

Readme for NetCDF CF-1.4 – folders “_cf”

1. General

Another format file: **NetCDF CF-1.4** are available (since September 14, 2011 – DUACS v11.0). This format is based on the attribute data tags defined by the Cooperative Ocean/Atmosphere Research Data Service (**COARDS**) and Climate and Forecast (**CF**) metadata conventions.

The CF convention generalizes and extends the COARDS convention but relaxes the COARDS constraints on dimension order and specifies methods for reducing the size of datasets.

Each variable in the file has an associated description of what it represents, including physical units if appropriate, and that each value can be located in space and time. **To resume, a variable refers to data stored in the file as a vector.**

IMPORTANT NOTE

*DUACS products with the **old format will still be distributed until the end of January 2012**, leaving our users time to adapt to the new format CF ⇒ folders suffixed by “_cf”
Beyond that date, the **new format CF will be the only available format.***

2. Characteristics

- Global attributes hold information which applies to the whole file, such as the data set title, the grid type, the version number, the reference, etc.
- Dimensions and variables are given in variable attributes.
- A wide range of software are available, to write or read NetCDF/CF files.
- API are made available by UNIDATA (<http://www.unidata.ucar.edu/software/netcdf>)
 - C/C++/Fortran
 - Java
 - MATLAB, Objective-C, Perl, Python, R, Ruby, Tcl/Tk,
- Many software enable to handle NetCDF files. They are listed on the UNIDATA web site <http://www.unidata.ucar.edu/software/netcdf/software.html>.
- Among the more widely used: Ferret (simple visualization and analysis tool), ncBrowse (GUI), CDAT (python), NCO (command line utility).

3. Aviso along-track products Old format *versus* new format CF

Hereafter, we designate:

ATP-v0 *corresponding to products processed in old format.*

ATP-CF *corresponding to products processed in new format following the standard NetCDF CF-1.4.
CF files are available in the folders suffixed by “_cf” and are tagged Conventions = “CF-1.4” in their header.*

3.1. Files content and nomenclature

For products in Near Real-Time mode:

ATP-v0: Each file contains a maximum of **21 days measurement**.

ATP-CF: Each file contains a **single day observation**.

Example: the old format data in the file 'nrt_global_j2_sla_vfec_20110825_20110914_20110915.nc' are contained in 21 different new format CF files:

'nrt_global_j2_sla_vfec_20110825_20110825_20110915.nc'

'nrt_global_j2_sla_vfec_20110826_20110826_20110915.nc'

...

'nrt_global_j2_sla_vfec_20110914_20110914_20110915.nc'

3.2. Dimensions/variables equivalences - data structure

ATP-v0:

- "Stacking" of data per cycle
- Calculation of necessary dates based on BeginDate and DeltaT

ATP-CF:

- All variables now depend on time
- Dates are directly accessible

	ATP-v0	ATP-CF
dimensions	Tracks	time
	Cycles	
	Data	
variables	short SLA (Data, Cycles)	short SLA (time)
	byte flag (Data, Cycles)	short flag (time)
	int Longitudes (Data)	int longitude (time)
	int Latitudes (Data)	int latitude (time)
	double BeginDates (Tracks, Cycles)	double time (time)
	int DeltaT	
	int Tracks (Tracks)	short track (time)
	int Cycles (Tracks, Cycles)	short cycle (time)
	int DataIndexes (Data)	-
	int NbPoints (Tracks)	-

Find the news on Aviso website www.aviso.oceanobs.com/duacs/ and further explanations in the [DUACS user guide](#).

ANNEXE: Along-track files examples (new format CF vs old format)

ATP-CF

```
netcdf nrt_global_j2_sla_vfec_20110919_20110919_20110922 {
dimensions:
    time = 12312 ;
variables:
    short SLA(time) ;
        SLA:long_name = "Sea Level Anomaly" ;
        SLA:_FillValue = 32767s ;
        SLA:add_offset = 0. ;
        SLA:scale_factor = 0.001 ;
        SLA:units = "m" ;
        SLA:coordinates = "longitude latitude" ;
        SLA:standard_name = "sea_surface_height_above_sea_level" ;
    int longitude(time) ;
        longitude:long_name = "Longitude of measurement" ;
        longitude:_FillValue = 2147483647 ;
        longitude:add_offset = 0. ;
        longitude:standard_name = "longitude" ;
        longitude:scale_factor = 1.e-006 ;
        longitude:units = "degrees_east" ;
    short track(time) ;
        track:long_name = "Track in cycle the measurement belongs to" ;
        track:_FillValue = 32767s ;
        track:units = "1" ;
        track:coordinates = "longitude latitude" ;
    double time(time) ;
        time:long_name = "Time of measurement" ;
        time:_FillValue = 1.84467440737096e+019 ;
        time:axis = "T" ;
        time:standard_name = "time" ;
        time:units = "days since 1950-01-01 00:00:00 UTC" ;
    int latitude(time) ;
        latitude:long_name = "Latitude of measurement" ;
        latitude:_FillValue = 2147483647 ;
        latitude:add_offset = 0. ;
        latitude:standard_name = "latitude" ;
        latitude:scale_factor = 1.e-006 ;
        latitude:units = "degrees_north" ;
    short flag(time) ;
        flag:coordinates = "longitude latitude" ;
        flag:_FillValue = 3267s ;
        flag:long_name = "data origin" ;
        flag:flag_values = 1s, 0s ;
        flag:flag_meanings = "igdr_like non_igdr_like" ;
        flag:comment = "The origin of the data is determined by the types of
geophysical data records (GDR) used in computation of the SLA: 1 for the Interim GDR (IGDR)
and 0 for Operational GDR (OGDR)." ;
    short cycle(time) ;
        cycle:long_name = "Cycle the measurement belongs to" ;
        cycle:_FillValue = 32767s ;
        cycle:units = "1" ;
        cycle:coordinates = "longitude latitude" ;

// global attributes:
    :history = "21-Sep-2011 23:10:01 GMT : File created by the SSLATO/DUACS system
version 11.0.1" ;
    :comment = "Produce from Jason-2 satellite altimetry data" ;
    :institution = "CLS/CNES" ;
    :references =
"http://www.aviso.oceanobs.com/fileadmin/documents/data/tools/hdbk_duacs.pdf" ;
    :source = "satellite altimetry" ;
    :title = "along track Sea Level Anomaly" ;
    :Conventions = "CF-1.4" ;
}
```

ATP-v0

```
netcdf nrt_global_j2_sla_vfec_20110901_20110921_20110922 {
dimensions:
    Tracks = 254 ;
    Cycles = 3 ;
    Data = UNLIMITED ; // (126376 currently)
variables:
    int DeltaT ;
        DeltaT:_FillValue = 2147483647 ;
        DeltaT:long_name = "Time gap between two measurements in mean profile" ;
        DeltaT:units = "s" ;
        DeltaT:valid_min = 0 ;
        DeltaT:scale_factor = 1.e-006 ;
    int Tracks(Tracks) ;
        Tracks:_FillValue = -1 ;
        Tracks:long_name = "Pass number" ;
        Tracks:units = "count" ;
    int NbPoints(Tracks) ;
        NbPoints:_FillValue = 0 ;
        NbPoints:long_name = "Number of measurements for each pass" ;
        NbPoints:units = "count" ;
    int Cycles(Tracks, Cycles) ;
        Cycles:_FillValue = -1 ;
        Cycles:long_name = "Cycle numbers for each pass" ;
        Cycles:units = "count" ;
    int Longitudes(Data) ;
        Longitudes:_FillValue = 2147483647 ;
        Longitudes:long_name = "Longitude of each measurement" ;
        Longitudes:units = "degrees_east" ;
        Longitudes:scale_factor = 1.e-006 ;
    int Latitudes(Data) ;
        Latitudes:_FillValue = 2147483647 ;
        Latitudes:long_name = "Latitude of each measurement" ;
        Latitudes:units = "degrees_north" ;
        Latitudes:scale_factor = 1.e-006 ;
    double BeginDates(Tracks, Cycles) ;
        BeginDates:_FillValue = 1.84467440737096e+019 ;
        BeginDates:long_name = "Date of first measurement for each cycle/pass" ;
        BeginDates:units = "days since 1950-01-01 00:00:00.000 UTC" ;
        BeginDates:C_format = "%17.11f" ;
    int DataIndexes(Data) ;
        DataIndexes:_FillValue = 2147483647 ;
        DataIndexes:long_name = "Data index in theoretical pass" ;
        DataIndexes:valid_min = 0 ;
    short SLA(Data, Cycles) ;
        SLA:_FillValue = 32767s ;
        SLA:long_name = "Sea Level Anomaly" ;
        SLA:units = "m" ;
        SLA:scale_factor = 0.001 ;
    byte flag(Data, Cycles) ;
        flag:_FillValue = 127b ;
        flag:long_name = "Data origin (1 for NRT data; 0 for RT data)" ;
        flag:units = "1" ;

// global attributes:
    :FileType = "ALONG_TRACK_PRODUCT" ;
    :OriginalName = "nrt_global_j2_sla_vfec_20110901_20110921_20110922.nc" ;
    :CreatedBy = "SSALTO/DUACS" ;
    :CreatedOn = "21-SEP-2011 23:06:51:000000" ;
    :Mission = "J2" ;
    :MeanProfile = "ProfilMoyen_J2_2010.nc" ;
    :title = "along track Sea Level Anomaly" ;
    :version = "11.0.1" ;
}
```