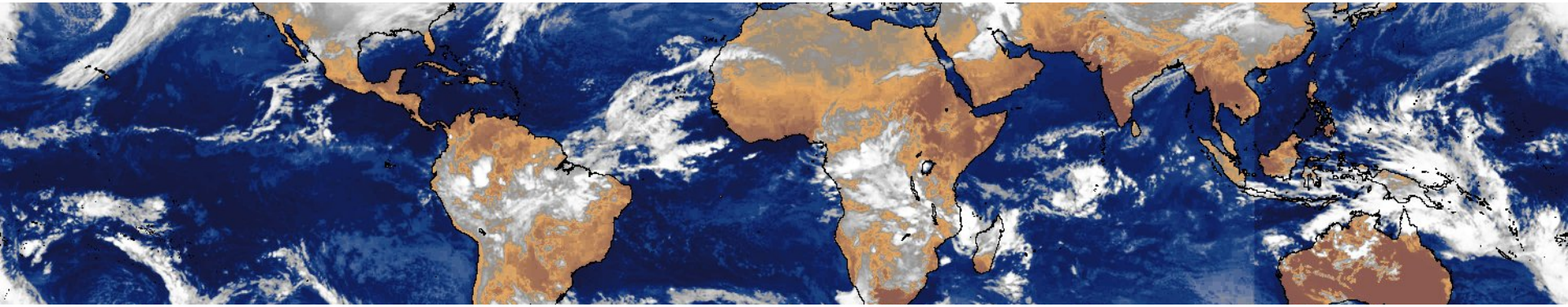
Long term monitoring of ScaRaB



Le 28Janvier 2014 à 0300Z Courtesy SATMOS

Patrick Raberanto, Olivier Chomette, Remy Roca

MEGHA-TROPIQUES : 2011, October 12th - 2014, October 1Oth

3 YEARS of DATA

but due to lack of experience with regard to a long serie

ScaRaB-1 : 14 months
ScaRaB-2 : 9 months

STABILITY of ScaRaB-3 on MT ?

Outline:

Calibration on-board

Geophysical target: Deep Convective Clouds

Monitoring with radiance comparison

Conclusion

Calibration on-board

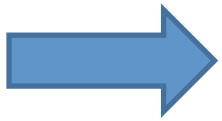
CNES Team – Tec-MT uses :

Different modes: once a month

Calibration mode (MC) using CALM

Solar Mode (MS)

Total Mode (MT)

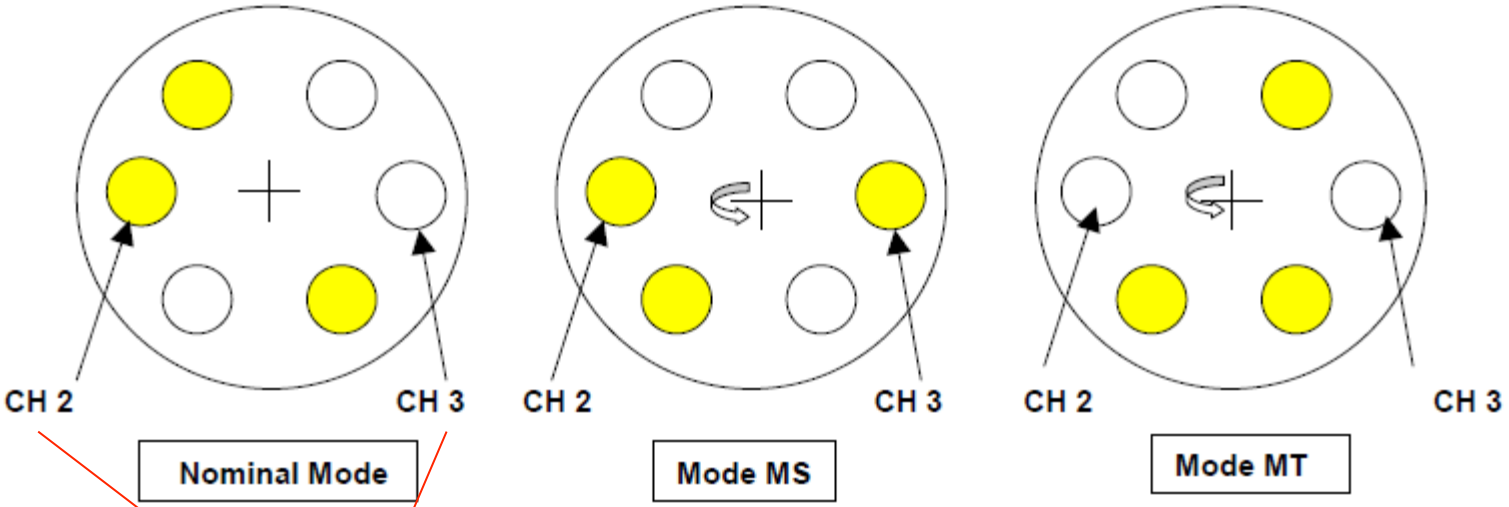


Instrument parameters

Gains (Gi)

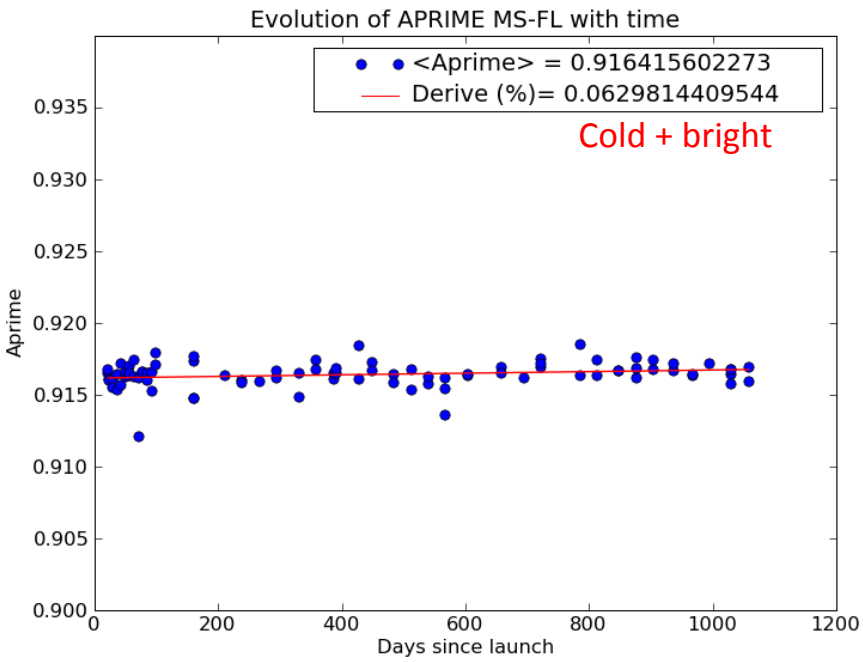
A' : (LW= TW – A' SW)

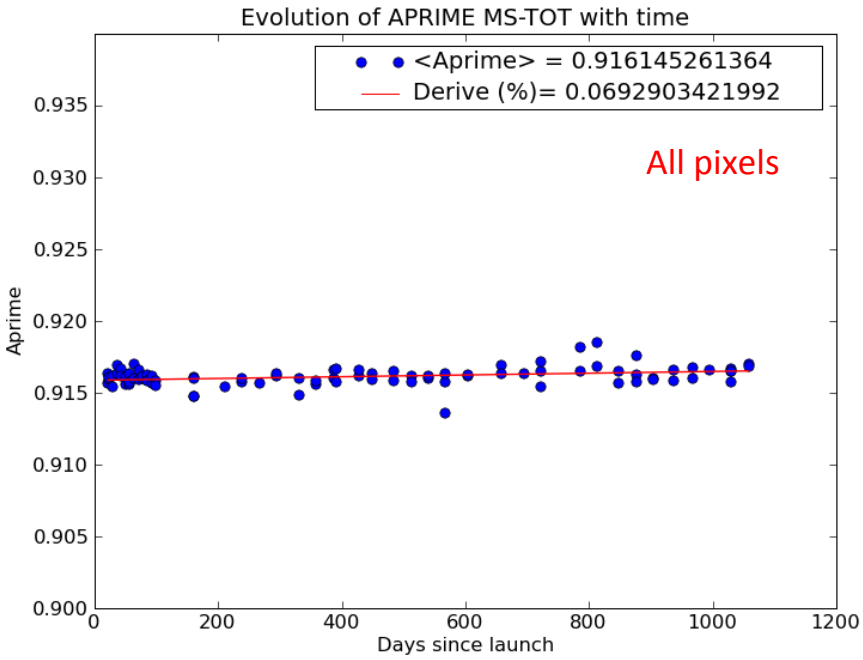
SCARAB ACQUISITION MODES



$$L_{lw} = L_{tot} - A^{'}.L_{sw}$$

A' COEFFICIENT IN SOLAR MODE





A' coefficient must have a time deviation lower than 0.1 % whatever the acquisition mode

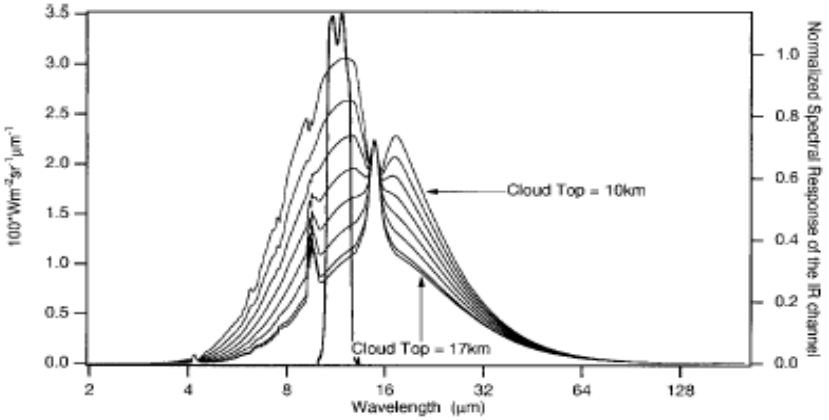
Using Geophysical target :

Deep Convective Cloud

Deep Convective Cloud

principle:

Hypothesis: **Very Cold, high clouds --→ Black Body**



Simulation with the **MODTRAN radiative transfert model**
Top of the clouds : between 10-17 km

=> **Tb using L4 radiance**

Convective Clouds: Tb < 205°K

L4 < 7 Wm-2sr-1

LW: Channel 3, 4 **Rapport LLW/LIR**

SW: Channel 1, 2 **Rapport Lvis/LSW**

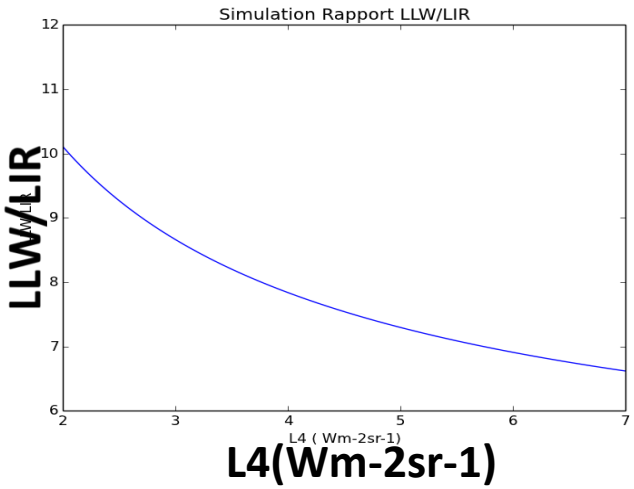
Longwave

DCC: LLW/LIR

MODTRAN : **using the channel spectral responses**
LLW/LIR versus LIR(L4)

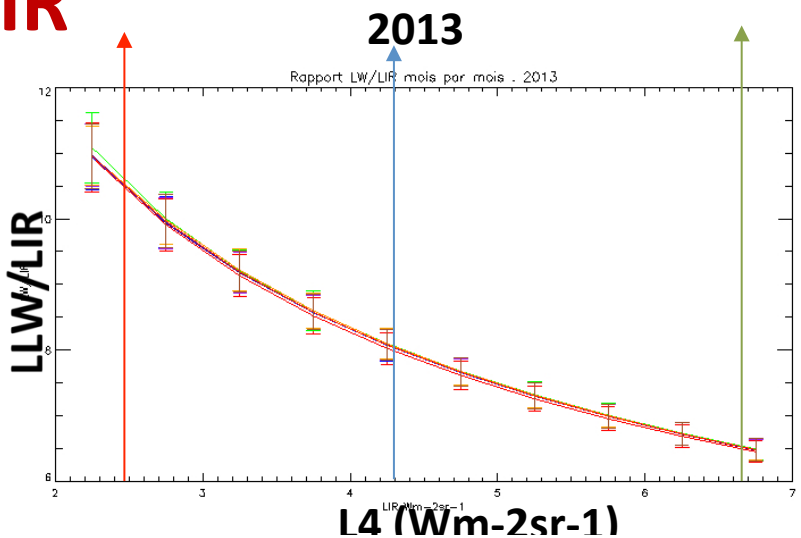
Night: **LLW=LTW**
Day: **LLW=LTW-A'LSW**

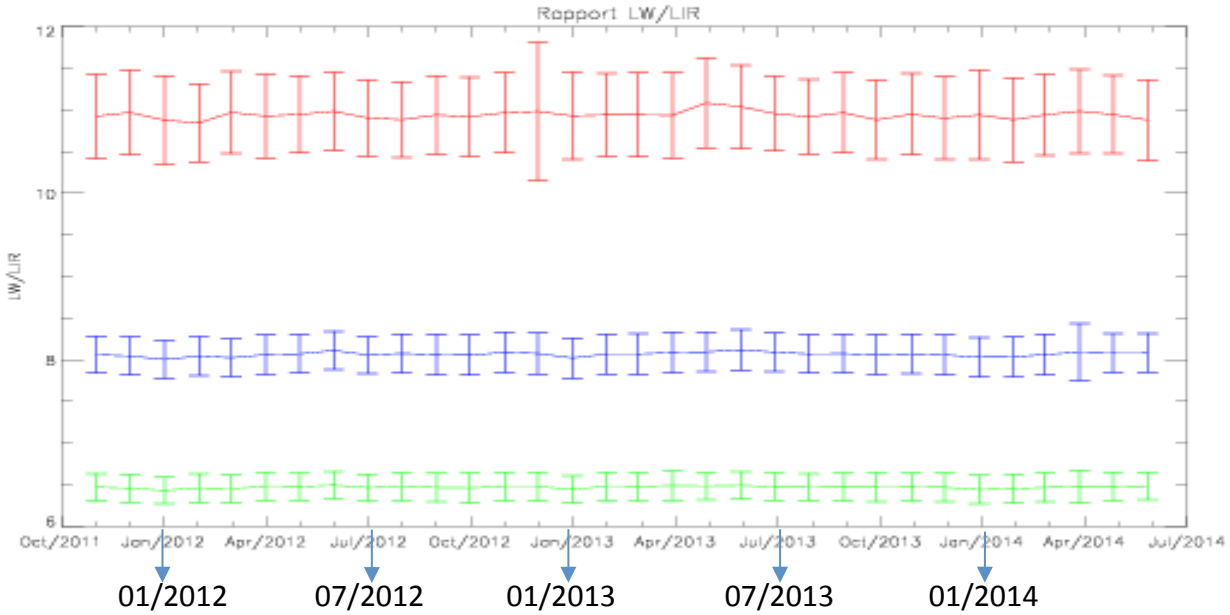
Theoritical computation:



LW

DCC: LLW/LIR



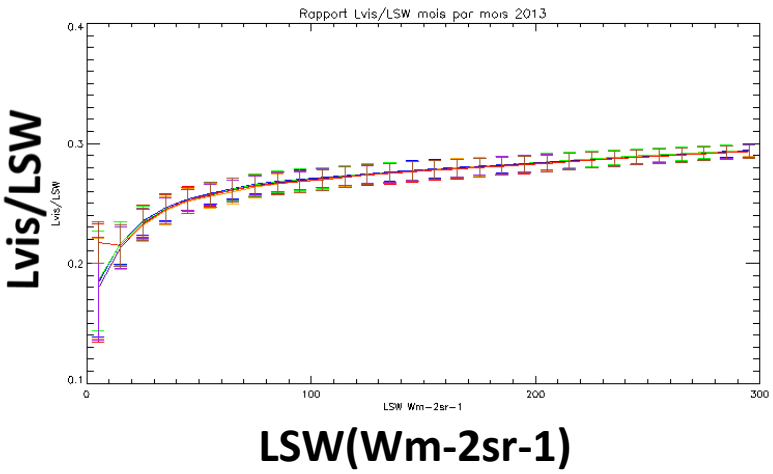


LW=2.5 Wm-2sr-1

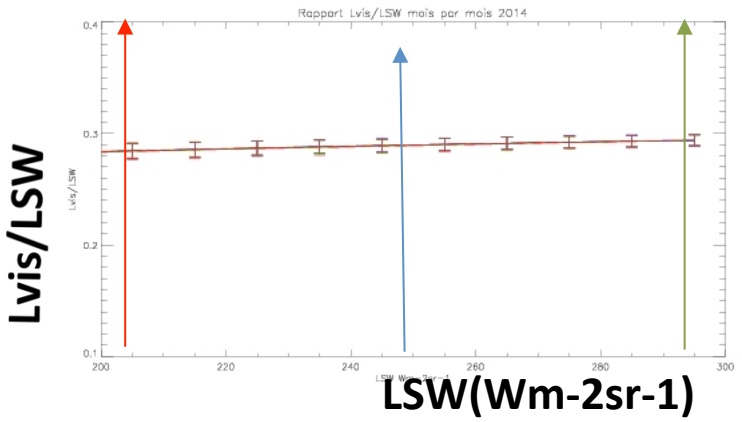
LW=4.25 Wm-2sr-1

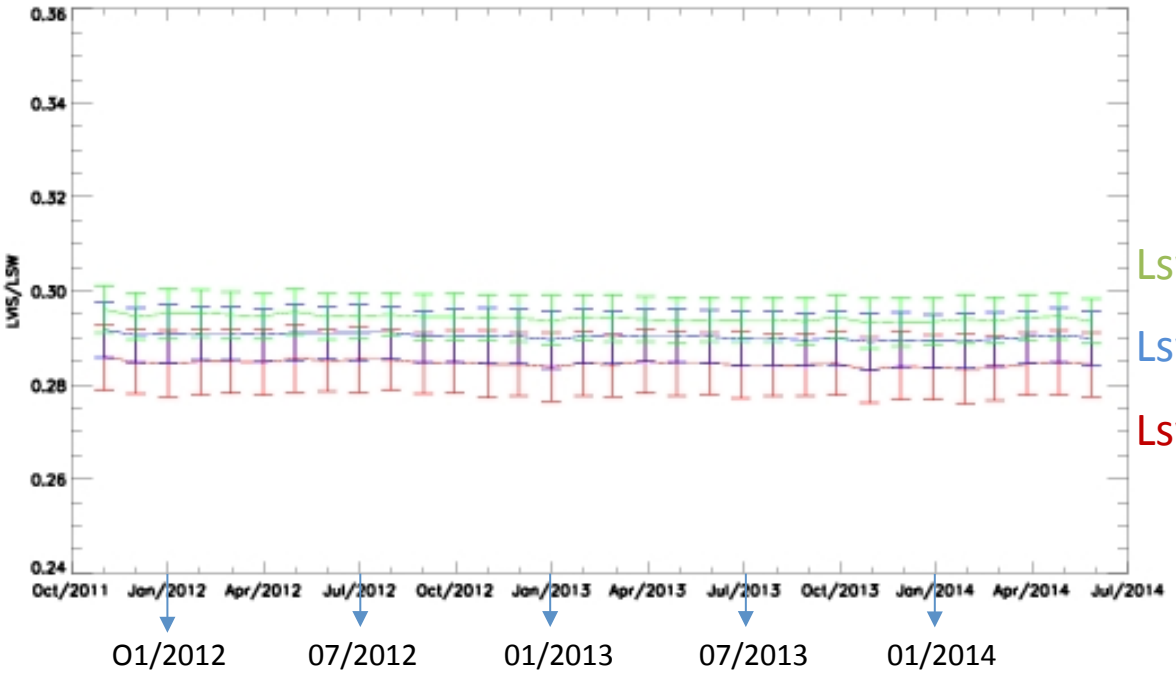
LW=6.75 Wm-2sr-1

SW DCC: LVIS/LSW



LSW > 200 Wm-2sr-1





Lsw=295Wm-2sr-1

Lsw=255Wm-2sr-1

Lsw=205Wm-2sr-1

Monitoring with radiance comparison with CERES data

done by O. Chomette

Radiances monitoring with CERES data

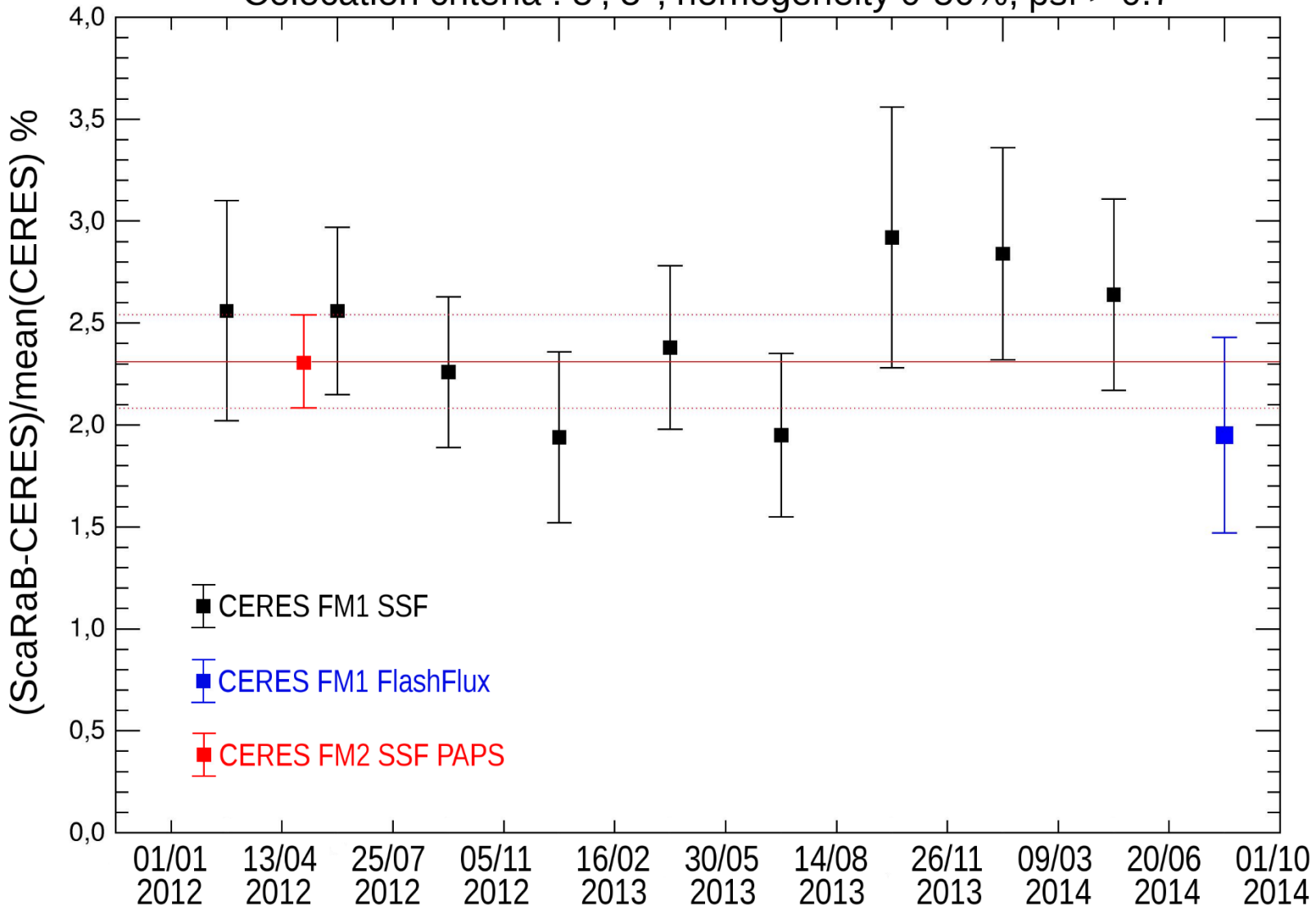
102 days (2 MT precession cycles)
SSF until june 2014 , Flash Flux after

Colocation described by O. Chomette

temporal	5’
Cone	5°
homogeneity index : between 0-50%	
PSF	0.7

Comparisons between CERES & ScaRaB SW Radiances

Colocation criteria : 5', 5°, homogeneity 0-50%, psf > 0.7



Summary

3 different methods to monitor long time serie

ScaRaB Radiometers
confident with on-board calibration
very stable during his life time

Working about aging in particular SW and Visible ?