Cloud Assessment

Status Report

http://climserv.ipsl.polytechnique.fr/gewexca

Co-chairs:

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Assessments of global climate records

essential for climate studies & model evaluation

& should include:

- **Description of retrieval algorithms and references**
- **Averages and distributions of the different variables**

(maps, latitude bands, specific regions)

- **Time variability**

(seasonal and diurnal variation, interannual variability)

- **Uncertainties and biases due to:**

Calibration, sampling (time & space), instrument sensitivity, retrieval method

- **Common data base**

providing monthly statistics (for ex. in netCDF)

so that every new data base can compare to this data base…

It takes time & effort….

Cloud Assessment

Apr 2005: **1. meeting, Madison** *(co-chairs: G. Campbell, B. Baum)*
focus on longterm anomalies

Jul 2006: **2. meeting, Madison** *(co-chairs: B. Baum, C. Stubenrauch)*
focus on cloud amount

2007/08: **Preparation of datasets for intercomparisons**
(via http://climserv.ipsl.polytechnique.fr/gewexca)

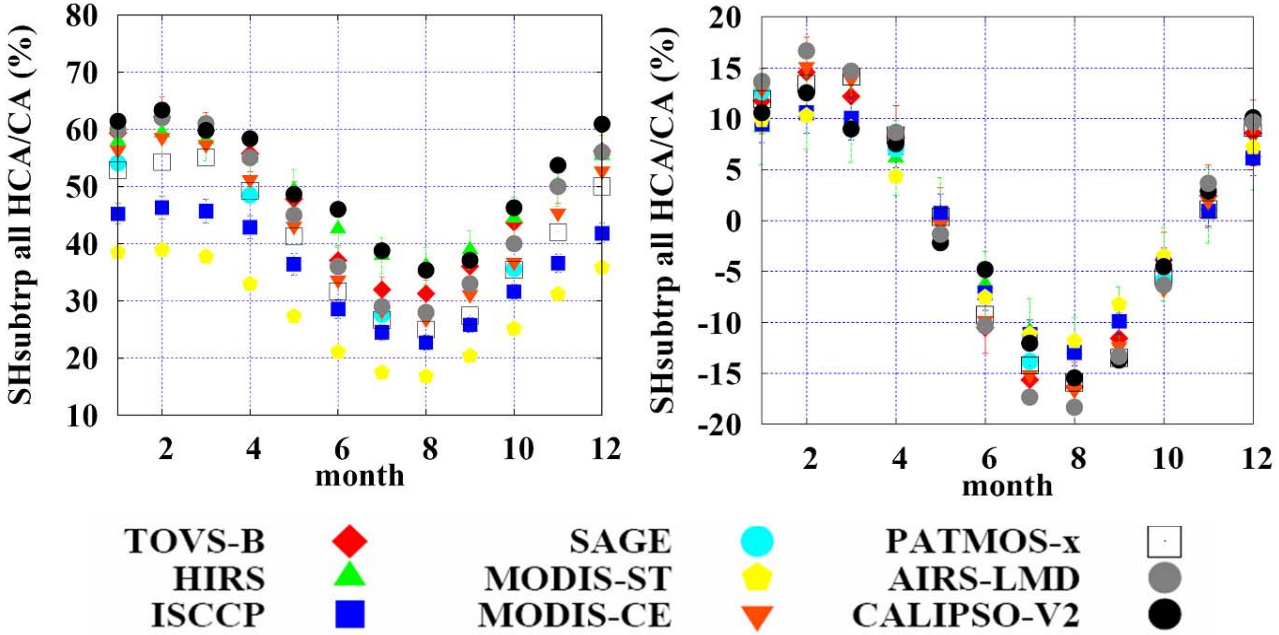
Jul 2008: **3. meeting, New York** *(co-chairs: C. Stubenrauch, S. Kinne)*
intercomparison of cloud variables per type
1. draft of WCRP report (75 pages; on CA, CAHR, CAMR, CALR)

2009: **Preparation of common data base (netCDF)**
& quality checks ***+ GEWEX news article (Feb)***

2010: **Intercomparison / quality checks**

Jun 2010: **4. meeting, Berlin** **=> WCRP report & article**

GEWEX news article, Feb 2009



Key results:

- 70% (±5%) clouds: ~ 40% high clouds & ~40% single-layer low clouds
- geographical cloud structures & seasonal cycles agree quite well
- absolute values depend on instrument sensitivity (& retrieval method)
- detection thresholds also affect average cloud opt. depth & T
- trend analysis difficult, synergy of data sets & variables important

Data requests

(decided at New York meeting in 2008)

Monthly statistics per year & obs time, 1° x 1°

- average, • standard deviation, • uncertainty,
- histograms, • nb obs

properties

- cloud amount **CA** (tot, H, M, L, W, I)
- rel. cloud amount **CAR** (H, M, L, W, I)
- VIS optical depth **COD** (tot, H, M, L, W, I)
- IR emissivity **CEM** (tot, H, M, L, W, I)
- pressure **CP** (tot)
- temperature **CT** (tot, H, M, L, W, I)
- Water path **CLWP/CIWP** (W, I, IH)
- r_{eff} **CRE** (W, I, IH)

joint histograms

COD – CP, CEM – CP, COD – CRE

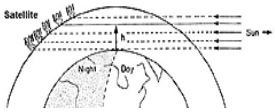
netCDF data : a s h (e)

only averages

* most complete variables

Longterm cloud climatologies:

***ISCCP** *GEWEX cloud dataset*	*1984-2007*	*(Rossow et al. 1999)*
PATMOS-x *AVHRR*	*1982-2007*	*(NESDIS/ORA; Heidinger)*
***TOVS Path-B** *7h30/19h30*	*1987-1995*	*(Stubenrauch et al. 2006)*
HIRS-NOAA *13h30/1h30*	*1982-2008*	*(Wylie et al. 2005)*
SAGE *limb solar occultation*	*1984-2005*	*(Wang et al. 1996, 2001)*
SOBS *Surface OBServations*	*1952-1996*	*(Hahn & Warren 1999; 2003)*



EOS cloud climatologies:

MODIS-ST	*2001/3-2009*	*(Ackerman et al.; Platnick et al.)*
MODIS-CE	*2001/3-2006*	*(Minnis et al.)*
***AIRS-LMD**	*2003-2009*	*(Stubenrauch et al. 2008, 2010)*
MISR	*2001-2007*	*(DiGirolamo)*

+ A-Train:

POLDER	*2006-2008*	*(Riedi)*

CALIPSO *(Winker et al. 2007, 2009)* **GOCCP** *(Chepfer et al. 2009)*

***ATSR-GRAPE**	***ERS, 1997-2002 / ENV, 2003-2009***	*(Poulsen)*

Preparation of GEWEX CA common data base

10/2008: send out *detailed* data request document

01/2009: send out Fortran program to build netCDF files

-12/2009: data sets arrive at IPSL ftp server

-06/2010: checking of data sets, reporting errors, & teams resending data sets

- **Each data set had been produced so far at least 3 times**
- **still some errors in specific datasets not resolved!**
- **Goal:** comprehensive reference data base of cloud properties for climate studies & model evaluation

by 15 Sep 2010 !!!!

inventory:

12 participating data sets, providing invaluable information !

some technical problems still to be resolved:

MODIS-CE: ***histograms are not ok (except CP) !!!***

ATSR-GRAPE: ***histograms not ok for ENV (2003-2009),***
errors are not usable (or too large or too small or neg.)

PATMOSX: ***CAHR, CAMR, CALR in reality CAH, CAM, CAL!***
corrected, but too late for plots

PATMOSX, HIRS: ***histograms to be added,***
how to handle periods with missing data or very incomplete global coverage?

ISCCP, MODIS-CE: ***Pb with 2-dim histograms***
???

Documentation

- **homogenized data descriptions**

(*sensor, calibration, method, ancillary data, sampling, evaluation*)

For each data set:

- **state strength & limitations & suitable applications**

intercomparison :

- **make clear statements on the different cloud properties**
(global averages & distributions, regional variability, seasonal cycles, diurnal cycle, interannual variations, longterm anomalies)

- **completeness of data sets for acceptance in data base?**
- **established, newly developed, complementary data sets ?**

Thank you to all teams &

looking forward to the contributions during this workshop!