

## Each file contains data for one day of observation.

File names include date of observation. Their structure is:

**SENSOR\_PLATFORM\_LEVEL\_"CLOUD"\_YYYYMMDD\_INSTITUTION\_VERSION".tar"**

where:

SENSOR = AIRS,

PLATFORM = AQUA,

LEVEL = L2,

YYYY = year, MM = month, DD = day,

INSTITUTION = LMD,

VERSION = version number of the retrieval code

Each tar file contains two files: day and night observations with this structure,

**PLATFORM\_LEVEL\_"CIRS-AIRS"\_YYYYMMDD"THH-MM-OO\_ INSTITUTION\_VERSION".nc"**

where:

PLATFORM = AQUA,

LEVEL = L2,

YYYY = year, MM = month, DD = day,

HH-MM = local observation time, for AIRS: 01-30,

OO = AM for day observation and PM for night observation

INSTITUTION = LMD,

VERSION = version number of the retrieval code

## The format of the files is NetCFD4.

The structure of the file header (eg for 1 January 2019) is as follows:

```
netcdf AQUA_L2_CIRS-AIRS_20190101T01-30-AM_LMD_V1.2 {
```

dimensions:

```
  ngroupoffootprints = 127187 ;
```

```
  nfootprints = 9 ;
```

```
  maps_LAT = 450 ;
```

```
  maps_LON = 900 ;
```

variables:

```
  float maps_LAT(maps_LAT) ;
```

```
    maps_LAT:long_name = "Map latitudes in degrees" ;
```

```
    maps_LAT:units = "degrees_north" ;
```

```
    maps_LAT:valid_range = -90., 90. ;
```

```
    maps_LAT:standard_name = "latitude" ;
```

```
  float maps_LON(maps_LON) ;
```

```
    maps_LON:long_name = "Map longitudes in degrees" ;
```

```
    maps_LON:units = "degrees_east" ;
```

```
    maps_LON:valid_range = -180., 180. ;
```

```
    maps_LON:standard_name = "longitude" ;
```

```
  float map_E_CP(maps_LAT, maps_LON) ;
```

```
    map_E_CP:long_name = "2D global map of cloud pressure uncertainty" ;
```

```
    map_E_CP:units = "hPa" ;
```

```
    map_E_CP:missing_value = -999.f ;
```

```
    map_E_CP:fill_value = 0. ;
```

```

float map_CTYP(maps_LAT, maps_LON) ;
    map_CTYP:long_name = "2D global map of cloud type" ;
    map_CTYP:valid_range = 1L, 8L ;
    map_CTYP:fill_value = 0. ;
float map_CT(maps_LAT, maps_LON) ;
    map_CT:long_name = "2D global map of cloud temperature" ;
    map_CT:units = "K" ;
    map_CT:missing_value = -999.f ;
    map_CT:fill_value = 0. ;
float map_CP(maps_LAT, maps_LON) ;
    map_CP:long_name = "2D global map of cloud pressure" ;
    map_CP:units = "hPa" ;
    map_CP:missing_value = -999.f ;
    map_CP:fill_value = 0. ;
float map_CEM(maps_LAT, maps_LON) ;
    map_CEM:long_name = "2D global map of cloud emissivity" ;
    map_CEM:missing_value = 0.f ;
    map_CEM:fill_value = 0. ;
float time(ngroupoffootprints) ;
    time:long_name = "Granule start time since beginning of the day per group of footprint (3x3
AIRS footprint)" ;
    time:units = "second" ;
    time:standard_name = "time" ;
float tb12(ngroupoffootprints) ;
    tb12:long_name = "Average 12um brightness temperature per group of footprint (3x3 AIRS
footprint)" ;
    tb12:units = "K" ;
float std_tb12(ngroupoffootprints) ;
    std_tb12:long_name = "Spatial variability of tb12 per group of footprint (3x3 AIRS footprint)" ;
    std_tb12:units = "K" ;
float solzen(ngroupoffootprints) ;
    solzen:long_name = "Solar zenith angle per group of footprint (3x3 AIRS footprint)" ;
    solzen:units = "degrees" ;
    solzen:valid_range = 0., 180. ;
float satzen(ngroupoffootprints) ;
    satzen:long_name = "Viewing zenith angle per group of footprint (3x3 AIRS footprint)" ;
    satzen:units = "degrees" ;
    satzen:valid_range = 0., 180. ;
byte airtigr(ngroupoffootprints) ;
    airtigr:long_name = "TIGR air mass per group of footprint (3x3 AIRS footprint)" ;
    airtigr:description = "1: tropical, 2: midlatitude summer, 3: midlatitude winter, 2: polar summer,
3: polar winter" ;
    airtigr:valid_range = 1L, 5L ;
int surface_type(ngroupoffootprints) ;
    surface_type:long_name = "Surface class determined from ERA-Interim sea ice and snow per
group of footprint (3x3 AIRS footprint)" ;
    surface_type:description = "1: unfrozen land, 2: unfrozen ocean, 3: sea ice, 5: snow" ;
    surface_type:valid_range = 1L, 5L ;
float landfrac(ngroupoffootprints) ;
    landfrac:long_name = "Land fraction per group of footprint (3x3 AIRS footprint)" ;
    landfrac:valid_range = 0., 1. ;
float latitude(nfootprints, ngroupoffootprints) ;
    latitude:long_name = "latitude per footprint" ;
    latitude:units = "degrees_north" ;

```

```

latitude:valid_range = -90., 90. ;
latitude:standard_name = "latitude" ;
latitude:missing_value = -999.f ;
float longitude(nfootprints, ngrouppoffootprints) ;
longitude:long_name = "longitude per footprint" ;
longitude:units = "degrees_east" ;
longitude:valid_range = -180., 180. ;
longitude:standard_name = "longitude" ;
longitude:missing_value = -999.f ;
float sz(nfootprints, ngrouppoffootprints) ;
sz:long_name = "Surface altitude per AIRS footprint" ;
sz:units = "m" ;
sz:missing_value = -999.f ;
float cz(nfootprints, ngrouppoffootprints) ;
cz:long_name = "Cloud altitude per AIRS footprint" ;
cz:units = "m" ;
cz:missing_value = -999.f ;
float e_cz(nfootprints, ngrouppoffootprints) ;
e_cz:long_name = "Cloud altitude uncertainty per AIRS footprint" ;
e_cz:units = "m" ;
e_cz:missing_value = -999.f ;
float ct(nfootprints, ngrouppoffootprints) ;
ct:long_name = "Cloud temperature per AIRS footprint" ;
ct:units = "K" ;
ct:missing_value = -999.f ;
float e_ct(nfootprints, ngrouppoffootprints) ;
e_ct:long_name = "Cloud temperature uncertainty per AIRS footprint" ;
e_ct:units = "K" ;
e_ct:missing_value = -999.f ;
float cp(nfootprints, ngrouppoffootprints) ;
cp:long_name = "Cloud pressure per AIRS footprint" ;
cp:units = "hPa" ;
cp:missing_value = -999.f ;
float e_cp(nfootprints, ngrouppoffootprints) ;
e_cp:long_name = "Cloud pressure uncertainty per AIRS footprint" ;
e_cp:units = "hPa" ;
e_cp:missing_value = -999.f ;
byte ctyp(nfootprints, ngrouppoffootprints) ;
ctyp:long_name = "Cloud type per AIRS footprint" ;
ctyp:description = "1: high opaque (CP<440 hPa, CEM>0.95), 2: cirrus (CP<440 hPa,
0.5>CEM>0.95), 3: thin cirrus (CP<440 hPa, CEM<0.5), 4: midlevel opaque (680 hPa >CP>440 hPa,
CEM>0.5), 5: midlevel partly cloudy (680 hPa>CP>440 hPa, CEM<0.5), 6: lowlevel opaque (CP>680 hPa,
CEM>0.5), 7: lowlevel partly cloudy (CP>680 hPa, CEM<0.5), 8: clear sky" ;
ctyp:valid_range = 1L, 8L ;
float cem(nfootprints, ngrouppoffootprints) ;
cem:long_name = "Cloud emissivity per AIRS footprint" ;
cem:missing_value = 0.f ;
float e_cem(nfootprints, ngrouppoffootprints) ;
e_cem:long_name = "Cloud emissivity uncertainty per AIRS footprint" ;
e_cem:missing_value = 0.f ;

// global attributes:
:title = "CIRS/AIRS cloud products (emissivity, pressure, cloud type, temperature, height and
uncertainties)" ;

```

```
:institution = "LMD" ;
:product_version = "1.2" ;
:history = "2020-09-25 23:14:15 - Product generated with retrieval code version 2.0" ;
:summary = "AIRS-AQUA cloud climatology with 2D global maps" ;
:source = "NASA AIRS L1 + ancillary data from ERA-Interim" ;
:input_files = "AIRS_V6_010119.AML2_prof_fixed" ;
:web_site = "https://cirs.aeris-data.fr, https://iasi.aeris-data.fr" ;
:climatology = "CIRS-AIRS" ;
:product_name = "L2-CIRS-AIRS" ;
:file_name = "AQUA_L2_CIRS-AIRS_20190101T01-30-AM_LMD_V1.2.nc" ;
:references = "Stubenrauch et al., ACP (2017) doi :10.5194/acp-17-13625-2017" ;
:creator_name = "AERIS" ;
:contact_email = "stubenrauch@lmd.polytechnique.fr" ;
:data_policy = "cite reference and AERIS website" ;
:netcdf_conventions = "CF-1.6" ;
:standard_name_vocabulary = "NetCDF Climate and Forecast (CF) Metadata Convention version
30, 3 December 2015" ;
:keywords = "cloud,satellite,observation,atmosphere,level-2,AQUA" ;
:keywords_vocabulary = "GCMD Science Keywords" ;
:platform = "AQUA" ;
}
```