**NODC NetCDF Templates v1.1**

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| Feature Type | Description | General Ocean Data Examples | CDL Template | Specific CDL Examples | Specific Examples on NODC THREDDS Data Server |
| point | A single data point (having no implied coordinate relationship to other points). | One or more recorded observations that have no temporal or spatial relationship (where each observation equals one point in time and space). | [Point](http://www.nodc.noaa.gov/data/formats/netcdf/v1.1/point.cdl) | [Kachemak Bay, NS and T Bioeffects Program Data](http://data.nodc.noaa.gov/testdata/netCDFTemplateExamples/point/KachemakBay.cdl) | [Kachemak Bay](http://data.nodc.noaa.gov/thredds/catalog/testdata/netCDFTemplateExamples/point/catalog.html?dataset=testdata/netCDFTemplateExamples/point/KachemakBay.nc) |
| timeSeries | A series of data points at the same spatial location with monotonically increasing times. | Sea Surface Temperature from one or more fixed platforms with the exact same increasing time intervals. | [Orthogonal](http://www.nodc.noaa.gov/data/formats/netcdf/v1.1/timeSeriesOrthogonal.cdl) | [Bodega Marine Lab Buoy](http://data.nodc.noaa.gov/testdata/netCDFTemplateExamples/timeSeries/BodegaMarineLabBuoy.cdl) | [Bodega Marine Lab Buoy](http://data.nodc.noaa.gov/thredds/catalog/testdata/netCDFTemplateExamples/timeSeries/catalog.html?dataset=testdata/netCDFTemplateExamples/timeSeries/BodegaMarineLabBuoy.nc) |
| Multiple platforms collecting observations at different time intervals. | [Incomplete](http://www.nodc.noaa.gov/data/formats/netcdf/v1.1/timeSeriesIncomplete.cdl) | [Bodega Marine Lab Buoy Combined](http://data.nodc.noaa.gov/testdata/netCDFTemplateExamples/timeSeries/BodegaMarineLabBuoyCombined.cdl) | [Bodega Marine Lab Buoy Combined](http://data.nodc.noaa.gov/thredds/catalog/testdata/netCDFTemplateExamples/timeSeries/catalog.html?dataset=testdata/netCDFTemplateExamples/timeSeries/BodegaMarineLabBuoyCombined.nc) |
| trajectory | A series of data points along a path through space with monotonically increasing times. | One or more events where an underway platform collected data from a thermosalinograph. | [Incomplete](http://www.nodc.noaa.gov/data/formats/netcdf/v1.1/trajectoryIncomplete.cdl) | 1. [Okeanos Explorer SCS Data](http://data.nodc.noaa.gov/testdata/netCDFTemplateExamples/trajectory/Okeanos.cdl); 2. [AOML TSG](http://data.nodc.noaa.gov/testdata/netCDFTemplateExamples/trajectory/aoml_tsg.cdl); 3. [Jason-2 Altimeter Data](http://data.nodc.noaa.gov/testdata/netCDFTemplateExamples/trajectory/jason2_satelliteAltimeter.cdl) | 1. [Okeanos Explorer SCS Data](http://data.nodc.noaa.gov/thredds/catalog/testdata/netCDFTemplateExamples/trajectory/catalog.html?dataset=testdata/netCDFTemplateExamples/trajectory/Okeanos.nc); 2. [AOML TSG](http://data.nodc.noaa.gov/thredds/catalog/testdata/netCDFTemplateExamples/trajectory/catalog.html?dataset=testdata/netCDFTemplateExamples/trajectory/aoml_tsg.nc); 3. [Jason-2 Altimeter Data](http://data.nodc.noaa.gov/thredds/catalog/testdata/netCDFTemplateExamples/trajectory/catalog.html?dataset=testdata/netCDFTemplateExamples/trajectory/jason2_satelliteAltimeter.nc) |
| profile | An ordered set of data points along a vertical line at a fixed horizontal position and fixed time. | One or more CTD or XBT casts that have the exact same depth (z) values (do not need to have the same number of depth levels). | [Orthogonal](http://www.nodc.noaa.gov/data/formats/netcdf/v1.1/profileOrthogonal.cdl) | [World Ocean Database Standard Level Data](http://data.nodc.noaa.gov/testdata/netCDFTemplateExamples/profile/wodStandardLevels.cdl) | [World Ocean Database Standard Level Data](http://data.nodc.noaa.gov/thredds/catalog/testdata/netCDFTemplateExamples/profile/catalog.html?dataset=testdata/netCDFTemplateExamples/profile/wodStandardLevels.nc) |
| Multiple CTD or XBT casts that do not have the exact same depth (z) values. | [Incomplete](http://www.nodc.noaa.gov/data/formats/netcdf/v1.1/profileIncomplete.cdl) | [World Ocean Database Observed Level Data](http://data.nodc.noaa.gov/testdata/netCDFTemplateExamples/profile/wodObservedLevels.cdl) | [World Ocean Database Observed Level Data](http://data.nodc.noaa.gov/thredds/catalog/testdata/netCDFTemplateExamples/profile/catalog.html?dataset=testdata/netCDFTemplateExamples/profile/wodObservedLevels.nc) |
| timeSeriesProfile | A series of profile features at the same horizontal position with monotonically increasing times. | Single or multiple mooring lines with stationary instruments at the same depths across all the mooring lines and all the instruments measuring at the same points in time. | [Orthogonal Time and Depth](http://www.nodc.noaa.gov/data/formats/netcdf/v1.1/timeSeriesProfileOrthoVOrthoT.cdl) | [USGS Internal Wave Data](http://data.nodc.noaa.gov/testdata/netCDFTemplateExamples/timeSeriesProfile/usgs_internal_wave_timeSeries.cdl) | [USGS Internal Wave Data](http://data.nodc.noaa.gov/thredds/catalog/testdata/netCDFTemplateExamples/timeSeriesProfile/catalog.html?dataset=testdata/netCDFTemplateExamples/timeSeriesProfile/usgs_internal_wave_timeSeries.nc) |
| Multiple mooring lines with stationary instruments at different depths across the mooring lines but all the instruments measuring at the same points in time. | [Orthogonal Time and Incomplete Depth](http://www.nodc.noaa.gov/data/formats/netcdf/v1.1/timeSeriesProfileIncomVOrthoT.cdl) | No example CDL available. | No netCDF file on NODC TDS available. |
| Multiple mooring lines with stationary instruments at the same depth across all the mooring lines but the instruments measuring at different points in time. | [Incomplete Time and Orthogonal Depth](http://www.nodc.noaa.gov/data/formats/netcdf/v1.1/timeSeriesProfileOrthoVIncomT.cdl) | No example CDL available. | No netCDF file on NODC TDS available. |
| Multiple mooring lines with stationary instruments at different depths across the mooring lines and the instruments measuring at different points in time. | [Incomplete Time and Depth](http://www.nodc.noaa.gov/data/formats/netcdf/v1.1/timeSeriesProfileIncomVIncomT.cdl) | No example CDL available. | No netCDF file on NODC TDS available. |
| trajectoryProfile | A series of profile features located at points ordered along a trajectory. | Undulating gliders, Argo floats | [Orthogonal](http://www.nodc.noaa.gov/data/formats/netcdf/v1.1/trajectoryProfileOrtho.cdl) | No example CDL available. | No netCDF file on NODC TDS available. |
| [Incomplete](http://www.nodc.noaa.gov/data/formats/netcdf/v1.1/trajectoryProfileIncom.cdl) | No example CDL available. | No netCDF file on NODC TDS available. |
| swath | An array of data in "sensor coordinates". | Level 2 polar-orbiting satellite data | NODC is awaiting results of recent CF-satellite discussions before constructing a swath template and supporting examples. | No example CDL available. | No netCDF file on NODC TDS available. |
| grid | Data represented or projected on a regular or irregular grid. | 1-degree resolution salinity analysis product | [Grid](http://www.nodc.noaa.gov/data/formats/netcdf/v1.1/grid.cdl) | [Pathfinder SST Climatology](http://data.nodc.noaa.gov/testdata/netCDFTemplateExamples/grid/00000110200000-NODC-L4_GHRSST-SSTskin-AVHRR_Pathfinder-PFV5.0_Daily_Climatology_1982_2008_DayNightCombined-v02.0-fv01.0.cdl) | [Pathfinder SST Climtology](http://data.nodc.noaa.gov/thredds/catalog/testdata/netCDFTemplateExamples/grid/catalog.html?dataset=testdata/netCDFTemplateExamples/grid/00000110200000-NODC-L4_GHRSST-SSTskin-AVHRR_Pathfinder-PFV5.0_Daily_Climatology_1982_2008_DayNightCombined-v02.0-fv01.0.nc) |

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| Attribute | Conv. | Global / Variable | Format | Description | NODC Recommended Use and Comments |
| [acknowledgment](http://www.unidata.ucar.edu/software/netcdf-java/formats/DataDiscoveryAttConvention.html#acknowledgement_Attribute) | ACDD | global | string | This optional free text field identifies the funding agency and other relevant information. | Please identify the funding agency and proposal number. |
| [cdm\_data\_type](http://www.unidata.ucar.edu/software/netcdf-java/formats/DataDiscoveryAttConvention.html#cdm_data_type_Attribute) | ACDD | global | string | This attribute is used by THREDDS to identify the feature type, what THREDDS calls a "dataType". The current choices are: Grid, Image, Station, Swath, and Trajectory. | These data types do not map equally to the CF feature types. If the CF feature type = Trajectory Time Series, use "Trajectory"; if Point, Profile, or Time Series Profile, use "Station". |
| [comment](http://www.unidata.ucar.edu/software/netcdf-java/formats/DataDiscoveryAttConvention.html#comment_Attribute) | ACDD | global | string | Miscellaneous information about the data, that cannot be described in any of the other available attributes. | Note the difference bewteen comment and long\_name for a variable: While long\_name is intended for a phrase or a one line description of what the data represents, comment could be much longer and is intended to provide in greater detail any miscellaneous information important to interpret the data. |
| [contributor\_name](http://www.unidata.ucar.edu/software/netcdf-java/formats/DataDiscoveryAttConvention.html#contributor_name_Attribute) | ACDD | global | string | The name of any individuals or institutions that contributed to the creation of this data. Please use commas to separate the names. When applicable, use the conventions described above when identifying persons and/or institutions. | Note that there is also an attribute called creator\_name. This can have multiple comma seperated values. |
| [contributor\_role](http://www.unidata.ucar.edu/software/netcdf-java/formats/DataDiscoveryAttConvention.html#contributor_role_Attribute) | The role of the individual or institution that contributed to the creation of this data. Ensure that the listed roles are comma separated and in the same order as listed in the contributor\_name attribute. | Please follow the guidance in the Description |
| creator\_email | ACDD | global | string | Email address of the person or institution that collected the data. | The email of the person or institution may be found in the NODC tables for persons(<http://www.nodc.noaa.gov/cgi-bin/OAS/prd/person>) and institutions(<http://www.nodc.noaa.gov/cgi-bin/OAS/prd/institution>). Use the short name of the institution if available. |
| creator\_name | Name of the person who collected the data. | Use the name from the NODC persons(<http://www.nodc.noaa.gov/cgi-bin/OAS/prd/person>) table when applicable. |
| creator\_url | The URL of the institution that collected the data. | The url of the institution can be found in the NODC institutions(<http://www.nodc.noaa.gov/cgi-bin/OAS/prd/institution>) table. |
| date\_created | ACDD | global | string | The date or date and time when the file was created. Use [ISO 8601](http://en.wikipedia.org/wiki/ISO_8601) and give date or date and time in UTC (ex., "yyyy-mm-dd" or "yyyy-mm-ddThh:mn:ssZ"). This time stamp will never change, even when modifying the file. | Please follow the guidance in the Description |
| date\_modified | The date or date and time when the file was modified. Use [ISO 8601](http://en.wikipedia.org/wiki/ISO_8601) and give date or date and time in UTC (ex., "yyyy-mm-dd" or "yyyy-mm-ddThh:mn:ssZ").This time stamp will change any time information is changed in this file. | In an archive generally a file is never modified, another version might be created instead. In such cases, date\_modified is redundant and could be same as date\_created. |
| geospatial\_lat\_min | ACDD | global | float | These attributes define the latitude and longitude coordinates of the bounding box of the data set. | Report the latitude coordinates in decimal degrees north (south is negative). These values should be given in WGS 84 coordinate system. If the data is in a projected coordinate system, the bounding box for the data should be mapped to a bounding box on WGS 84 ellipsoid. |
| geospatial\_lat\_max |
| geospatial\_lon\_min |
| geospatial\_lon\_max |
| geospatial\_lat\_units | ACDD | global | string | This attribute defines the units applied to the geospatial\_lat\_min and geospatial\_lat\_max attributes. | CF recommends the units should be "degrees\_east". Regardless of what is used, it must conform to udunits(<http://www.unidata.ucar.edu/software/udunits/>). |
| geospatial\_lat\_resolution | ACDD | global | string | This attribute defines the resolution of the latitude coordinates. | For example, "point" or "10 degree grids". |
| geospatial\_lon\_units | ACDD | global | string | This attribute defines the units applied to the geospatial\_lon\_min and geospatial\_lon\_max attributes. | CF recommends the units should be "degrees\_north". Regardless of what is used, it must conform to udunits(<http://www.unidata.ucar.edu/software/udunits/>). |
| geospatial\_lon\_resolution | ACDD | global | string | This attribute defines the resolution of the longitude coordinates. | For example, "point" or "10 degree grids". |
| geospatial\_vertical\_min | ACDD | global | float | These attributes define the lowest and highest vertical measurements of the data set's bounding box. | These values should be given ideally with respect to WGS 84 ellipsoid. |
| geospatial\_vertical\_max |
| geospatial\_vertical\_units | ACDD | global | string | This defines the units applied to the geospatial\_vertical\_min and geospatial\_vertical\_max attributes. | Conform to udunits(<http://www.unidata.ucar.edu/software/udunits/>). |
| geospatial\_vertical\_resolution | ACDD | global | string | This defines the resolution of the vertical axis values. | Use the cell methods vocabulary in Appendix E([http://cfconventions.org/Data/cf-conventions/cf-conventions-1.6/build/cf-conventions.html#cell-methods](http://cfconventions.org/Data/cf-conventions/cf-conventions-1.6/build/cf-conventions.html" \l "cell-methods)) of the CF conventions. |
| geospatial\_vertical\_positive | ACDD | global | string | This attribute indicates which direction is positive (a value of "up" means that z increases up, like units of height, while a value of "down" means that z increases downward, like units of pressure or depth). | Select from "up" or "down". |
| history | ACDD | global | string | Any changes made to the file should be tracked here. (For example: "2010-06-09; previous version's uuid; added attributes for the calibration coefficients to the depth variable.") | This attribute is meant to give provenance of the data. The user should be able to trace the origin of the raw data and all the intermediate modifications which the data has gone through before reaching her/him. |
| id | ACDD | global | string | Unique identifier for the data set represented in the file. The combination of the "naming authority" and the "id" should be a globally unique identifier for the dataset. | Use any combination of alpha-numeric digits or words that make this data set unique in relation to the naming authority. |
| institution | ACDD | global | string | The institution of the person or group that collected the data. | Use the NODC institutions(<http://www.nodc.noaa.gov/cgi-bin/OAS/prd/institution>) name when applicable, selecting the short name if available. |
| keywords | ACDD | global | string | A comma separated list of key words and phrases. | keywords should be specified in the vocabulary mentioned in the attribute keywords\_vocabulary. |
| keywords\_vocabulary | ACDD | global | string | Identifies the controlled list of keywords from which the values in the "keywords" attribute are taken. | Good choices include: [NODC Data Types](http://www.nodc.noaa.gov/cgi-bin/OAS/prd/datatype), [NODC Observation Types](http://www.nodc.noaa.gov/cgi-bin/OAS/prd/obstype), [GCMD Science Keywords Version 8.1](http://gcmdservices.gsfc.nasa.gov/static/kms/sciencekeywords/sciencekeywords.csv), [CF Standard Names](http://www.cfconventions.org/standard-names.html), and [ISO Topic Categories](https://geo-ide.noaa.gov/wiki/index.php?title=ISO_Topic_Categories). |
| license | ACDD | global | string | Describe the restrictions to data access and distribution. | NODC strongly recommends that all data submitted to NODC for archiving be freely and openly available without restriction. We suggest you set this attribute to "These data may be redistributed and used without restriction." |
| Metadata\_Conventions | ACDD\* | global | string | This attribute should be set to "Unidata Dataset Discovery v1.0" or the most current version for netCDF files that follow this convention. | Note: be careful with the case here. It is indeed "Metadata\_Conventions", with the capitalization. Most attributes are normally lower case.  \*Also note that this is a proposed attribute, and not yet officially part of ACDD. |
| metadata\_link | ACDD\* | global | string | This attribute provides a link to a complete metadata record for this dataset or the collection that contains this dataset. This attribute is not included in Version 1 of the Unidata Attribute Convention for Data Discovery and is also a proposed attribute. It is recommended here because a complete metadata collection for a dataset will likely contain more information than can be included in granule formats. This attribute contains a link to that information. | Note: This is a proposed attribute in ACDD. The latest version of the TDS "UDDC" service accepts either "Metadata\_Link" or "metadata\_link". NODC recommends the use of the lower case form to be more consistent with other attributes, which with only one or two exceptions are also lower case. |
| naming\_authority | ACDD | global | string | The combination of the "naming authority" and the "id" should be a globally unique identifier for the dataset. | Recommend using the reverse URL of the institution. (ex., gov.noaa.nodc) |
| processing\_level | ACDD | global | string | A textual description of the processing (or quality control) level of the data. | This attribute should also identify the authority which defined the processing level along with the processing level itself. The processing levels defined by NOAA for satellite data can be found here: <https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels> . Similar list for NASA data can be found here: <http://science.nasa.gov/earth-science/earth-science-data/data-processing-levels-for-eosdis-data-products/> . |
| project | ACDD | global | string | The scientific project that the data was collected under. | Use the NODC projects (<http://www.nodc.noaa.gov/cgi-bin/OAS/prd/project>) name when applicable. |
| publisher\_email | ACDD | global | string | The email address of the person or group that distributes the data files. | Please follow the guidance in the Description |
| publisher\_name | Name of the person or group that distributes the data files. Use the conventions described above when identifying persons and/or institutions when applicable. | Please follow the guidance in the Description |
| publisher\_url | ACDD | global | string | URL of the person or group that distributes the data files. | Please follow the guidance in the Description |
| standard\_name\_vocabulary | ACDD | global | string | Indicates which controlled list of variable names has been used in the "standard\_name" attribute. Use of this attribute is recommended and their value will be used by THREDDS in the variable mapping. If the file uses the CF convention (and the Convention attribute indicates this), THREDDS will assume the standard\_name values are from the CF convention standard name table. | Since these templates comply with CF conventions, this attribute should contain "NetCDF Climate and Forecast (CF) Metadata Convention Standard Name Table Version X”, where X denotes the version number of the table. |
| summary | ACDD | global | string | One paragraph describing the data set. | Write a paragraph or abstract about the data contained within the file, expanding on the title to provide more information. |
| time\_coverage\_start | ACDD | global | string | Describes the temporal coverage of the data as a time range. The temporal coverage of the data can be described with any of the following pairs of values: start/end, start/duration, or end/duration. | Use [ISO 8601](http://en.wikipedia.org/wiki/ISO_8601) for date and time. |
| time\_coverage\_end |
| time\_coverage\_duration | Use udunits(<http://www.unidata.ucar.edu/software/udunits/>) date (e.g., "25 days since 1970-01-01"), or the string "present". |
| time\_coverage\_resolution | Describes the resolution of the time variable in the data. | Use [ISO 8601](http://en.wikipedia.org/wiki/ISO_8601) for time resolution (examples: P1Y ,P3M, P10D). |
| title | ACDD | global | string | One sentence about the data contained within the file. | Write one sentence that describes the scope of the data contained within the file; answer the five "W's": Who, What, Where, Why, When.Please use the following construction guidelines for creating a meaningful title for your netCDF file. Do not use all capitals or capitalize words other than proper nouns or widely used acronyms. Avoid using acronyms, especially for projects or organizations. If you feel you must include an acronym, spell out the meaning of the acronym then put the acronym in parentheses after the meaning. General construction guideline for data set title "Summary of variables and feature type" collected by instrument(s) from the platform(s) in the sea\_name(s) from time\_coverage\_start to time\_coverage\_end;  Here are some good examples: a. Physical and chemical profile data from bottle and conductivity-temperature-depth (CTD) casts from the RV JERE CHASE in the Gulf of Maine from 1982 to 1984; b. Temperature and salinity trajectory data from thermosalinograph measurements from the RV JERE CHASE in the Gulf of Maine from 1982 to 1984;  A bad example would be: Temperature, Salinity and Chlorophyll Data from WADOE during NWCOP San Juan from the '80's. |
| add\_offset | CF | variable | float | This attribute along with add\_offset is used for unpacking data or for converting the data to CF valid units. CF places a lot of restrictions on the use of these attributes. Please read the CF documentation for best practices. | Please follow the guidance in the Description |
| ancillary\_variables | CF | variable | string | This attribute can be used to associate two different variables with one another. This attribute is generally used to associate with the given geophysical variable another variable containing metadata about each value in the given geophysical variable. An example is the flag variables used to show the status of each value in the geophysical variable. The standard name for the ancillary variable could be standard name of the geophysical variable followed by standard name modifier. See the comments for an example | Example:float temperature(z); temperature:standard\_name="sea\_water\_temperature"; temperature:ancillary\_variables="temperature\_WODflag"; int temperature\_WODflag(z); temperature\_WODflag:standard\_name="sea\_water\_temperature status\_flag"; temperature\_WODflag:flag\_values="..."; temperature\_WODflag:flag\_meanings="..."; |
| axis | CF | variable | char | This attribute is specifically for the variables time, latitude, longitude, and altitude when they are identified as the coordinate variables. The values of each variable coordinates axis are as follows: time = T, latitude = Y, longitude = X, and altitude = Z | Please follow the guidance in the Description |
| bounds | CF | variable | string | Name of the variable which contains the vertices of the cell boundaries. This attribute must be present for all the coordinate variables which are used within cell\_methods for representing non-point statistics | It is important to have bounds for a geophysical coordinate variable if a geophysical variable is extensive along it. |
| calendar | CF | variable | string | This attribute is used to show the type of calendar used for representing dates within netcdf file. The possible values are gregorian(default), proleptic\_gregorian, all\_leap, 360\_day, julian, or none. | Please follow the guidance in the Description |
| cell\_measures | CF | variable | string | This attribute has the form "measure\_type:variable\_name" where measure\_type could be one of the two: "area" or "volume" and variable\_name holds the name of the variable holding the areas or volumes corresponding to the cells. This attribute is necessitated by the fact that the cell areas or volumes cannot be determined purely by the boundary points of the cells. One would have to know how they are connected, though it is common to assume great circle connectivity. | This attribute is not a required attribute. |
| cell\_methods | CF | variable | string | Describes the characteristic of the field. This is a string attribute comprising a list of blank-separated words of the form "name: method", e.g. t: mean. The possible values for method are point, sum, maximum, median, mid\_range, minimum, mean, mode, standard\_deviation and variance. The possible values for name are dimension of the variable, a scalar coordinate variable, a valid standard name, or the word "area". | Multiple strings of this form could be repeated if more than one cell method is present. They would be arranged in the order they were applied. CF recommends use of cell\_methods for each spatio-temporal dimension and each spatio-temporal scalar coordinate variable. |
| cf\_role | CF | variable | char | Where feasible a variable with the attribute cf\_role should be included. The only acceptable values of cf\_role for Discrete Geometry CF data sets are "=station\_id=", "=profile\_id=", and "=trajectory\_id=". The variable carrying the cf\_role attribute may have any data type. When a variable is assigned this attribute, it must provide a unique identifier for each feature instance. CF files that contain timeSeries, profile or trajectory featureTypes, should include only a single occurrence of a cf\_role attribute; CF files that contain timeSeriesProfile or trajectoryProfile may contain two occurrences, corresponding to the two levels of structure in these feature types. | The cf\_role attribute should only be attached to a coordinated variable (See Appendix A ). In order for the CF Checker to determine that station\_name is indeed a coordinate variable it must be listed as such in the "coordinates" attribute. |
| climatology | CF | variable | string | This attribute points to another variable containing climatological bounds. Climatological bounds are the starting and ending dates for each climatological interval | Please follow the guidance in the Description |
| comment | CF | global / variable | string | This attribute is defined the same way as in ACDD. The only difference is that this can be used as a variable attribute. | Note the difference bewteen comment and long\_name for a variable: While long\_name is intended for a phrase or a one line description of what the data represents, comment could be much longer and is intended to provide in greater detail any miscellaneous information important to interpret the data. |
| compress | CF | variable | string | This attribute is used in order to achieve some compression of the data. | Please follow the guidance in the Description |
| Conventions | CF | global | string | States that the CF convention is being used and what version. | Try to use the most recent version of the CF convention. Currently, it is "CF-1.6". |
| coordinates | CF | variable | string | This attribute contains a space seperated list of all the coordinates corresponding to the variable.The list should contain all the arxiliary coordinate variables and optionally the coordinate variables. | Also, note that whenever any auxiliary coordinate variable contains a missing value, all other coordinate, auxiliary coordinate and data values corresponding to that element should also contain missing values. |
| flag\_masks | CF | variable | same as type of the variable | (Comma-separated) Describes the binary condition of the flags. | The boolean conditions are identified by performing bitwide AND of the variable value and the flag\_masks. For example, if the variable value is of type unsigned byte and equal to 5 and the flag\_masks are 1b, 2b, 4b, 8b, 16b, 32b. The binary encoding of 5 is 00000101 and the binary encoding of the flags are 00000001, 00000010, 00000100, 00001000, 00010000, 00100000. Now bitwide AND of the value with the masks returns 00000001, 00000000, 00000100, 00000000, 00000000, 00000000 respectively or 1b,0,4b,0,0,0,0,0 in decimal. So the masks corresponding to 1b and 4b are "true", rest are "false". In this example, first two bits are not used. If the variable were 4b, the flag\_mask corresponding to 4b would be "true" and rest would be "false". |
| flag\_meanings | CF | variable | string | (Space-separated) Interpretation corresponding to each of the flag\_values and/or flag\_masks | CF allows a single variable to contain both flag\_values and flag\_masks. The interpretation of the flags in such cases is slightly tricky. In such cases flag\_masks is used to "group" a set of flag\_values into a nested conditional. Please see the example 3.5 in the CF document on how to interpret flag\_meanings in such cases. NODC recommends that boolean and enumerated flags be kept in separate variables. |
| flag\_values | CF | variable | same as type of the variable | (Comma-separated) flag\_values maps each value in the variable to a value in the flag\_meanings in order to interpret the meaning of the value in the array. | Please follow the guidance in the Description |
| \_FillValue | CF | variable | float | This value is considered to be a special value that indicates undefined or missing data, and is returned when reading values that were not written. | CF does not allow fill values for coordinate variables (Note that, here coordinate variable is not same as geophysical coordinates, see below). If the geophysical coordinates in your dataset could have null values, coordinate variables([http://www.cfconventions.org/1.6.html#terminology](http://cfconventions.org/Data/cf-conventions/cf-conventions-1.6/build/cf-conventions.html" \l "terminology)) should be used to represent the geophysical coordinates.  Note that the term "coordinate variable" here is NOT used in the sense of geophysical coordinates. The term is defined in the netCDF users guide (section 2.3.1(<http://www.unidata.ucar.edu/software/netcdf/docs/netcdf.html#Variables>)). It is a one-dimensional variable with the same name as its dimension [e.g., time(time)], and it is defined as a numeric data type with values that are ordered monotonically. Unfortunately, lot of terminology used by CF and netCDF interferes with the terminology used by scientists and has different meaning. Some examples - variable (netCDF variable or geophysical variable), coordinate variable (geophysical coordinate (lat, lon, depth, etc) or netCDF/CF coordinate variable), dimension (geophysical dimension or netCDF dimension), etc. Depending on the context, the reader should be careful to distinguish the subtle variation in the meaning of the terms used. |
| grid\_mapping | CF | variable | string | Describes the horizontal coordinate system used by the data. The grid\_mapping attribute should point to a variable which would contain the parameters corresponding to the coordinate system. There are typically several parameters associated with each coordinate system. CF defines a separate attributes for each of the parameters. Some examples are "semi\_major\_axis", "inverse\_flattening", "false\_easting" | All the attributes within a grid\_mapping variable are described in [http://www.cfconventions.org/1.6.html#grid-mappings-and-projections](http://cfconventions.org/Data/cf-conventions/cf-conventions-1.6/build/cf-conventions.html#grid-mappings-and-projections) . For all the measurements based on WSG84 which is the default coordinate system used for GPS measurements, the following parameters should be used: crs:grid\_mapping\_name = "latitude\_longitude"; crs:longitude\_of\_prime\_meridian = 0.0 ; crs:semi\_major\_axis = 6378137.0 ; crs:inverse\_flattening = 298.257223563 ; Here "crs" represents the name of the variable pointed to by grid\_mapping attribute |
| institution | CF | global / variable | string | This attribute is defined the same way as in ACDD. The only difference is that this can be used as a variable attribute. Use the conventions defined above for institution. | Please follow the guidance in the Description |
| long\_name | CF | variable | string | A free-text field to describe the variable. | Often long\_name is used as the title of an image, a graph or title of an axis when showing the data graphically. Try not to put too much here. Use comment if you want to be more elaborate. |
| references | CF | global / variable | string | Published or web-based references that describe the data or methods used to produce it. | This attribute should point to project web sites, published papers, and similar items. |
| sample\_dimension | CF | variable | string | An attribute which identifies a count variable and names the sample dimension to which it applies. The count variable indicates that the contiguous ragged array representation is being used for a collection of features. | Please follow the guidance in the Description |
| scale\_factor | CF | variable | float | This attribute along with add\_offset is used for unpacking data or for converting the data to CF valid units. CF places a lot of restrictions on the use of these attributes. Please read the CF documentation for best practices. | Note that the packed value is calculated from original value as follows: packedValue = (originalValue - add\_offset)/scale\_factor and NOT packedValue = (orginalValue/scale\_factor) - add\_offset |
| source | CF | global / variable | string | The method of production of the original data. If it was model-generated, source should name the model and its version, as specifically as could be useful. If it is observational, source should characterize it (e.g., "surface observation" or "radiosonde"). | Please follow the guidance in the Description |
| standard\_name | CF | variable | string | Standardized field which uses the CF Standard Names([http://www.cfconventions.org/documents.html/](http://www.cfconventions.org/documents.html)). If a variables does not have an existing standard\_name in the CF-managed list, this attribute should not be used. In these cases, a standard name can be proposed to the CF community for consideration and acceptance. | Please follow the guidance in the Description |
| units | CF | variable | string | Required for most all variables that represent dimensional quantities. The value should come from udunits(<http://www.unidata.ucar.edu/software/udunits/>) authoritative vocabulary, which is documented in the CF standard name table with it's corresponding standard name. The udunits package includes a file udunits.dat which lists its supported unit names. | Please follow the guidance in the Description |
| valid\_max | CF | variable | float | Maximum possible value of a variable. Note that if the data values are packed with scale\_factor and add\_offset, these values are packed too. | Please follow the guidance in the Description |
| valid\_min | CF | variable | float | Minimum possible value of a variable. Note that if the data values are packed with scale\_factor and add\_offset, these values are packed too. | Please follow the guidance in the Description |
| uuid | NODC | global | char | Machine readable unique identifier for each netCDF file. A new uuid should be created whenever the netCDF file is changed. Review the history attribute listed below for further information about tracking older versions of the data file. From wikipedia: A UUID is a 16-byte (128-bit) number. The number of theoretically possible UUIDs is therefore about 3 × 1038. In its canonical form, a UUID consists of 32 hexadecimal digits, displayed in 5 groups separated by hyphens, in the form 8-4-4-4-12 for a total of 36 characters (32 digits and 4 hyphens). (ex., 550e8400-e29b-41d4-a716-446655440000) <http://en.wikipedia.org/wiki/Universally_unique_identifier>) | Numerous tools exist to rapidly and easily create UUIDs. See the wiki page for a list. |
| platform | NODC | global / variable | char | This attribute can be used with a geophysical variable to identify the platform that was used in the collection of the data. The value of the attribute should be set to another variable which contains the details of the platform. There can be multiple platforms involved depending on if all the instances of the featureType in the collection share the same platform or not. If multiple platforms are involved, a variable should be defined for each platform and referenced from the geophysical variable in a comma separated string. NODC recommends the use of the following attributes for those platform variables: call\_sign, ices\_code, wmo\_code, and imo\_code | Information on NODC codes is available at <http://www.nodc.noaa.gov/cgi-bin/OAS/prd/platform>  Information on WMO codes is available at <http://www.wmo.int/pages/prog/amp/mmop/wmo-number-rules.html>  We recommend you avoid using ambiguous phrases like "NA" or "N/A" which might mean different things (e.g., Not Applicable, or Not Available). |
| instrument | NODC | global / variable | char | This attribute can be used with a geophysical variable to identify the instrument that collected the data.The value of the attribute should be set to another variable which contains the details of the instrument. There can be multiple instruments involved depending on if all the instances of the featureType in the collection come from the same instrument or not. If multiple instruments are involved, a variable should be defined for each instrument and referenced from the geophysical variable in a comma seperated string. NODC recommends the use of the following attributes for those instrument variables: make\_model, serial\_number, calibration\_date, factory\_calibrated, user\_calibrated, calibration\_report, accuracy, valid\_range, and precision. | Please follow the guidance in the Description |
| sea\_name | NODC | global | char | The names of the sea in which the data were collected. | See the list of NODC sea names here: NODC Sea Names (<http://www.nodc.noaa.gov/General/NODC-Archive/seanamelist.txt>) |
| nodc\_name | NODC | variable | char | The NODC controlled vocabulary name for the variable if different from the standard name attribute or the standard name attribute does not exist. | See the list of available NODC data type names (<http://www.nodc.noaa.gov/cgi-bin/OAS/prd/datatype>). |
| nodc\_template\_version | NODC | global | char | This attribute tracks the version of the feature type created by NODC. (for example: nodc\_template\_version = "netCDF\_single\_trajectory\_v1.0") | Please follow the guidance in the Description |