

Post-filtering of SADE reference data over Libya-4 desert

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CONTENT

- **Context & Objective**
- **Preliminary analysis to filter out SADE measurements**
 - ◆ **VGT-2, PARASOL and MERIS**
- **Impact on cross-calibration results**

Context & Objective

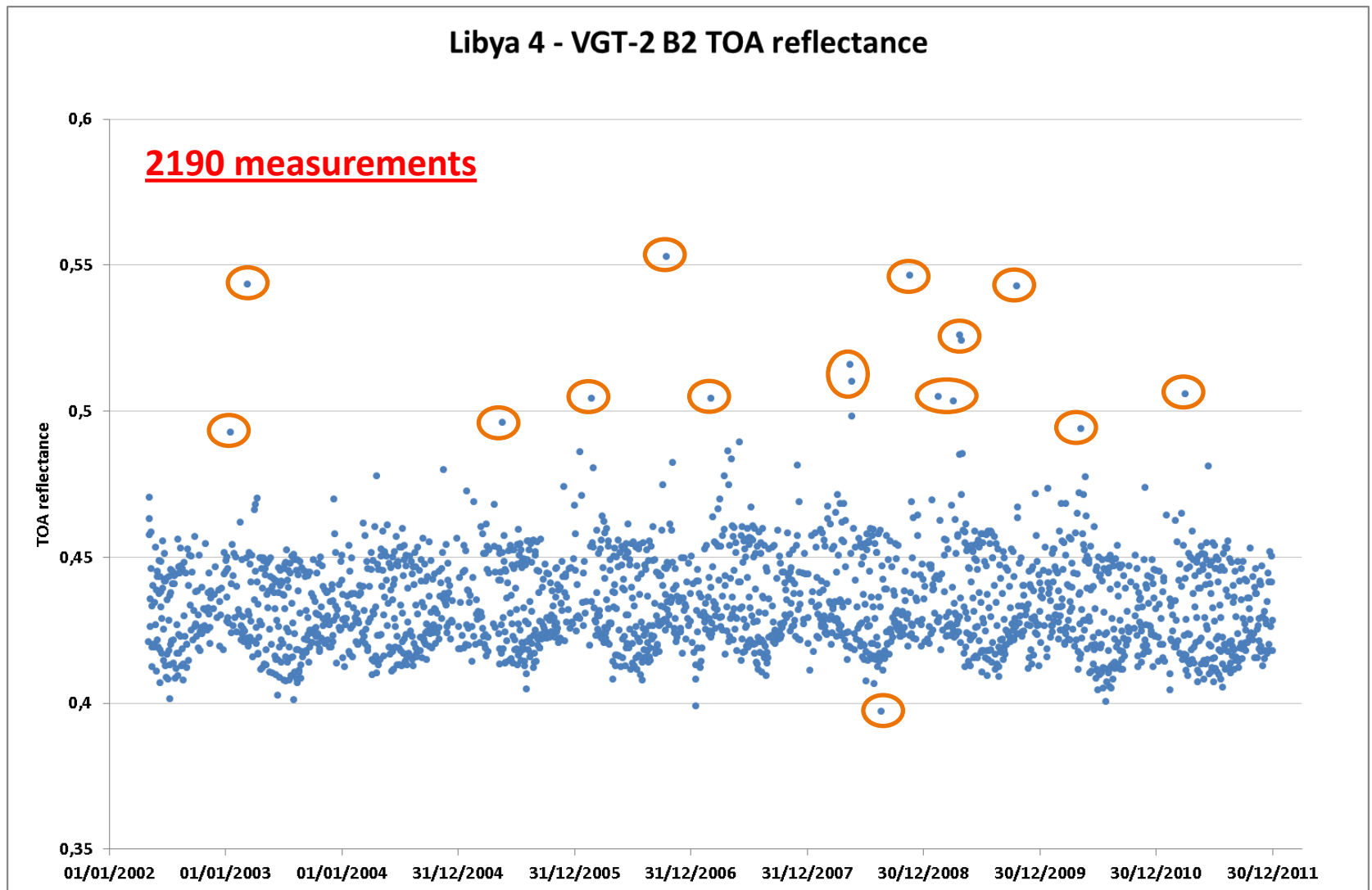
The quality of the cross-calibration results using data acquired over desert sites depends on the selection of the “BEST” reference measurements.

CNES inter-calibration environment is based on

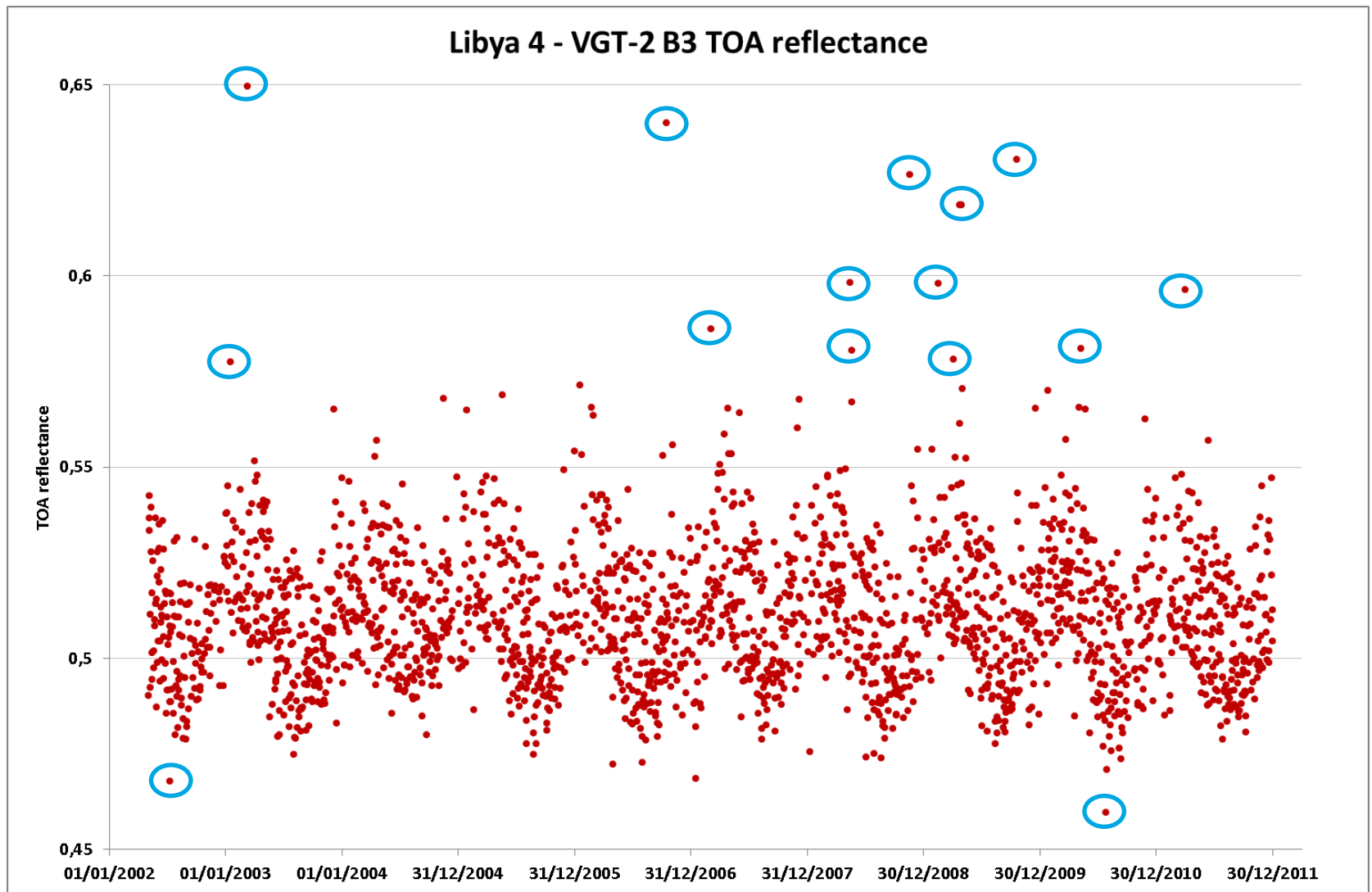
- SADE database = reference measurements
- MUSCLE tools = calibration processors

ACRI-ST is in charge to filter out SADE measurements over desert sites in order to improve the reliability of the sensors cross-calibration results: VGT-2, PARASOL, MERIS and MODIS (on-going study).

Analysis of the VGT-2 data available in SADE database



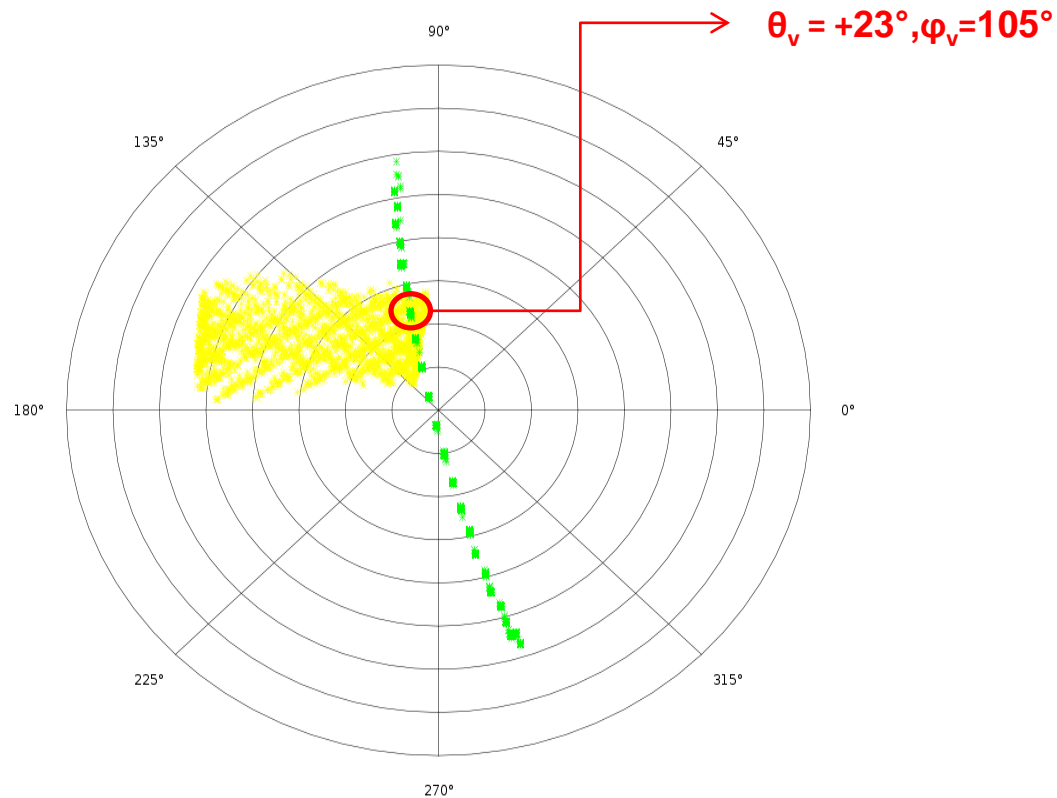
Analysis of the VGT-2 data available in SADE database



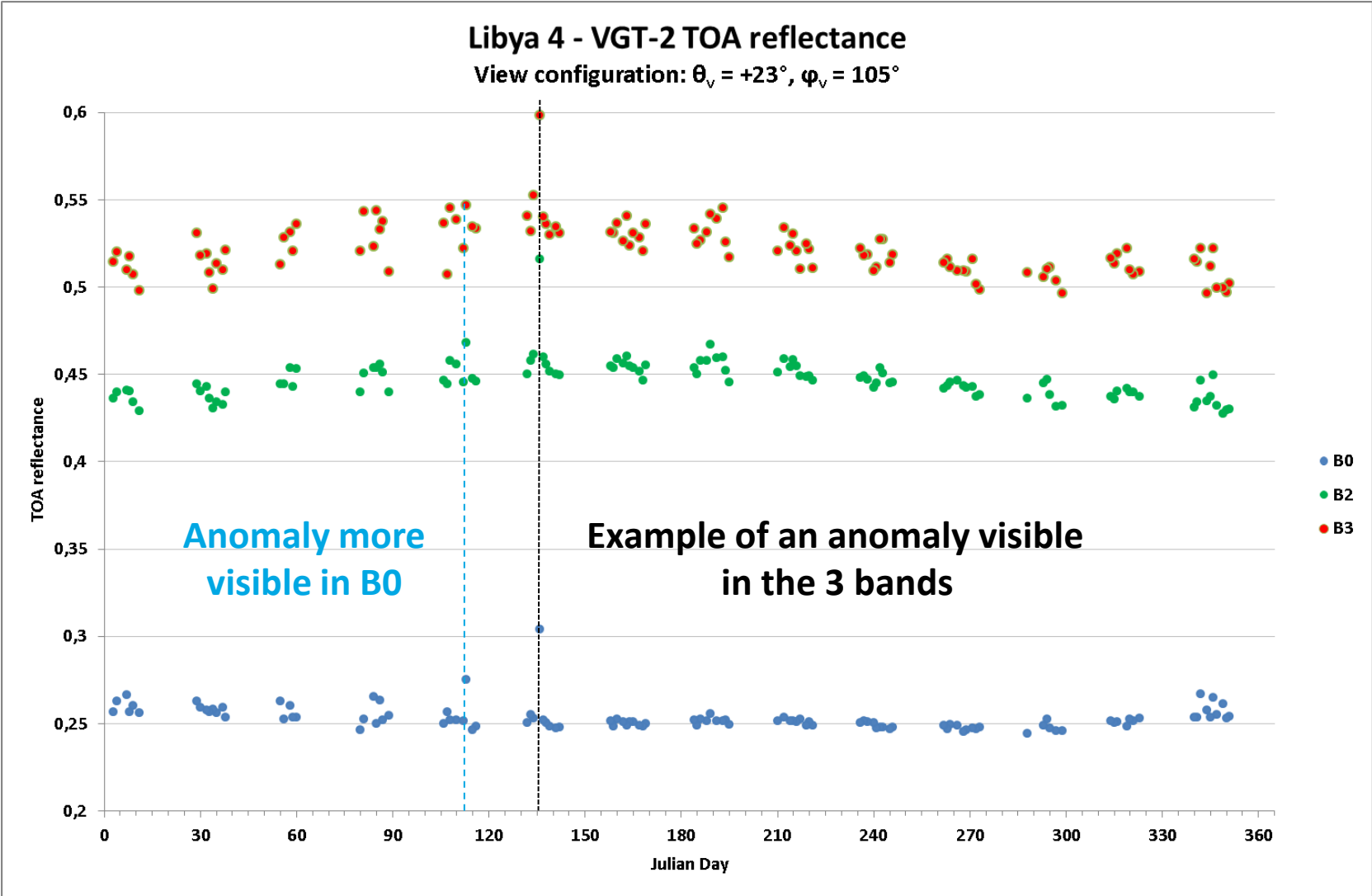
VGT-2 data filtering (1)

First data filtering based on the temporal stability analysis of the reflectances corresponding to almost the same geometry over the global archive

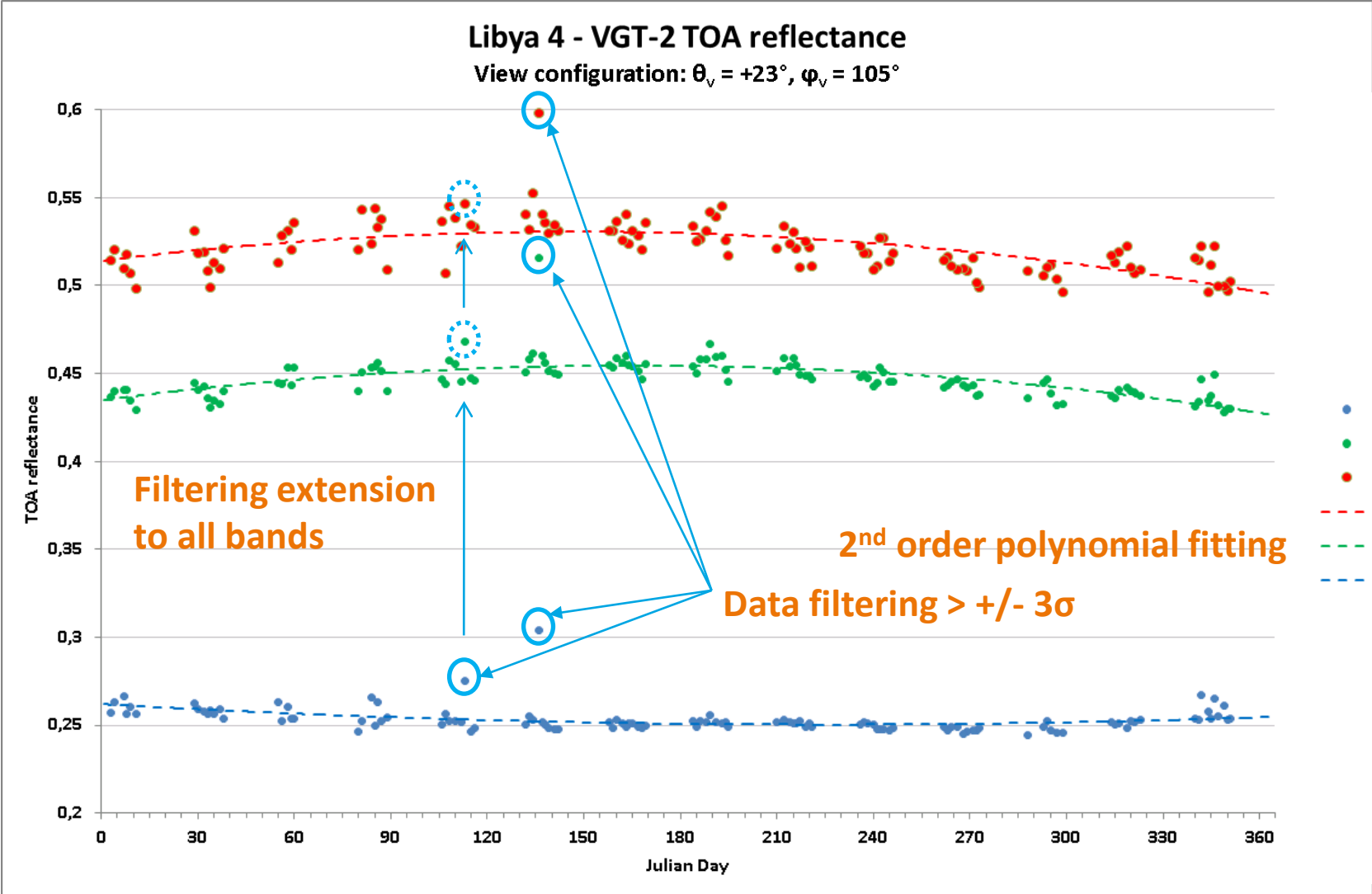
- VGT-2 has a revisit cycle of 26 days



VGT-2 data filtering (1)

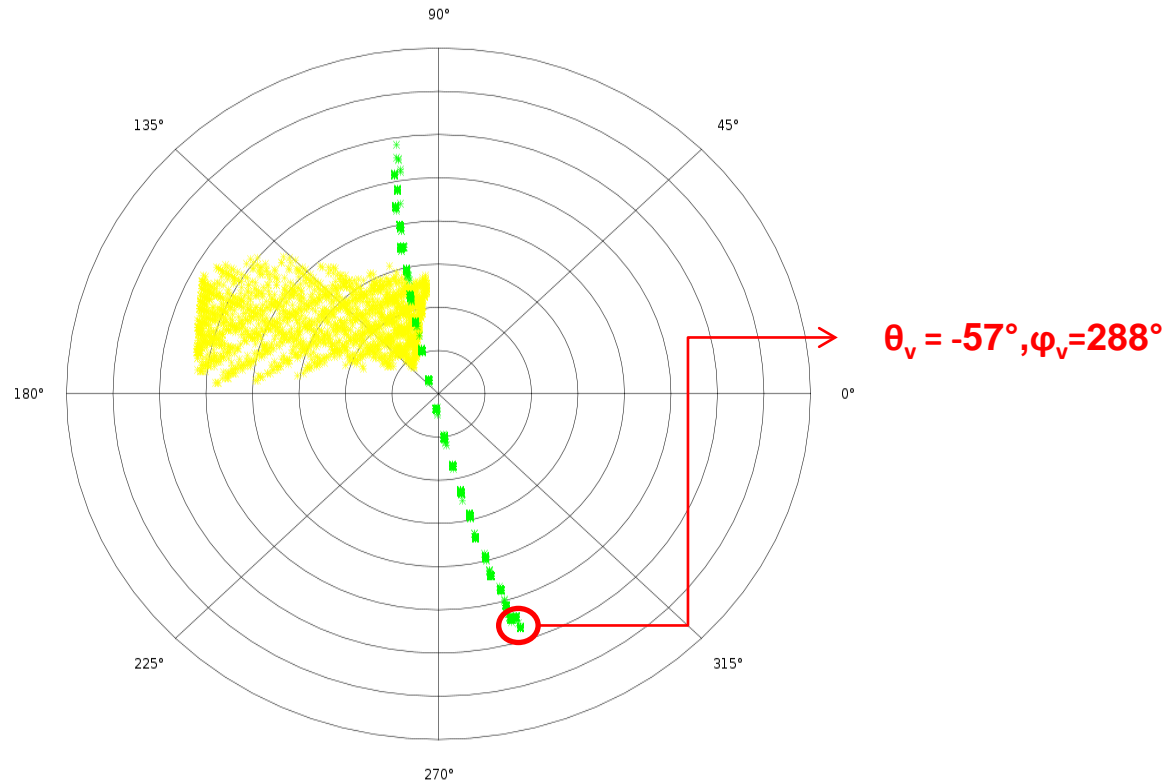


VGT-2 data filtering (1)

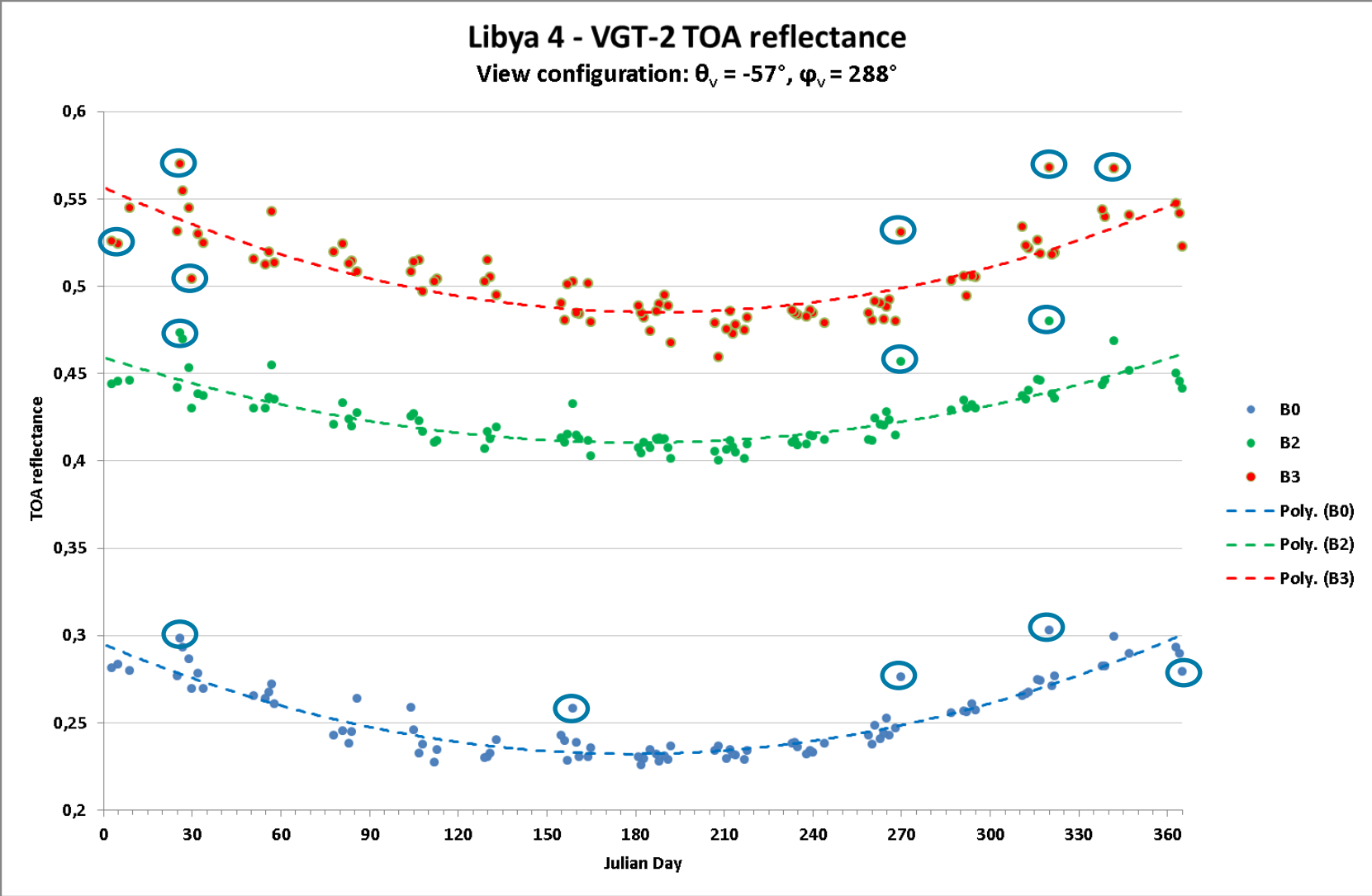


VGT-2 data filtering (1)

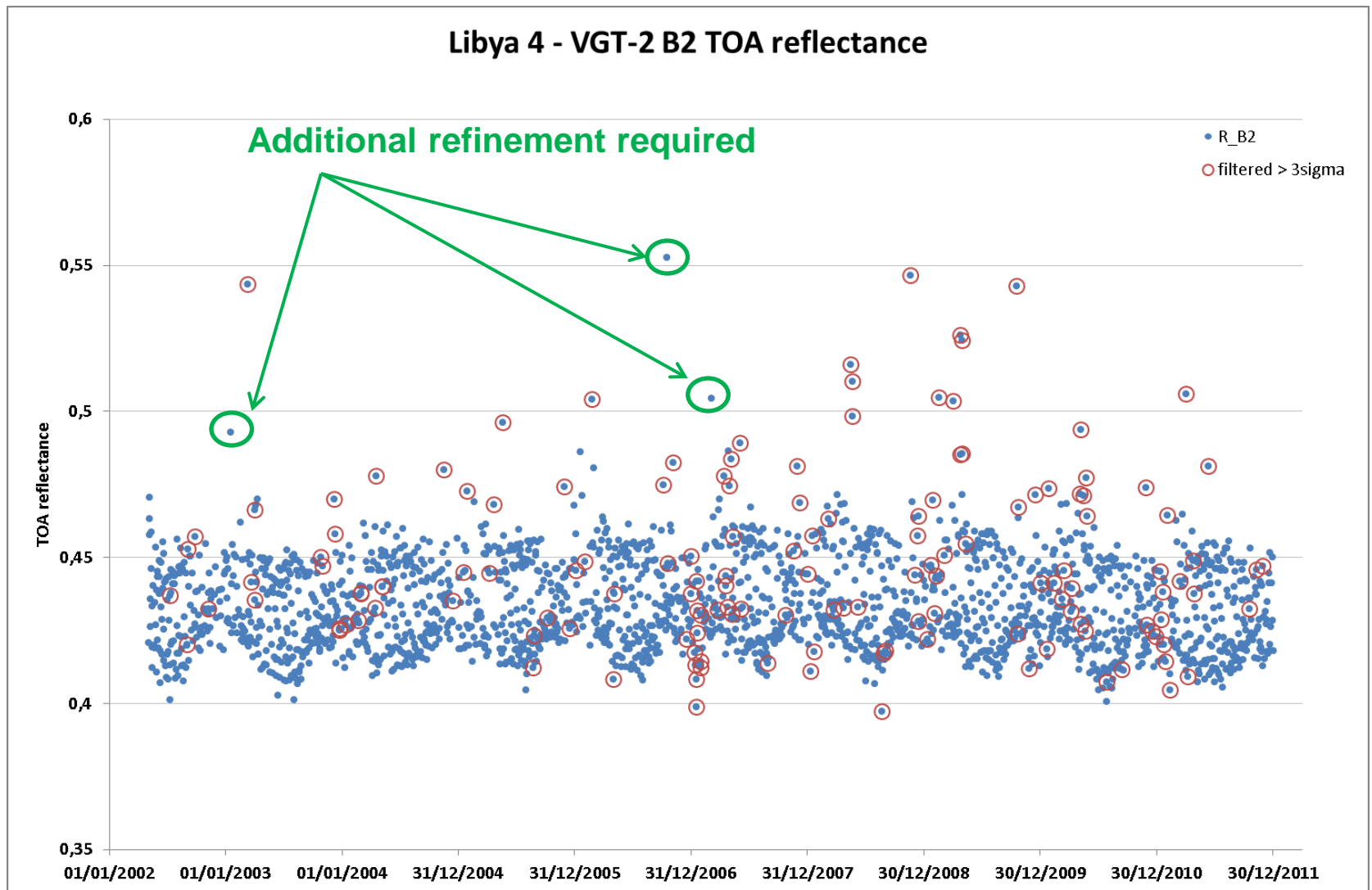
Illustration for a viewing configuration corresponding to high VZA



VGT-2 data filtering (1)



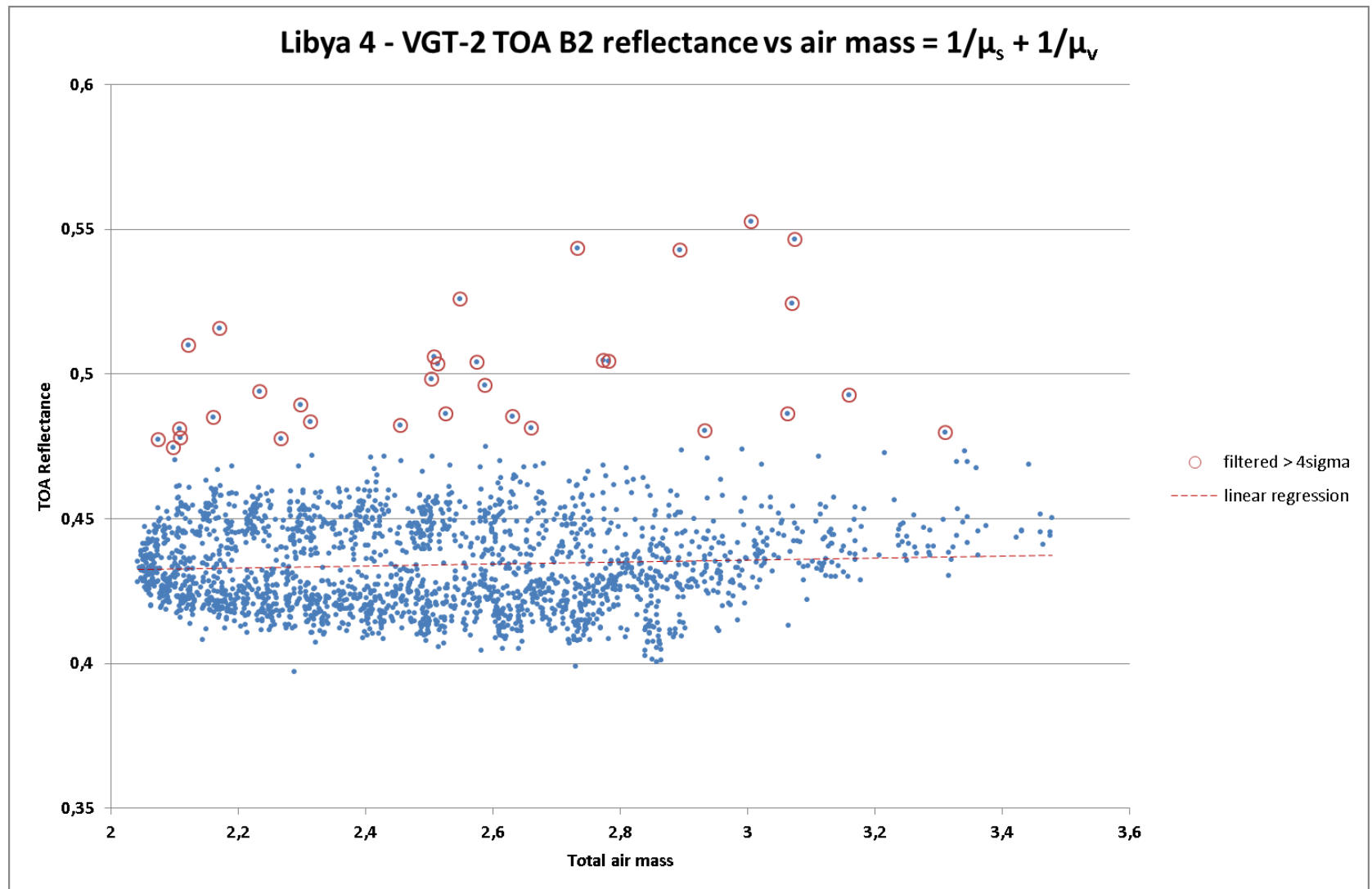
VGT-2 data filtering impact (1)



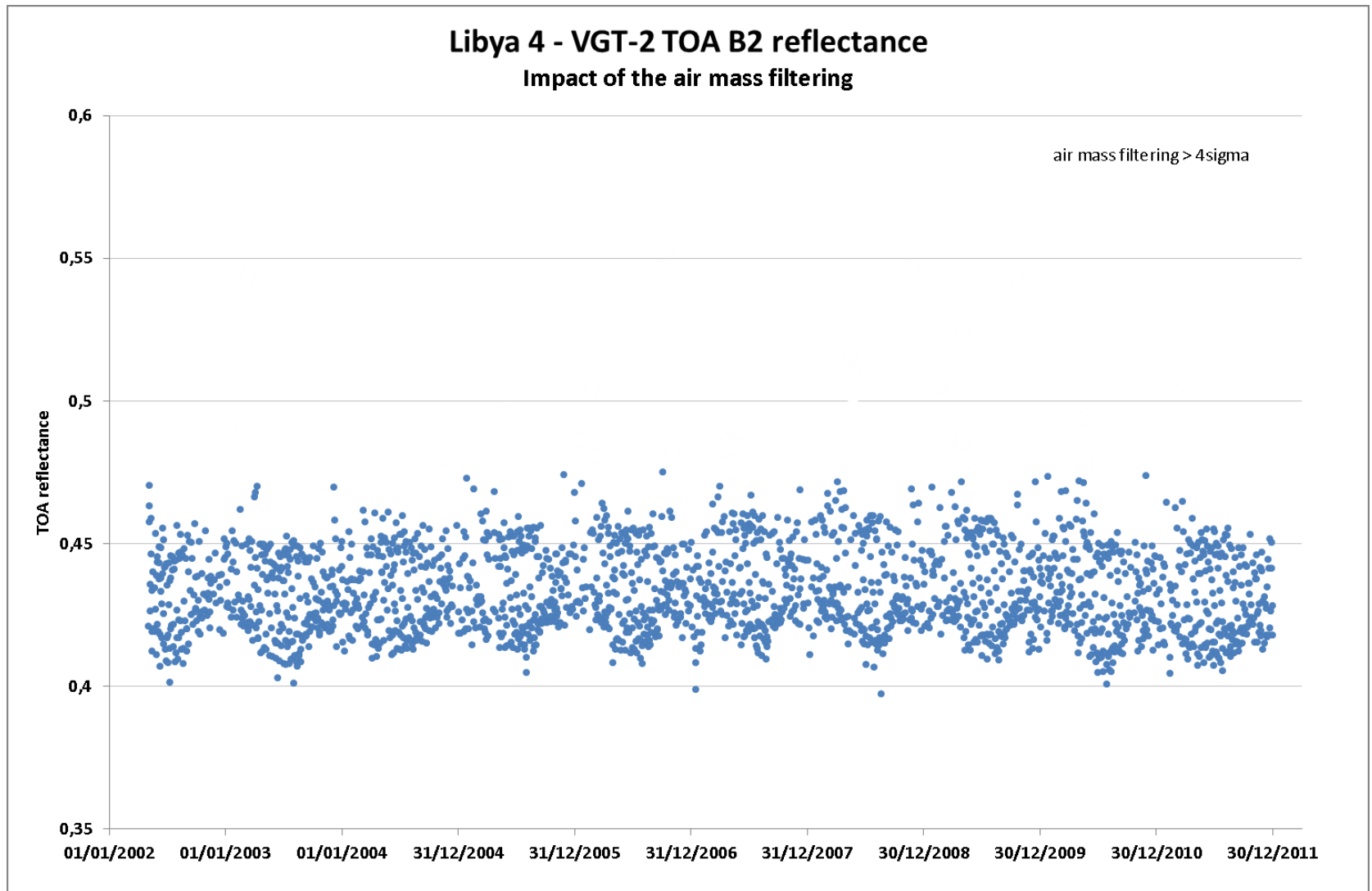
VGT-2 data filtering (2)

2nd data filtering based on threshold on Reflectance vs Total air mass

VGT-2 data filtering (2)

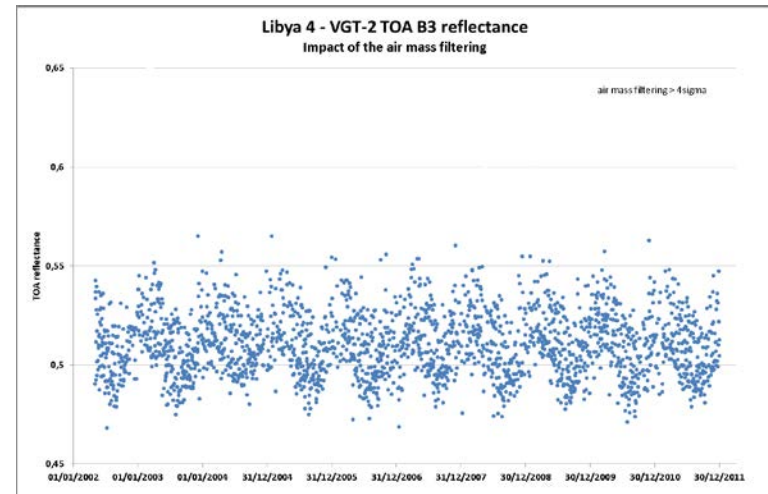
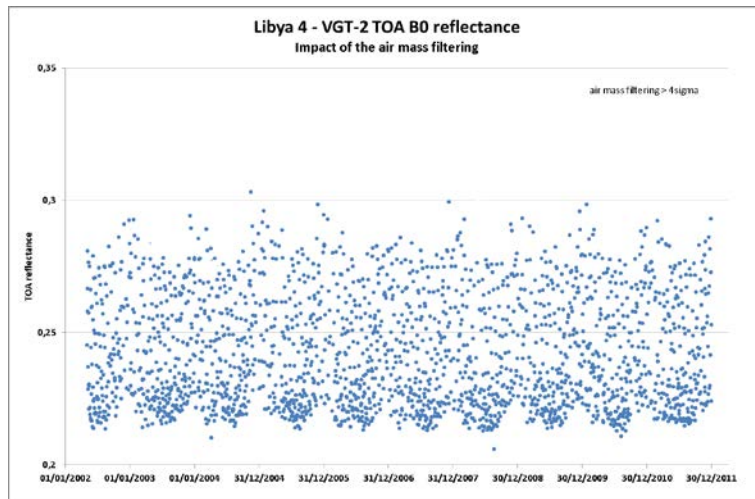


VGT-2 data filtering impact (2)

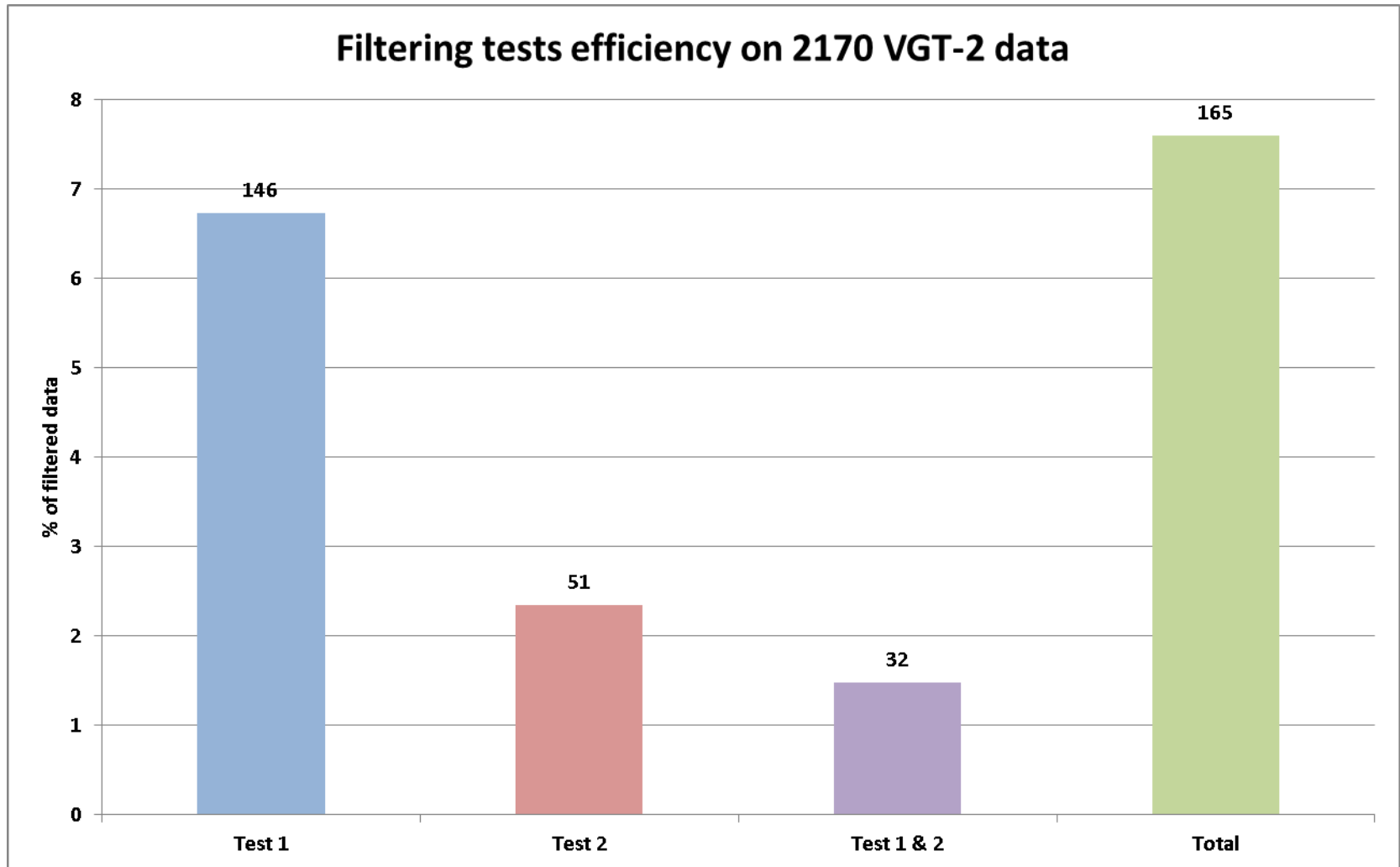


VGT-2 data filtering impact (2)

Impact of air mass filtering on VGT-2 data temporal series

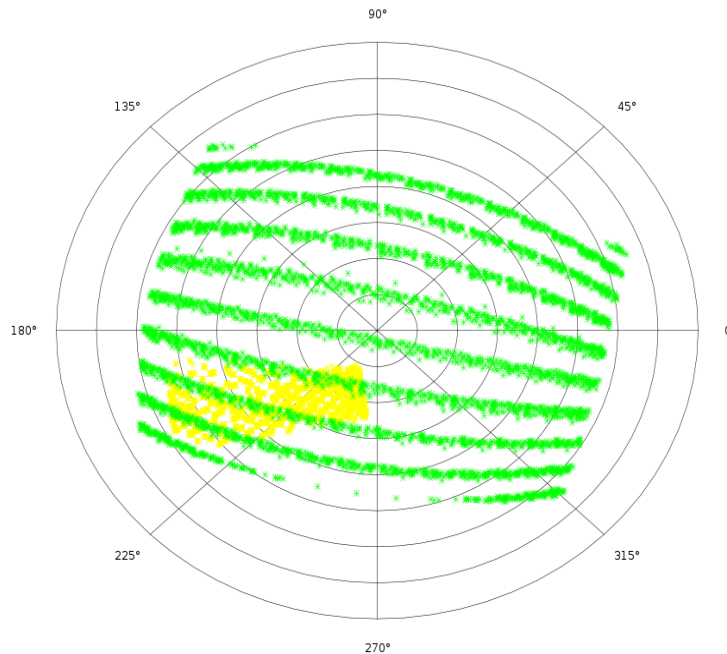


VGT-2 data filtering statistics



Analysis of the PARASOL data in SADE database

SADE = 10 716 PARASOL data [03/2005 - 12/2011] over Libya-4
reduced to 4916 data [12/2005 – 12/2008] for this study
due to the satellite drift since 2009

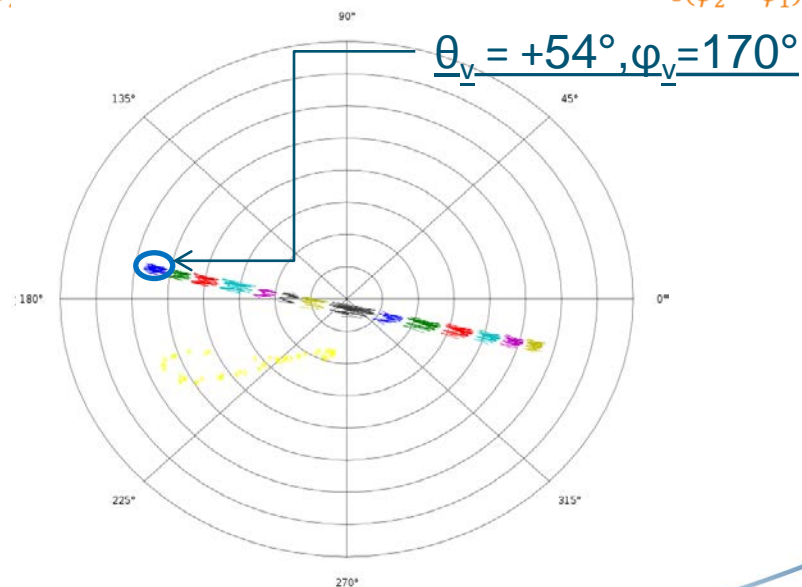
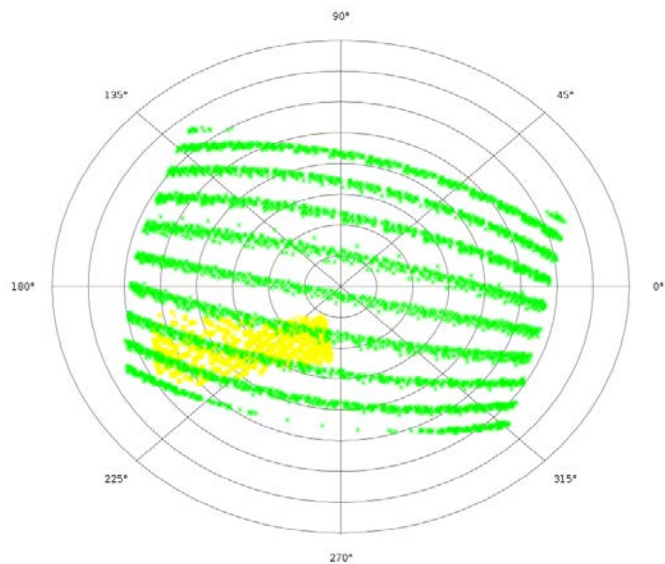


PARASOL data filtering

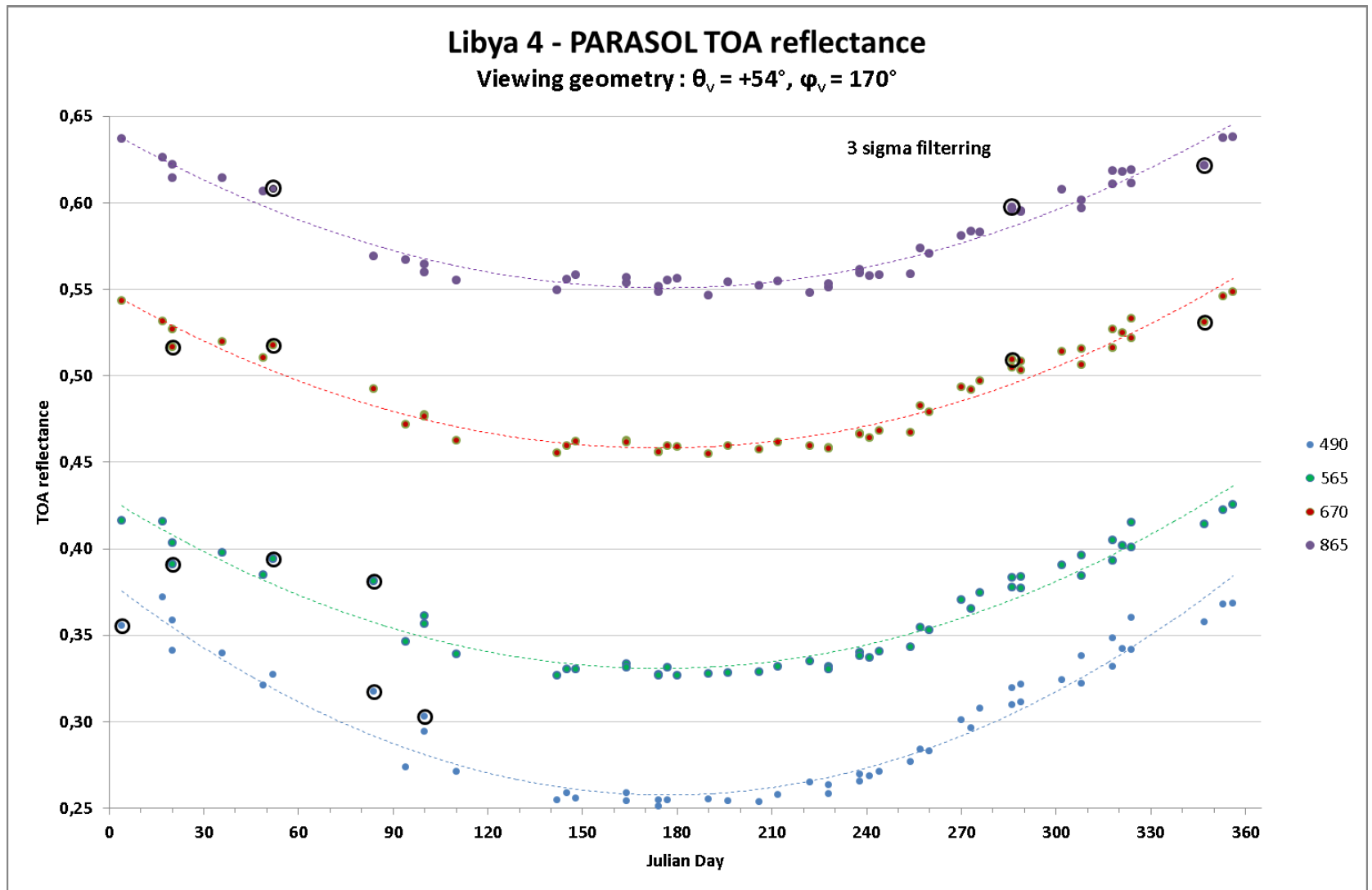
The VGT-2 data filtering approach based on the analysis of the temporal stability of the reflectance corresponding to close geometric configurations is applied to PARASOL data.

All the PARASOL viewing configurations available in SADE are grouped into 14 “reference” viewing angles per orbit using the orthodromic distance between all the geometries and a dendrogram (classification tree)

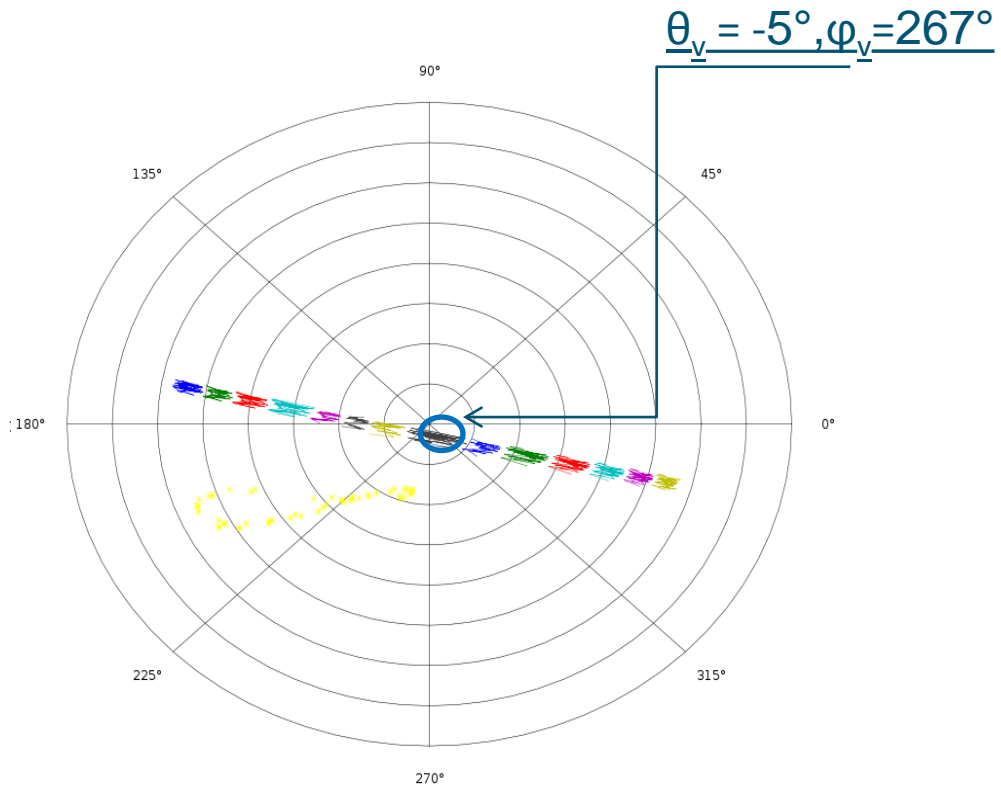
$$d(\theta_1, \varphi_1, \theta_2, \varphi_2) = \sqrt{(\cos(\theta_1) - \cos(\theta_2))^2 + (\sin(\theta_1) \cos(\varphi_1) - \sin(\theta_2) \cos(\varphi_2))^2 + (\sin(\theta_1) \sin(\varphi_1) - \sin(\theta_2) \sin(\varphi_2))^2} + s(\varphi_2 - \varphi_1)$$



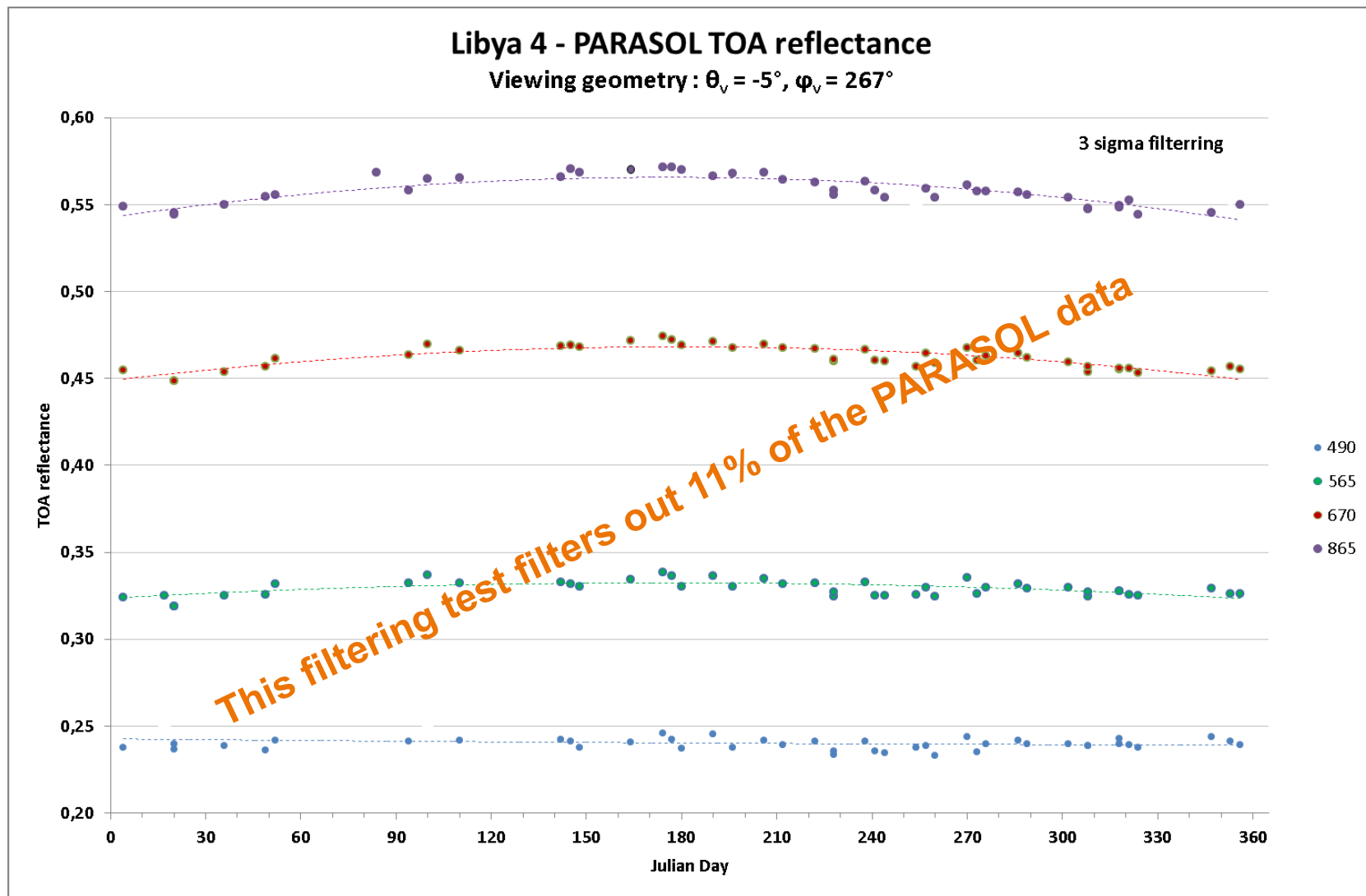
PARASOL data filtering



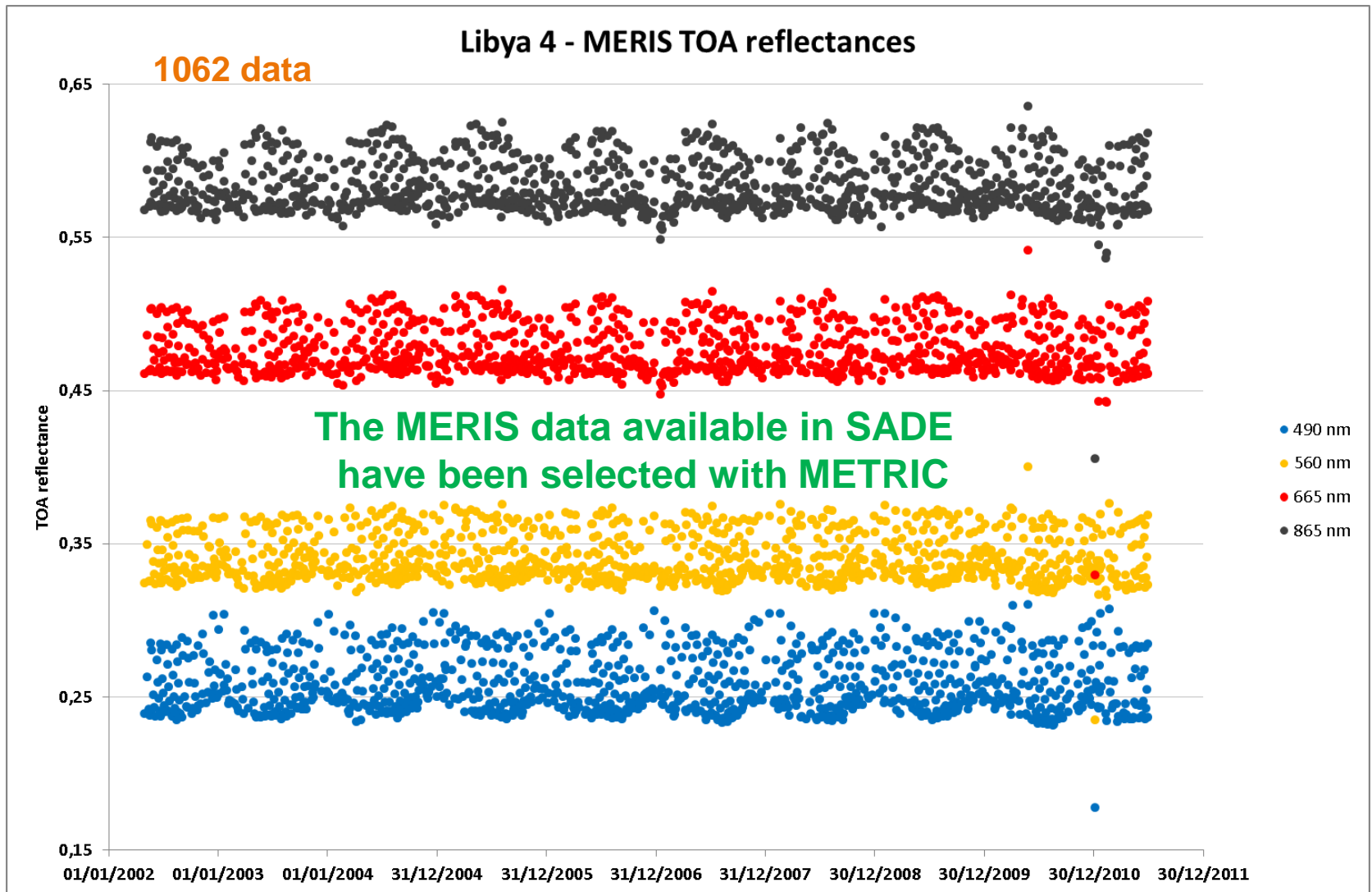
PARASOL data filtering



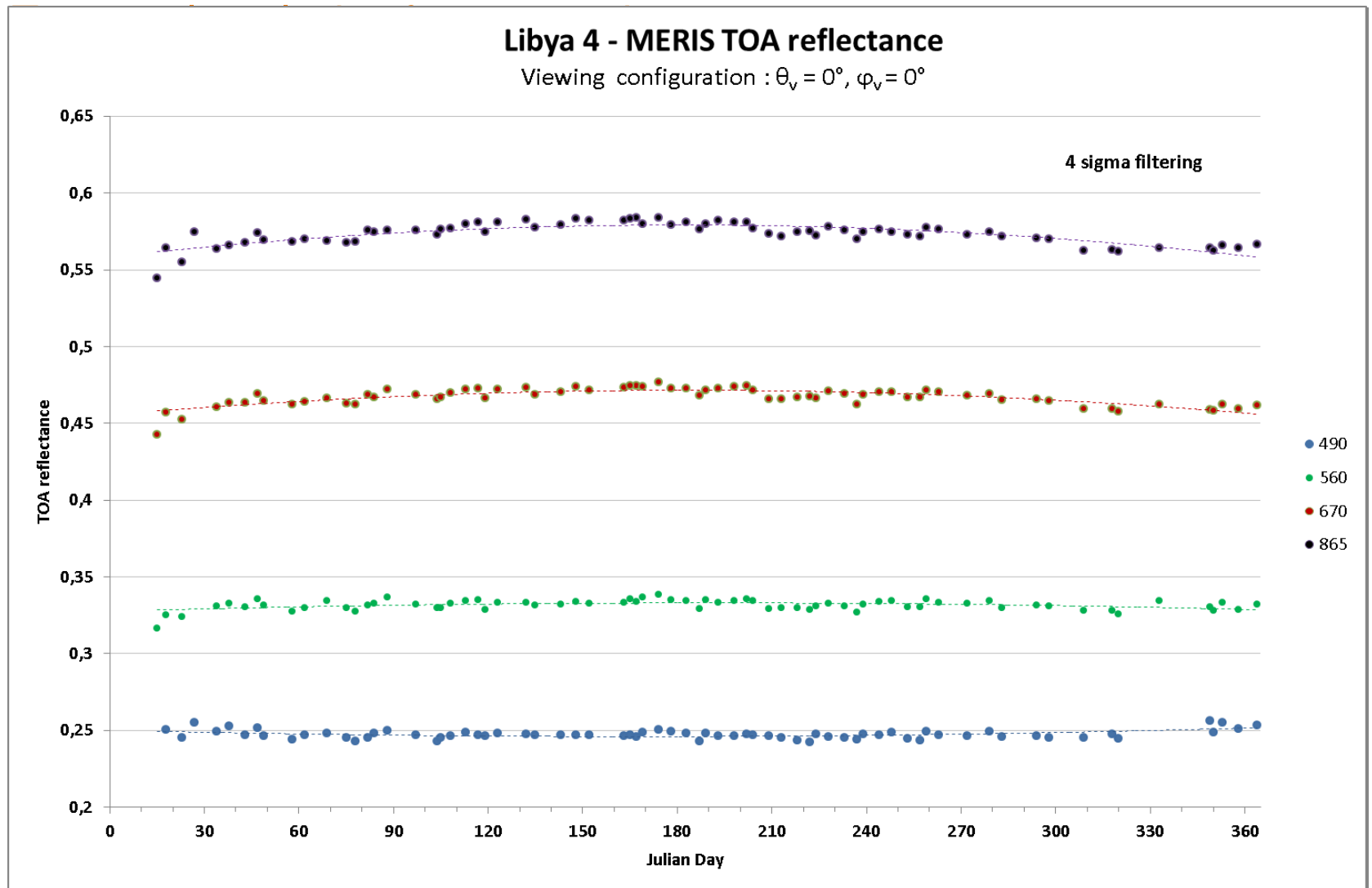
PARASOL data filtering



Analysis of the MERIS data in SADE database

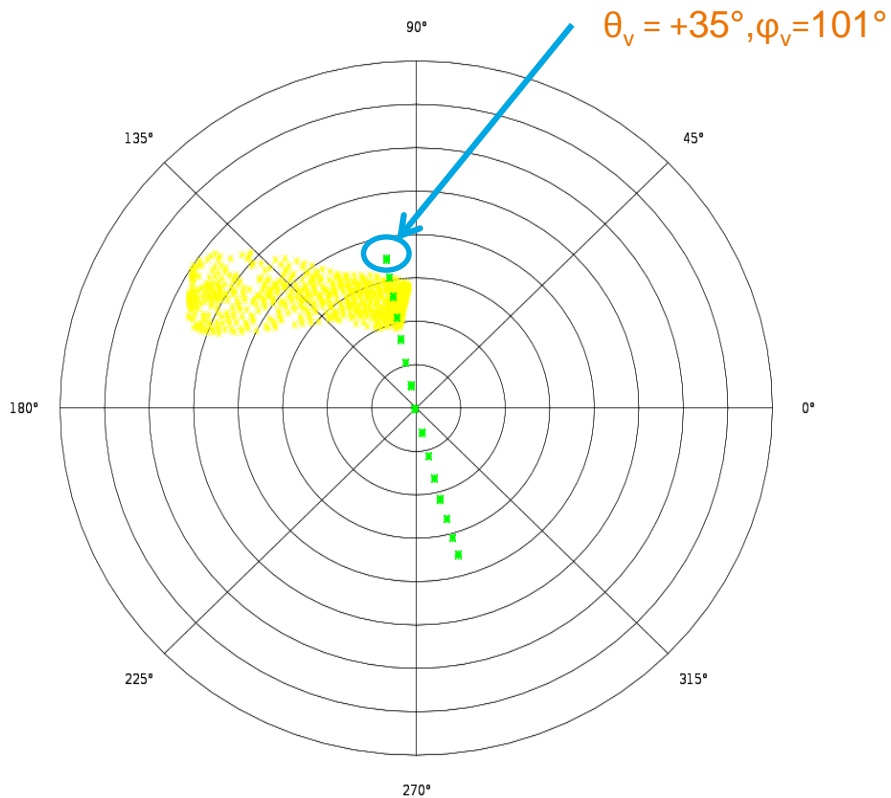


MERIS data filtering



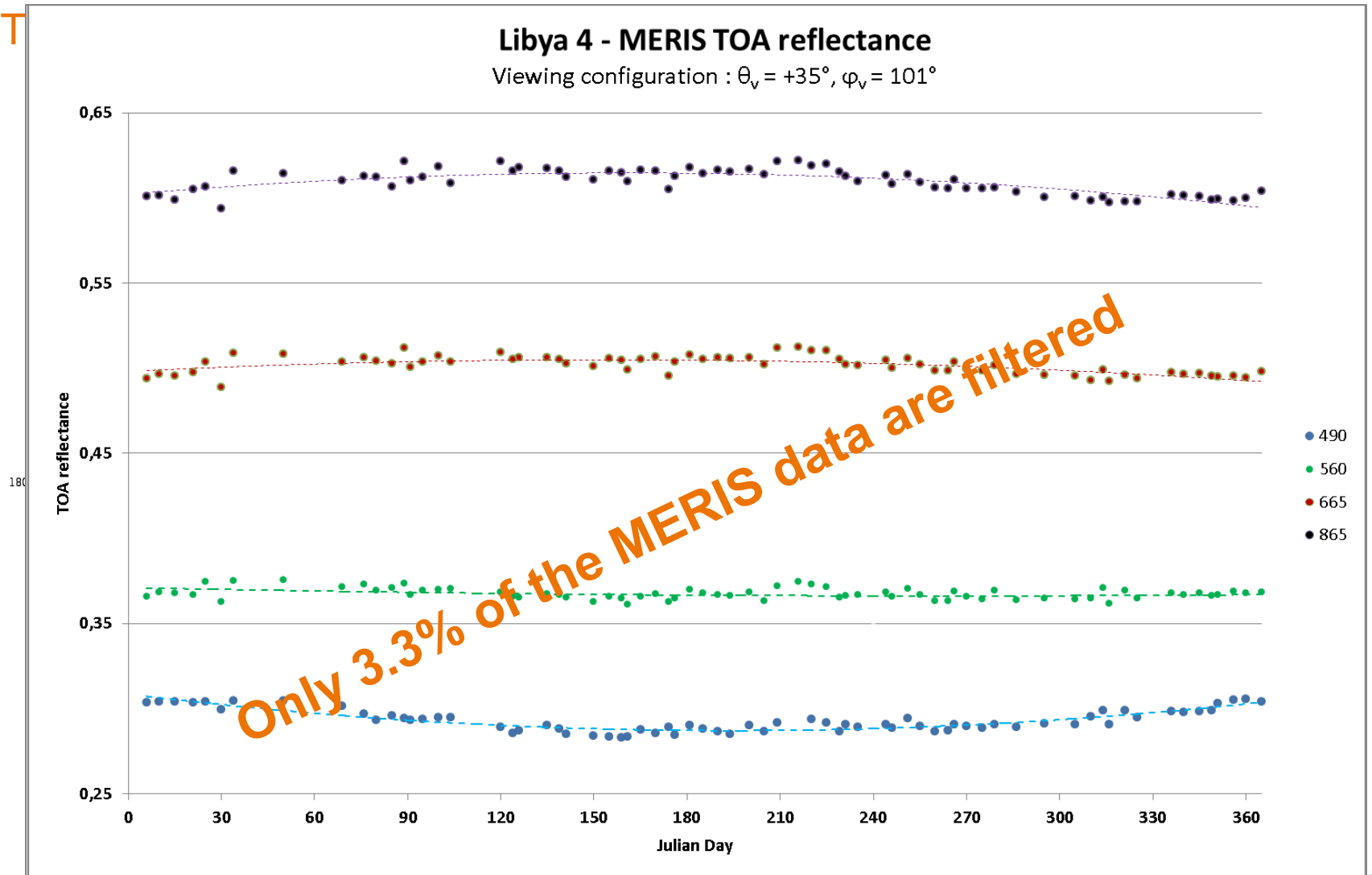
MERIS data filtering

Temporal analysis of 2 geometries

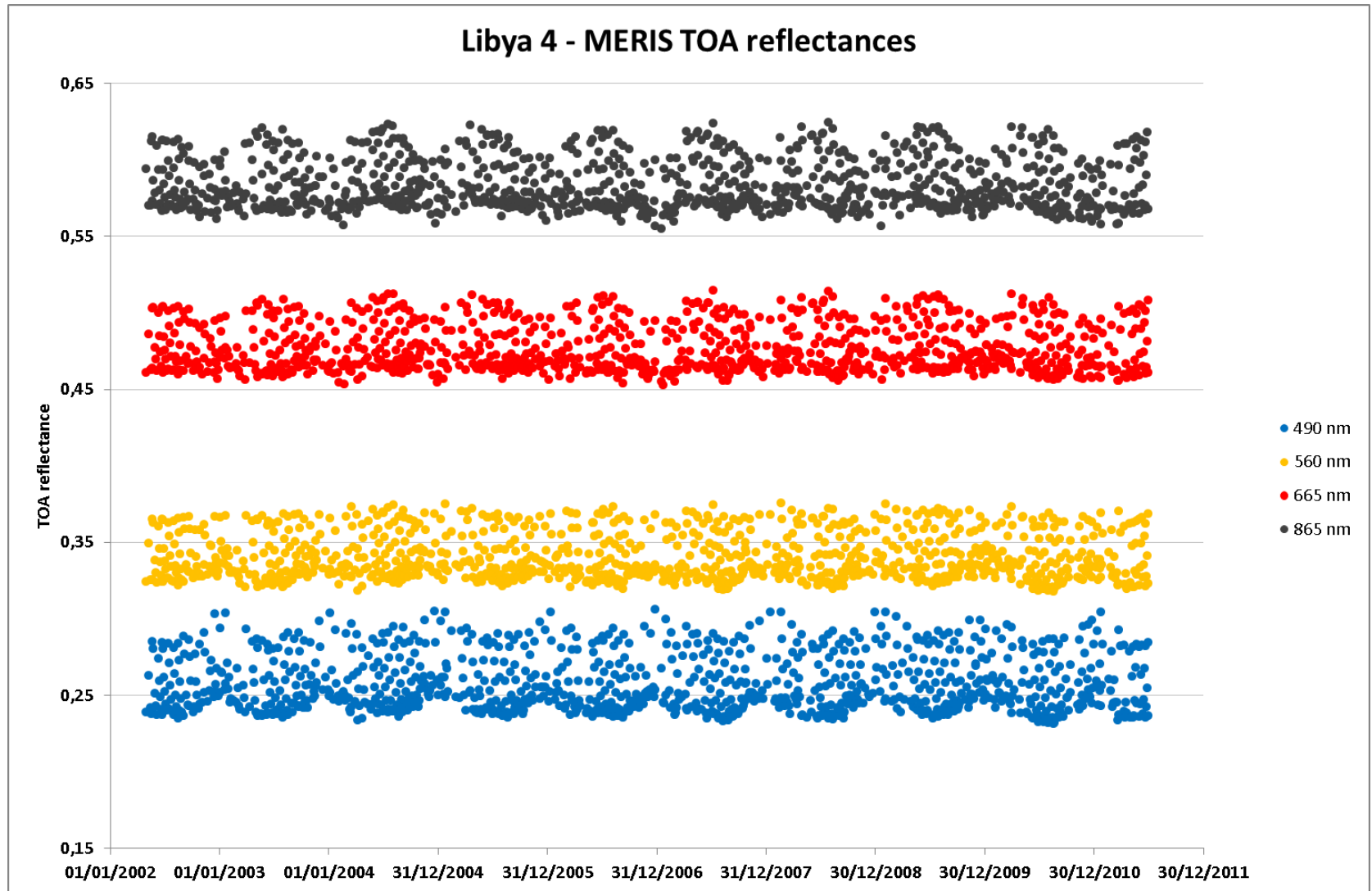


MERIS data filtering

T

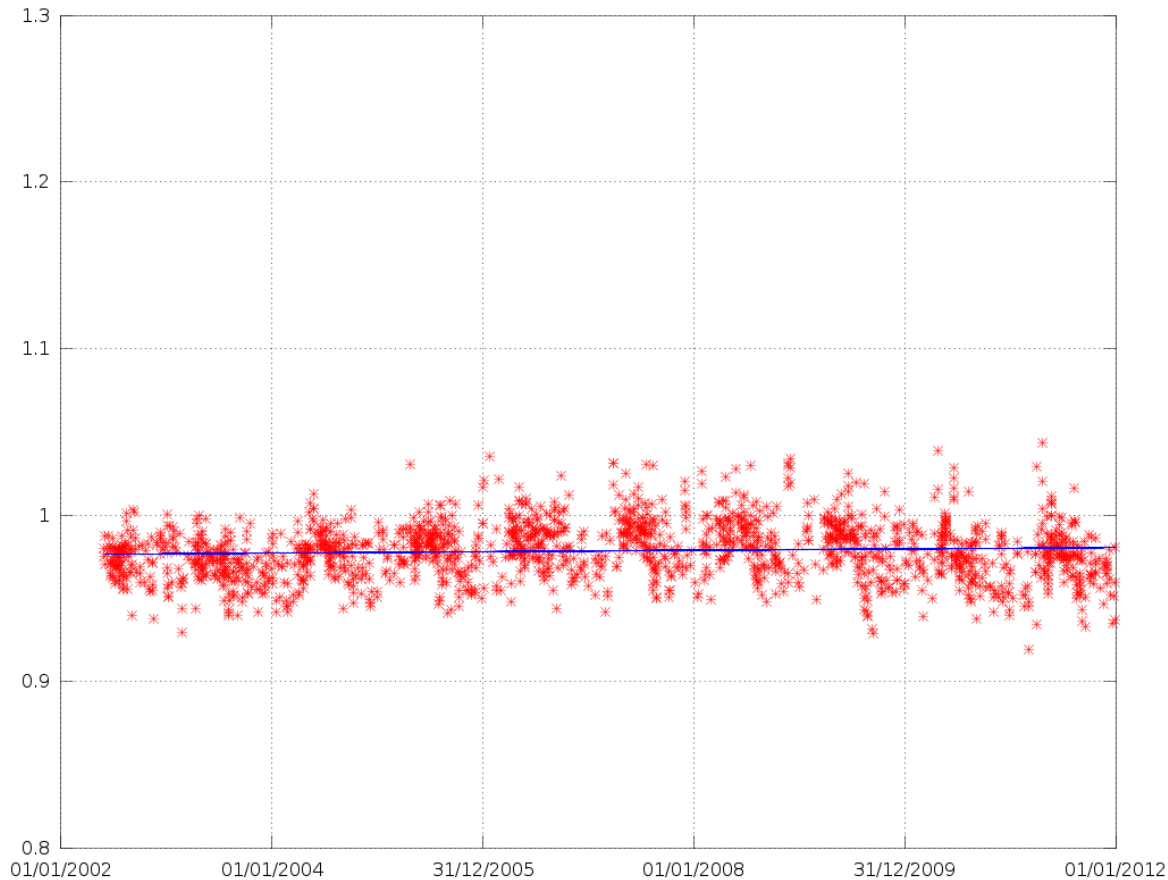


MERIS data filtering impact



Filtering impact on cross-calibration results

VGT-2 / PARASOL – B2 cross-calibration



Before filtering

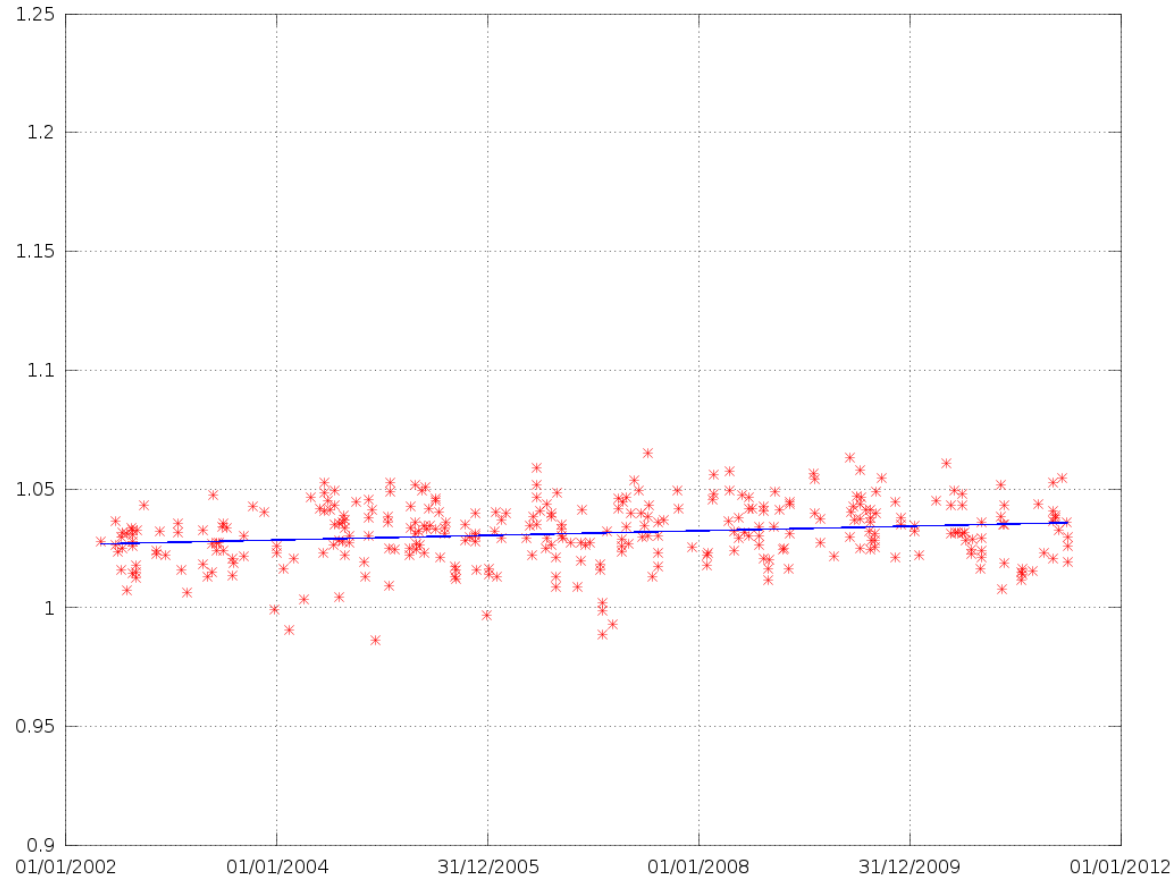
$A_k = 0,981 / \text{std} = 0,0291$

After filtering

$A_k = 0,980 / \text{std} = 0,0168$

Filtering impact on cross-calibration results

MERIS / PARASOL – 665 nm cross-calibration

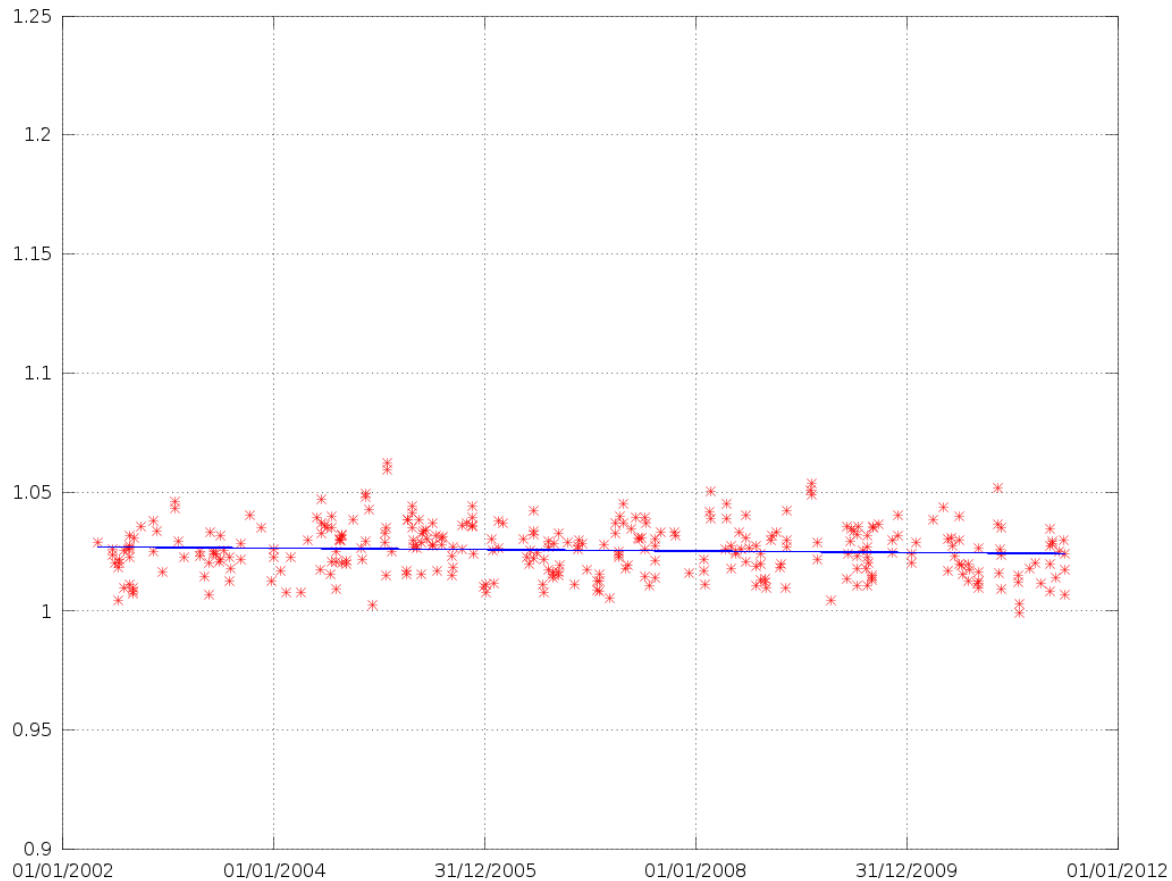


Before filtering
Ak = 1,031 / std = 0,0162

After filtering
Ak = 1,031 / std = 0,0129

Filtering impact on cross-calibration results

MERIS / PARASOL – 865 nm cross-calibration



Before filtering
 $A_k = 1,025 / \text{std} = 0,0137$

After filtering
 $A_k = 1,025 / \text{std} = 0,0107$

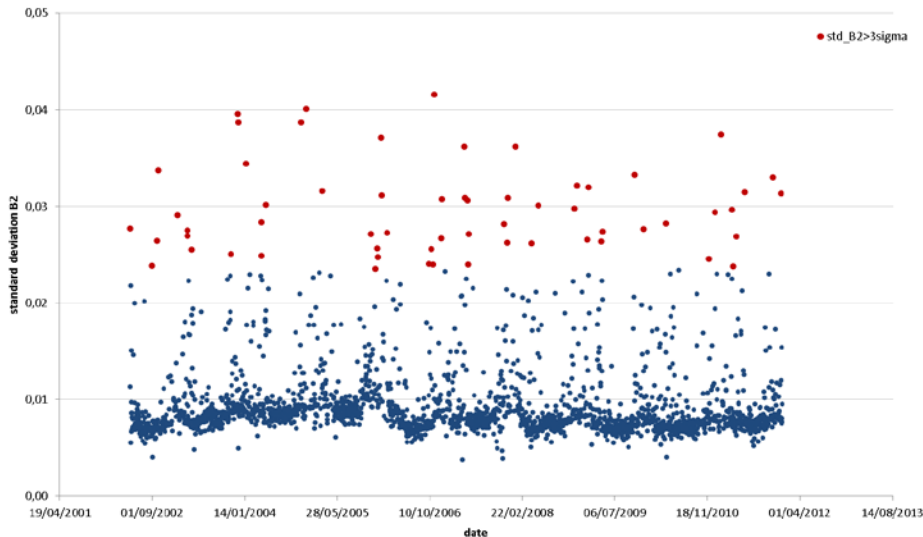
Perspectives

On-going investigations to propose other data filtering tests based on

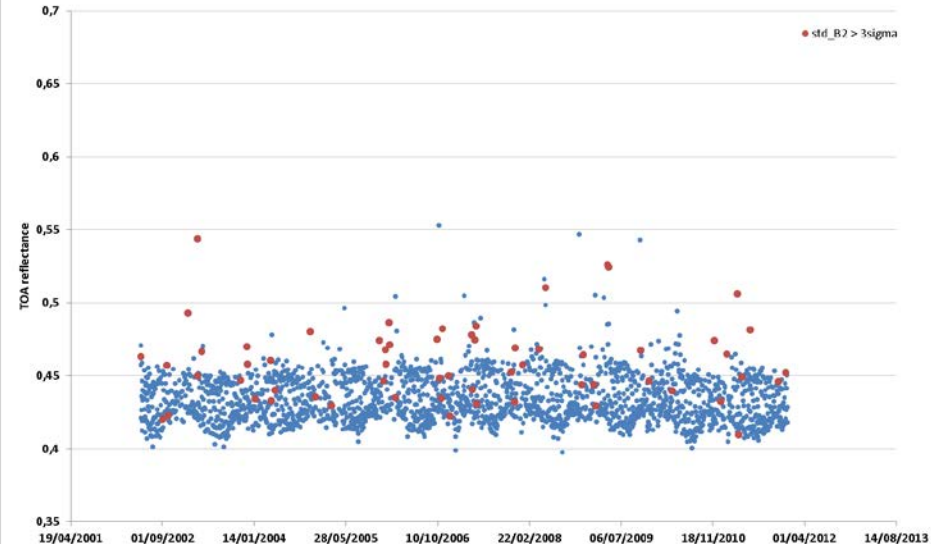
- Exploitation of the spatial standard deviation associated to each SADE data
- Band ratios, etc.

Post-filtering of MODIS data

Libya 4 : VGT-2 sensor
Standard deviation B2



Libya 4 : VGT-2 sensor
TOA reflectance B2



Thank you for your attention !
