Long-term satellite-based cloud property datasets derived within CM SAF

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Outline

• Overview of CM SAF
• CM SAF cloud property datasets
  • 7 year record of SEVIRI
  • 28 year record of AVHRR GAC
• Example of validation and known problems
• Future activities
• Summary
CM SAF overview

- EUMETSAT Satellite Application Facility on Climate Monitoring (CM SAF)
CM SAF overview

- CM SAF’s role in climate monitoring and research
CM SAF overview

- CM SAF provides medium- and long-term cloud, radiation, water vapour and temperature products /datasets derived from different instruments (Schulz et al., 2009).

- As complementing part to the creation of operational monitoring products, CM SAF is increasingly focusing on the generation of retrospectively produced long-term datasets taking into latest retrieval developments and inter-calibrated and homogenized satellite measurement records.

- For these datasets errors due orbit changes and inter-satellite biases are minimized. These datasets can be used for monitoring inter-annual variability, and for climate analysis and trend investigation.
CM SAF cloud property datasets

**SEVIRI (Meteosat SG)**

**AVHRR (NOAA-xy, MetOp)**

Temporal coverage

Mean daytime cloud fraction – CM SAF AVHRR (01/1982–12/2009)

Temporal coverage
**CM SAF cloud property datasets**

**SEVIRI (Meteosat SG)**
- MSG-NWC package for CFC, CTH, CTP, CTT; CPP software for COT, LWP, IWP
- ERA-Interim used as auxiliary data
- SEVIRI on MSG1/2, 2004 – 2010, full SEVIRI disk
- **IR**: Reprocessed radiances before May/2008 (recently provided by EUMETSAT)
- **VIS/NIR**: calibration (against MODIS, done by KNMI) applied to channels 0.6, 0.8, 1.6
- Daily and monthly means, 1d/2d histograms

**AVHRR (NOAA-xy, MetOp)**
- PPS software package for CFC, CTH, CTP, CTT; CPP software for COT, LWP, IWP
- ERA-Interim used as auxiliary data
- AVHRR-GAC of all NOAA and MetOp, 1982 – 2009, global coverage on 0.25°
- **VIS**: Recalibrated visible reflectances provided by NOAA (Heidinger et al., 2010).
- **IR**: unchanged (only onboard BB calibration)
- Daily and monthly means, 1d/2d histograms

CPP: Cloud Physical Properties (Roebeling et al., 2006; PUM, 2009)
MSG-NWC: NWC SAF MSG software package (SATBD1, 2009)
PPS: NWC SAF Polar Processing System (Dybbroe et al., 2005a and Dybbroe et al., 2005b)
CM SAF cloud property datasets

Derived cloud parameters:

- Cloud Fractional Coverage (CFC)
- Cloud Top Parameters (CTH, CTP, CTT)
- Cloud Phase (CPH)
- Liquid/Ice Water Path (LWP/IWP)
- Cloud Optical Thickness (COT)
- 1D-Histograms, COT-CTP-2D-Histograms
Validation examples

CFC

CTP
Validation examples

Cloud phase all sfc. 200607

LWP afternoon all sfc. 200607

IWP afternoon all sfc. 200607

Joint Cloud Property Histograms

CMSAF AVHRR

MODIS

ISCCP
Known problems - example

Courtesy of M. Foster
Future cloud-related activities

• **Several reprocessing cycles** for SEVIRI and AVHRR cloud property datasets will be carried out using updated retrieval schemes and radiance records (new METEOSAT IR cal. (?) and AVHRR IR cal. (e.g. Mittaz and Harris, 2009))

• Two additional cloud datasets will be included in CM SAF’s portfolio: **MVIRI+SEVIRI** cloud cover dataset, **TOVS+ATOVS** high cloud amounts
Summary

• In addition to the operational products, CM SAF is generating more and more **climate data records** for **radiation** (e.g. MVIRI, SEVIRI, AVHRR), tropospheric **humidity and temperature** (SSM/I, ATOVS), and **clouds** (SEVIRI, AVHRR, (A)TOVS), with periodic reprocessings.

• 1st generation of AVHRR cloud properties datasets was finished

• 1st SEVIRI cloud property datasets will be finished soon

• In the near future TOVS & ATOVS based datasets (with focus on high clouds) will be generated.

• All products and datasets are comprehensively evaluated and documented (www.cmsaf.eu)
References


Thank you