



CENTRE NATIONAL D'ÉTUDES SPATIALES

# Current Status of the SADE Database at CNES

Claire Tinel, Patrice Henry, Bertrand Fournie - CNES

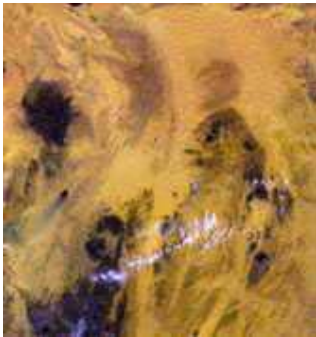
## Outline

- **SADE Database (Deserts)**
- **MODIS data current status**
- **Multi-Temporal calibration over DCC**

## Calibration of in-flight optical sensors using natural targets

### ■ Calibration Methods

- ◆ 5 calibration methods are used to calibrate sensors



**Deserts**



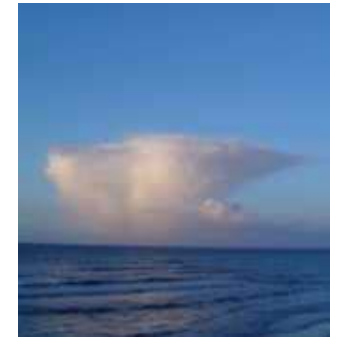
**Sun Glint**



**Rayleigh**

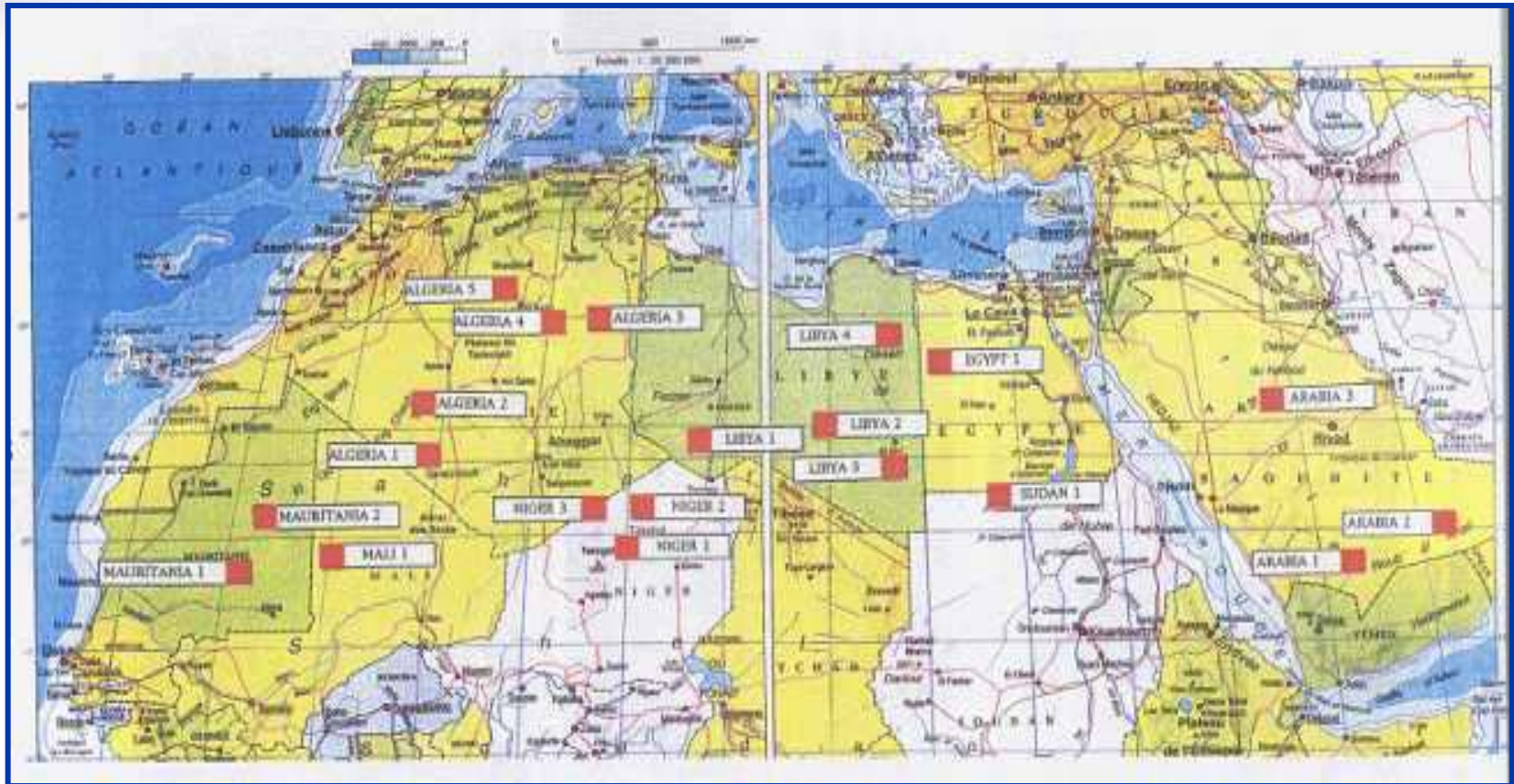


**Snow**



**Clouds**

- ◆ **These calibration methods are used operationally at CNES**
  - for POLDER 1, 2, 3, VEGETATION 1 and 2,
  - for SPOT satellites, MERIS, FORMOSAT-2 and KOMPSAT-2



■ **19 sites selected over North Africa and Arabia**

## ■ Desert Sites Database

- Systematic collect of satellite acquisitions over the 19 sites :  
Operational monitoring of CNES sensors calibration (on a monthly basis) :

- ◆ SPOT(s)/High Resolution
- ◆ SPOT(s)/Vegetation-1&2
- ◆ PARASOL

Calibration monitoring and intercalibration of other sensors on a regular basis  
(through cooperation agreements with international space agencies)

- ◆ High resolution : Formosat-2 (Taiwan NSPO), Kompsat-2 (South Korea KARI)
- ◆ Coarse resolution : MERIS (ESA), MODIS/AQUA (soon to come)

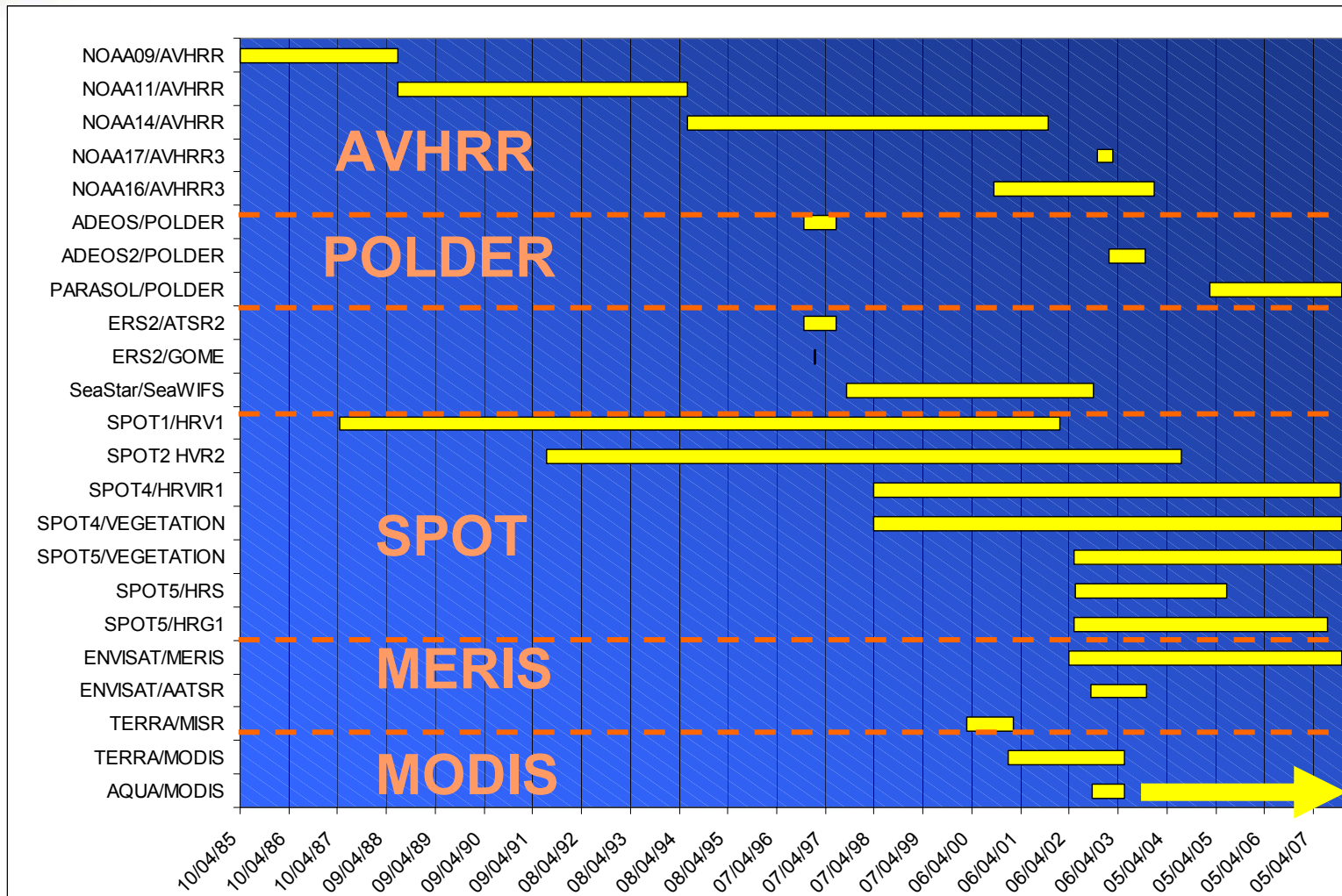
- Storage in a data base :

- SADE data base : “Structure d’Accueil de Données d’Etalonnage” (**Calibration Data Repository**)
- Easy data management (**MUSCLE software**)
- Link between satellite measurements, calibration and synthesis results (**Traceability**)

- The SADE data base also includes calibration measurements over ocean, sun glint, clouds and snowy sites
- Snowy sites: Dôme Concordia : SPOT(s)/Vegetation-1&2 and PARASOL measurements  
MODIS and SPOT(s) High Resolution (soon to come)

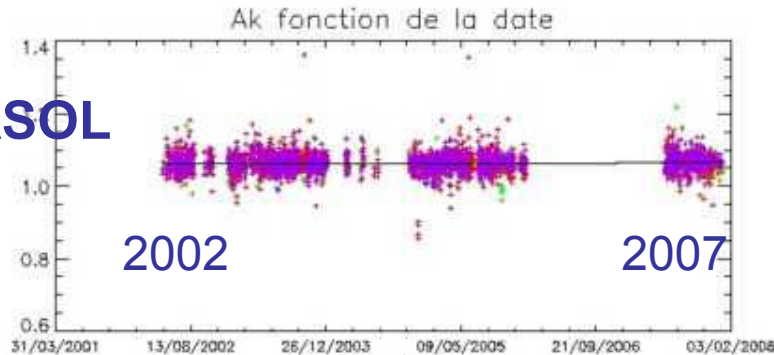


## ■ Desert Sites Database (from 1985 until 2008)

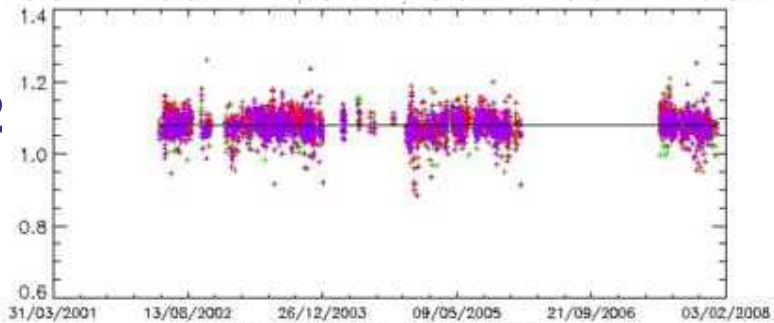


# MERIS On-board Calibration Validation (Band 665)

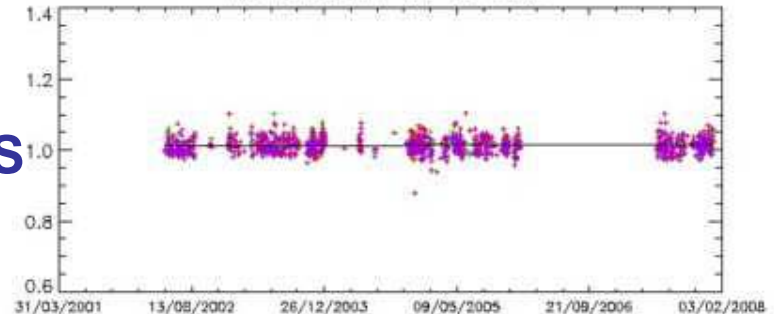
**PARASOL**



**VGT2**



**MODIS**



Cross-calibration with PARASOL, VGT2 and MODIS as a function of time (19 sites)

Matching measurements = same viewing and solar geometries (no collocation with time)

PARASOL : 4000 match. meas.  
 VGT2 : 4600 match. meas.  
 MODIS : 1400 match. meas.

**No significant variation with time**  
**Agreement between all ref. sensors**

## MODIS Data Current Status

- MODIS data extraction tool currently developed
- End of February 2008 : tool implementation in MUSCLE
- March – April 2008 : Insertion of 2006 MODIS data (V5) in SADE
- From April 2008 : Operational insertion of MODIS data  
: Insertion of MODIS data from launch until today



## ■ Dense convective clouds targets :

### ◆ every month, acquisitions over

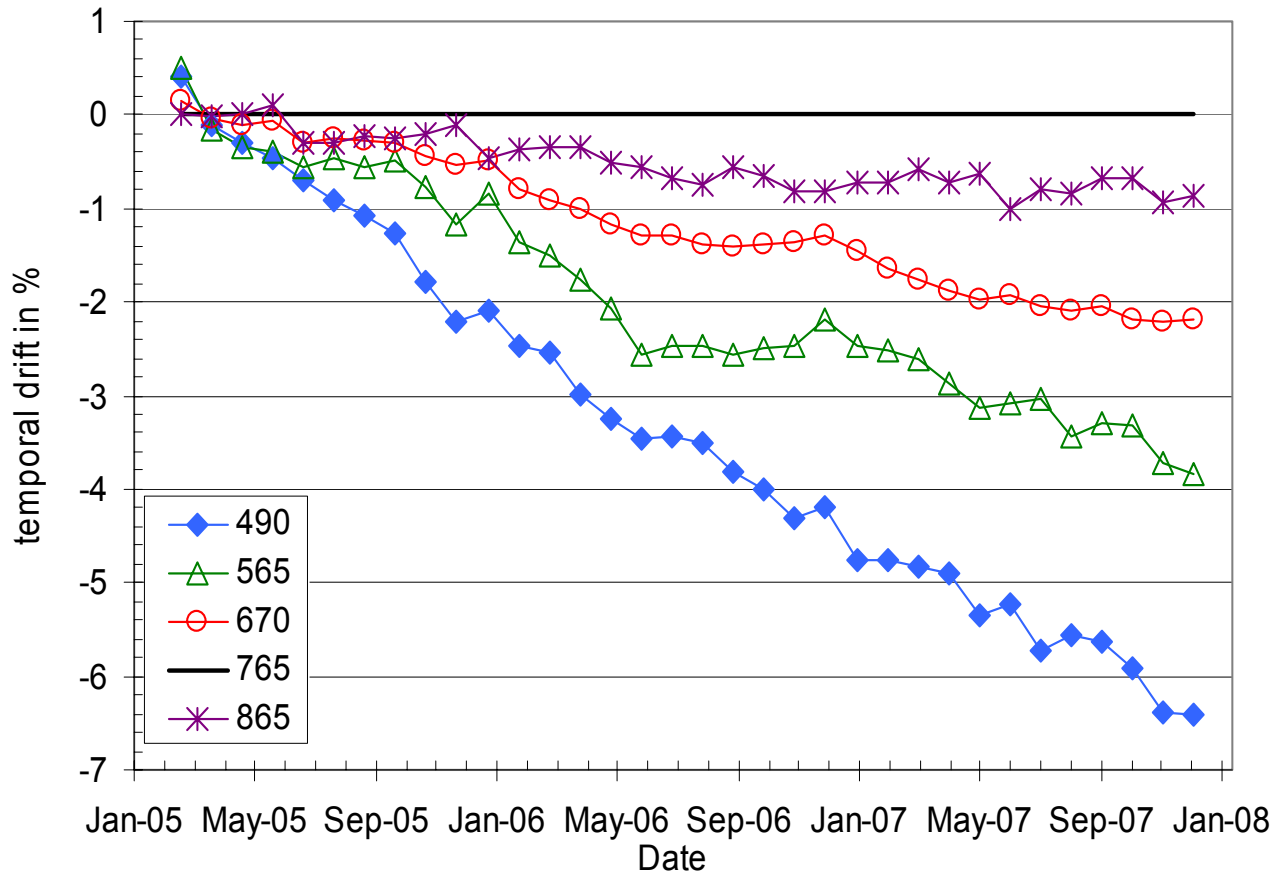
- oceanic sites in Guinea and Maldives
- $\rho_{865} > 0.7$ , neighborhood (5x5)  $< 3\%$ , Papp  $< 400\text{hPa}$
- "nadir/zenith" geometries :  $\theta_s < 30^\circ$  et  $\theta_v < 40^\circ$  (avoiding shadow)
- 200 to 2000 points after a strict selection (for PARASOL)

Criteria	Characteristics	Properties
reflectance in band 865 $> 0.7$	intensive scattering inside the cloud	dense scattered cloud
Inter-tropical sites	favorable areas for the convection mechanism	convective cloud
oceanic site	negligible surface contribution	predominance of the cloud
apparent pressure $< 400\text{HPa}$	top of the cloud $> 11\text{km}$ low molecular and aerosol impact	very high cloud
cloud size $> 70 \times 70 \text{ km}^2$	spatially large cloud structure	large cloud
rms for band 865 $< 3\%$ over $30 \times 30 \text{ km}^2$	homogeneity minimization of structure effect	homogenous cloud
solar angle $< 30^\circ$ viewing angle $< 40^\circ$	"nadir/zenith" viewing low bidirectional and shadow effects	reference geometry

# Multi-temporal calibration over convective clouds

## ■ Monitoring of the radiometric sensor stability : Application to PARASOL

- ◆ interband calibration method (white targets) = need a reference band



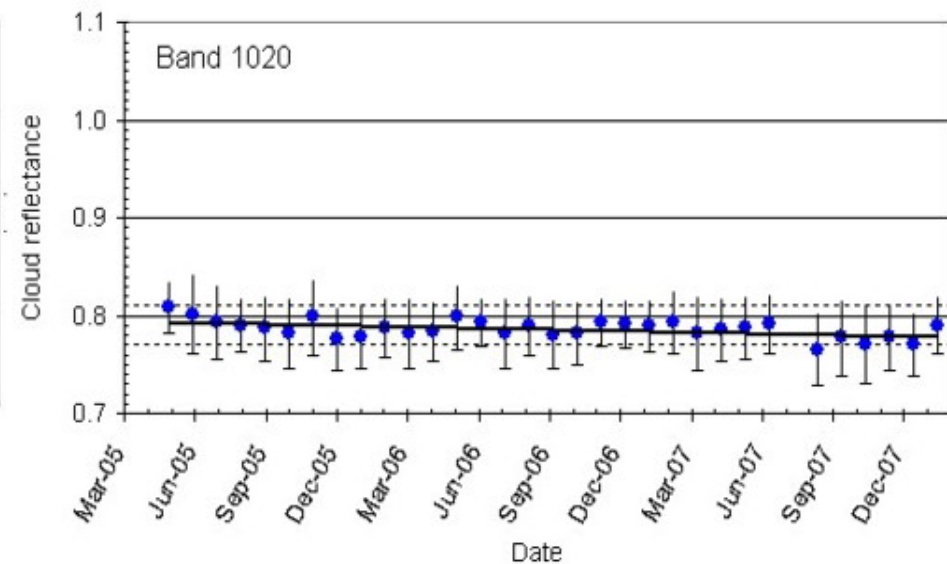
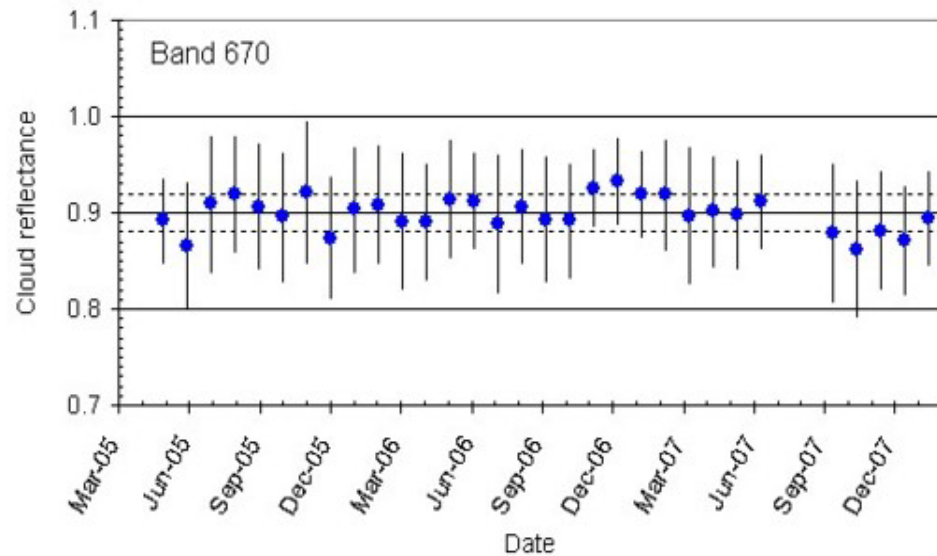
3 years of data

assuming 765 is stable with time  
(validated hypothesis)

accuracy close to 0.2%

# Multi-temporal calibration over convective clouds

- very good potentialities to use absolute monthly mean :
  - ◆ monthly mean cloud reflectance over 3 years of PARASOL data



monthly RMS = 8% for 670nm, and 3% for 1020nm

stability with time close to  $\pm 3\%$  for band 670nm, and  $\pm 1.5\%$  for band 1020nm