Current Status of the SADE Database at CNES

Claire Tinel, Patrice Henry, Bertrand Fougnie - 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

- 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
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)
SADE Data Base

- Desert Sites Database (from 1985 until 2008)

**SADE Data Base**

- AVHRR
- POLDER
- SPOT
- MERIS
- MODIS
- AVHRR
- POLDER
- SPOT
- MERIS
- MODIS

GSICS – Feb 2008 – Claire Tinel / CNES
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 < 400hPa
  - "nadir/zenith" geometries: $\theta_s < 30^\circ$ et $\theta_v < 40^\circ$ (avoiding shadow)
  - 200 to 2000 points after a strict selection (for PARASOL)

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<table>
<thead>
<tr>
<th>Criteria</th>
<th>Characteristics</th>
<th>Properties</th>
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<tbody>
<tr>
<td>reflectance in band 865 &gt; 0.7</td>
<td>intensive scattering inside the cloud</td>
<td>dense scattered cloud</td>
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<tr>
<td>Inter-tropical sites</td>
<td>favorable areas for the convection mechanism</td>
<td>convective cloud</td>
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<tr>
<td>oceanic site</td>
<td>negligible surface contribution</td>
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<tr>
<td>apparent pressure &lt; 400HPa</td>
<td>top of the cloud &gt; 11km</td>
<td>predominance of the cloud</td>
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<td>cloud size &gt; 70x70 km²</td>
<td>low molecular and aerosol impact</td>
<td>very high cloud</td>
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<tr>
<td>rms for band 865 &lt; 3% over 30x30km²</td>
<td>spatially large cloud structure</td>
<td>large cloud</td>
</tr>
<tr>
<td>solar angle &lt; 30°</td>
<td>homogeneity</td>
<td>homogenous cloud</td>
</tr>
<tr>
<td>viewing angle &lt; 40°</td>
<td>minimization of structure effect</td>
<td></td>
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<tr>
<td></td>
<td>&quot;nadir/zenith&quot; viewing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>low bidirectional and shadow effects</td>
<td>reference geometry</td>
</tr>
</tbody>
</table>
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%
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 ±3% for band 670nm, and ±1.5% for band 1020nm