AIRS-LMD cloud climatology data description

C. Stubenrauch

When publishing analyses using this data set, you have to use the following references:

Stubenrauch, C. J. , S. Cros, A. Guignard and N. Lamquin: A 6-year global cloud climatology from the Atmospheric InfraRed Sounder aboard the Aqua satellite: statistical analysis in synergy with CALIPSO and CloudSat, *Atmos. Chem. Phys.,* 10, 7197−7214 (2010).

Stubenrauch, C. J. , S. Cros, N. Lamquin, R. Armante, A. Chédin, C. Crevoisier and N. A. Scott: Cloud properties from AIRS and evaluation with CALIPSO, *J. Geophys. Res.*, 113, D00A10, doi:10.1029/2008JD009928 (2008).

In addition, please acknowledge this website and contact us when you encounter any problems or obtain strange results.

The AIRS-LMD climatology is participating in the GEWEX Cloud Assessment, and therefore data are available in a common netCDF format (one file per cloud property, per individual year and observation time) including monthly cloud data at a spatial resolution of 1° latitude x 1° longitude.

The following cloud properties (variables) are given as monthly statistics:

Cloud amount	**CA**
Effective Cloud amount (weighted by cloud emissivity)	**CAE**
Cloud temperature	**CT**
Cloud pressure	**CP**
Cloud IR emissivity	**CEM**
Cloud VIS optical thickness	**COD**

In addition, statistics of these variables is given separately for high clouds (CP < 440 hPa), midlevel clouds (440 hPa < CP < 680 hPa), low clouds (CP > 680 hPa), for ice clouds and high ice clouds as well as for water clouds. The distinction between ice and water clouds is based on retrieved cloud temperature: ice clouds are clouds with CT < 230 K and water clouds are clouds with CT ≥ 260 K.

Relative cloud type amount is the cloud amount of the specific cloud type, divided by the total cloud amount. It describes how much of this cloud type contributes to the total cloud amount.

All files include 12 months of data, for the period 2003 – 2009. The name of the files is:
var_AIRS-LMD_AQU_0130AM_yyyy.nc,
var_AIRS-LMD_AQU_0130PM_yyyy.nc,
var_AIRS-LMD_AQU_0130AMPM_yyyy.nc

For each of these variables, the files contain the following information:
- **nb of orbit passages:**   **n_tot**
- **percentage of retrieved pixels out of cloudy pixels:** **f_var**
- **monthly average values:**   **a_var**
- **monthly standard deviation:**   **s_var**
- **monthly spatial variability** (only for CP,CT,CEM,COD)**:**   **v_var**
- **monthly histograms**   **h_var**

where var stands for one of the cloud properties described above:

total	H*	M*	L*	W*	I*	IH*
CA	CAH	CAM	CAL	CAW	CAI	CAIH
CAE	CAEH	CAEM	CAEL	CAEW	CAEI	CAEIH
	CAHR	CAMR	CALR	CAWR	CAIR	CAIHR
CT	CTH	CTM	CTL	CTW	CTI	CTIH
CP						
CEM	CEMH	CEMM	CEML	CEMW	CEMI	CEMIH
COD	CODH	CODM	CODL	CODW	CODI	CODIH
						CIWPH
						CREIH

* H: pcld < 440 hPa   **M**: 440 hPa < pcld < 680 hPa   **L**: pcld > 680 hPa
W: water clouds   **I**: ice clouds   **IH**: ice clouds with pcld < 440 hPa

note: COD was radiatively averaged

parameter	Id	boundaries	bins	unit
cloud amount	CA	0, .1, .2, .3, .4, .5, .6, .7, .8, .9, 1	10	
cld amount, high	CAH	0-1	-	
cld amount, mid	CAM	0-1	-	
cld amount, low	CAL	0-1	-	
cld amount, water	CAW	0-1	-	
cld amount, ice	CAI	0-1	-	
cld amount, iceH	CAIH	0-1	-	
cld amount, high/CA	CAHR	0-100	-	%
cld amount, mid /CA	CAMR	0-100	-	%
cld amount, low /CA	CALR	0-100	-	%
Effective cloud amount	CAE	0, .1, .2, .3, .4, .5, .6, .7, .8, .9, 1	10	
Eff cld amount, high	CAEH	0−1	-	
Eff cld amount, mid	CAEM	0−1	-	
Eff cld amount, low	CAEL	0−1	-	
Eff cld amount, water	CAEW	0−1	-	
Eff cld amount, ice	CAEI	0−1	-	
Eff cld amount, iceH	CAIEH	0−1	-	
cloud pressure	CP	100-1100	10	hPa
cloud temperature	CT	150,180,185,190,195,...310, 320	28	K
cloud temp, high	CTH	150,180,185,190,195,…310, 320	28	K
cloud temp, mid	CTM	150,180,185,190,195,…310, 320	28	K
cloud temp, low	CTL	150,180,185,190,195,…310, 320	28	K
cloud temp, water	CTW	150,180,185,190,195,…310, 320	28	K
cloud temp, ice	CTI	150,180,185,190,195,…310, 320	28	K
cloud temp, iceH	CTIH	150,180,185,190,195,…310, 320	28	K
cloud_emissivity	CEM	0,0.2,0.4,0.8,0.95,1	5	
cld emissivity, high	CEMH	0,0.2,0.4,0.8,0.95,1	5	
cld emissivity, mid	CEMM	0,0.2,0.4,0.8,0.95,1	5	
cld emissivity, low	CEML	0,0.2,0.4,0.8,0.95,1	5	
cld emissivity, water	CEMW	0,0.2,0.4,0.8,0.95,1	5	
cld emissivity, ice	CEMI	0,0.2,0.4,0.8,0.95,1	5	
cld emissivity, iceH	CEMIH	0,0.2,0.4,0.8,0.95,1	5	
cloud optical depth	COD	0, .1, .2, .3, .4, .5, .6, .7, .8, .9, 1, 2,	34	

		3, 4, 5, 6, 7, 8, 9, 10,15, 20, 25, 30, 40 ,50 ,60 ,70 ,80 ,90 ,100, 150, 200, 300 ,>300		
cld opt. depth, high	**CODH**	"	34	
cld opt. depth, mid	**CODM**	"	34	
cld opt. depth, low	**CODL**	"	34	
cld opt. depth, water	**CODW**	"	34	
cld opt. depth, ice	**CODI**	"	34	
cld opt. depth, iceH	**CODIH**	"	34	

joint histograms: parameters and bin boundaries:

var1 [bins]	bin boundaries	var2 [bins]	bin boundaries
COD [7bins]	0, .3,1.3, 3.6, 9.4, 23 ,60 ,1000	**CP** [7 bins]	0, 180, 310, 440, 560, 680, 800, 1100 hPa
CEM [5bins]	0, .2, .4, .8, .95, 1	**CP** [7 bins]	0, 180, 310, 440, 560, 680, 800, 1100 hPa