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24/06/14

Performance of Proba-V during its first year in orbit

Sindy Sterckx, Stefan Adriaensen

CEOS WGCV IVOS, June 4 - 6 2014, Pasadena, USA

The commissioning phase SCHEDULE

Platform commissioning

Instrument commissioning

User segment commissioning

CAL/VAL commissioning

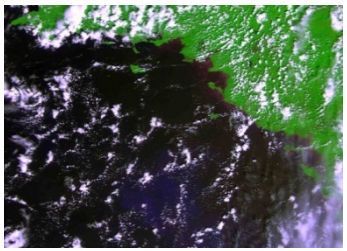
Operational phase

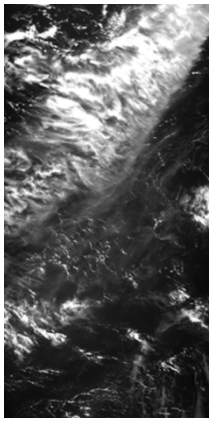
Launch 6/05/2013

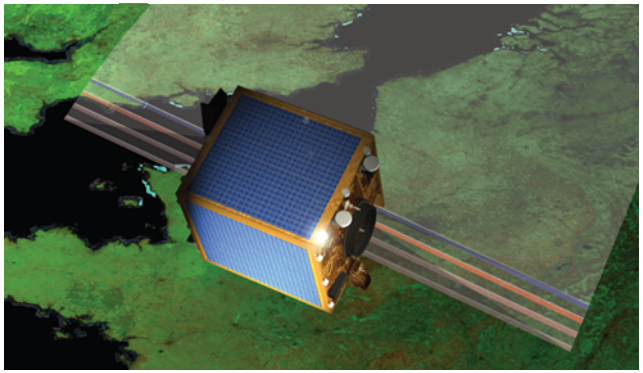
First image 15/05/2013

Start Calibration campaigns 08/2013

IOCR 11/2013







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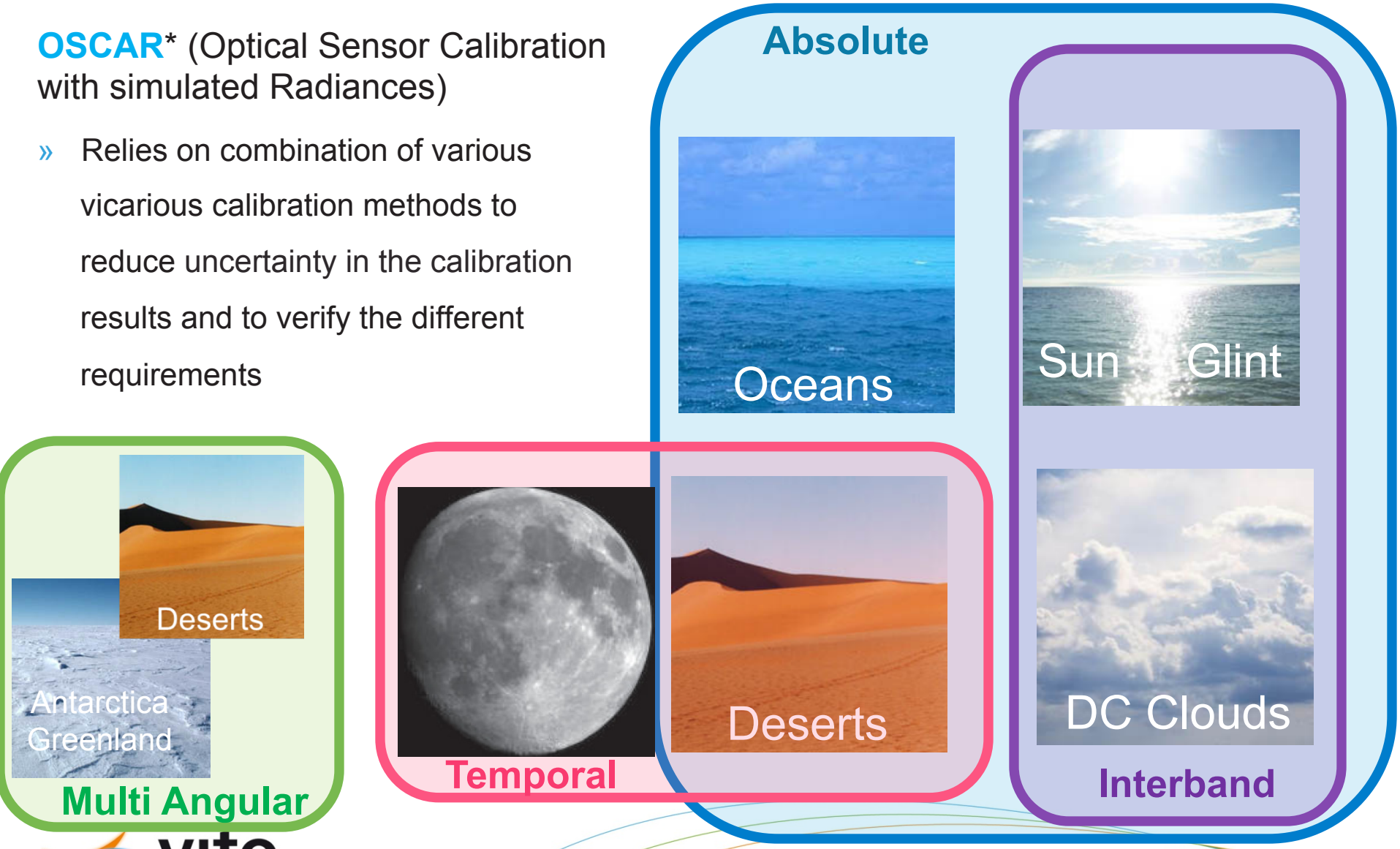
RC – IQC: Vicarious Calibration Concept

OSCAR* (Optical Sensor Calibration with simulated Radiances)

» Relies on combination of various vicarious calibration methods to reduce uncertainty in the calibration results and to verify the different requirements



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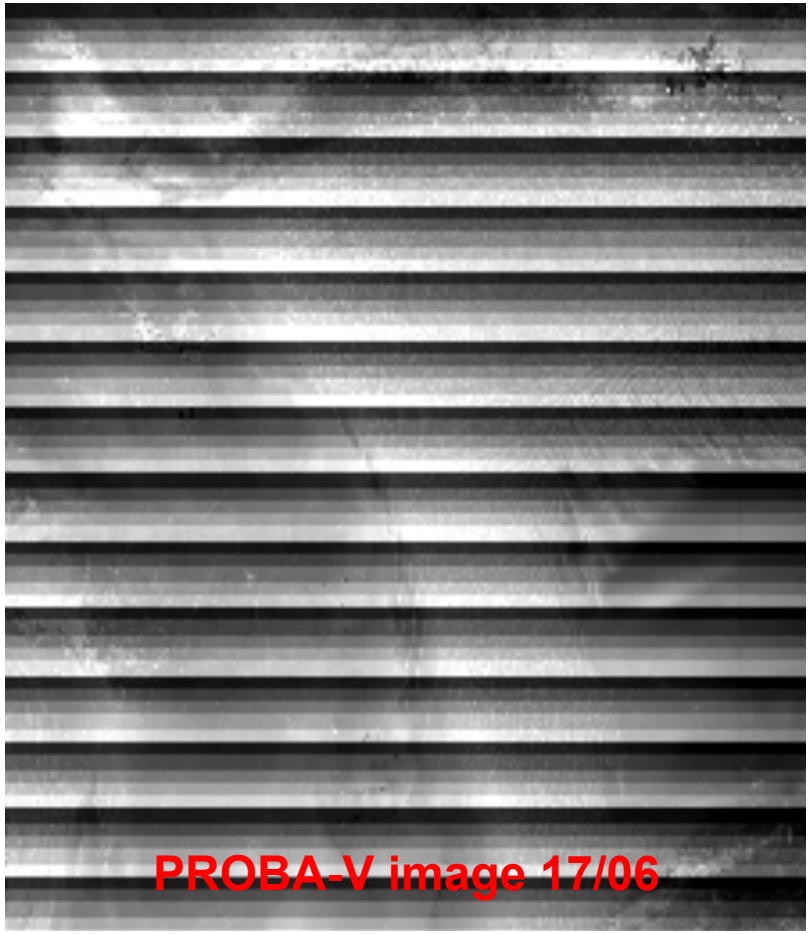
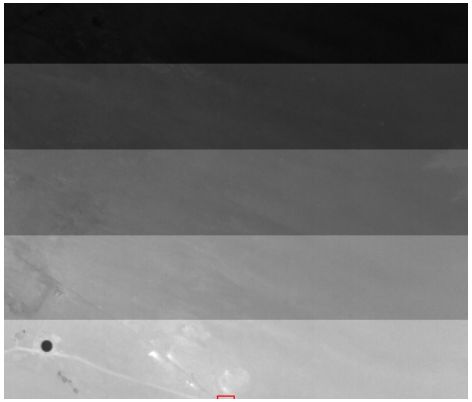
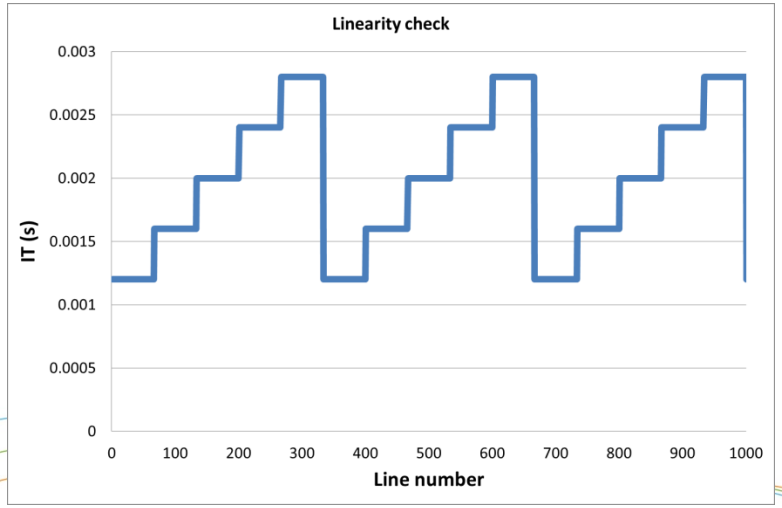
*Sterckx *et al.* IJRS, 2014; Sterckx *et al.* , TGARS, 2013; Govaerts *et al.*, RSL, 2013

Experimental calibrations : the linearity check

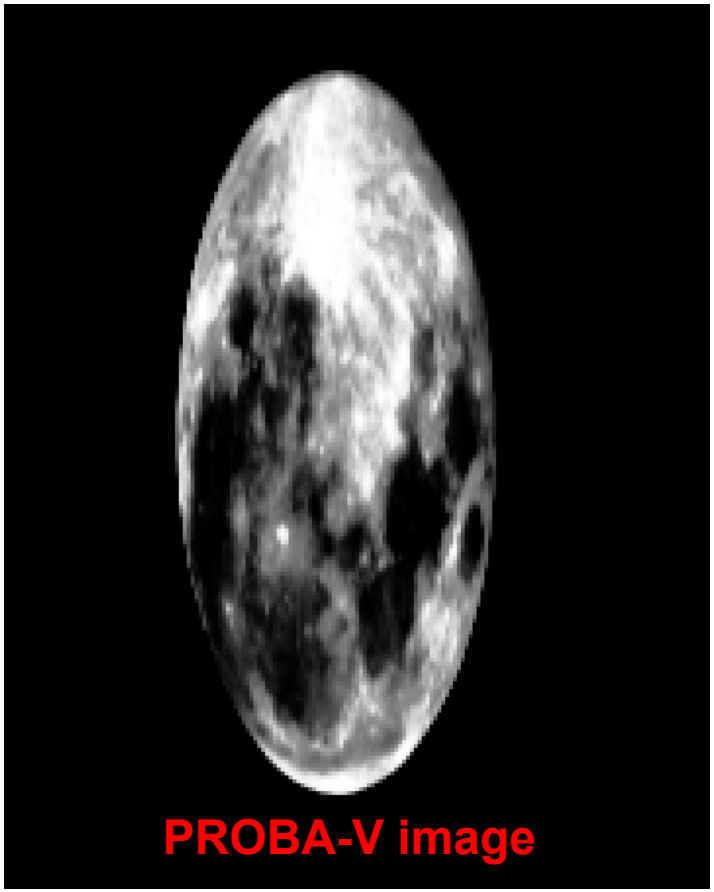




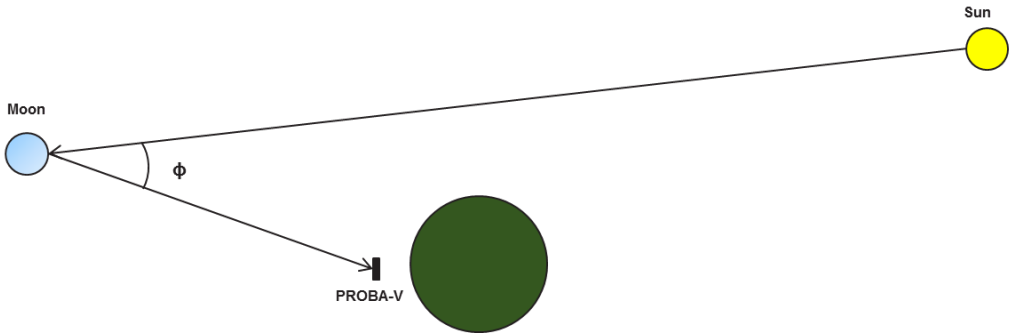
Integration time changes in steps over homogenous areas



Lunar Calibration

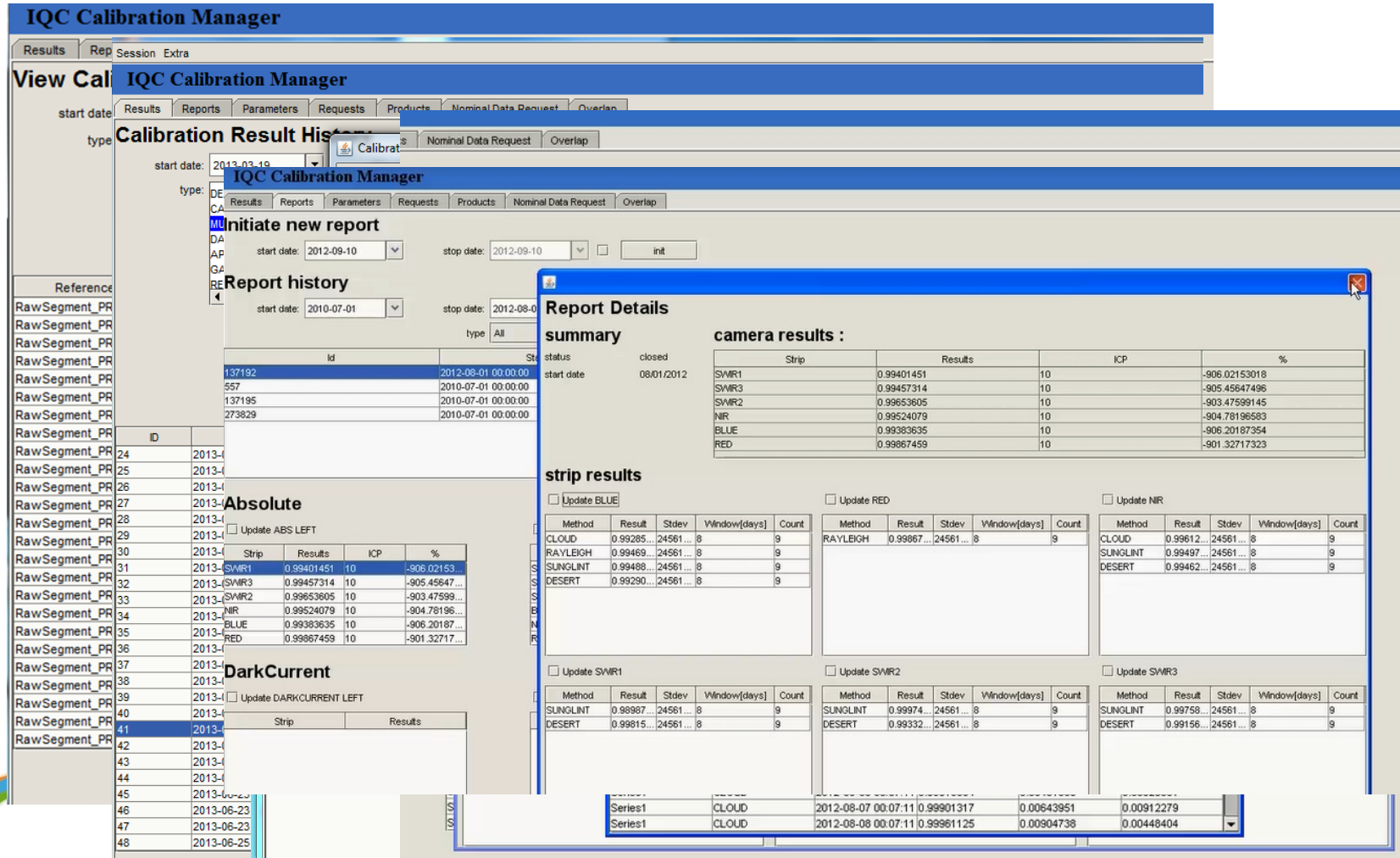


- Observation of the moon :
  - Phase angle 7° +/- 0.5 degrees (moon - observer - sun angle)
  - Pitch maneuver : 360 degrees rotation at approx. 0.2 °/s
  - Oversampling of +/-4.0



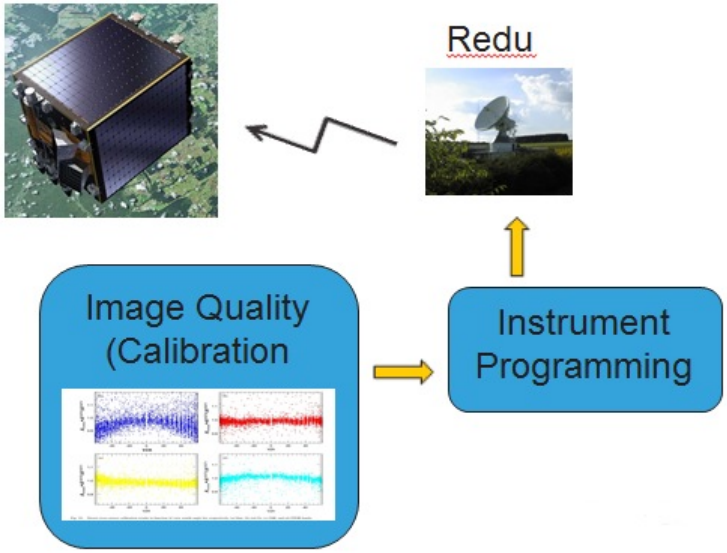
RC- Image Quality Center: HMI

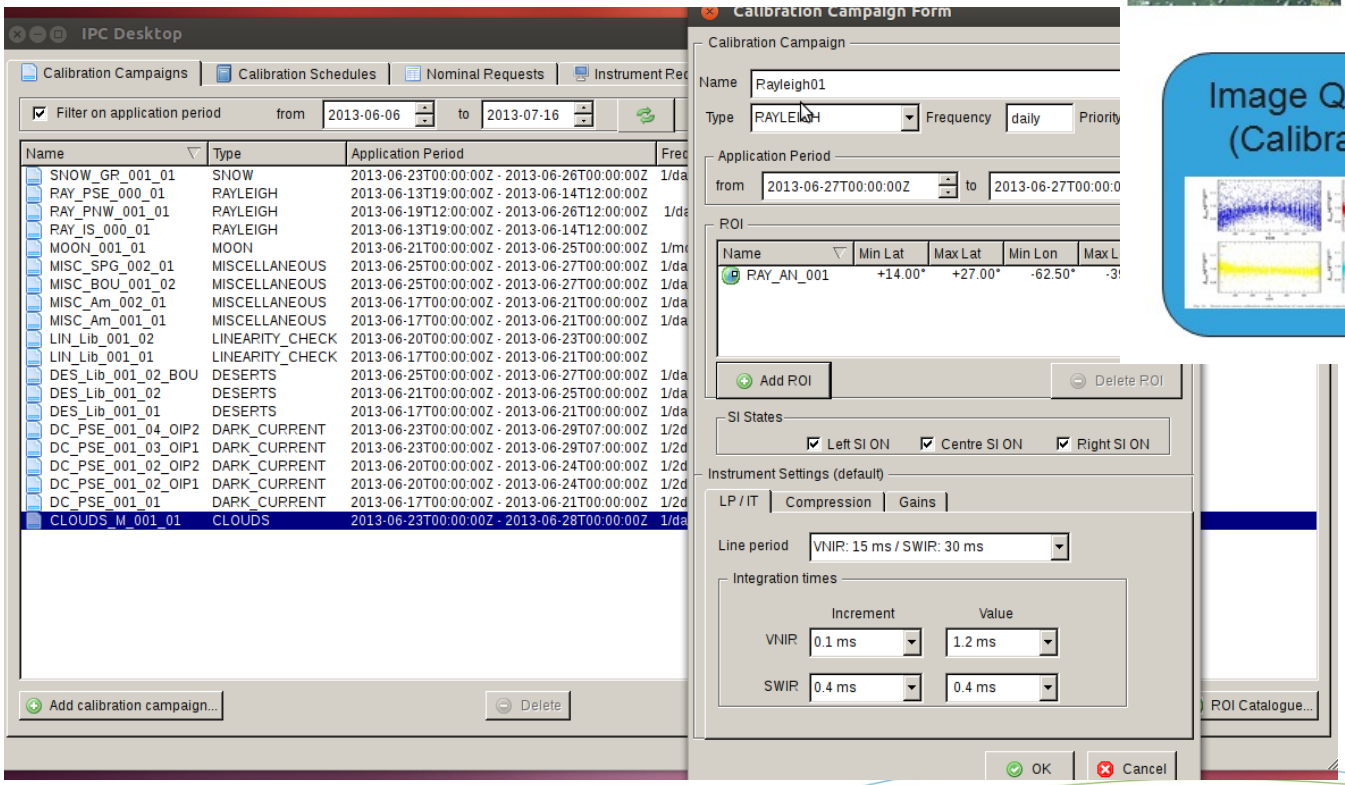
- fully automated image workflows and statiscal processing
- View at the database using Graphical User Interface
- Full traceability new instrument calibration parameters updates
- Automated distribution towards PF



Instrument Programming Center (IPC)

- Communication with Mission Control Center (MCC) for acquisitions
  - with specific instrument settings
  - over non-nominal sites
  - with maneuvers

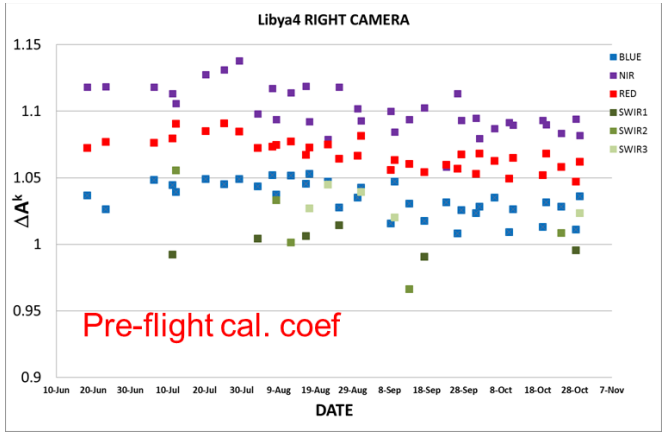


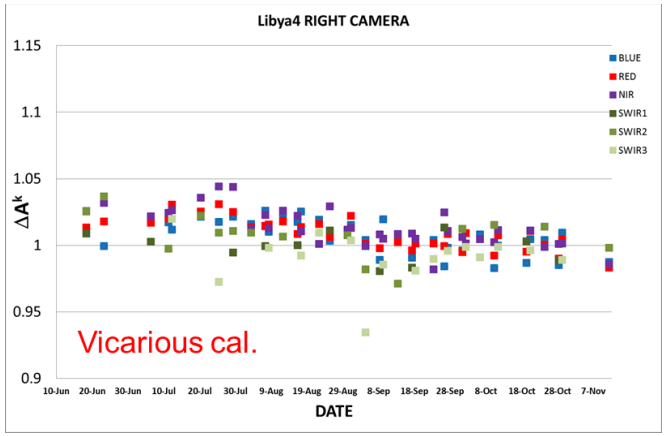


COMMISSIONING

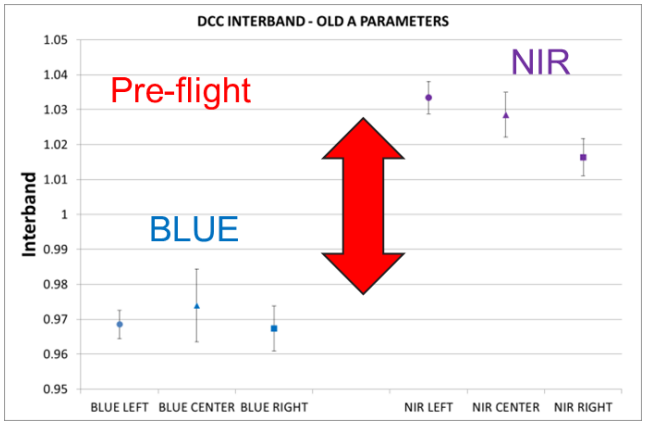
Absolute calibration coefficient

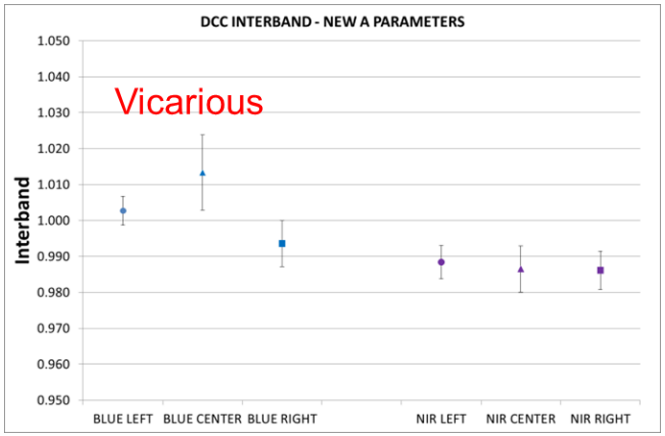
Assessment absolute calibration





Assessment interband calibration





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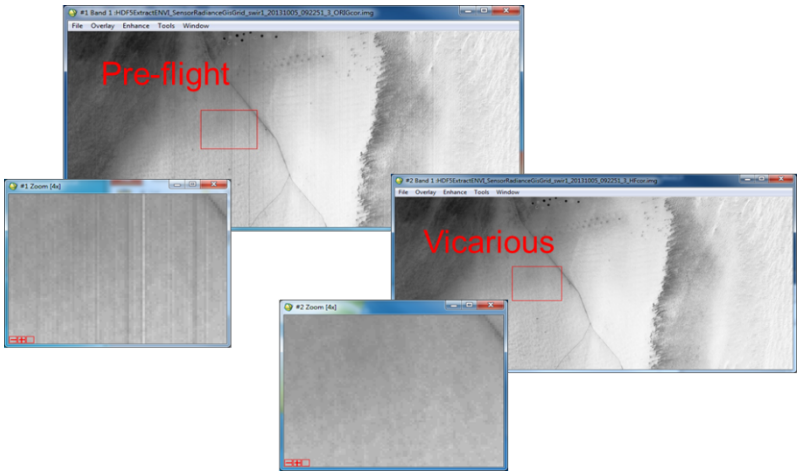
Equalisation

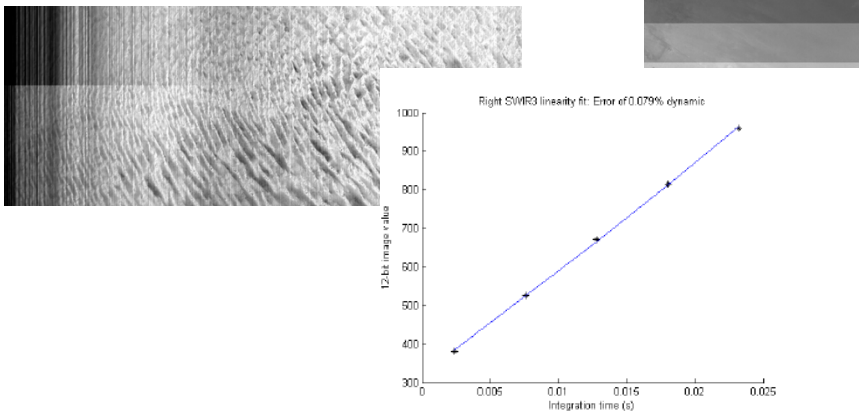
- Reduction of SWIR stripes



- A few bad SWIR pixels identified + some marked as suspect

Non-linearity

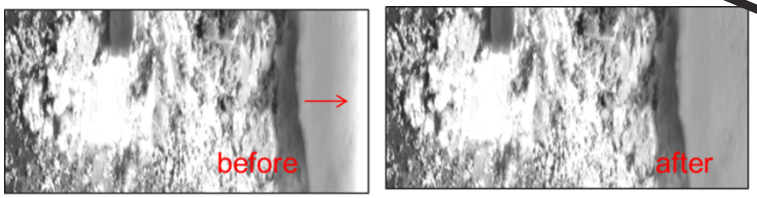
- SWIR detector non linearity for DN > 3300 => IT reduced
- Observed linearity VNIR below 1 %
- Observed linearity SWIR below 0.4 %



Dark current

- Monitoring of stability
- Identification bad & suspect pixels

Vignetting



List of bad pixels

List of 10 SWIR bad pixels

CAMERA	STRIP	BAD (commis)
LEFT	SWIR1	352
LEFT	SWIR2	711,863
LEFT	SWIR3	438,759
CENTER	SWIR1	1021
CENTER	SWIR2	769
CENTER	SWIR3	890
RIGHT	SWIR1	
RIGHT	SWIR2	14,438
RIGHT	SWIR3	

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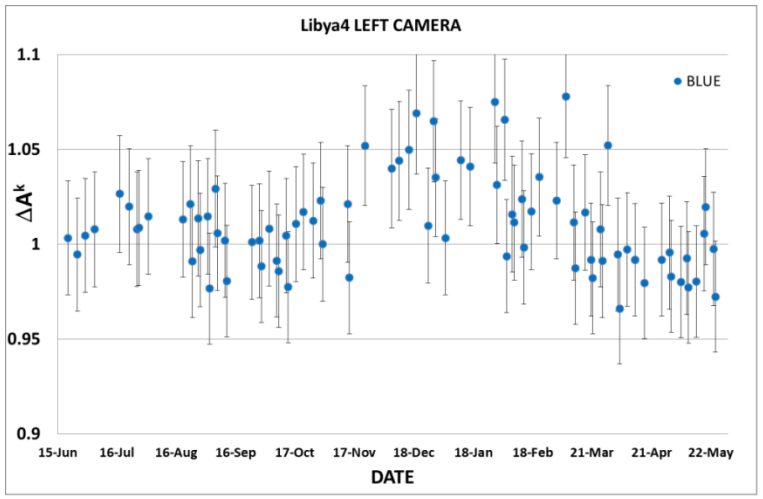
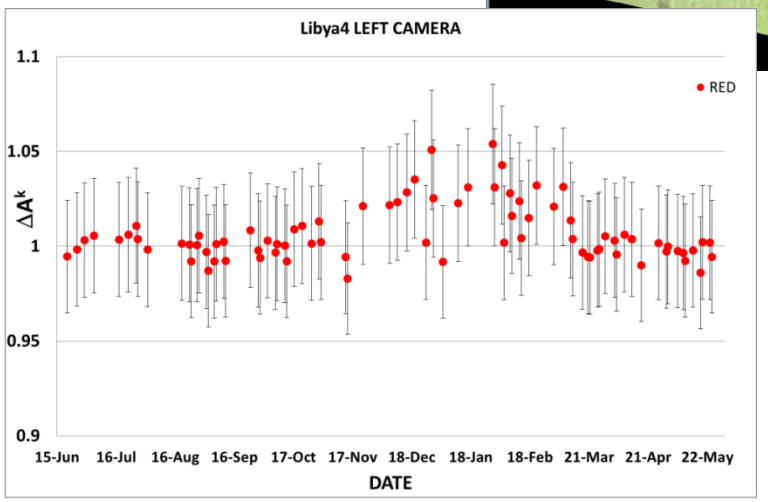
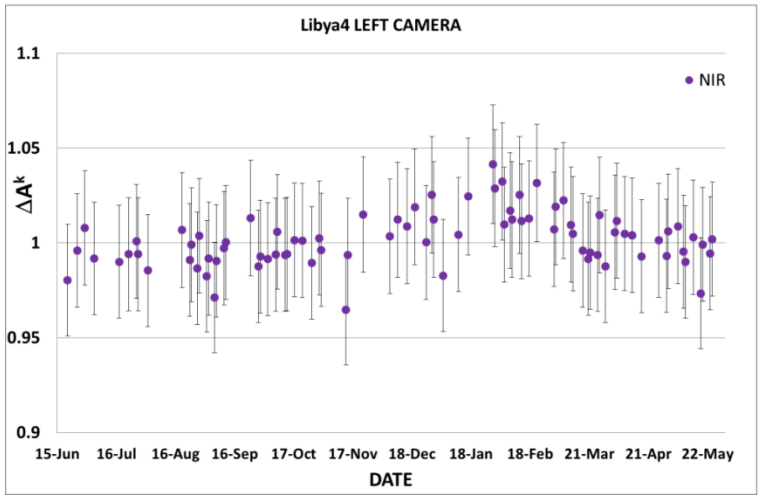
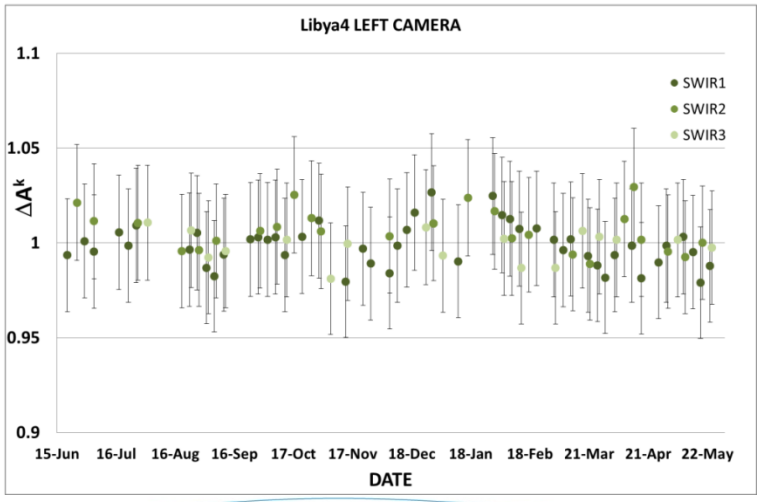
LATEST STATUS

Oscar Libya-4 calibration - LEFT



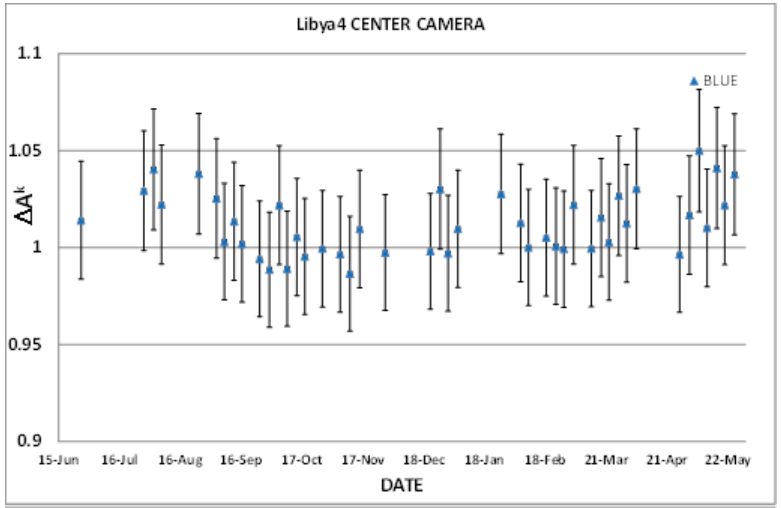


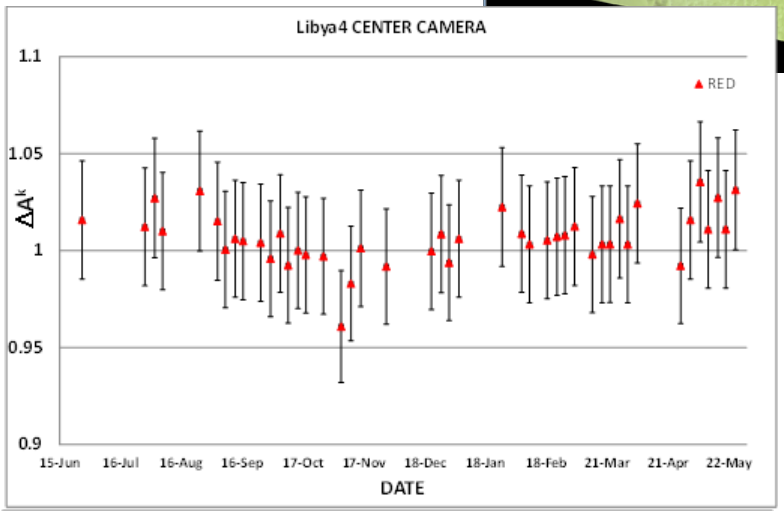


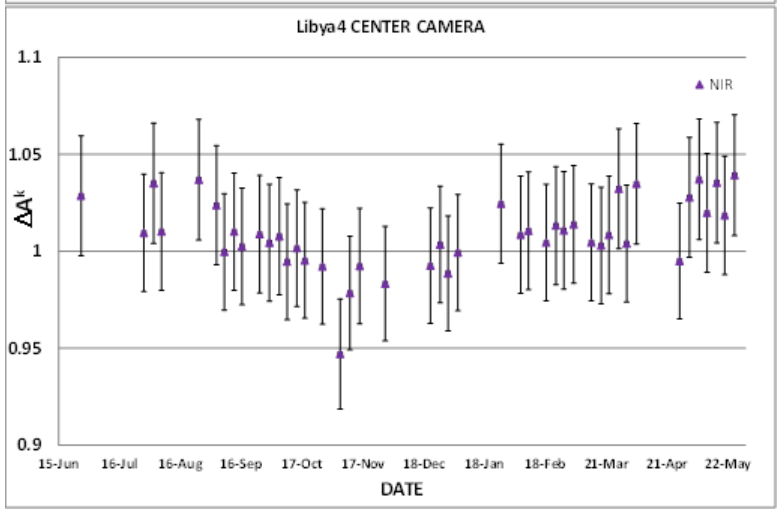


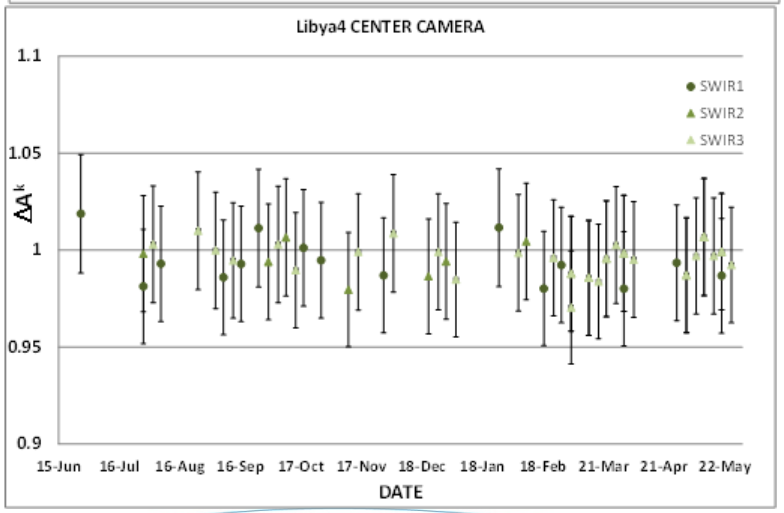
Govaerts, Y., Sterckx S. and Adriaensen S., Remote Sensing Letters, 4(6), 2013.

Oscar Libya-4 calibration - CENTER



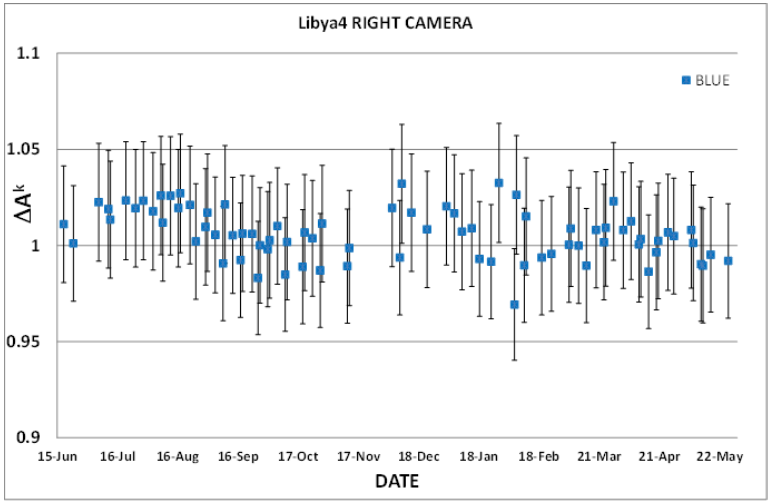


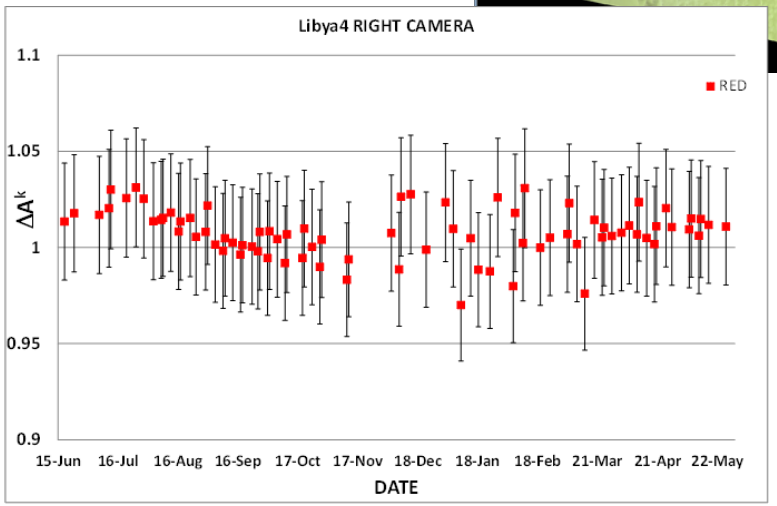


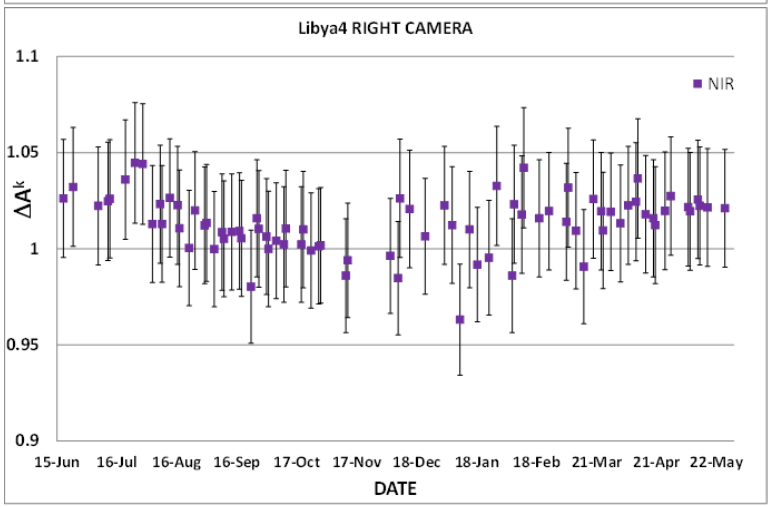


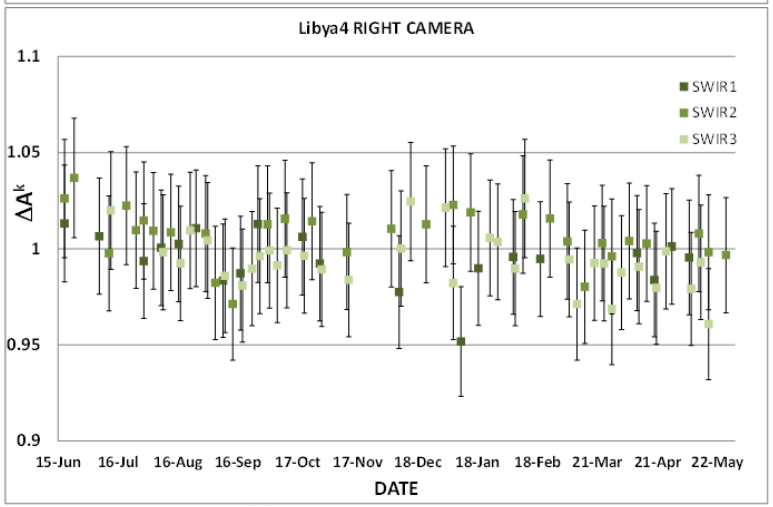
Govaerts, Y., Sterckx S. and Adriaensen S., Remote Sensing Letters, 4(6), 2013.

Oscar Libya-4 calibration - RIGHT

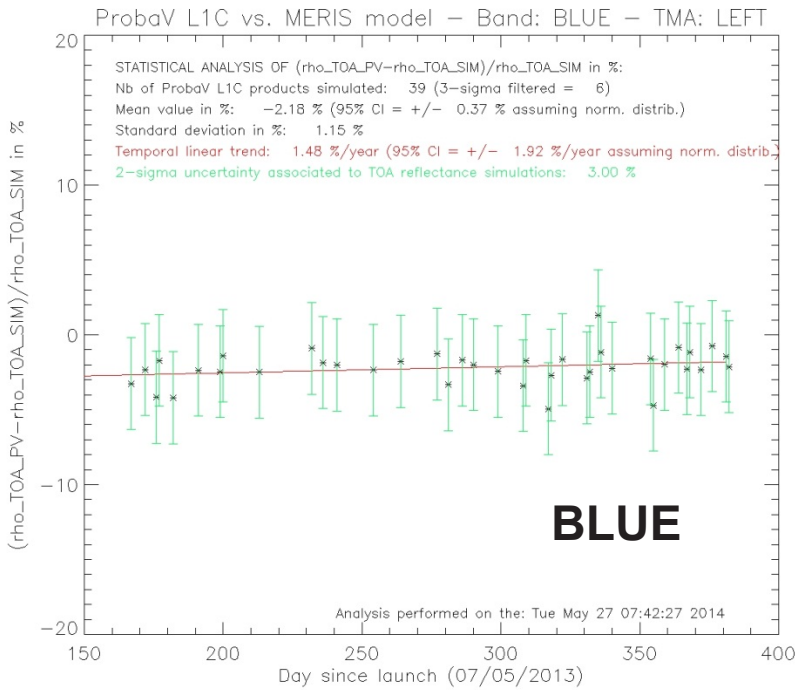


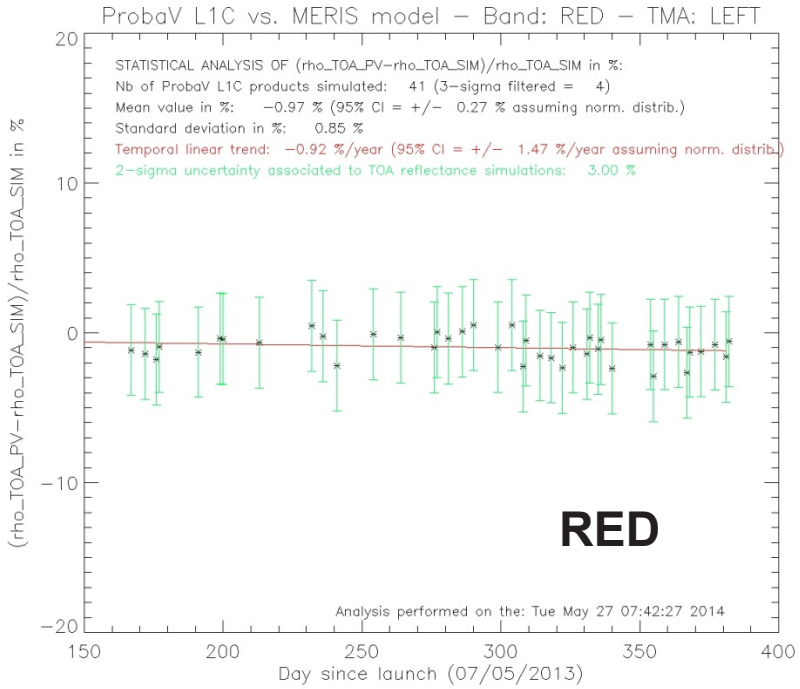


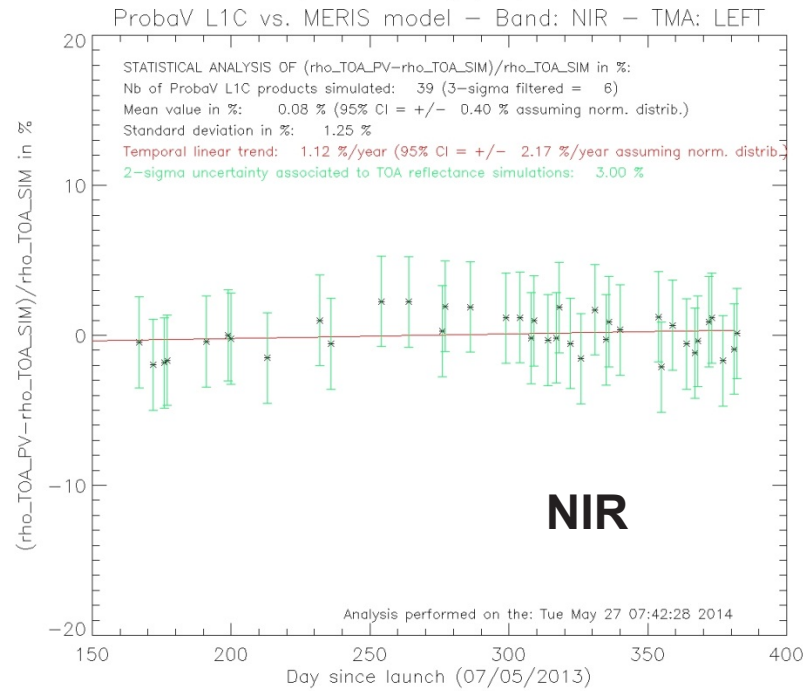




Govaerts, Y., Sterckx S. and Adriaensen S., Remote Sensing Letters, 4(6), 2013.



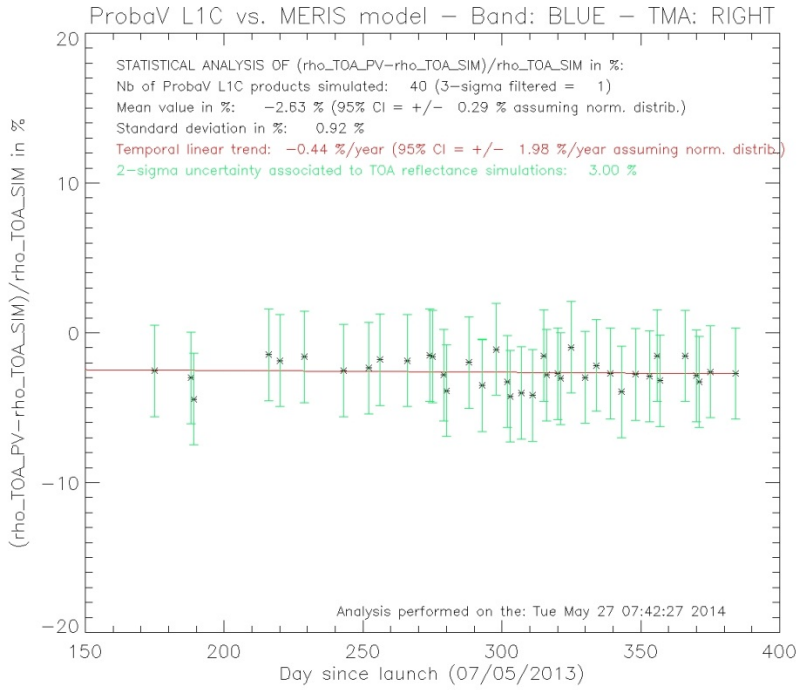


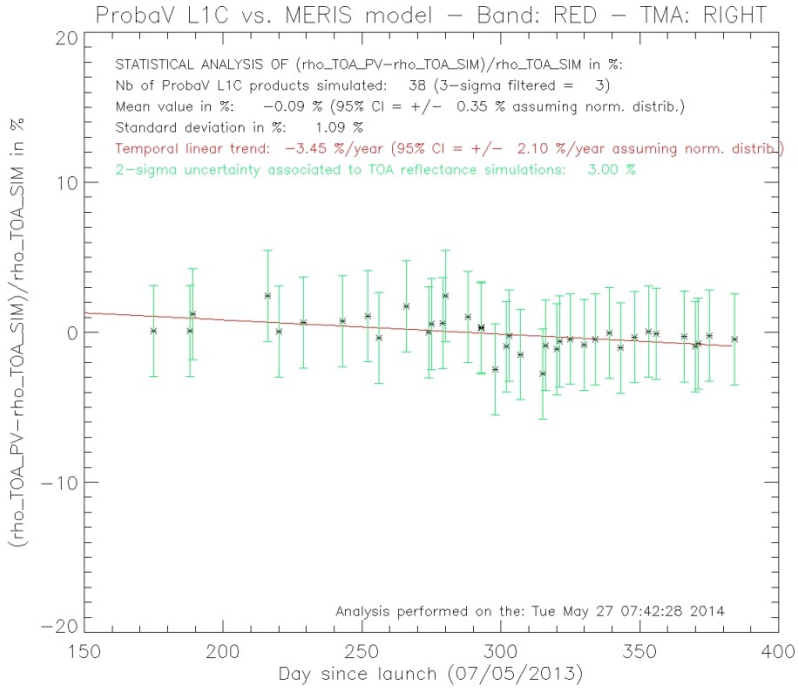


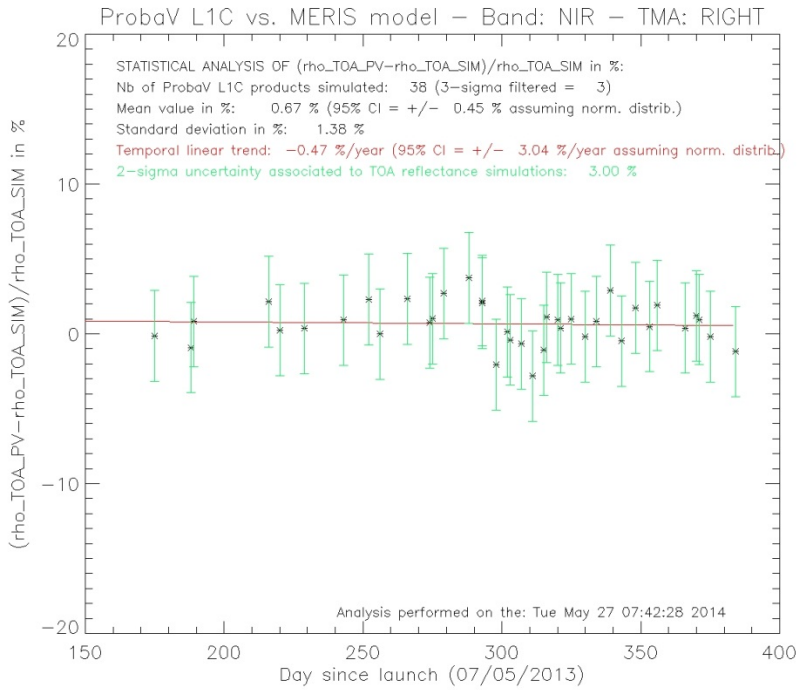
Libya-4 - LEFT

PROBA-V vs MERIS 3rd repr.

Bouvet M., RSE,140, 2014.



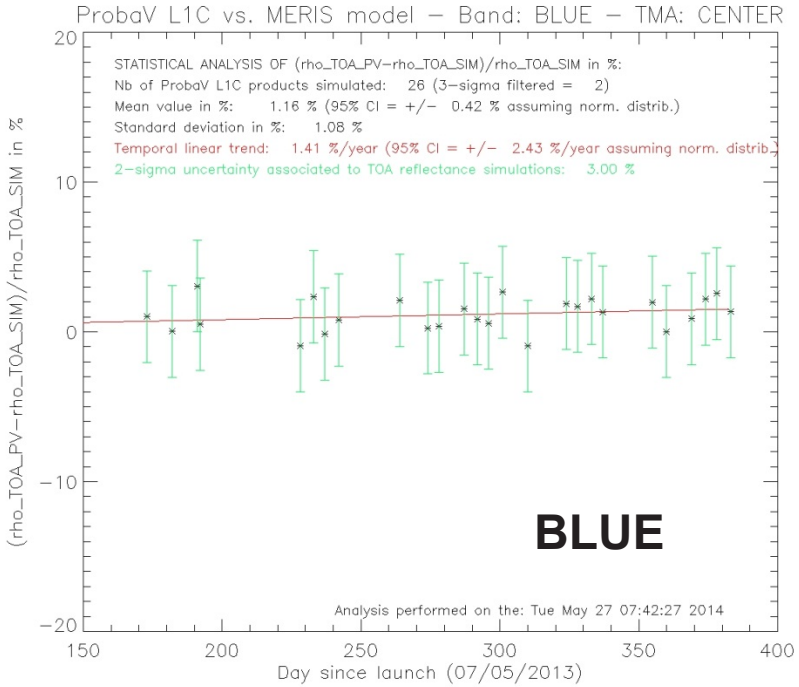


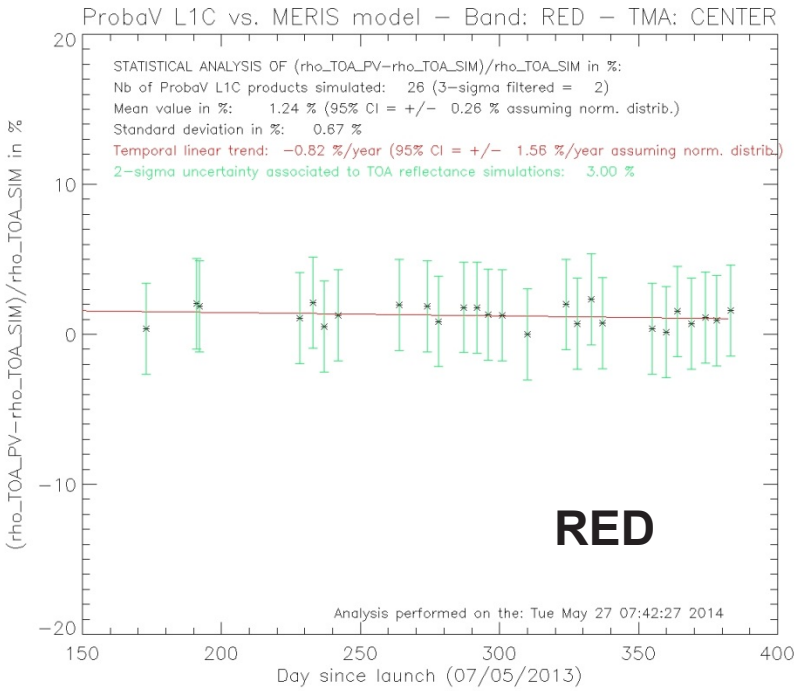


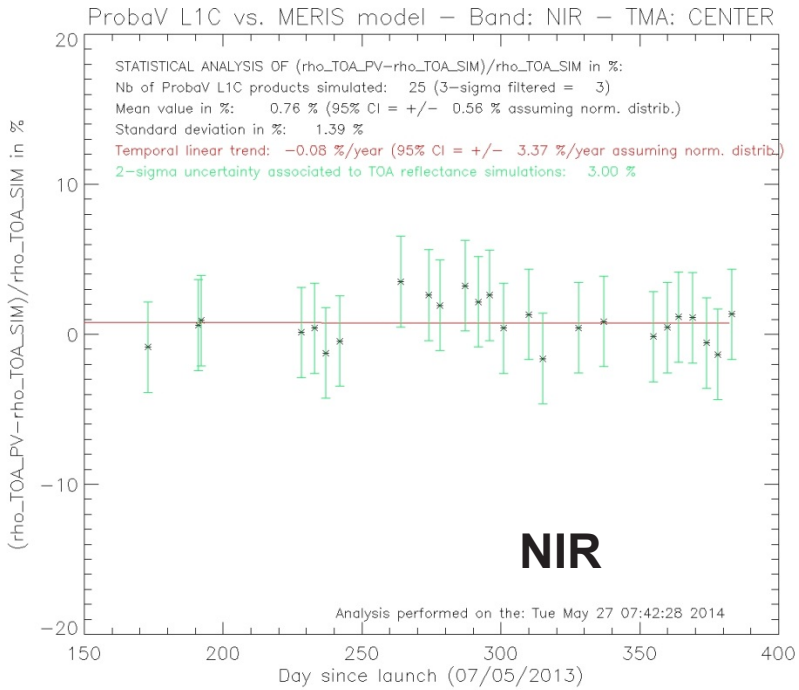
Libya-4 - RIGHT

PROBA-V vs MERIS 3rd repr.

BOUVET M., RSE,140, 2014.





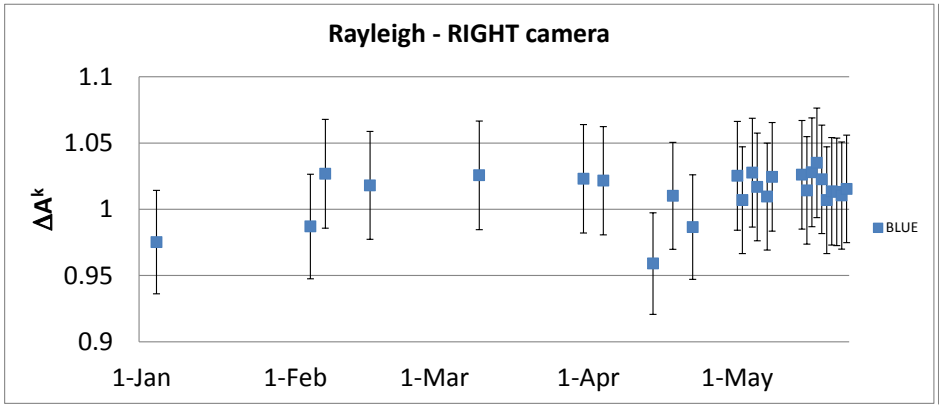


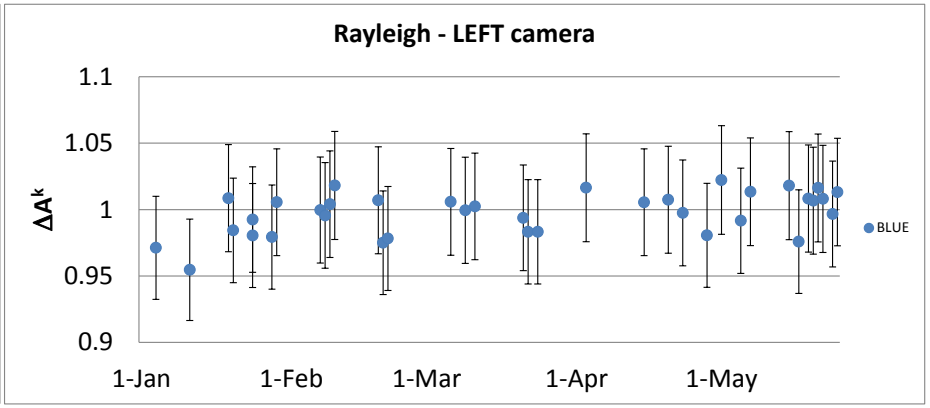
Libya-4 - CENTER

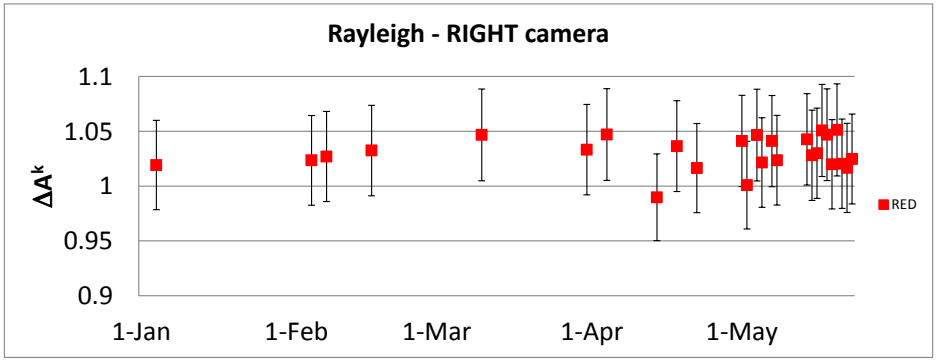
PROBA-V vs MERIS 3rd repr.

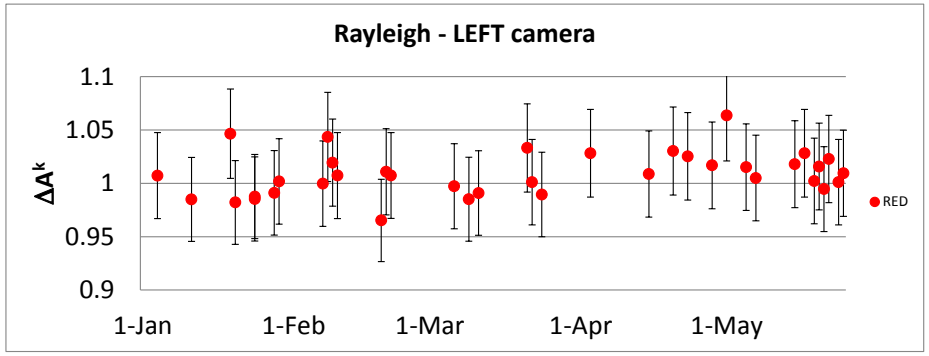
BOUVET M., RSE,140, 2014.

RAYLEIGH

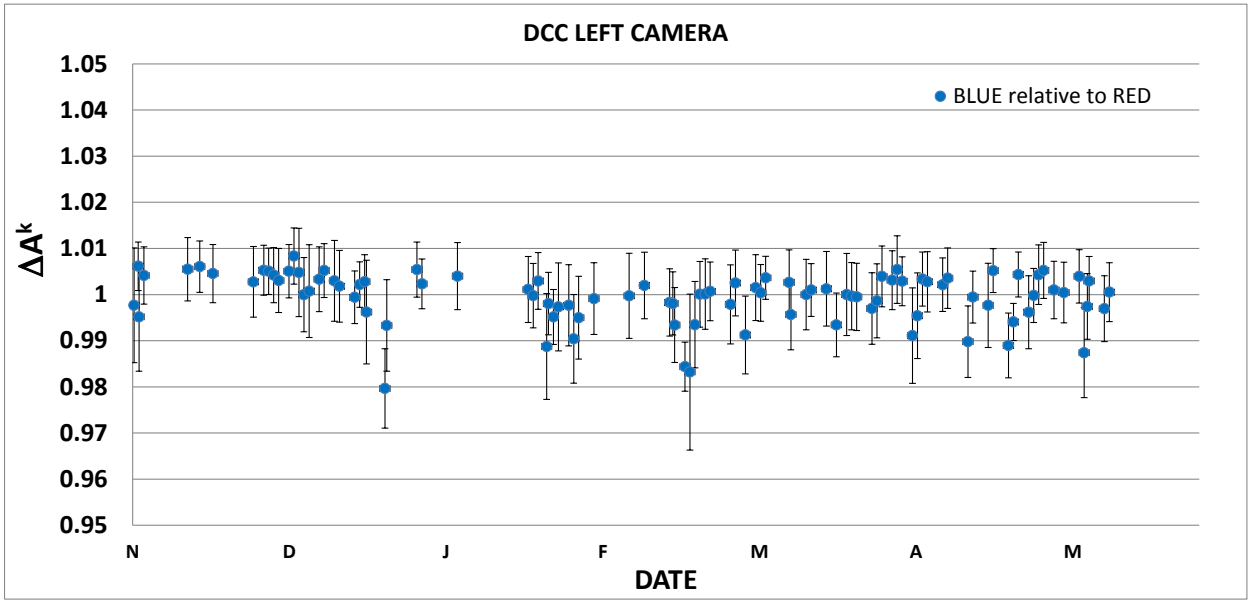


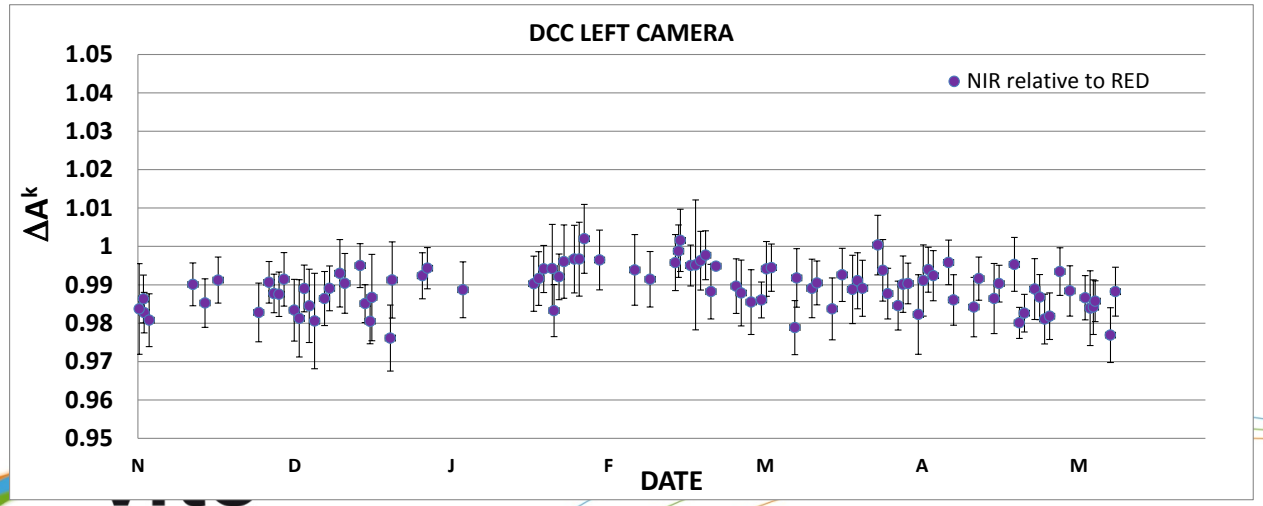


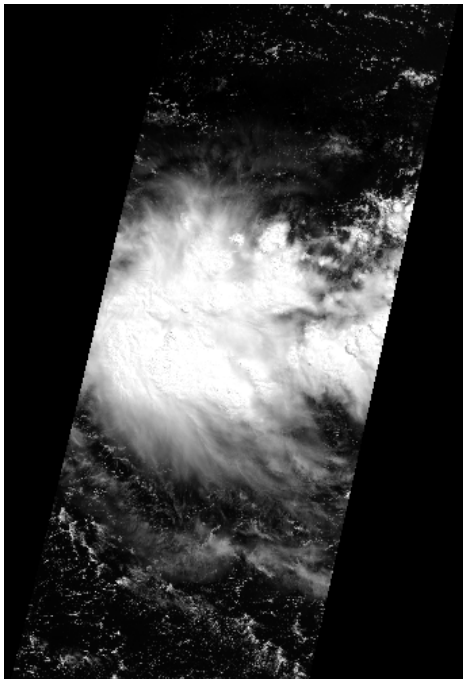




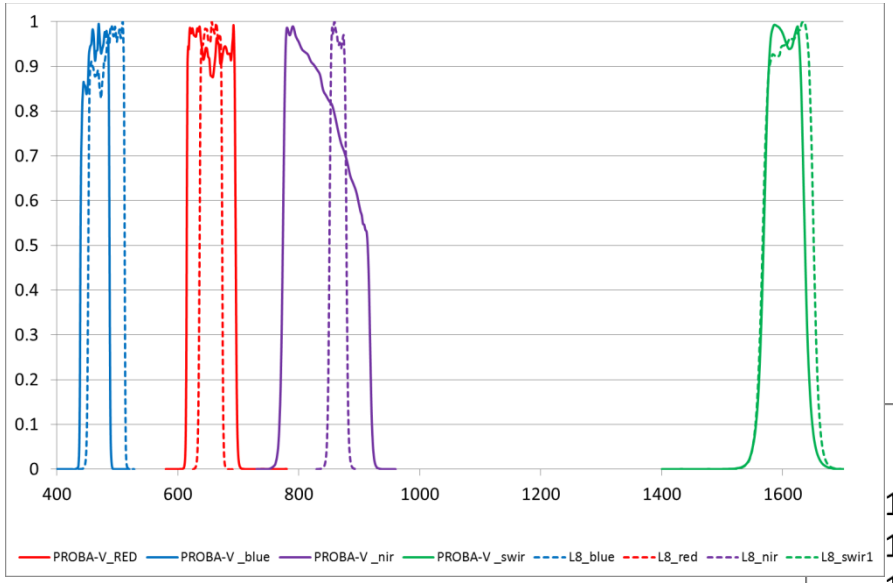
DCC Inter-band

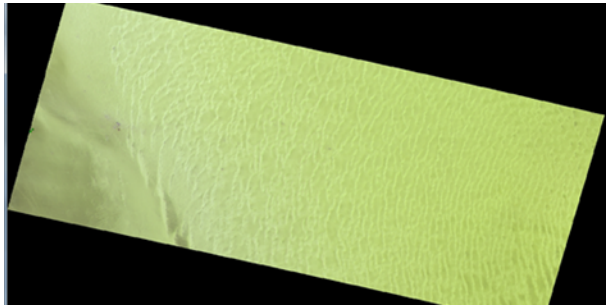


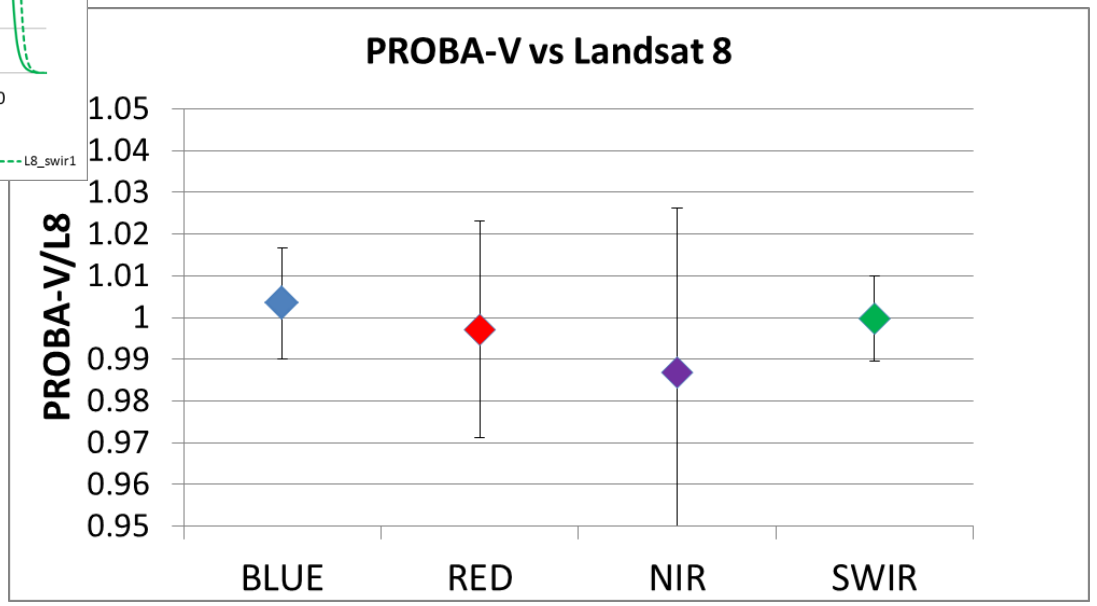




Proba-V versus Landsat8







Landsat 8 Libya-4 data
Dennis Helder & Nischal Mishra, South Dakota State University

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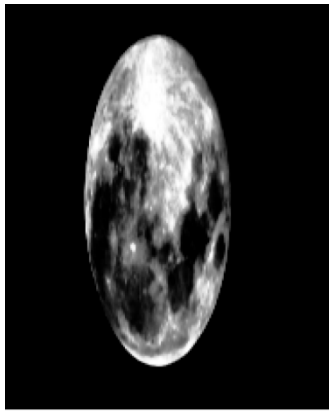
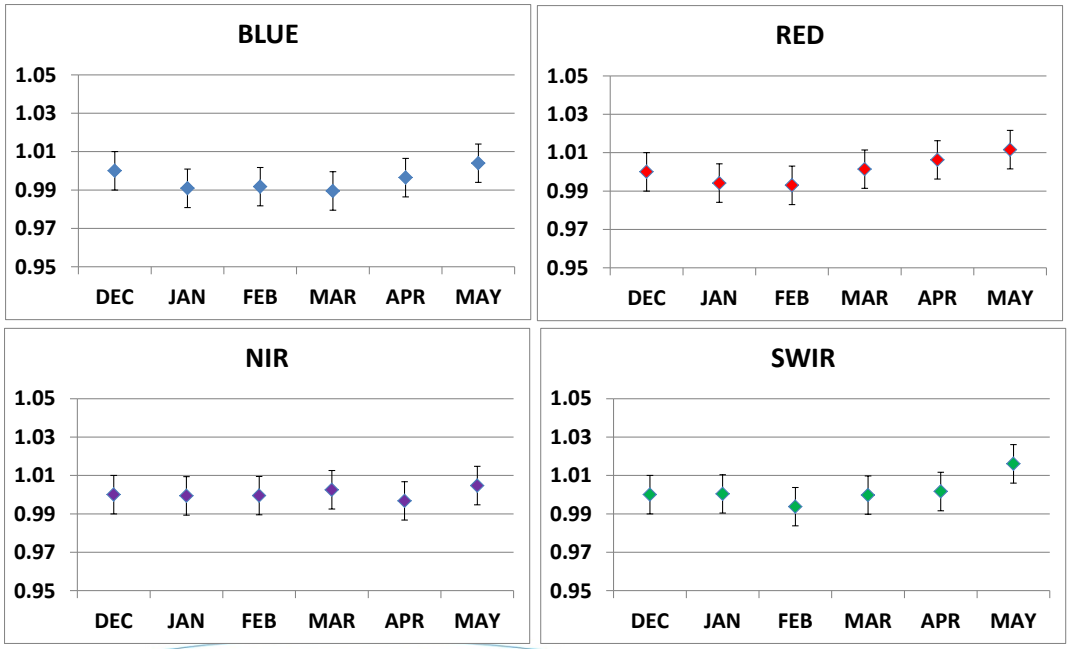
Stability monitoring lunar observations



- USGS **ROLO model** implemented (311g)
  - **Kiefer and Stone, 2005**
  - Based on thousands of automated lunar observations
- Model Input parameters :
  - Phase angle
  - Sun selenographic longitude
  - Observer selenographic lat and lon
- Model returns 'disc equivalent reflectance'
  - Smoothed to Apollo sand reflectance
  - Corrected for distance observer – moon and sun – moon

Proba-V stability plots (relative to DEC)



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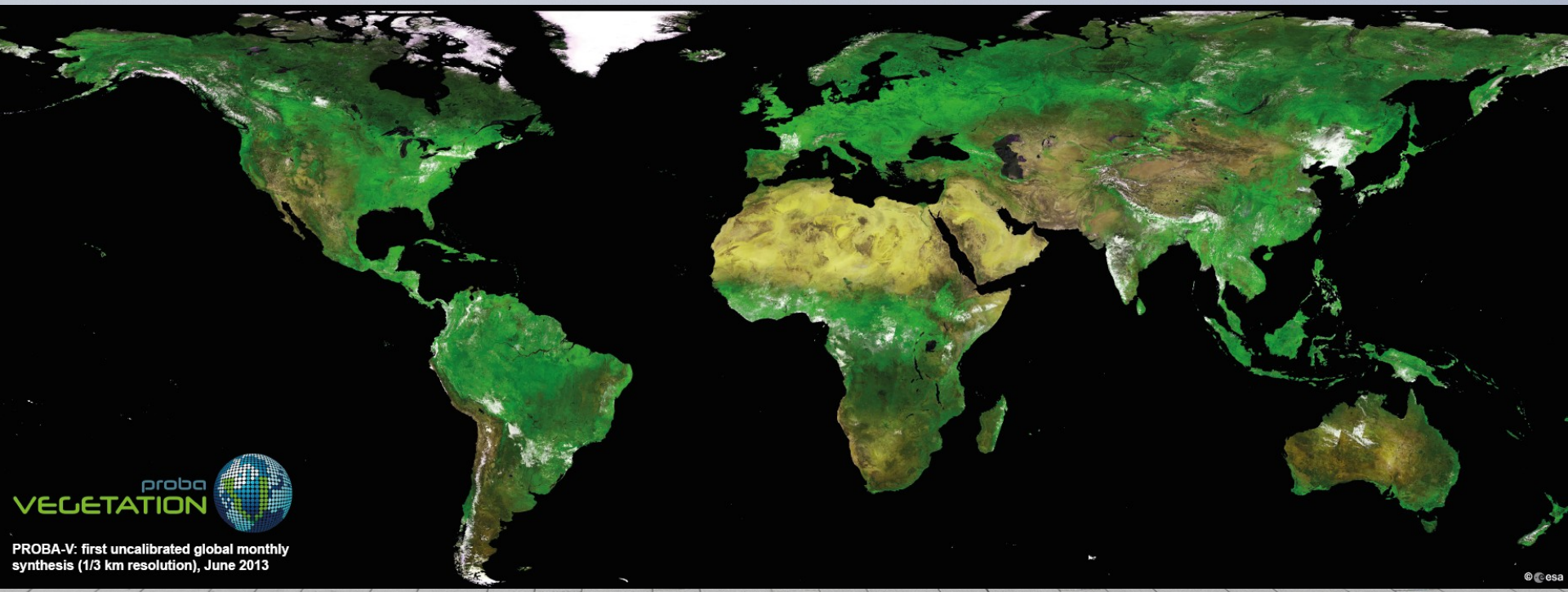
Thank you!



The VITO PROBA-V team