_L3_S5_TOC_100M	6	6	0	6
PROBAV_L3_S5_TOC_NDVI_100M	6	6	0	6
PROBAV_L3_S1_TOA_300M	31	31	0	31
PROBAV_L3_S1_TOC_300M	31	31	0	31
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	31
PROBAV_L3_S1_TOC_1KM	31	31	0	31
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

[*] 60 L1A segments were processed without the leap second that was introduced early 2017. They were reprocessed using the correct data afterwards.
[**] 2 x L1A errors: Geometric processing

3.3. Backup and archiving service

Product type	Total Files	Total File Size (GB)
TFF	131	749.1
L1A	2877	1270.21
Database transaction logs	2519	1027.53
Database incremental back-up	178	243.81
Database full back-up	0	0.0

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

Product type	Total Files	Total File Size (GB)
PROBAV_TRANSFERFRAMES	2719	7526.38
PROBAV_L1A	33137	17092.84
PROBAV_L1C	30069	34234.78
PROBAV_L3_S1_TOA_100M	513	13250.85
PROBAV_L3_S1_TOC_100M	459	11939.29
PROBAV_L3_S1_TOC_NDVI_100M	806	2267.41
PROBAV_L3_S5_TOA_100M	166	15769.75
PROBAV_L3_S5_TOC_100M	193	18371.01
PROBAV_L3_S5_TOC_NDVI_100M	165	1689.80
PROBAV_L3_S1_TOA_300M	940	10462.71
PROBAV_L3_S1_TOC_300M	884	10196.64
PROBAV_L3_S10_TOC_300M	49	970.00
PROBAV_L3_S10_TOC_NDVI_300M	38	64.28
PROBAV_L3_S1_TOA_1KM	1006	1592.54
PROBAV_L3_S1_TOC_1KM	966	1544.72
PROBAV_L3_S10_TOC_1KM	41	114.83
PROBAV_L3_S10_TOC_NDVI_1KM	32	7.03
ICP_GEOMETRIC_CENTRE	0	0
ICP_ GEOMETRIC _LEFT	0	0
ICP_ GEOMETRIC _RIGHT	0	0
ICP_RADIOMETRIC_CENTRE	7	0.29
ICP_RADIOMETRIC_LEFT	7	0.29
ICP_RADIOMETRIC_RIGHT	7	0.29
METEO_ECMWF	252	0.31
METEO_METEOSERVICES	252	1.34
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	2551	77	80
PROBAV_L3_S1_TOA_100M	31	4002	1528
PROBAV_L3_S1_TOC_100M	31	2044	1780
PROBAV_L3_S1_TOC_NDVI_100M	31	1415	1320
PROBAV_L3_S5_TOA_100M	6	407	442
PROBAV_L3_S5_TOC_100M	6	370	397
PROBAV_L3_S5_TOC_NDVI_100M	6	499	508
PROBAV_L3_S1_TOA_300M	31	202	240
PROBAV_L3_S1_TOC_300M	30	610	32437
PROBAV_L3_S10_TOC_300M	3	50	50
PROBAV_L3_S10_TOC_NDVI_300M	3	141	247
PROBAV_L3_S1_TOA_1KM	31	188	193
PROBAV_L3_S1_TOC_1KM	31	316	306
PROBAV_L3_S10_TOC_1KM	3	14	21
PROBAV_L3_S10_TOC_NDVI_1KM	3	196	241

Table 6: Ordered and delivered products for this reporting period

3.5. End-user activity

8 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 **1034** with **103** different nationalities representing **788** different companies/universities.

Product type	Africa	Asia	Europe	N-America	Oceania	S-America
PROBAV_L1C	0	7.14	145.38	0	0	0
PROBAV_L3_S1_TOA_100M	0.00	138.52	17.61	0	0	0
PROBAV_L3_S1_TOC_100M	0	897.25	519.83	13485.68	0	0
PROBAV_L3_S1_TOC_NDVI_100M	1.06	0	1.92	0	0	0.07
PROBAV_L3_S5_TOA_100M	0	850.84	16.72	0	0	0.00
PROBAV_L3_S5_TOC_100M	35.99	72.33	1396.05	0	0	0
PROBAV_L3_S5_TOC_NDVI_100M	0.96	24.06	12.47	0	0	0.94
PROBAV_L3_S1_TOA_300M	0	1.67	1658.61	0	0	0
PROBAV_L3_S1_TOC_300M	0	0	3044.81	6281.19	0	0
PROBAV_L3_S10_TOC_300M	4.11	0.36	184.97	0	0	0.18
PROBAV_L3_S10_TOC_NDVI_300M	0.00	2.00	0.24	0	0	0.58
PROBAV_L3_S1_TOA_1KM	0	0.01	202.89	0	0	0

PROBAV_L3_S1_TOC_1KM	0.00	0	250.61	0	0	0
PROBAV_L3_S10_TOC_1KM	0	0	15.97	0.76	0	0
PROBAV_L3_S10_TOC_NDVI_1KM	1.81	0.06	2.24	0	0	0.25

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

Product Type	Global
L1C	152.52
PROBAV_L3_S1_TOA_100M	156.13
PROBAV_L3_S1_TOC_100M	14902.76
PROBAV_L3_S1_TOC_NDVI_100M	3.05
PROBAV_L3_S5_TOA_100M	867.56
PROBAV_L3_S5_TOC_100M	1504.38
PROBAV_L3_S5_TOC_NDVI_100M	38.44
PROBAV_L3_S1_TOA_300M	1660.28
PROBAV_L3_S1_TOC_300M	9326.00
PROBAV_L3_S10_TOC_300M	189.62
PROBAV_L3_S10_TOC_NDVI_300M	2.83
PROBAV_L3_S1_TOA_1KM	202.90
PROBAV_L3_S1_TOC_1KM	250.61
PROBAV_L3_S10_TOC_1KM	16.73
PROBAV_L3_S10_TOC_NDVI_1KM	4.35

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

Company	# Downloads
UNIVERSITY OF LEICESTER	30571
BASRAH	2300
GOOGLE	2059
BOKU VIENNA	1734
VITO	986
METEO FRANCE	354
INSTITUTE OF REMOTE SENSING AND DIGITAL EARTH	232
IBIGEO	212
BOMBAY NATURAL HISTORY SOCIETY	175
AIRBUS	163

Table 9: Top 10 user companies for the reporting period

Country	# Users
CHINA	103
BELGIUM	91
FRANCE	55
ITALY	53
BRAZIL	46
UNITED STATES	44
UNITED KINGDOM	42
INDIA	36
NETHERLANDS	35
GERMANY	34

Table 10: Top 10 countries with most registered users

List of issues raised by users:

ProbaV:

* calendar ordering problem
* Free proba data
* Order "M0159492" is completed
* PDF: N.A. - fatemeh farzanehpy - 2016/12/16
* Order "M0159503" is completed
* PDF issue - Malinee
* Collection 0 done?
* Proba V imagery for Zambia site
* Sample python script for Spark

4. Image Calibration services

4.1. Radiometric Calibration

Calibration request type	Total	Processed	Not received	Error
CLOUDS	16	16	0	0
DARK CURRENT	23	22	1	0
MOON	2	2	0	0
RAYLEIGH	53	51	2	0
SNOW	59	58	1	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	391	330	61
PROBA-V_L1B_INTERSECTION	810	322	488
PROBA-V_L1B_OVERLAPREGION	0	0	0

Table 12: Processed calibration images for this reporting period

[*] Due to insufficient overlap with the calibration region of interest, not enough pixels (e.g. clouds contamination), site not sufficiently uniform (illumination), etc.

Long-term monthly Libya-4 mean plots for different cameras are given in Figure 1, Figure 2 and Figure 3. Deep convective clouds interband calibration results are given in Figure 4. Please note that plots are given for collection 0 products.

The DCC interband calibration results for LEFT and CENTER BLUE and RIGHT NIR still show a slight decrease. Investigations to evaluate the need for an update of the absolute calibration coefficients for these bands are still on-going.

A clear vertical stripe is visible at pixel 250 (0-based numbering) of the LEFT SWIR3 strip. This pixel will be assigned the status BAD at the next ICP file update.

Radiometric ICP file

ICP dark values will be updated in the coming days and one bad pixel, i.e. Left SWIR3 pixel 250, will be added.

Another ICP update will follow end of the month where both the SWIR absolute calibration coefficients will be updated following the linear degradation model and dark currents will be updated.

The current ICP files are

- PROBAV_ICP_RADIOMETRIC#LEFT_20170101_V01
- PROBAV_ICP_RADIOMETRIC#CENTER_20170101_V01
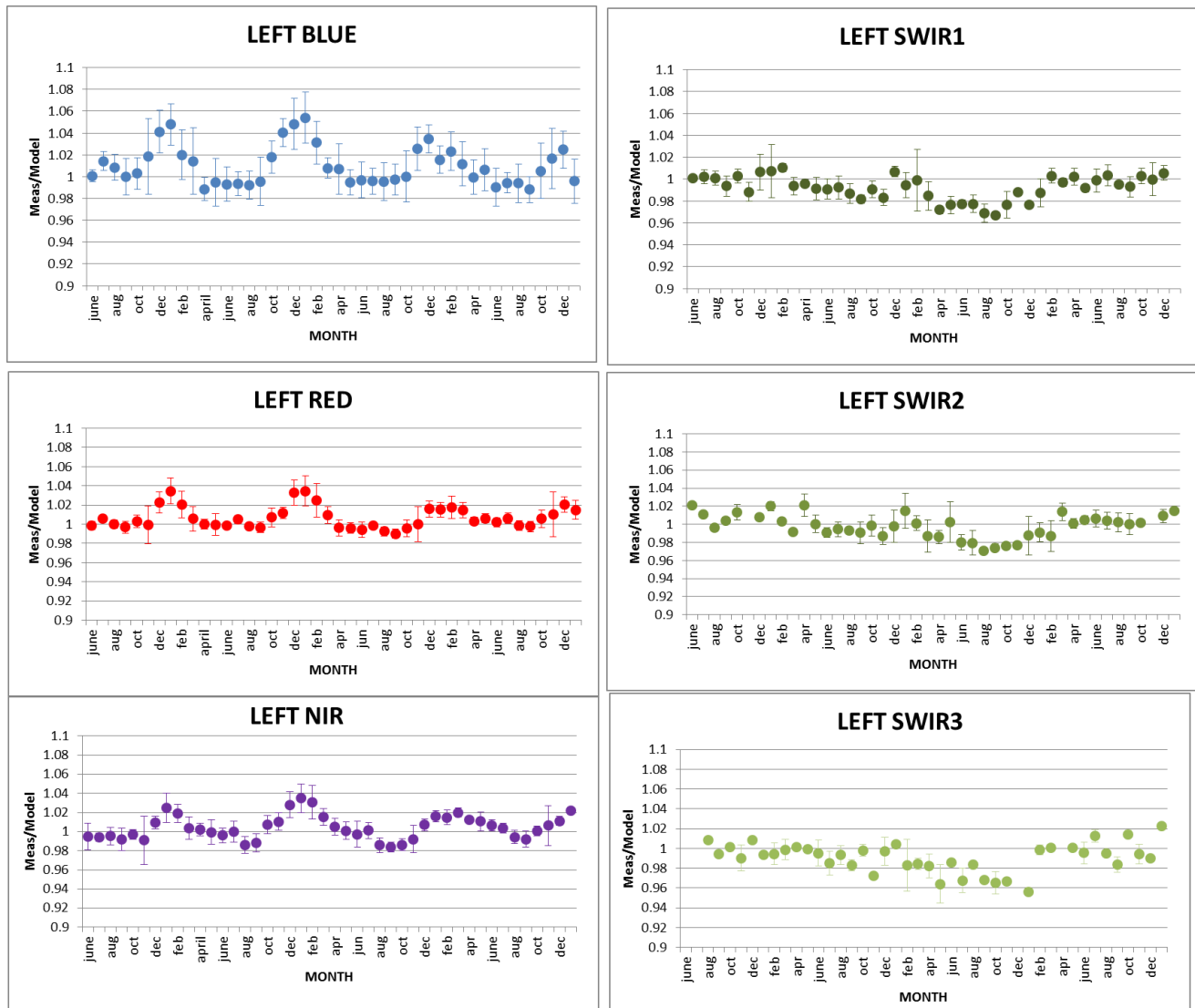- PROBAV_ICP_RADIOMETRIC#RIGHT_20170101_V01

Figure 1. Libya-4 desert calibration results: LEFT monthly averaged results (collection 0)
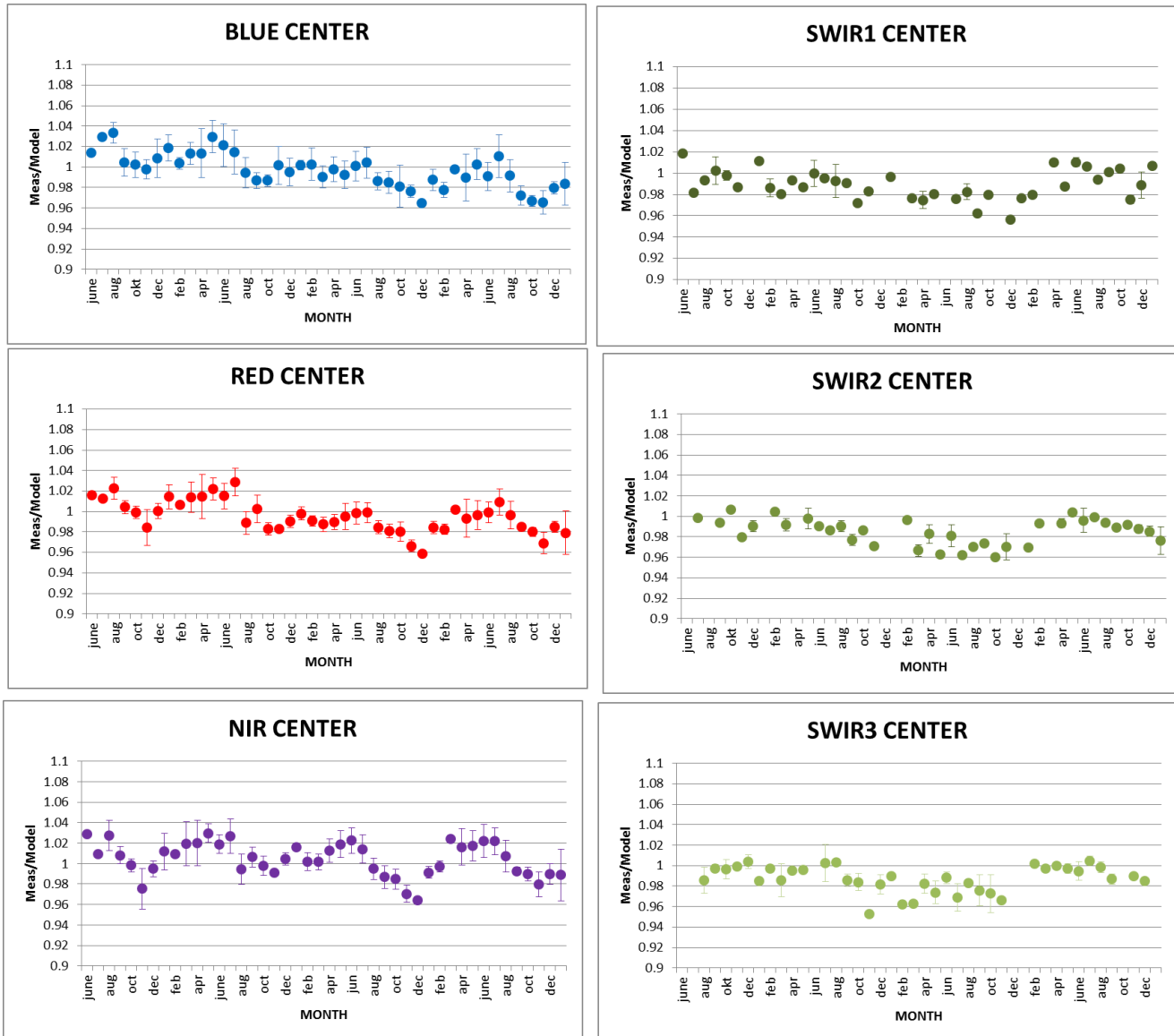
Figure 2. Libya-4 desert calibration results: CENTER monthly averaged results (collection 0)
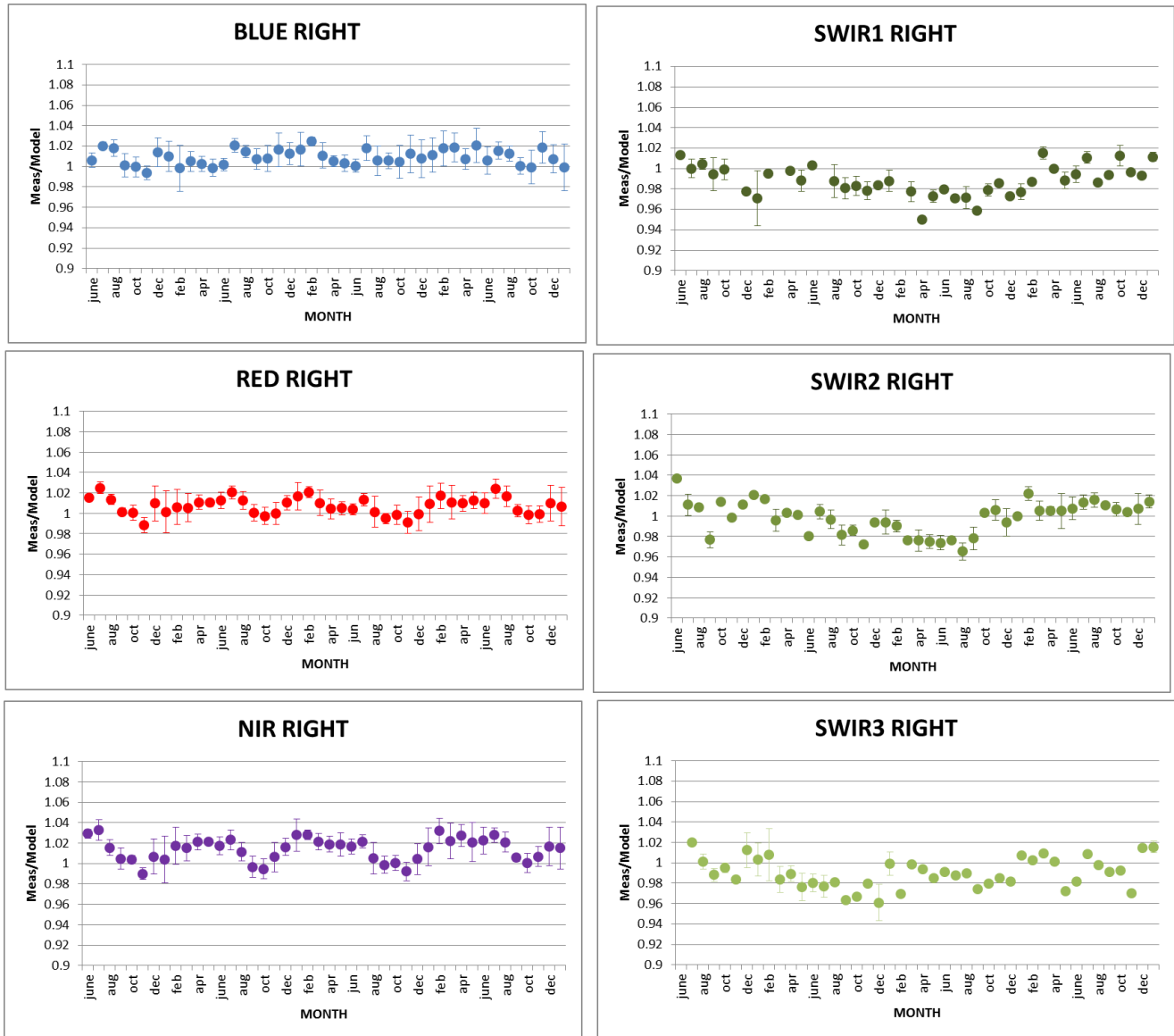
Figure 3. Libya-4 desert calibration results: RIGHT monthly averaged results (collection 0)
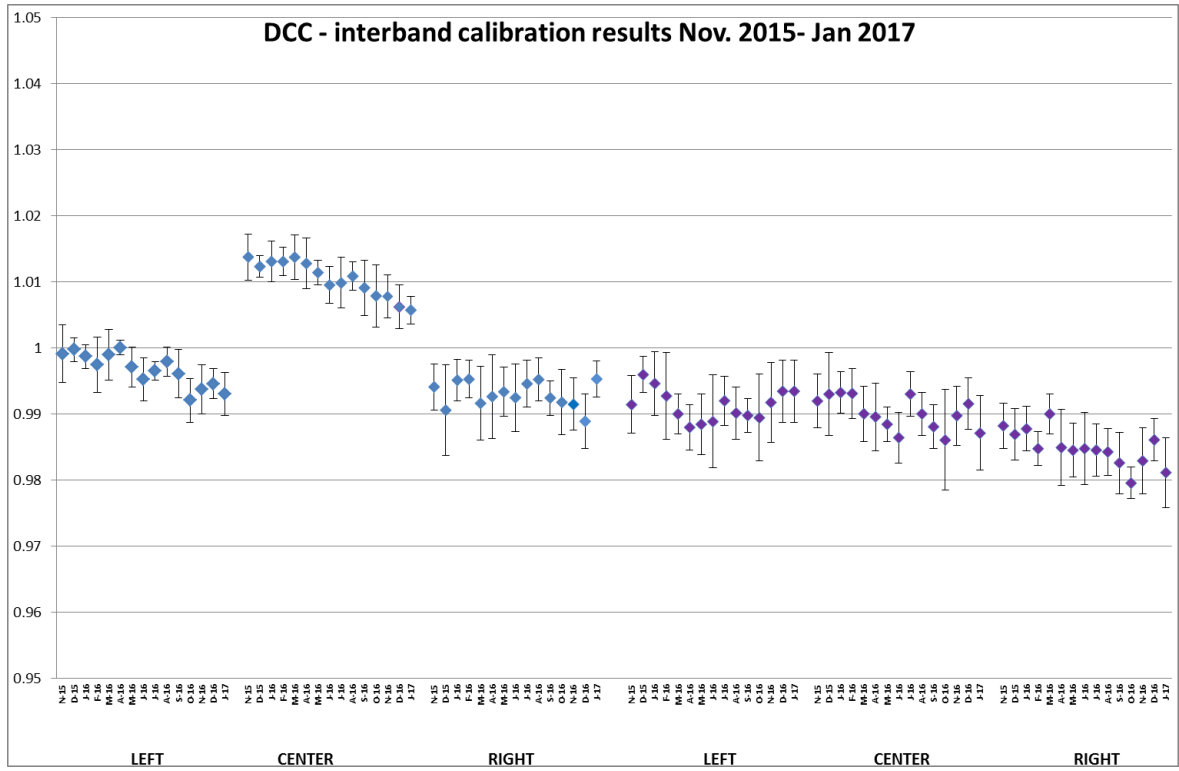
Figure 4. DCC inter-band calibration results: LEFT, CENTER and RIGHT camera (collection 0)

4.2. Geometric Calibration

Calibration image type	Total	Processed	Error
PROBA-V_L1C_INTERSECTION	13298	13298	0

Table 13: Processed calibration images for this reporting period

During previous month, the average ALE was < 77 m (σ < 96 m). Daily values started relatively high, with peaks at 18/12 and 21/12 (peak values 87 – 97 m on both dates), followed by a decrease to values of 55 – 75 m between 27/12 and 3/1. The remainder of the period was characterised again by high ALE values, with maxima on 4/1 (peak values 87 – 95 m) and 14/1 (peak values 86 – 110 m).

The geometric accuracy was within the requirement of < 300 m, with an average compliance for all cameras of 99.2% (98.8 – 99.7% from BLUE to SWIR). Daily values showed minima coinciding with the maximum ALE values.

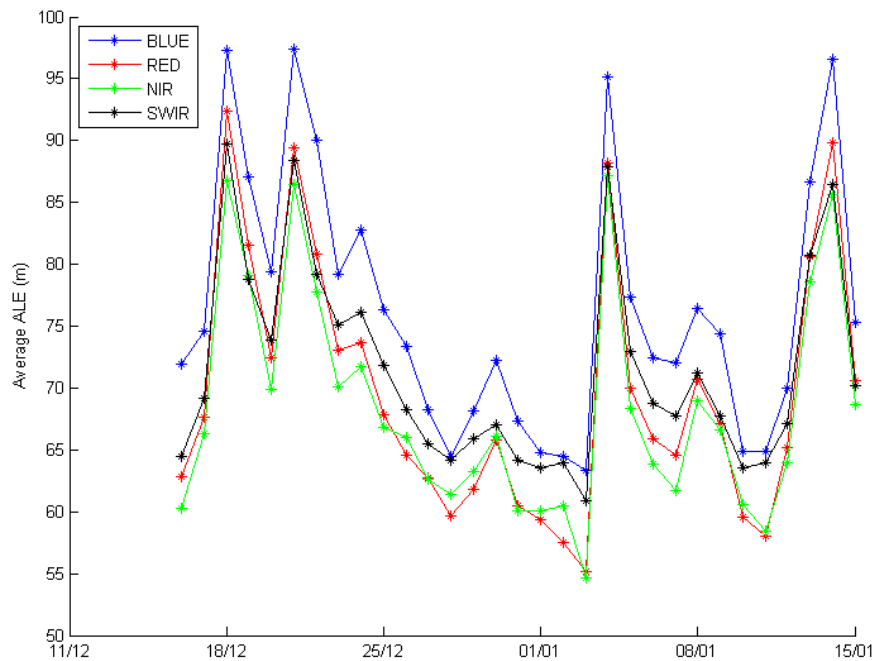

Figure 5 - Daily ALE evolution for all PROBA-V spectral bands for period 16/12/16 – 15/01/17

Geometric ICP file

- PROBAV_ICP_GEOMETRIC#LEFT_20160907_V01
- PROBAV_ICP_GEOMETRIC#CENTER_20160907_V01
- PROBAV_ICP_GEOMETRIC#RIGHT_20160907_V01

5. Anomalies

5.1. System related issues

A detailed description of each issue is available in the issue tracking system http://jira.vgt.vito.be

Key	Summary	Status	Created	Component/s
PROBAVUS-7	Very small images fail to process	Resolved	10/01/2014	General
PROBAVUS-60	LTDA Restore fails when product destination already exists on disk	Open	22/01/2016	Software
PROBAVUS-63	Cloud shadow detection at high solar zenith angles not working properly	Open	11/05/2016	Software
PROBAVUS-65	Processing statuses L2 products	Open	16/09/2016	Software
PROBAVUS-66	Cloud cover percentages on PDF products are not reliable	Open	19/10/2016	PDF
PROBAVUS-67	PDF customisation.exe: L2 geotiff bands are not grouped	Open	25/11/2016	Software

0 new issues were logged during this reporting period
0 issue(s) was resolved and closed during this reporting period
0 issues are resolved but remain to be closed formally
1 issue are resolved but remain in the list logging purposes
5 issue(s) is open and remain to be solved

5.2. 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))	2	03/01, 01/01
Large Gaps (< 21600 km²)	0	
Medium Gaps (< 10000 km²)	2	30/12, 31/12
Minor Gaps (< 3600 km²)	10	24/12, 13/01, 22/12, 11/01, 14/01, 23/12, 02/01, 07/01, 10/01, 16/12
Negligible Gaps (< 1000 km²)	17	17/12, 27/12, 06/01, 20/12, 05/01, 15/01, 21/12, 26/12, 29/12, 19/12, 08/01, 09/01, 04/01, 25/12, 18/12, 28/12, 12/01
Complete synthesis (no gaps)		

Table14: Overview of S1 for this reporting period

An increase is noticed in the amount of geometric errors. If the absolute location error for a certain imaged line exceeds 150m, it causes one 'geometric error', of which this data is set to 'no data' due to the inferior quality.

Synthesis	Missing	Decom. Error	Geom. Error	Missing TFF	Autom. Recovery	VC4 Missing	Create Contours	Other
20161216	3.01%	4	11		2			
20161217	0.67%	1	3					
20161218	0.10%	2	16					
20161219	0.03%		6					
20161220	0.10%		18					
20161221	0.24%	1	24					
20161222	1.77%	6	27			2		
20161223	3.71%	7	21			1		
20161224	4.79%	2	30		1	1		
20161225	0.19%	2	15					
20161226	1.05%	2	20					
20161227	0.07%	2	14					
20161228	0.07%	1	9					
20161229	0.01%		2					
20161230	3.94%	10	10		1	1		
20161231	8.21%	8	13	1		1		
20170101	5.98%	5	21		1	1		
20170102	3.25%		13		1			
20170103	26.31%	6	15		1		2	1
20170104	0.67%	2	11					
20170105	0.36%	1	17			1		
20170106	0.54%	9	4					
20170107	3.71%				1	1		
20170108	0.23%		23					
20170109	0.15%		17					
20170110	0.74%	2	12			1		
20170111	0.53%	2	11			1		
20170112	0.06%		14					
20170113	0.42%		19					1
20170114	0.55%	6	19		1			
20170115	0.19%		25					

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:
  No developments are planned in the next period

- The release of the last batch of reprocessed data is scheduled for early February. A news item will be generated in order to inform the entire user community.

7. Operational remarks

At the time of reporting, VITO is reprocessing July 2016. To cover the entire collection using the new baseline, processing needs to be performed until the data of December 5th 2016. Expected end is scheduled for early February.