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Supplement of

Tropical cyclones vertical structure from GNSS radio occultation: an archive covering the period 2001–2018

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ANNEX 1

dimensions:

altitude

datetimeTC = dimension of datetimes of tropical cyclone tracks points, which are collocated with any RO profile;

5 numRO = maximum number of RO profiles collocated with single TC position

variables:

int altitude(altitude);

10

:standard_name = "height";

:long_name = "Altitude above geoid";

:units = "m";

:_CoordinateAxisType = "Height";

15

int basin(datetimeTC);

:long_name = "Current basin";

:flag_values = 1, 2, 3, 4, 5, 6, 7; // int

:flag_meanings = "East_Pacific North_Atlantic North_Indian South_Atlantic South_Indian South_Pacific
Western_Pacific";

20

double bending_angle(altitude, datetimeTC, numRO);

:long_name = "Ionosphere corrected non-optimized bending angle";

:units = "rad";

:_FillValue = -9999.0; // double

25

double bending_angle_climatology(altitude, datetimeTC, numRO);

:long_name = "Climatological ionosphere corrected non-optimized bending angle";

:units = "rad";

:_FillValue = -9999.0; // double

30

float datediff_RO_TC(datetimeTC, numRO);

:long_name = "Time difference between TC and RO datetimes";

:units = "s";

:_FillValue = -9999.0f; // float

35

int datetimeTC(datetimeTC);

:_FillValue = -9999; // int

:standard_name = "time";

:long_name = "Datetime of TC track position";

40

:_CoordinateAxisType = "Time";

:units = "seconds since 1970-01-01 00:00:0.0";

int dist2land(datetimeTC);

:_FillValue = -9999; // int

45

:standard_name = "dist2land";

:long_name = "Current distance to land from current position";

:units = "km";

int dist_RO_TC(datetimeTC, numRO);

50

:long_name = "Distance between TC and RO tangent point";

:units = "km";

:_FillValue = -9999; // int

int landfall(datetimeTC);

55

:_FillValue = -9999; // int

:long_name = "Minimum distance to land over next 3 hours (= 0 means landfall)";

:units = "km";

float latRO(datetimeTC, numRO);

60

:standard_name = "latitude";

:long_name = "Latitude of RO profile";

:units = "degrees_north";

:_FillValue = -9999.0f; // float

65

float lonRO(datetimeTC, numRO);

:standard_name = "longitude";

:long_name = "Longitude of RO profile";

:units = "degrees_east";

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:_FillValue = -9999.0f; // float
70
float latTC(datetimeTC);
:_FillValue = -9999.0f; // float
:standard_name = "latitude";
:long_name = "TC latitude";
75
:units = "degrees_north";

float lonTC(datetimeTC);
:standard_name = "longitude";
:long_name = "TC longitude";
80
:units = "degrees_east";
:_FillValue = -9999.0f; // float

int nature(datetimeTC);
:long_name = "Nature of the cyclone";
85
:flag_values = 1, 2, 3, 4, 5, 6; // int
:flag_meanings = "Not_Reported Disturbance Tropical_System Extratropical_System Subtropical_System
MIXED_occurs_when_agencies_reported_inconsistent_types";

double pressure(altitude, datetimeTC, numRO);
90
:standard_name = "air_pressure";
:long_name = "Air pressure";
:units = "Pa";
:_FillValue = -9999.0; // double

95 int QC(datetimeTC, numRO);
:standard_name = "status_flag";
:long_name = "RO overall retrieval quality control";
:valid_range = 0, 1; // int
:flag_values = 0, 1; // int
100 :flag_meanings = "good bad";
:_FillValue = -9999; // int

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double refractivity(altitude, datetimeTC, numRO);
:long_name = "Refractivity (N-units)";
105 :units = "1";
:_FillValue = -9999.0; // double

int RO_datetime(datetimeTC, numRO);
:standard_name = "time";
110 :calendar = "standard";
:long_name = "Datetime of RO profile";
:units = "seconds since 1970-01-01 00:00:0.0";
:_FillValue = -9999; // int

115 char RO_ID(datetimeTC, charr=64, numRO);
:long_name = "ID of collocated Radio Occultation profile, collocation criteria: 500 km, 6 hours";
:standard_name = "RO_ID";

int satellite(datetimeTC, numRO);
120 :long_name = "RO satellite name";
:flag_values = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13; // int
:flag_meanings = "CHAMP CNOFS F3C-FM1 F3C-FM2 F3C-FM3 F3C-FM4 F3C-FM5 F3C-FM6 GRACE-A GRACE-
B METOP-A METOP-B SAC-C";

125 double specific_humidity(altitude, datetimeTC, numRO);
:standard_name = "specific_humidity";
:long_name = "Specific humidity";
:units = "kg kg**-1";

130 double specific_humidity_climatology(altitude, datetimeTC, numRO);
:standard_name = "specific_humidity";
:long_name = "Climatological specific humidity";
:units = "kg kg**-1";
:_FillValue = -9999.0; // double

135 int storm_dir(datetimeTC);

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:_FillValue = -9999; // int
:long_name = "Storm translation direction (degrees east of north)";
:units = "degrees";
140 :valid_min = 0; // int
:valid_max = 360; // int

int storm_speed(datetimeTC);
:long_name = "Storm translation speed";
145 :units = "m s-1";
:_FillValue = -9999; // int

int subbasin(datetimeTC);
:long_name = "Current subbasin";
150 :flag_values = 1, 2, 3, 4, 5, 6, 7, 8, 9; // int
:flag_meanings = "Arabian_Sea Bay_of_Bengal Central_Pacific Caribbean_Sea Gulf_of_Mexico North_Atlantic
Eastern_Australia Western_Australia No_subbasin_for_this_position";

double temperature(altitude, datetimeTC, numRO);
155 :standard_name = "air_temperature";
:long_name = "Air temperature";
:units = "K";
:_FillValue = -9999.0; // double

160 double temperature_climatology(altitude, datetimeTC, numRO);
:standard_name = "air_temperature";
:long_name = "Climatological air temperature";
:units = "K";
:_FillValue = -9999.0; // double

165 int wmo_agency(datetimeTC);
:long_name = "Official WMO agency";
:flag_values = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10; // int
:flag_meanings = "Not_provided atcf bom hurdat_atl hurdat_epa nadi newdelhi reunion tokyo wellington";
170

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int wmo_pres(datetimeTC);
:_FillValue = -9999; // int
:standard_name = "surface_air_pressure";
:long_name = "Minimum central pressure from official WMO agency";
175 :units = "Pa";

int wmo_wind(datetimeTC);
:_FillValue = -9999; // int
:long_name = "Maximum sustained wind speed from official WMO agency";
180 :units = "m s-1";
:note = "Wind speed averaging periods by agency: 1-min for US Agencies, 3-min for IMD, 10-min for JMA, BoM, La
Reunion, Nadi and Wellington";

global attributes:
185 :TC_name; // char
:Conventions = "CF-1.7";
:SID; // char
:season_of_the_start; // double

```