CENTRE NATIONAL D'ÉTUDES SPATIALES

CNES in-orbit calibration activities for visible and NIR sensors

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CNES background in calibration activity

- CNES has developed different calibration methods over natural targets for visible and NIR optical sensors
  - Rayleigh scattering over ocean
  - Sun glint over ocean
  - Deep convective clouds (DCC)
  - Stable African deserts
  - Antarctica (Dome C site)
  - Autonomous calibration station (for high resolution)
  - Lunar calibration
- Most of them are used on an operational basis
  - Monitoring the CNES sensors calibration (SPOT, VGT, POLDER…)
  - Inter calibration with other sensors (MERIS, SeaWiFS, AVHRR, MODIS, Formosat2, Kompsat2…)

Calibration monitoring activities for CNES missions (1)

- **POLDER 3 on-board PARASOL (A-train)**
  - Routine calibration monitoring using DCC calibration (every month)
  - Regular calibration check with other methods : Rayleigh scattering, sun glint, desert sites (every 6 months)
- **VGT2 on-board SPOT5**
  - Misfunctioning of the on-board calibration device
  - Routine calibration monitoring using desert sites (every month)
  - Regular calibration check with other methods : Rayleigh scattering, sun glint, Antarctica sites (once a year)
- **High resolution instruments on-board SPOT4 & SPOT5**
  - Routine calibration monitoring over desert sites
  - Calibration campaigns over La Crau and Negev desert (twice a year)

Calibration monitoring activities for CNES missions (2)

- IIR on-board CALIPSO (A-Train)
  - Calibration monitoring using on-board device
- IASI on-board METOP
  - Radiometric and spectral calibration
  - Regular performance checks
  - IASI / AIRS inter-calibration

<u>Soon to come</u> :

- Recalibration of VGT1 data
  - To insure with VGT2 a consistent set of data over 10 years
- Preparation of Pleiades and Venμs in-orbit calibration

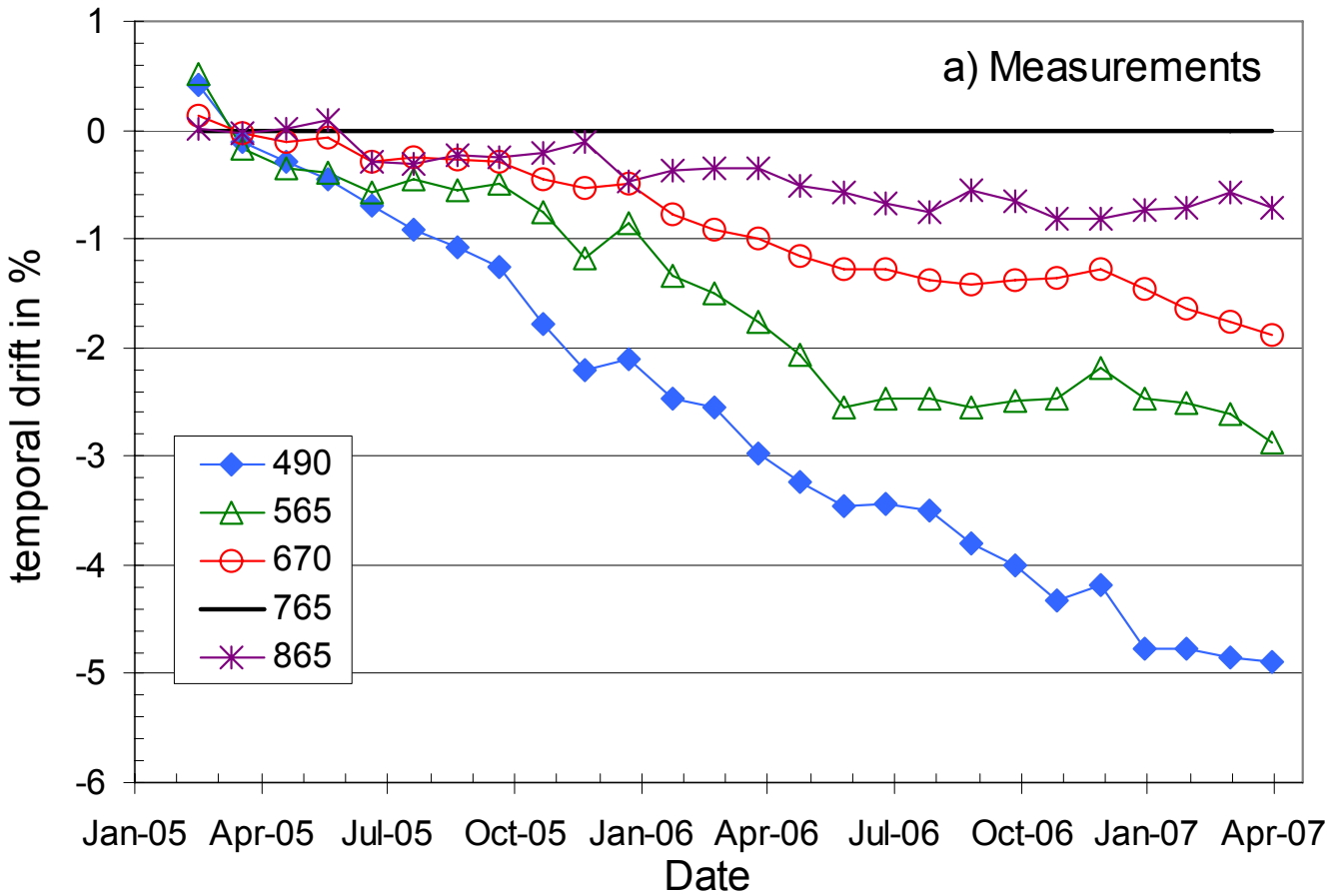
Cal/Val activities in cooperation with other agencies

- **FORMOSAT2 calibration for NSPO**
  - Activity started in 2005
  - Calibration monitoring over deserts, absolute calibration over La Crau, programming gains optimization using the worldwide CNES data base
- **Kompsat2 Cal/Val activities for KARI**
  - Activity in progress
  - Geometric calibration, FTM assessment, radiometric calibration…
- **MERIS for ESA**
  - Desert, Rayleigh and glitter calibration on an operational basis
- **Other inter-calibration activities**
  - MODIS, AVHRR (in the framework of GSICS activities)

Recent results

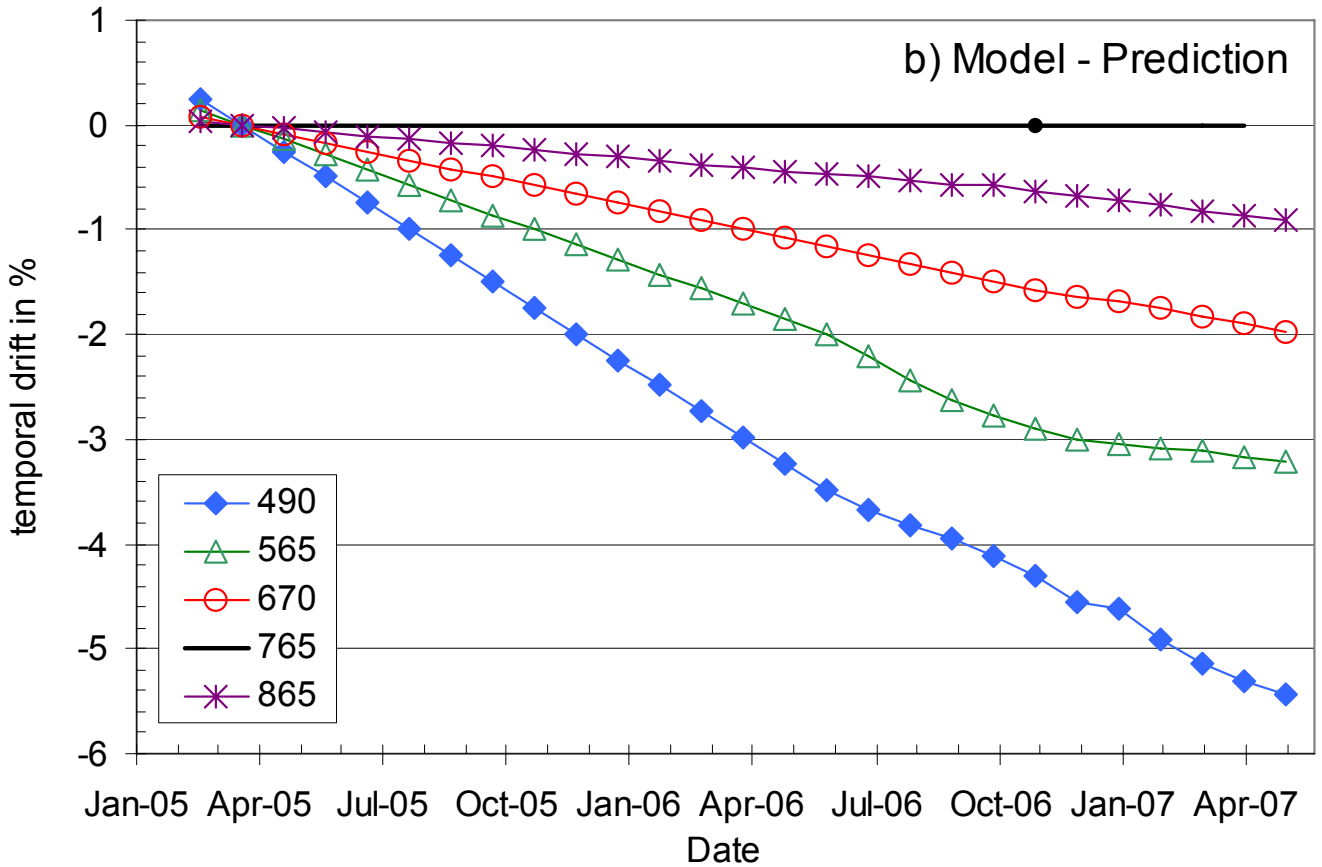
2 years of PARASOL calibration over DCC (1)

- **Calibration measurements performed every month (using 1 week of data)**

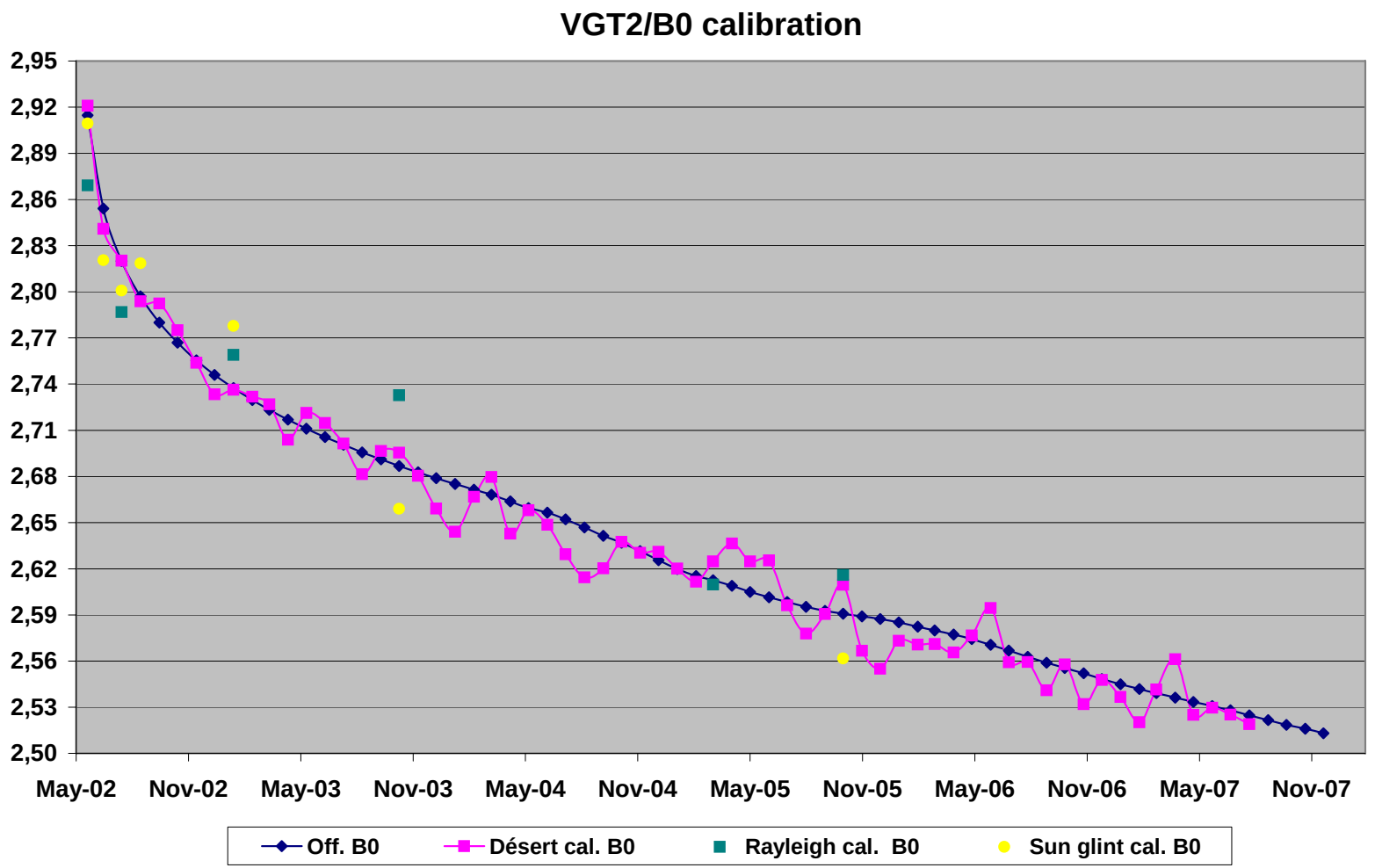


2 years of PARASOL calibration over DCC (2)

- **Calibration model (fitted with 18 months of measurements) + extrapolation performed every month using new measurements**



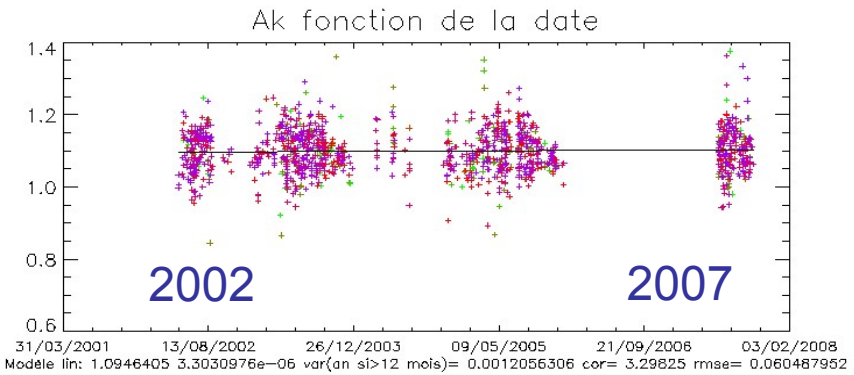
VGT2 calibration monitoring over desert sites



MERIS calibration monitoring

based on cross-calibration with PARASOL over 20 desert sites

490



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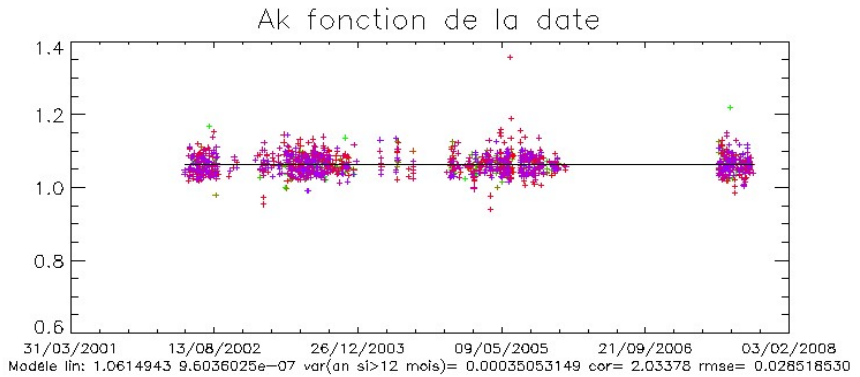

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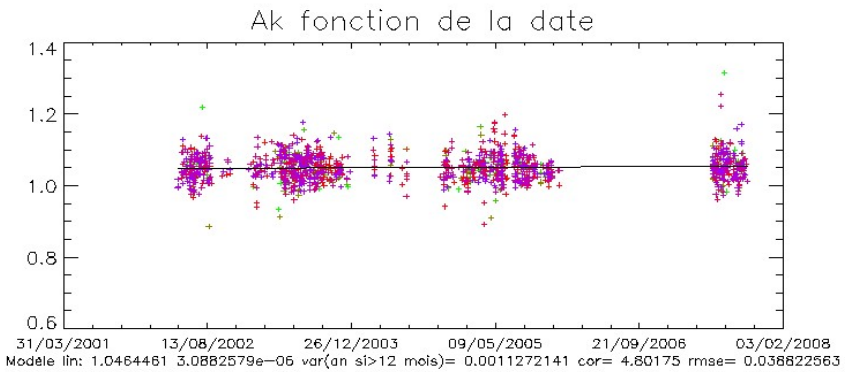

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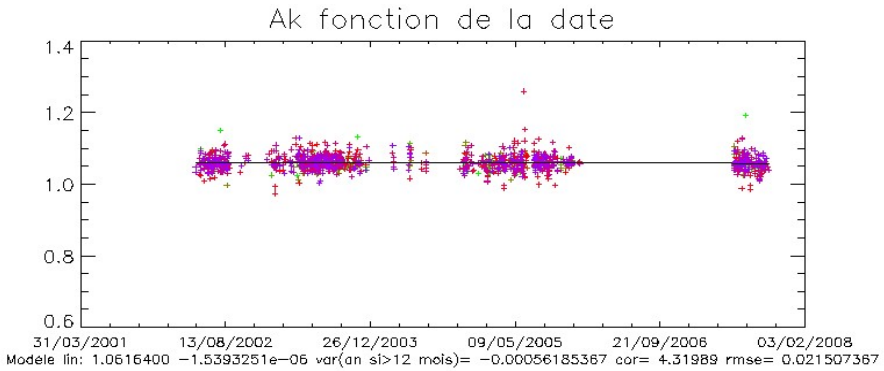
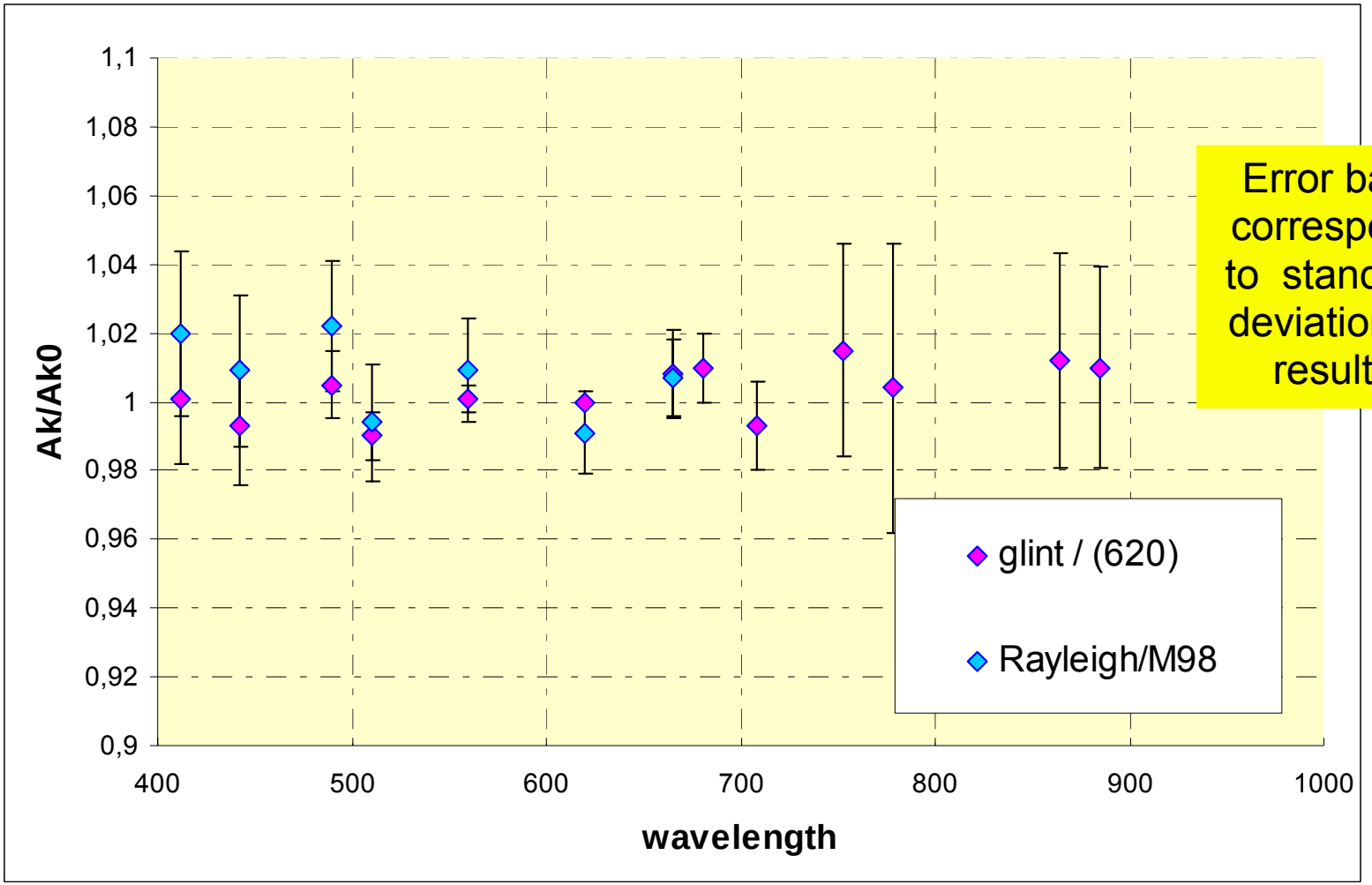


No significant variation with time

Validation of MERIS calibration

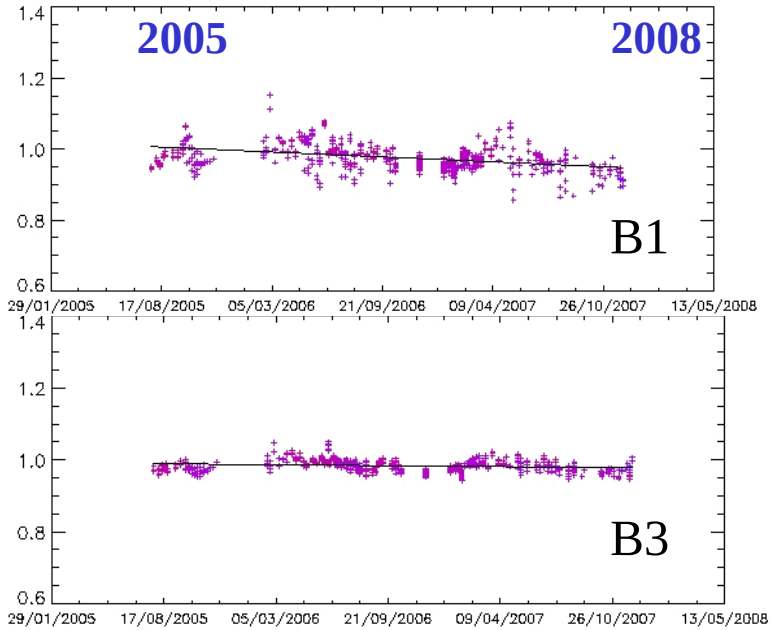
using Rayleigh scattering and sun glint methods

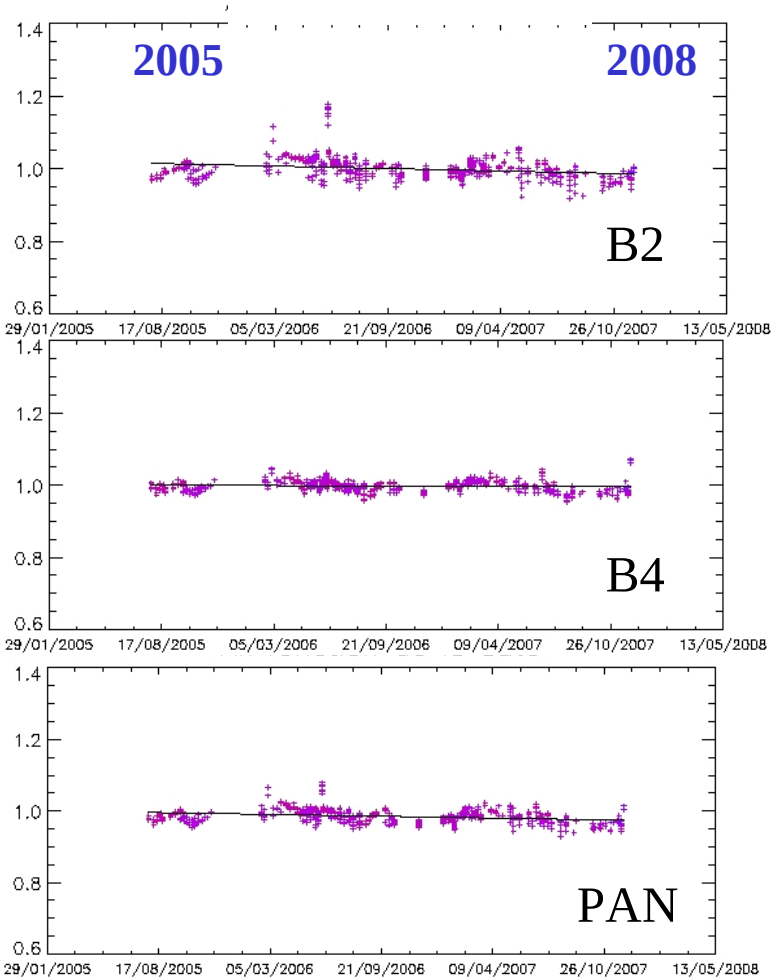


No discrepancy greater than 2%

Formosat 2 calibration monitoring

based on cross-calibration with POLDER1 over 20 desert sites





Spectral band	Loss (in 2.5 years)
B1	~ 4 %
B2	~ 1.5 %
B3	< 1 %
B4	negligeable
PAN	< 1 %

700 calibration points from July 2005 until Nov 2007