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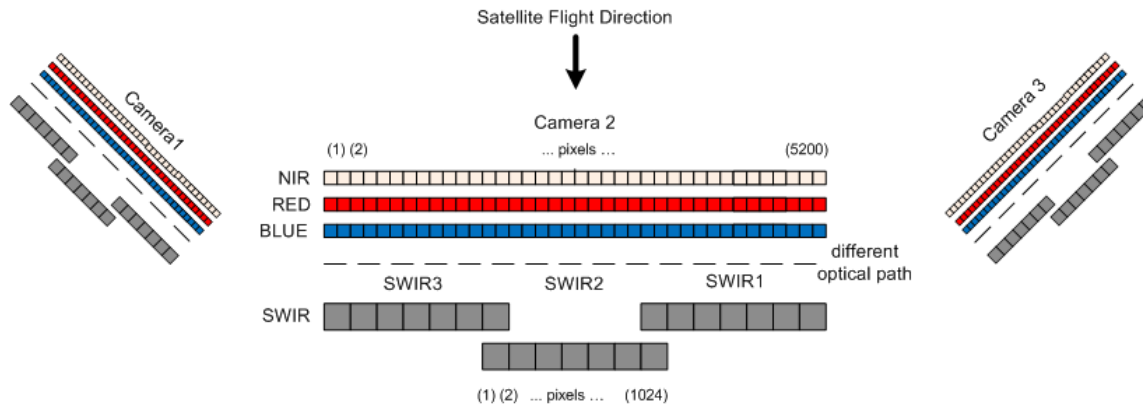
## PROBAV RADIOMETRIC CALIBRATION STATUS

Sindy Sterckx, Stefan Adriaensen

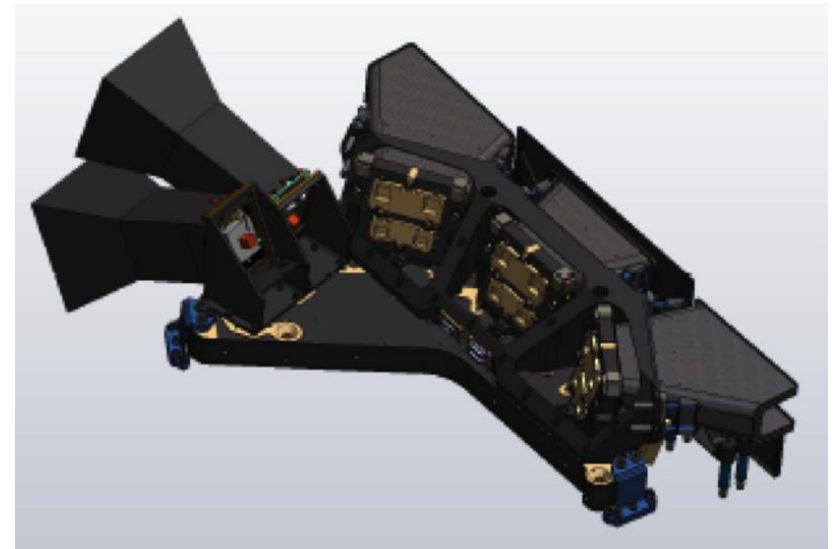
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CEOS WGCV IVOS 13-17 March 2017 Tucson, Arizona

# PROBA-V INSTRUMENT



- No active thermal control
- No on-board calibration lamp
- No solar diffuser
- Design complexity
  - 3 Cameras
  - 2 focal planes:
    - VNIR with 3 bands
    - SWIR with 1 band but staggered strips



## RADIOMETRIC PERFORMANCE REQUIREMENTS

- » max 5 % absolute error
- » max 3 % relative error
  - » inter-band
  - » multi-temporal
  - » Inter-camera

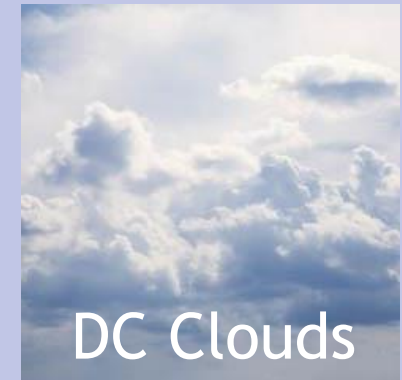
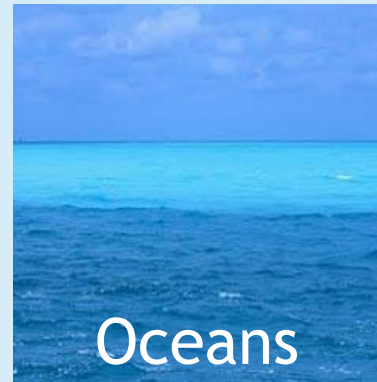
## PROBA-V INSTRUMENT

### 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



### Absolute

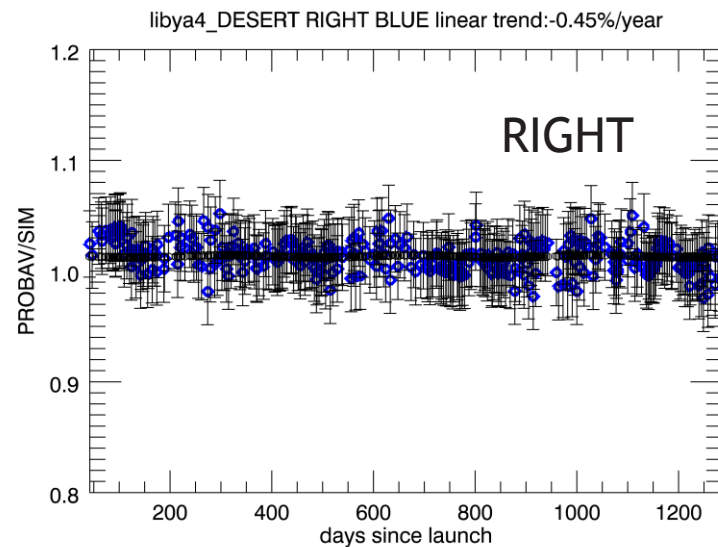
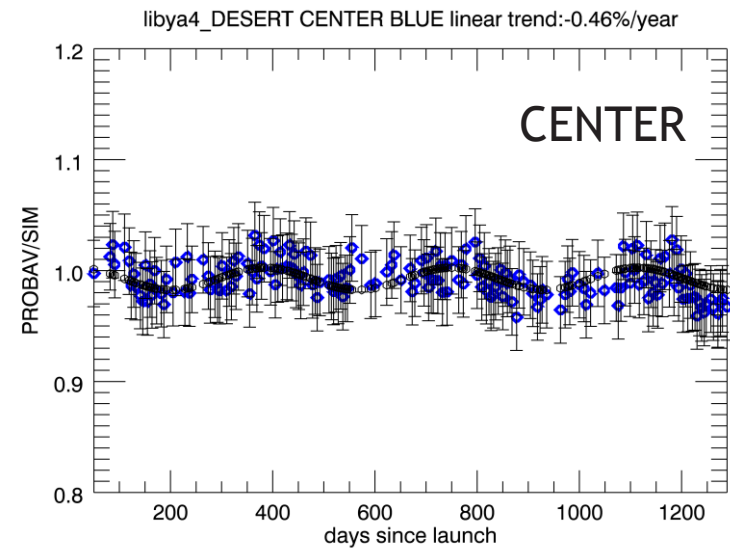
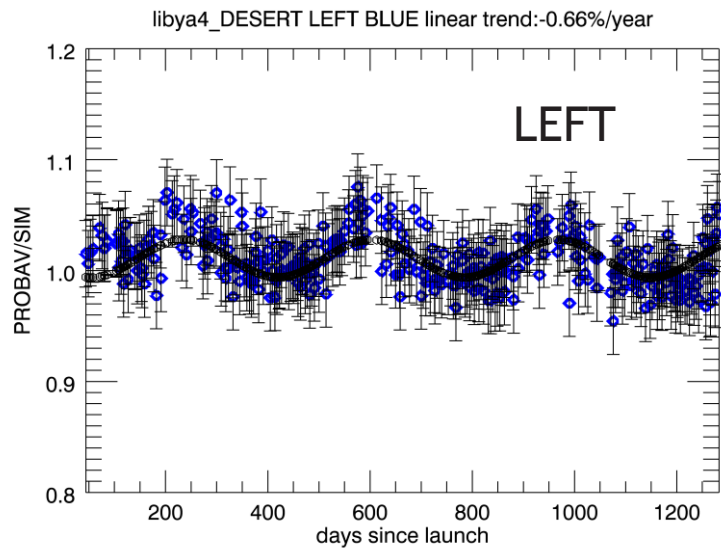


Interband

***PROBA-V***  
***INSTRUMENT STABILITY***

# INSTRUMENT STABILITY : BASED ON OSCAR DESERT METHOD LIBYA-4 BLUE

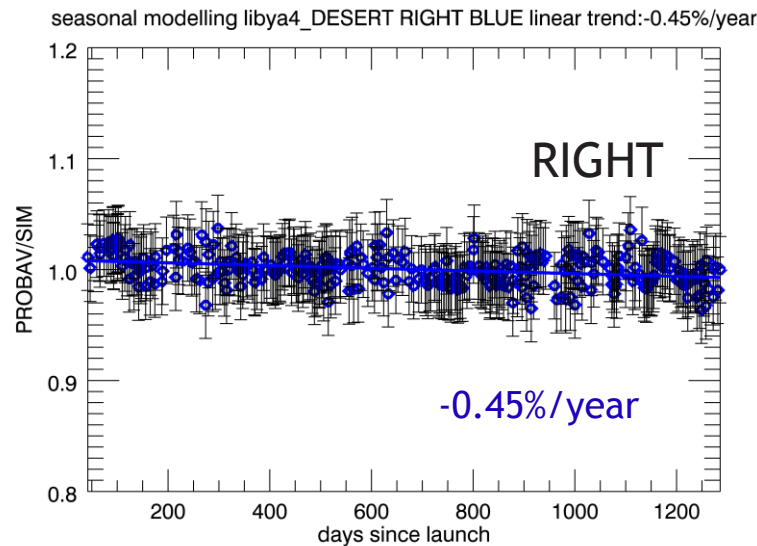
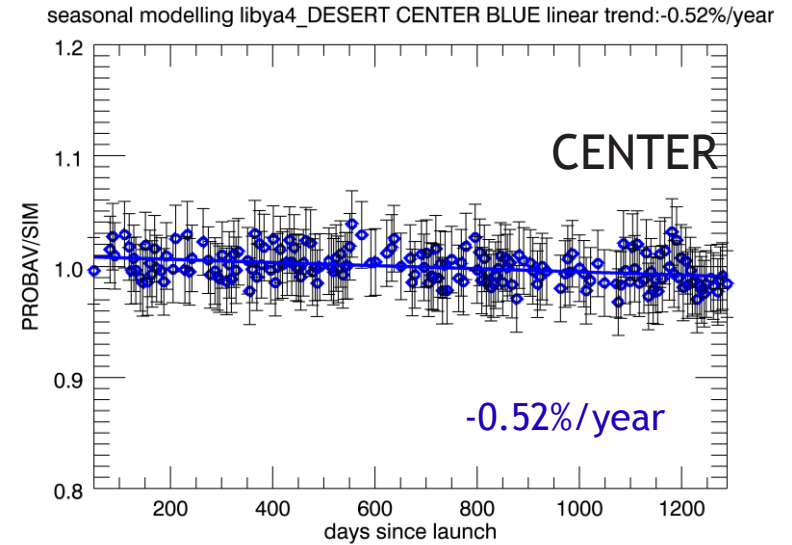
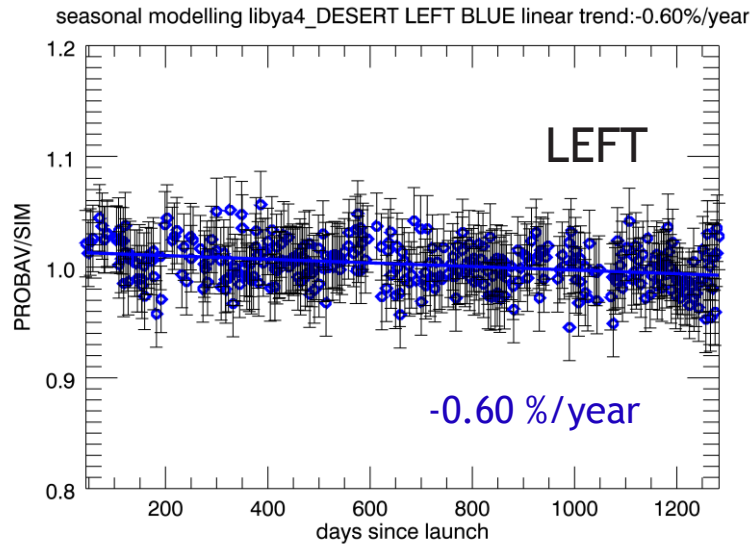
*Results OSCAR Libya-4 no  $A^k$  updates considered*





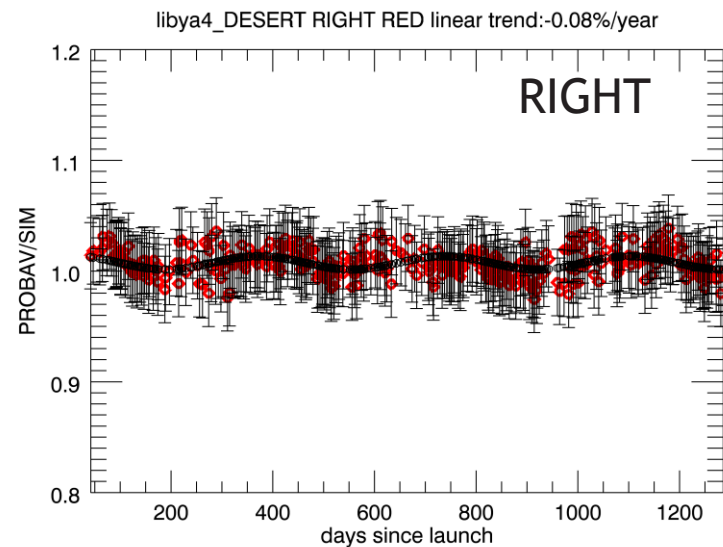
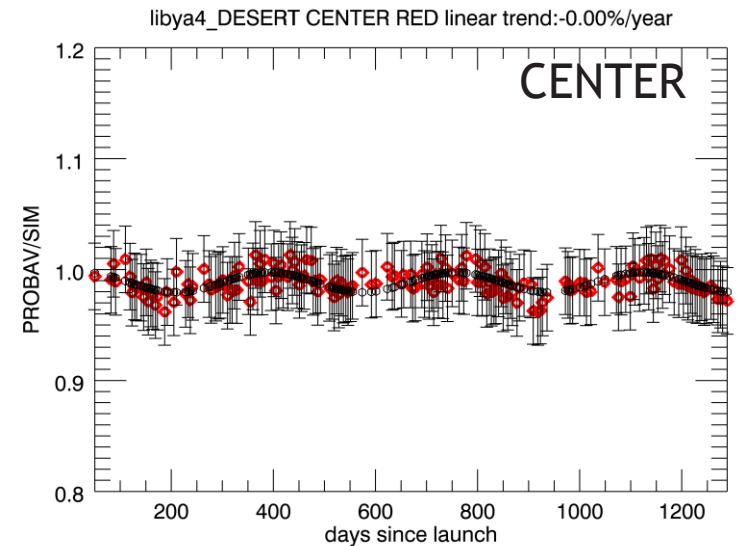
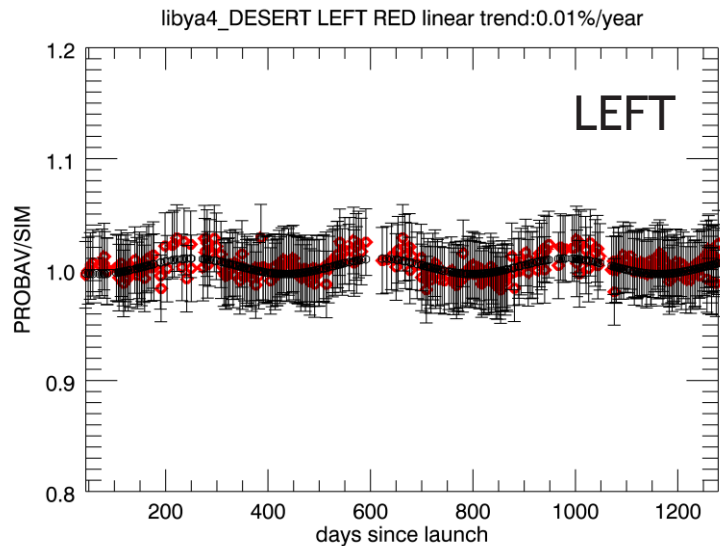
# INSTRUMENT STABILITY : BASED ON OSCAR DESERT METHOD LIBYA-4 BLUE

*Results OSCAR Libya-4 no  $\Delta k$  updates considered*



# INSTRUMENT STABILITY : BASED ON LIBYA-4 RED

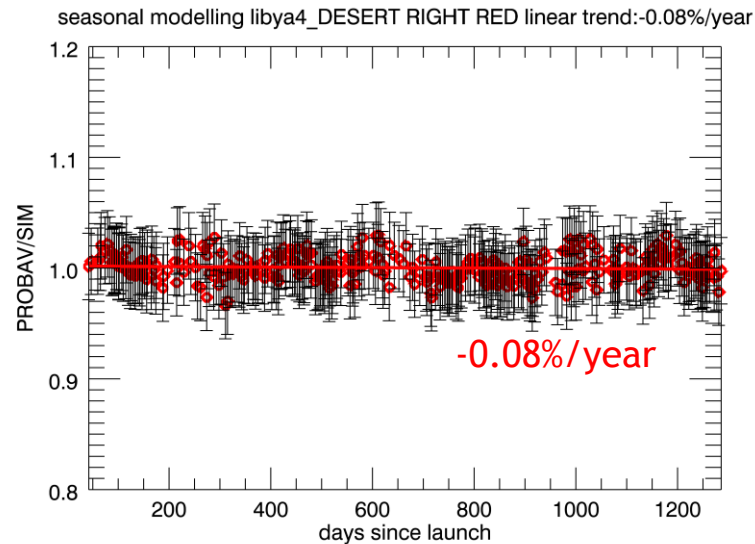
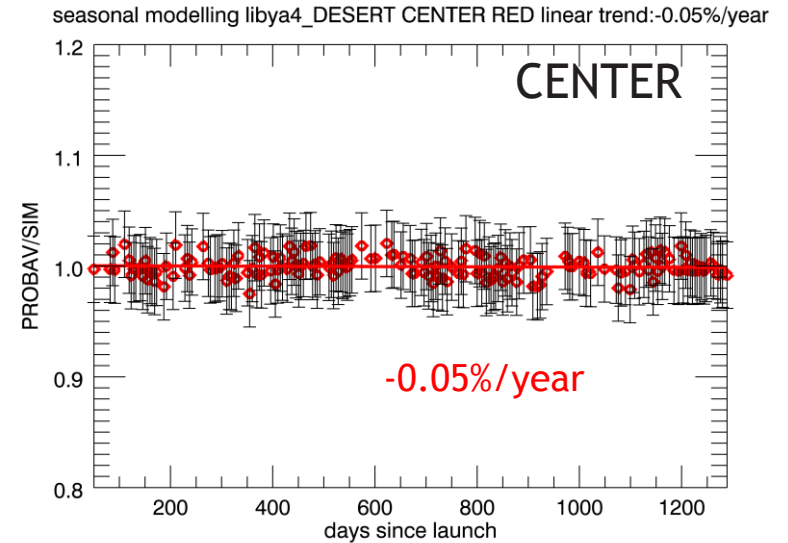
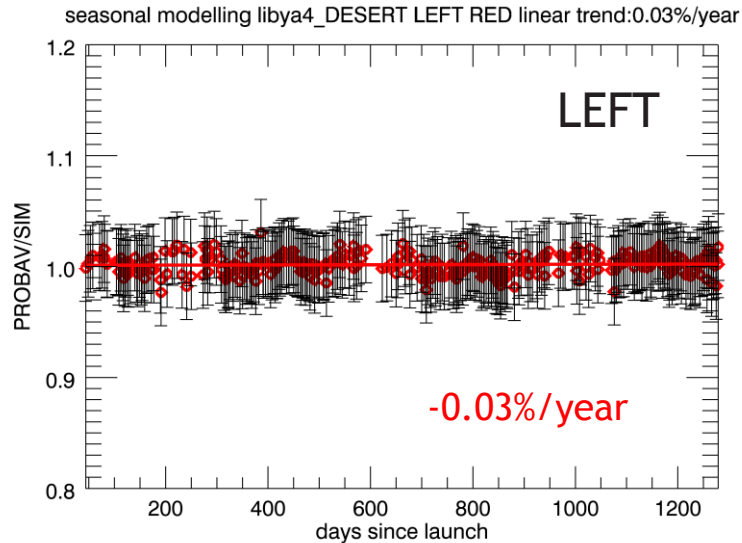
*Results OSCAR Libya-4 no  $A^k$  updates considered*





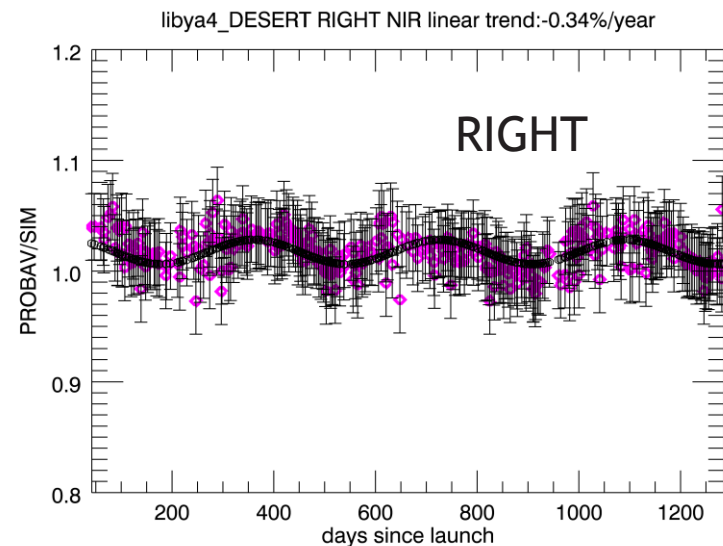
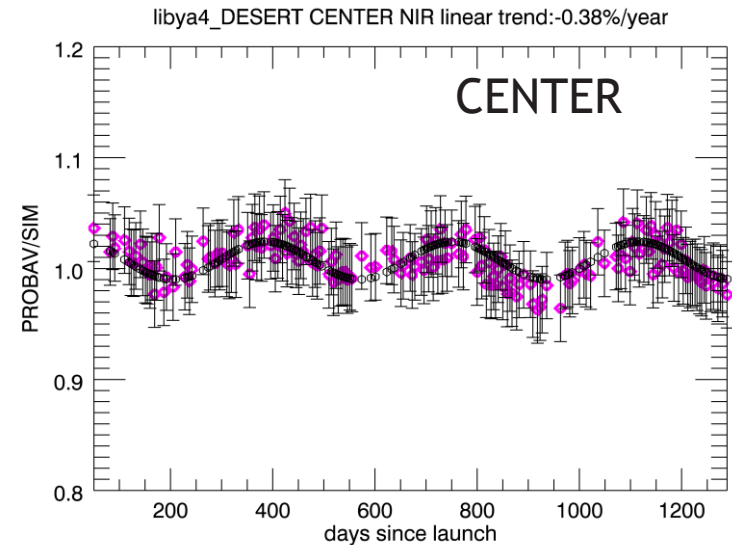
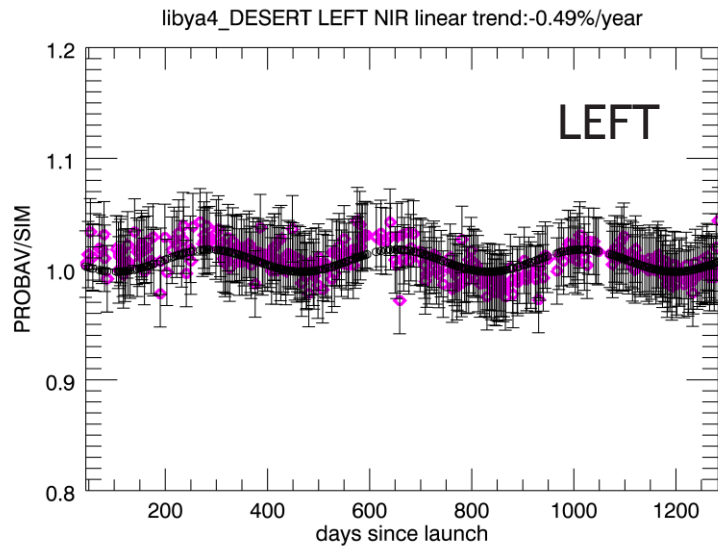
# INSTRUMENT STABILITY : BASED ON LIBYA-4 RED

*Results OSCAR Libya-4 no  $A^k$  updates considered*



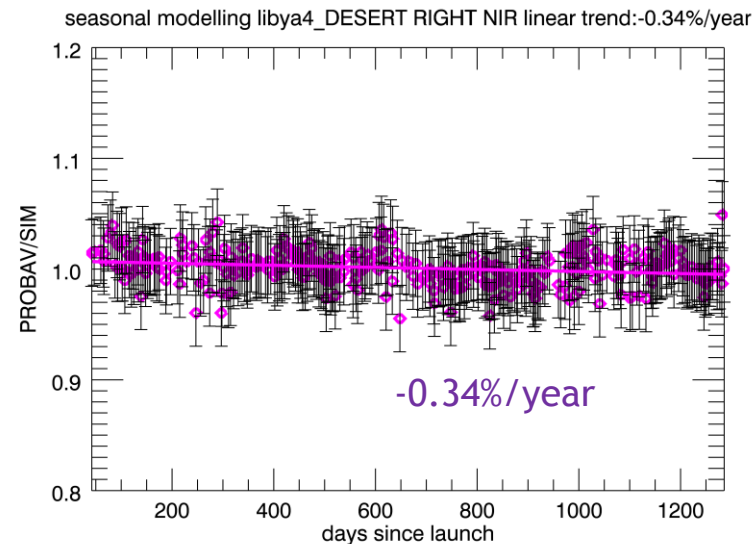
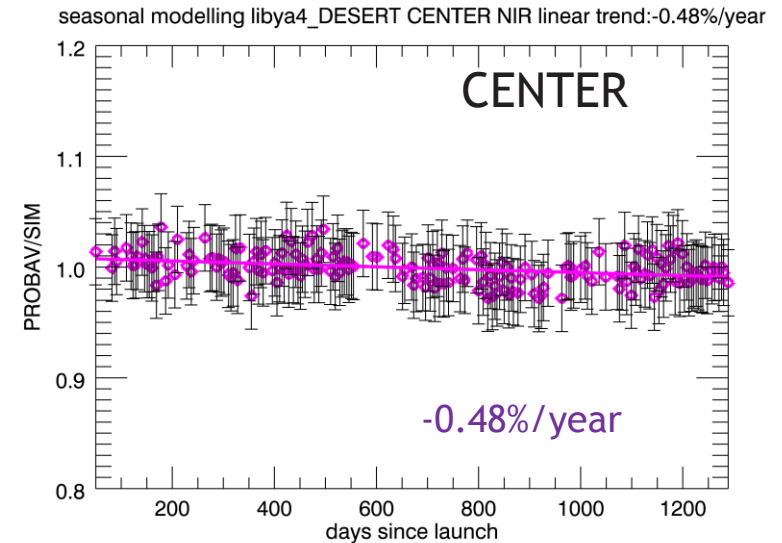
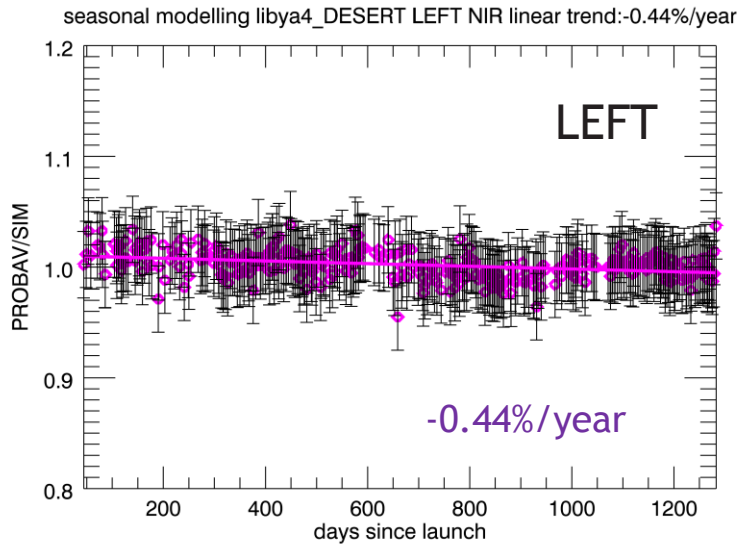
# INSTRUMENT STABILITY : BASED ON LIBYA4 NIR

*Results OSCAR Libya-4 no  $A^k$  updates considered*

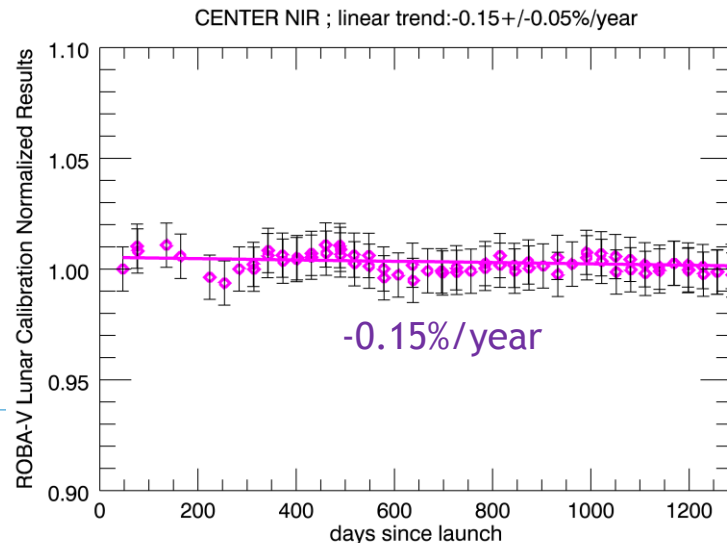
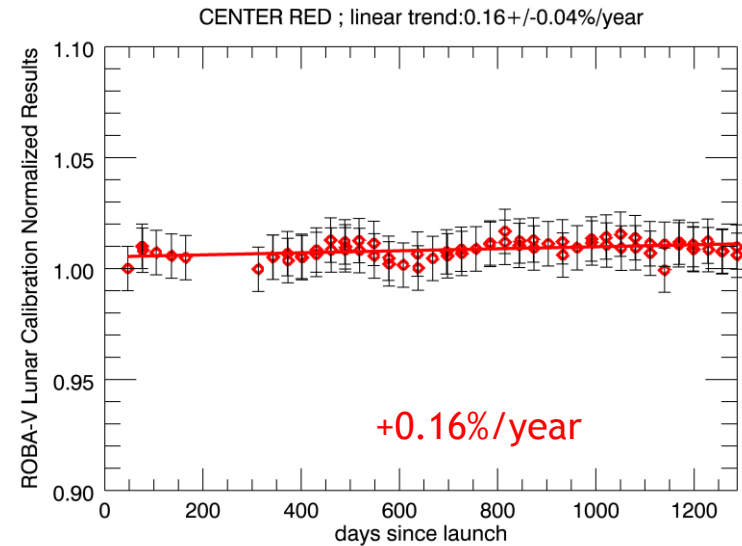
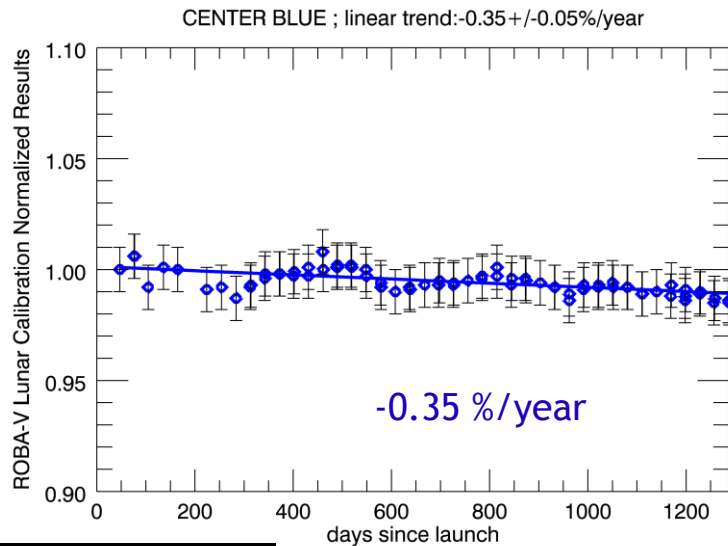


# INSTRUMENT STABILITY : BASED ON LIBYA4 NIR

*Results OSCAR Libya-4 no  $A^k$  updates considered*

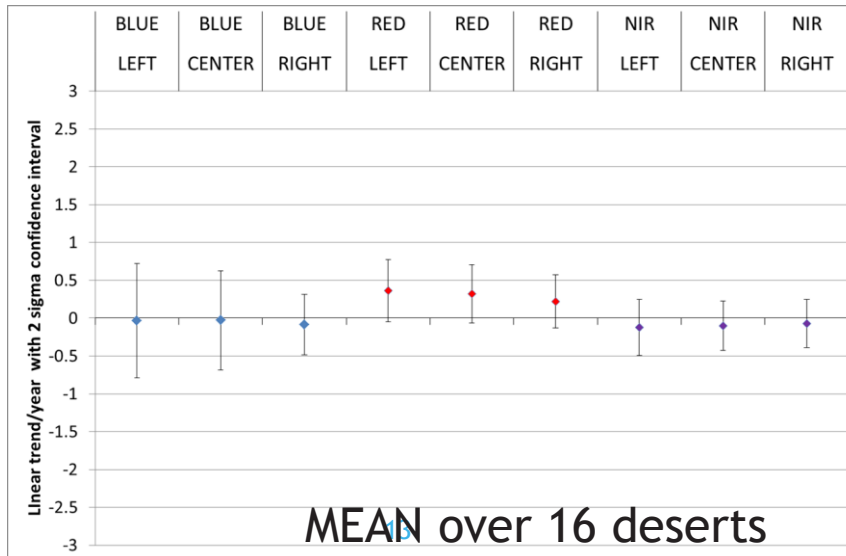
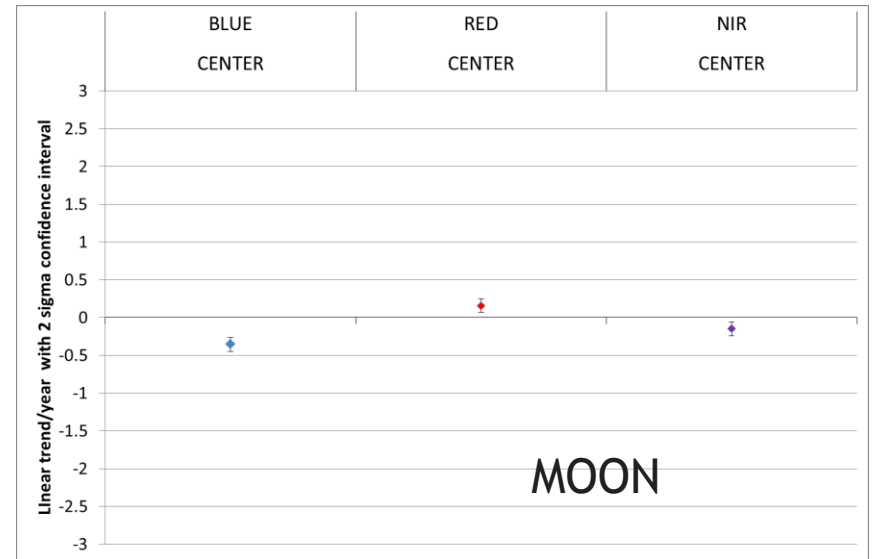
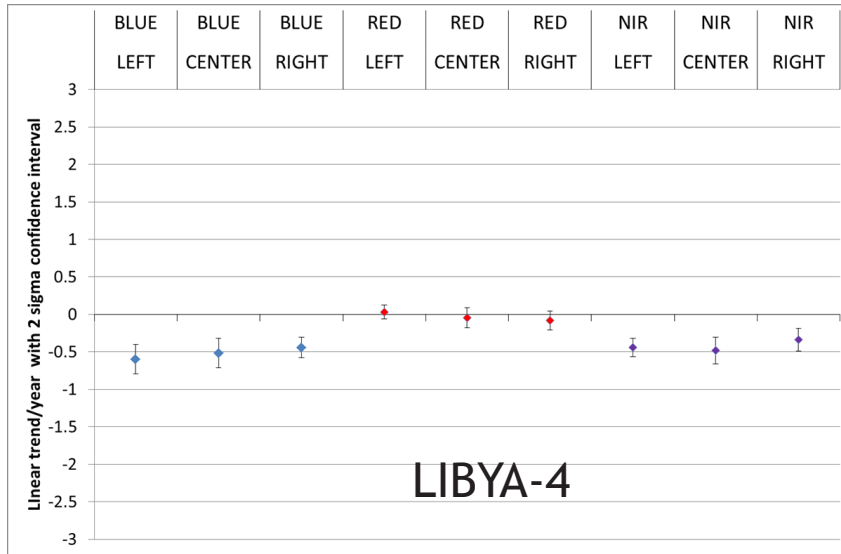


# LUNAR CALIBRATION RESULTS: CENTER VNIR



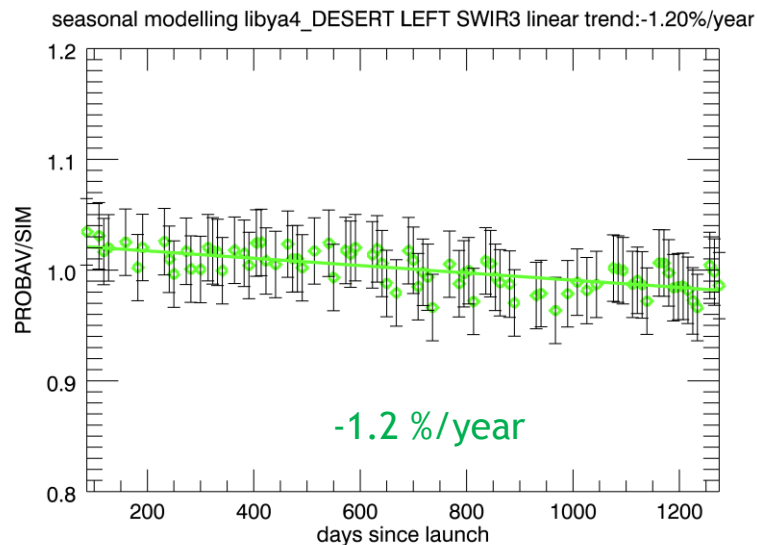
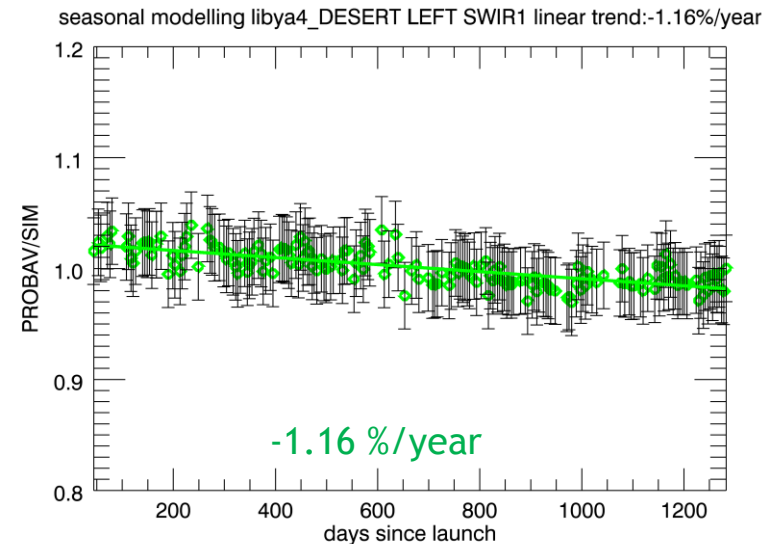
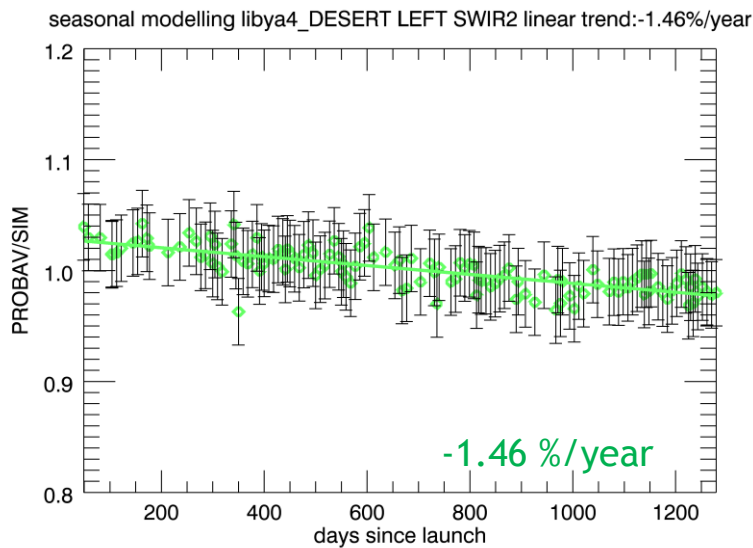
**Confirm relative  
stability of the  
VNIR strips  
responsivity**

# VNIR LINEAR TREND/YEAR



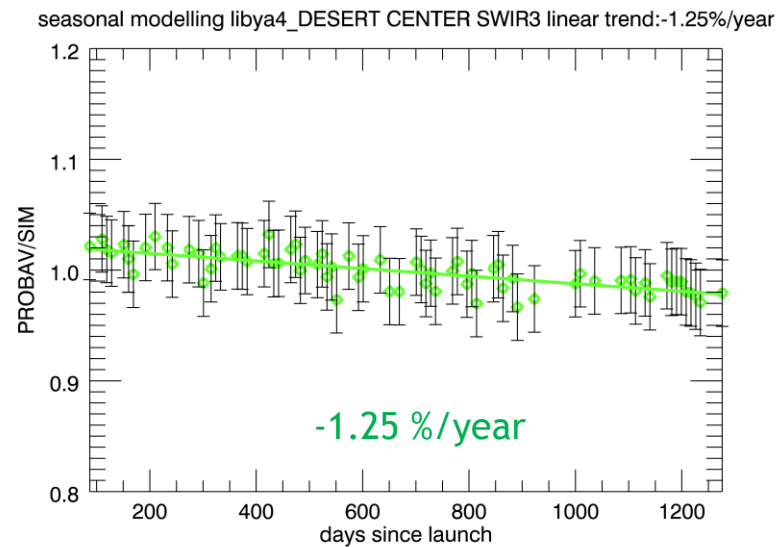
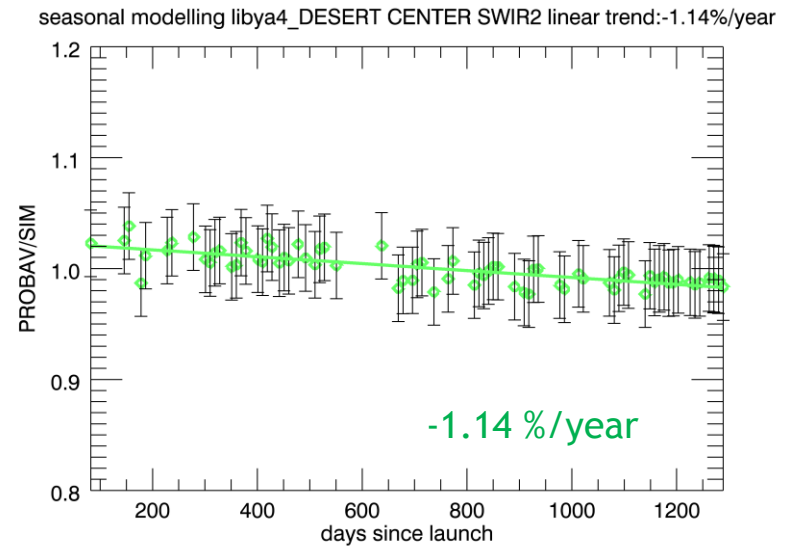
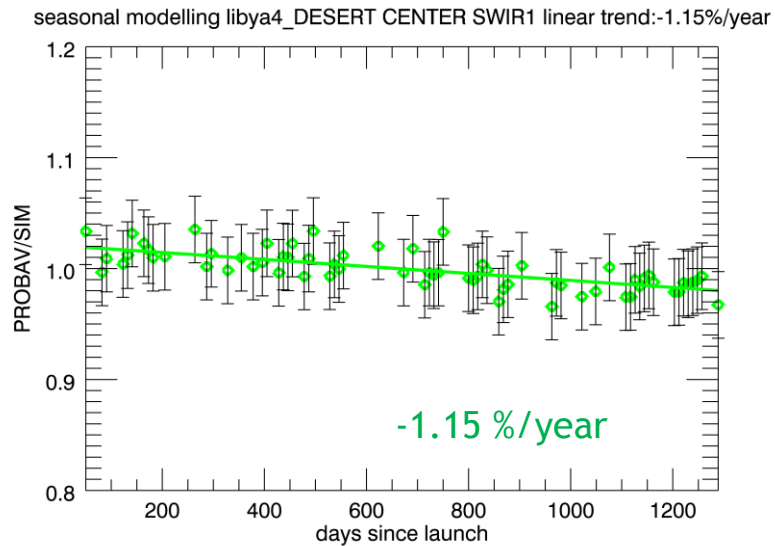
**All results confirm relative stability of the VNIR strips responsivity**

# LEFT CAMERA SWIR STABILITY BASED ON OSCAR LIBYA-4



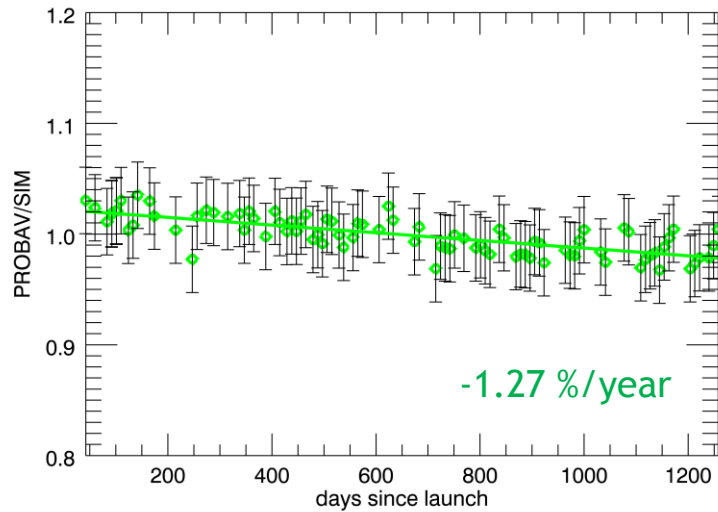


# CENTER CAMERA SWIR STABILITY BASED ON OSCAR LIBYA-4

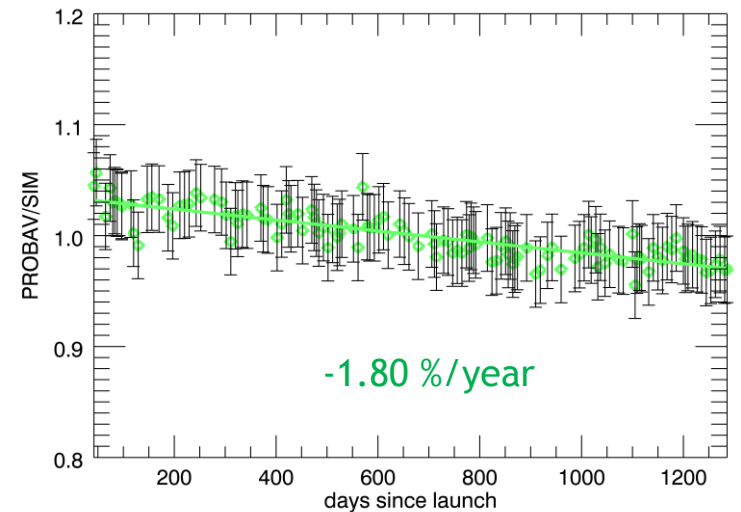


# RIGHT CAMERA SWIR STABILITY BASED ON OSCAR LIBYA-4

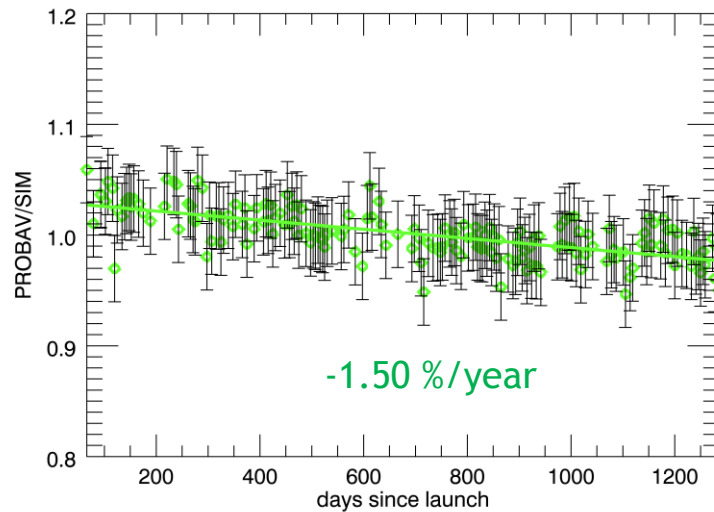
seasonal modelling libya4\_DESERT RIGHT SWIR1 linear trend:-1.27%/year



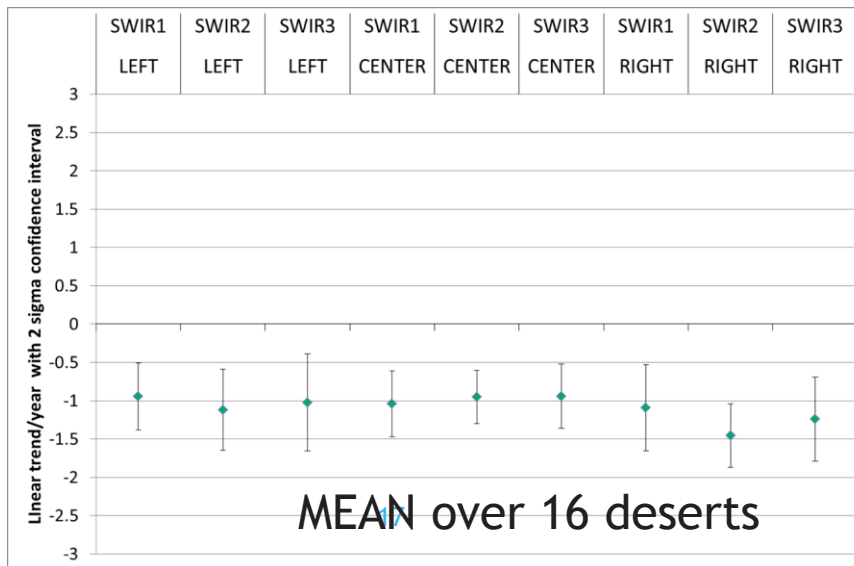
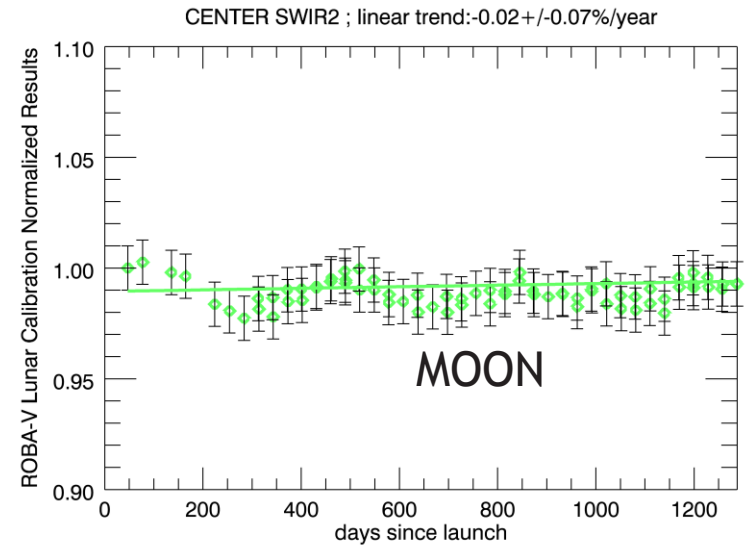
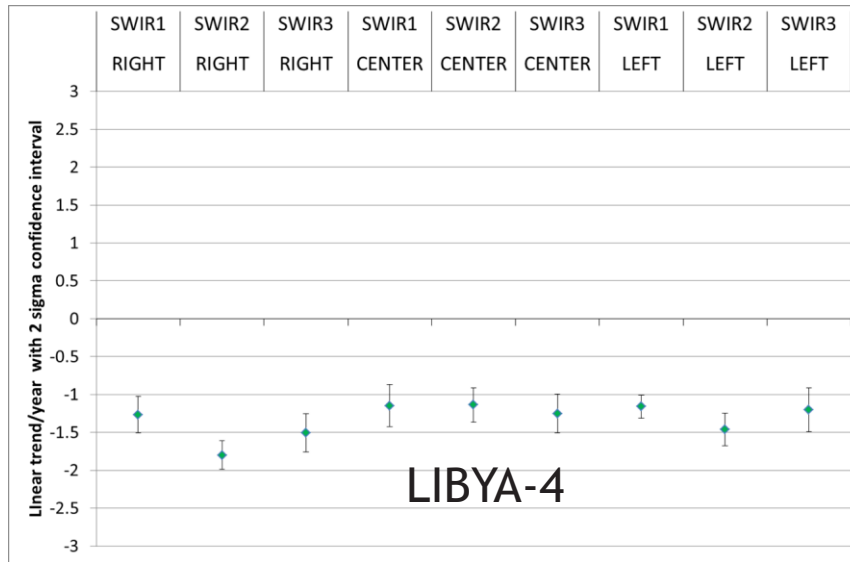
seasonal modelling libya4\_DESERT RIGHT SWIR2 linear trend:-1.80%/year



seasonal modelling libya4\_DESERT RIGHT SWIR3 linear trend:-1.50%/year

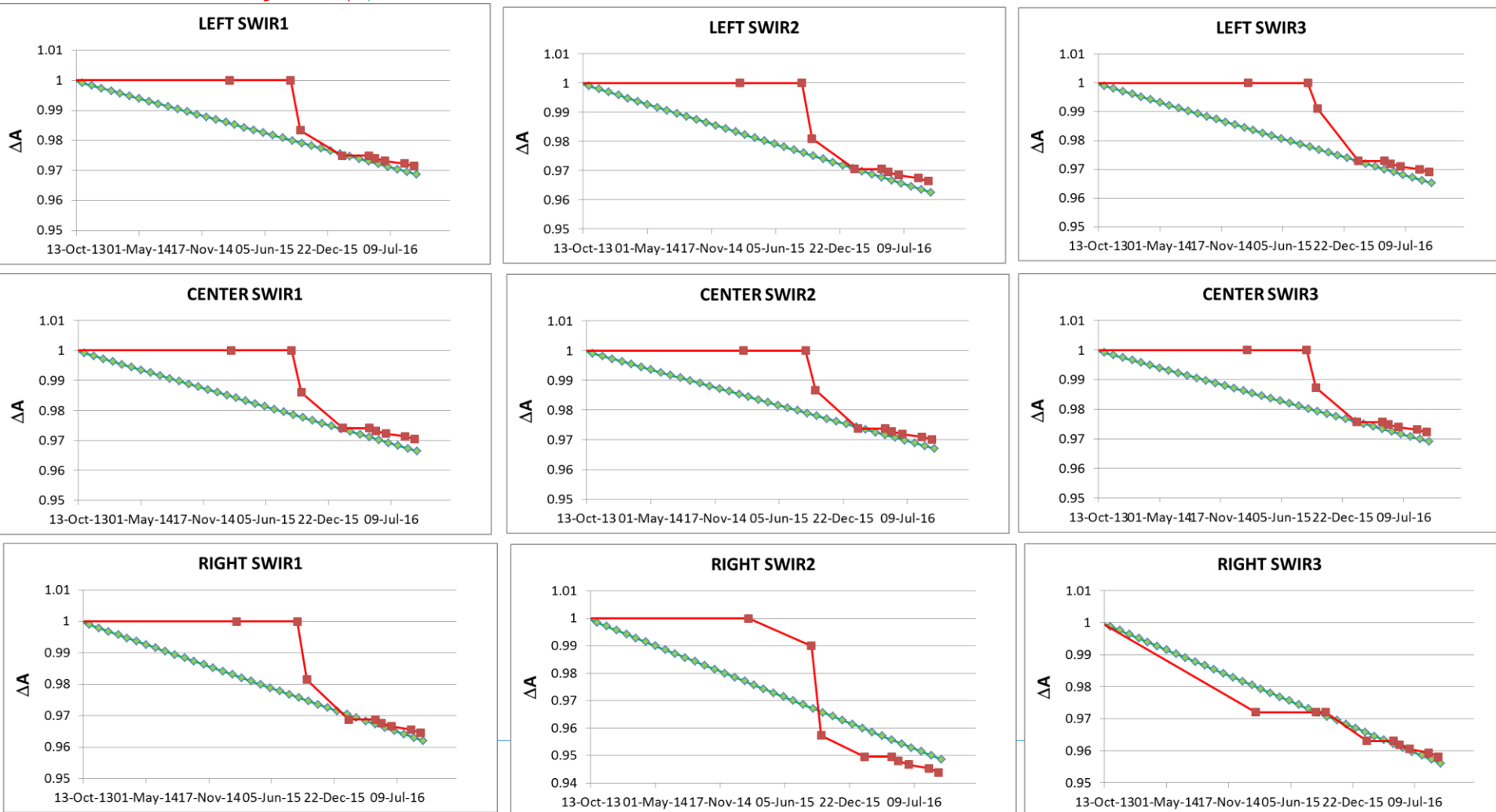


# SWIR LINEAR TREND/YEAR



# UPDATES TO SWIR ABSOLUTE CALIBRATION COEFFICIENTS

*Trending SWIR instead of stepwise updates (REPROCESSING (collection 1) vs collection 0 (trending since mid-May 2016) )*

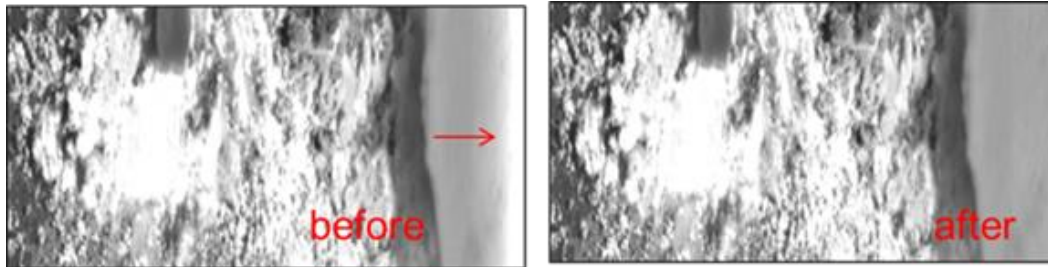


***PROBA-V***  
***YAW MANEUVER***

# WHY PERFORMING 90 YAW MANOEUVRE?

- Commissioning improvements to the pre-flight equalisation parameters

## Vignetting correction



- But, still some remaining uniformities both at the edges and the middle of the detectors (visible if stretched over uniform areas)



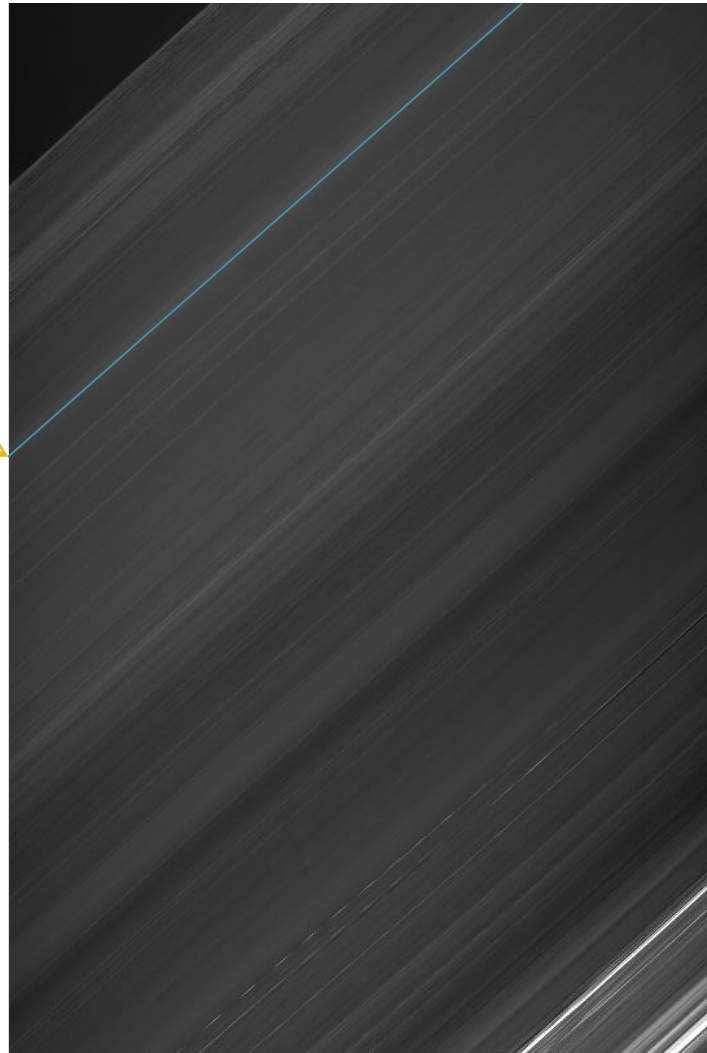


# Yaw Maneuver

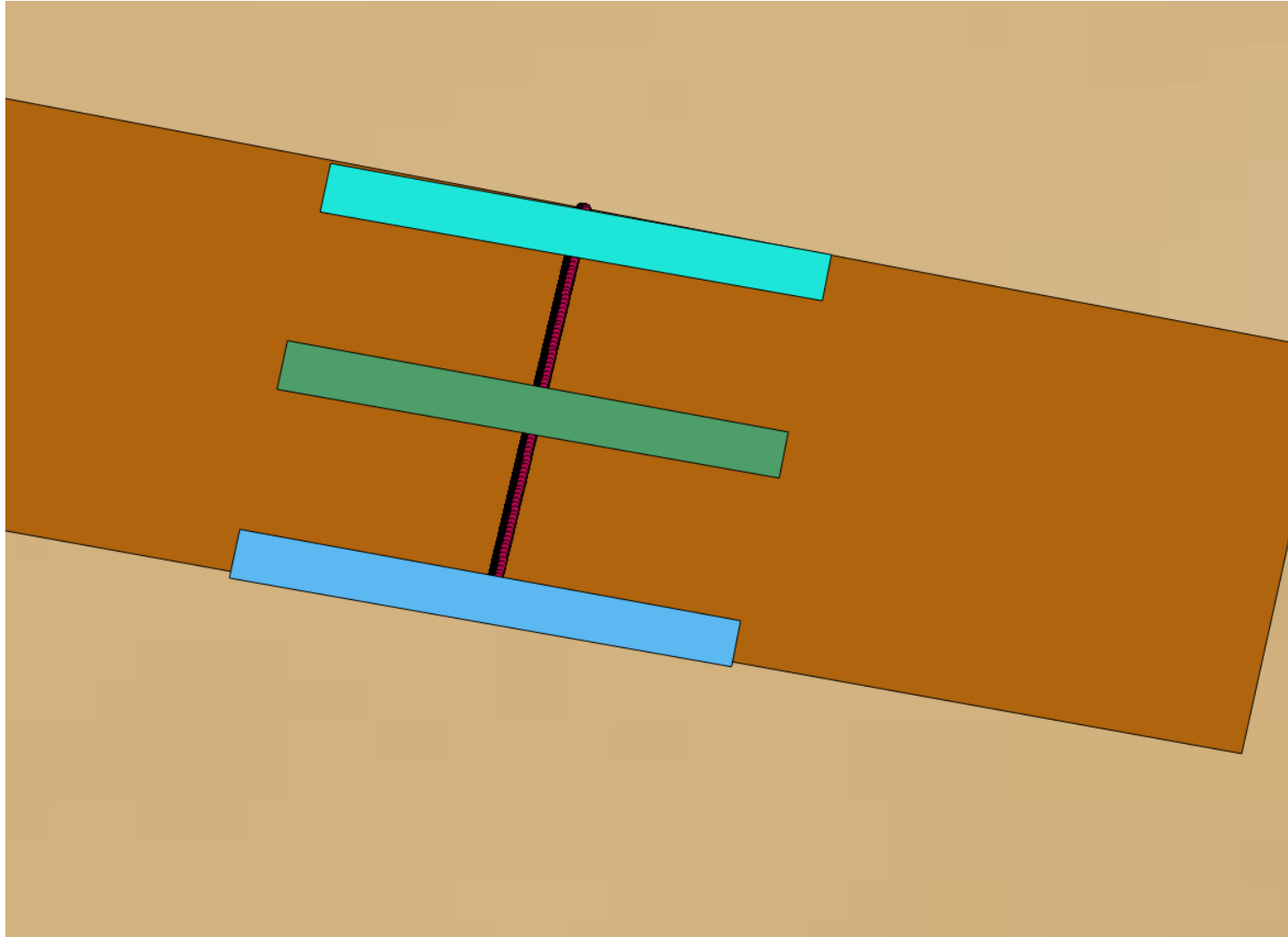


# Raw Data

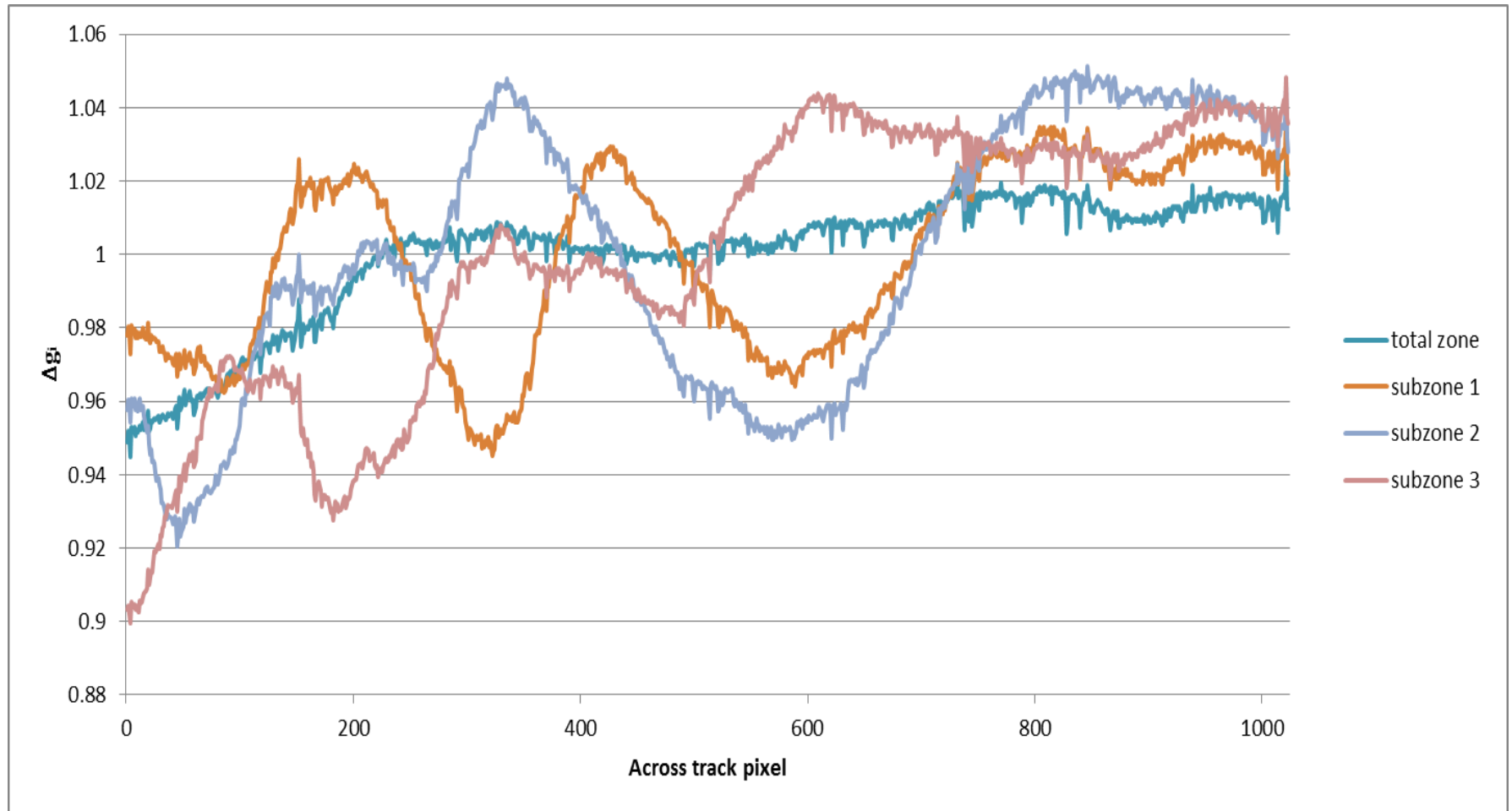
Same target on  
ground imaged by all  
the linear array  
detectors



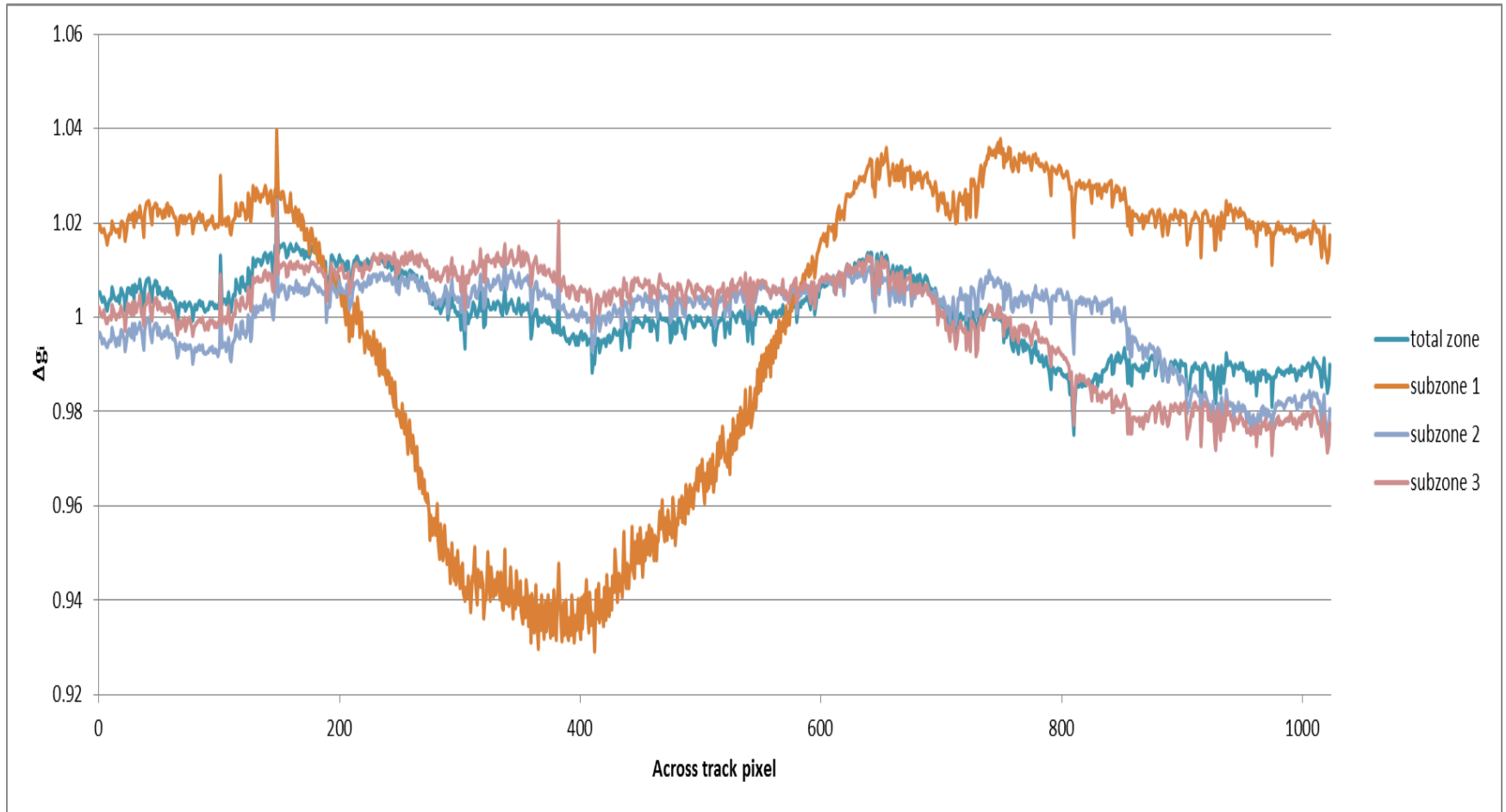
# Pixel selection strategy



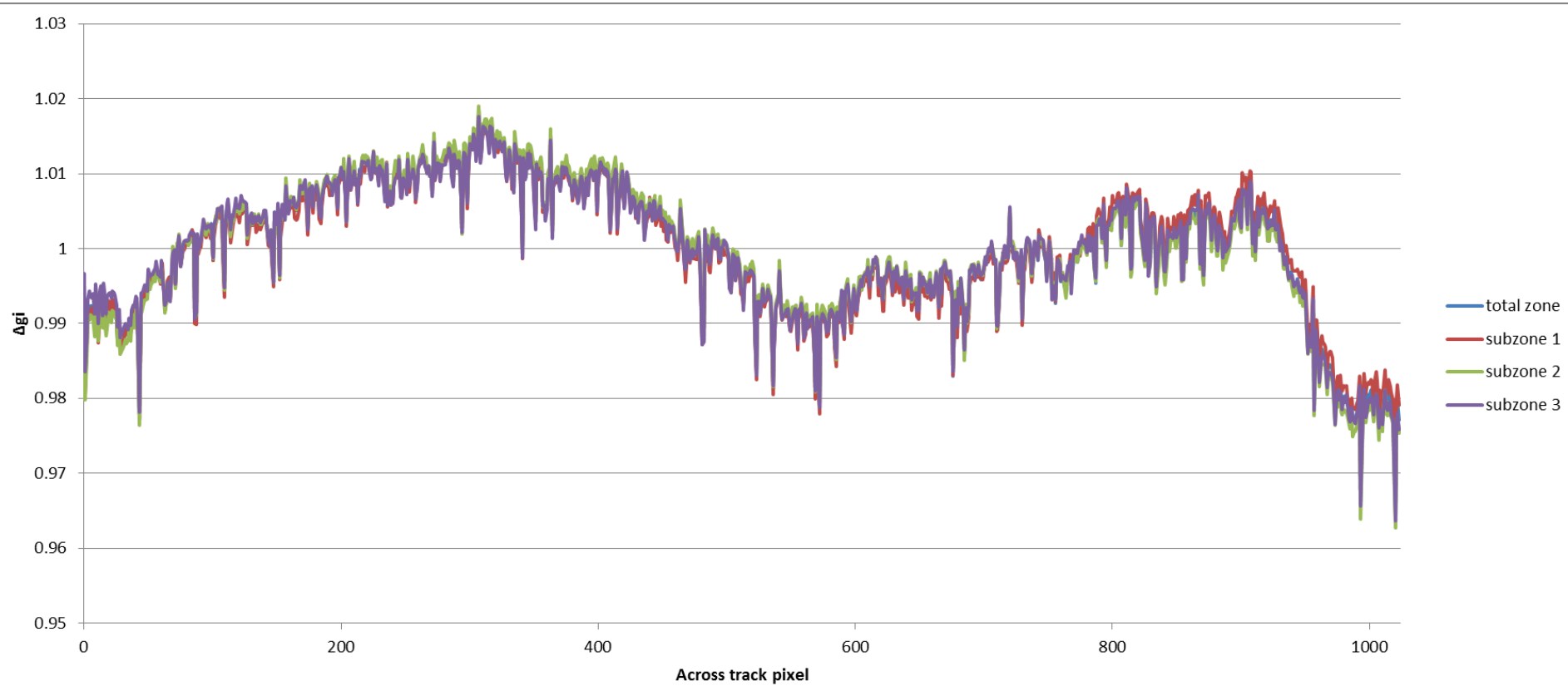
# Results : RIGHT SWIR



# Results : LEFT SWIR

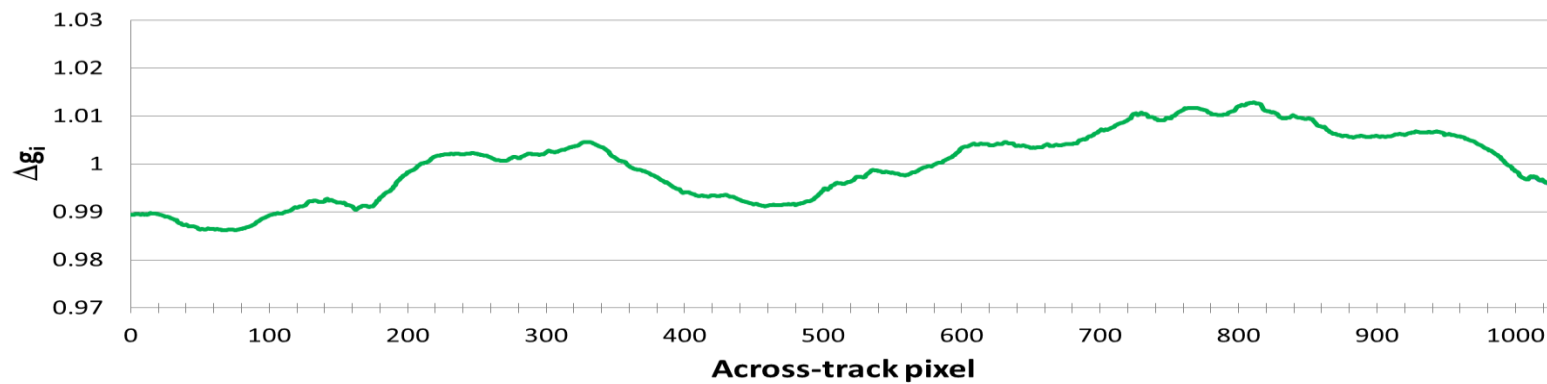


# Results : CENTER SWIR

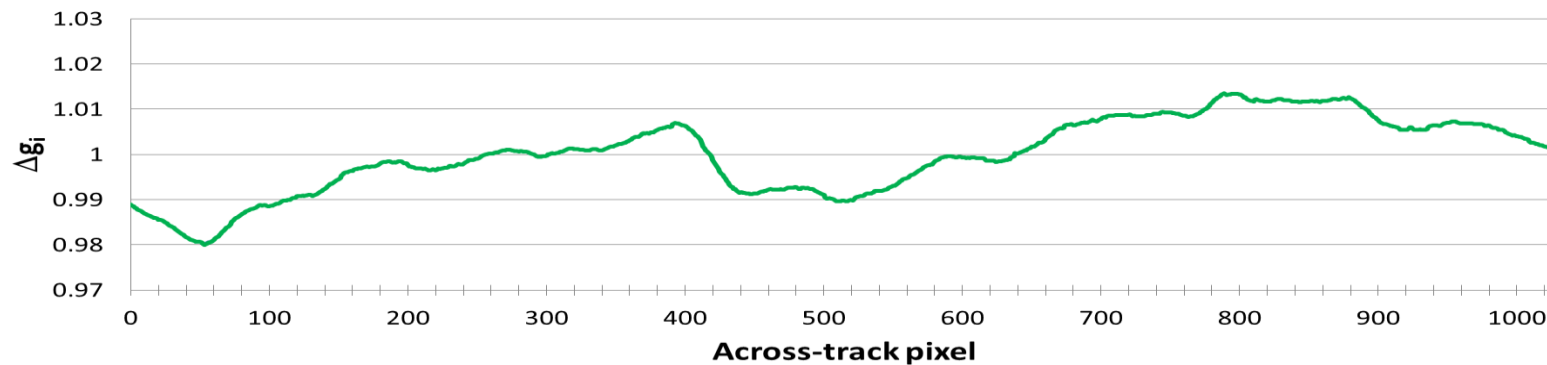




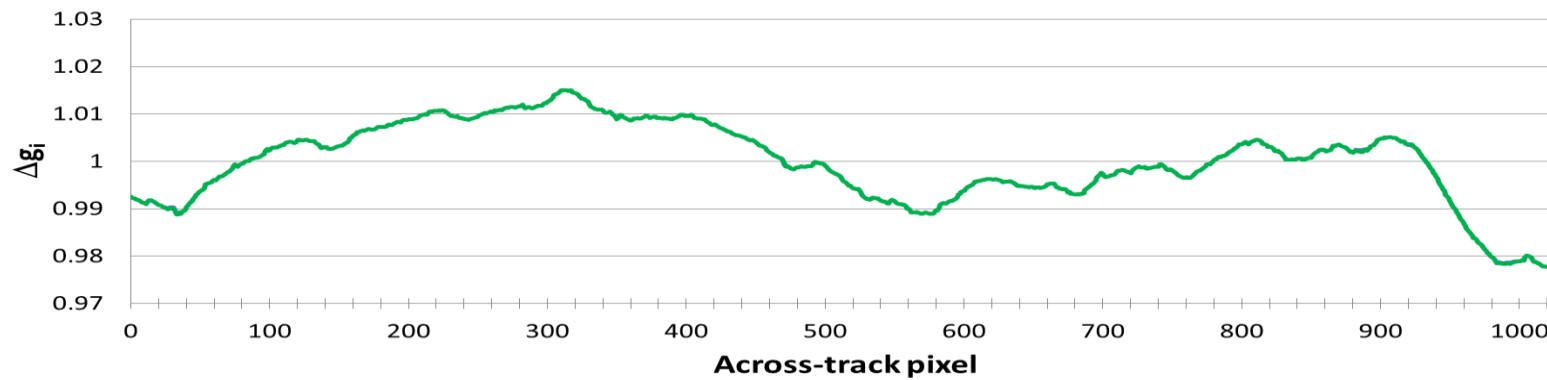
**CENTER SWIR 1**



**CENTER SWIR 2**



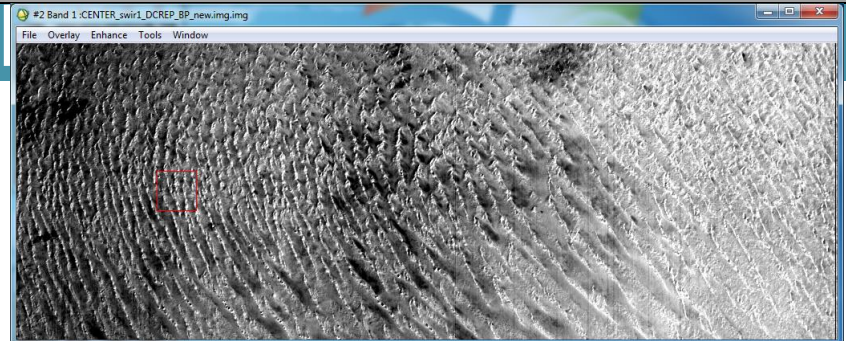
**CENTER SWIR 3**



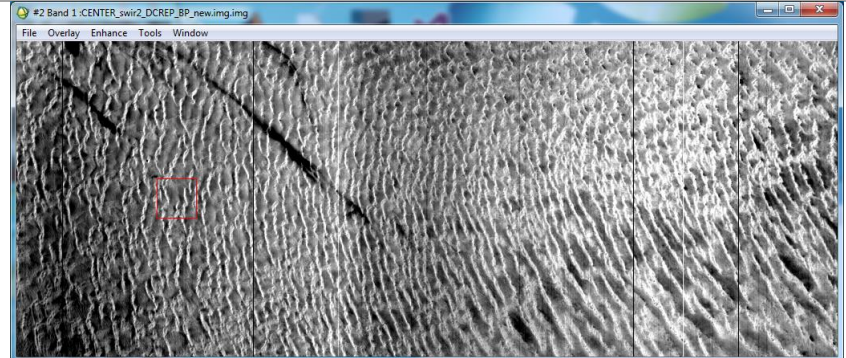
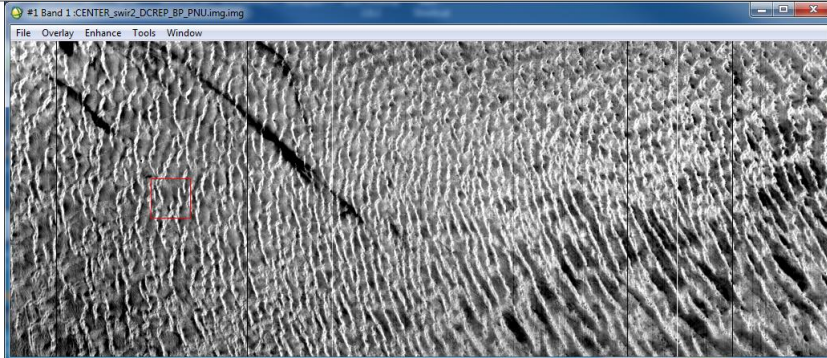
NEW

Old

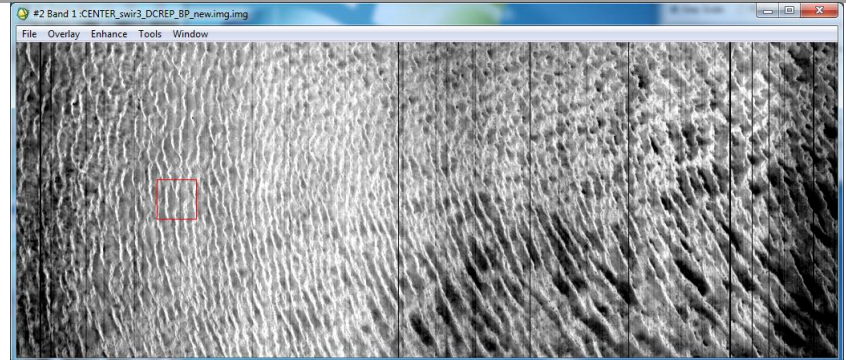
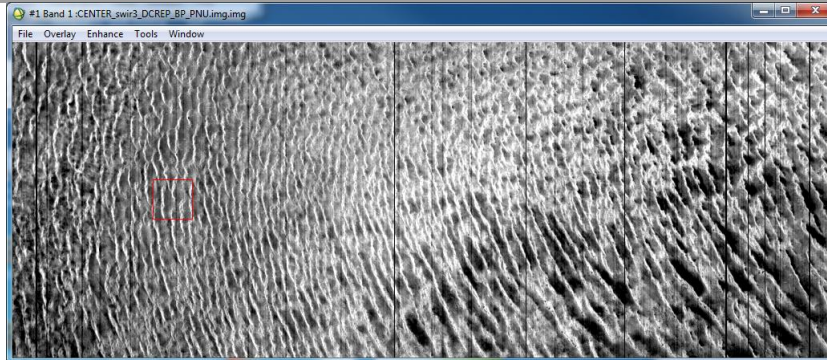
CENTER SWIR1



CENTER SWIR2



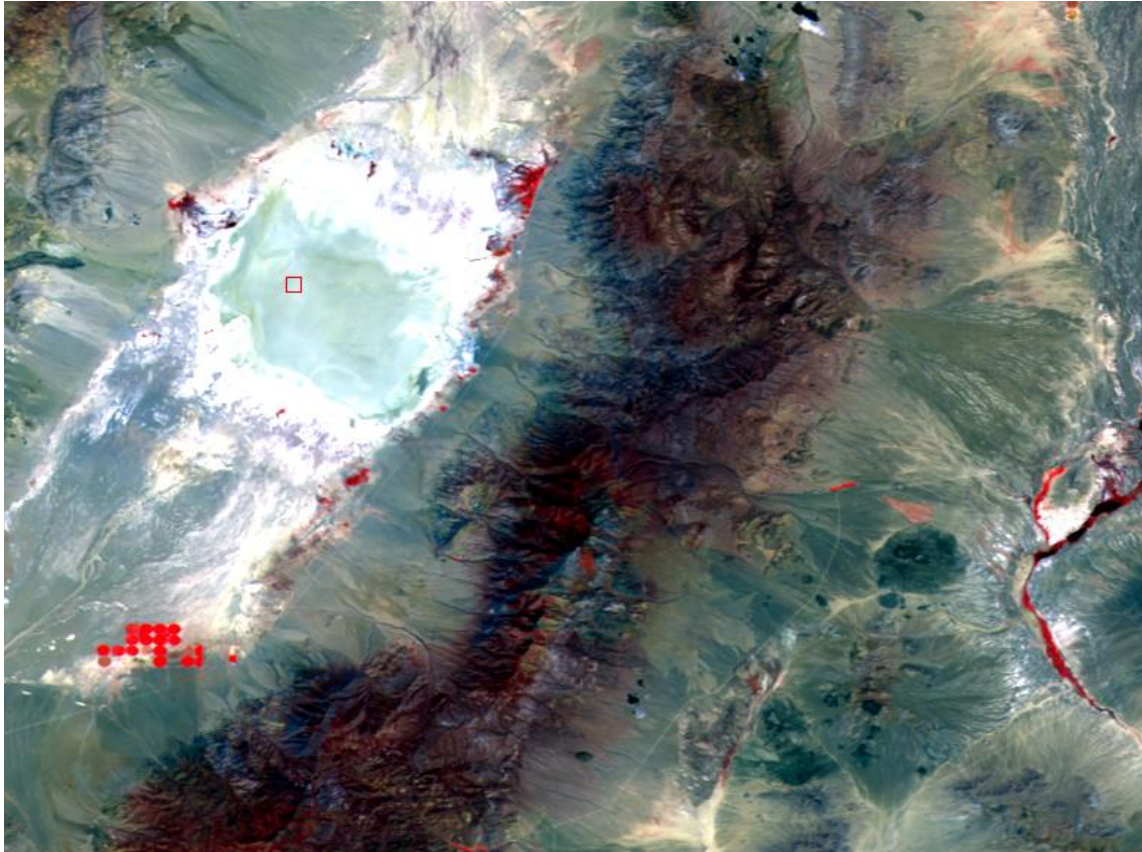
CENTER SWIR3



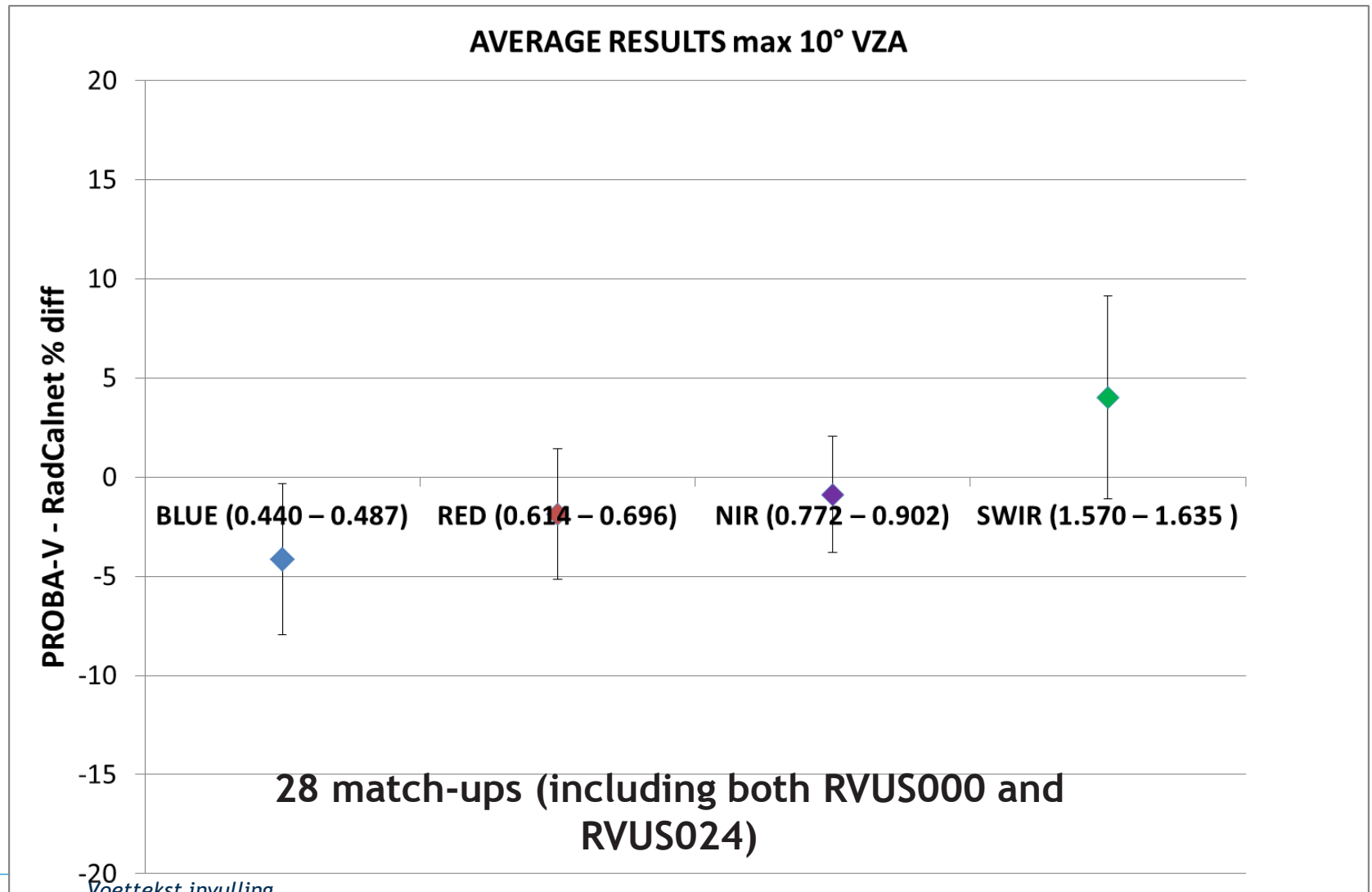
***RADCALNET***



## RAILROAD VALLEY PLAYA



- 100 m spatial resolution
  - Representative area: 1kmx1km  
~ 10 x 10 PV pixels
- (Libya-4 : 200x200 pixels)



***THANKS !***