



Australian Government

Bureau of Meteorology

Tropical Cyclone Database: Structure Specification

Overview

This document provides explanatory notes on the fields and codes used in the tropical cyclone track database. The database covers all recorded tropical cyclones tracks over the region south of the equator between 90E and 160E. Note that until 2007, a much more restrictive database structure had been used; hence many fields are not populated before this date. Some of these older systems may be reviewed in the future.

Each field is defined here. The name of each field defined here is located at the top row of the database.

CONTENTS

NAME.....	4
DISTURBANCE_ID.....	4
TM	4
TYPE.....	4
DATA_SRC.....	5
SURFACE_CODE.....	5
CYC_TYPE.....	6
LAT	6
LON.....	6
POSITION_METHOD.....	7
POSITION_UNCERTAINTY.....	7
DVORAK_DATA_T_NO	7
DVORAK_MODEL_T_NO.....	7
DVORAK_PATTERN_T_NO.....	7
DVORAK_FINAL_T_NO.....	7
DVORAK_CI_NO	7
CENTRAL_PRES.....	8
CENTRAL_PRES_UNCERTAINTY	8
CENTRAL_PRES_METHOD.....	8
PRES_WIND_RELATION_USED.....	8

ENV_PRES	9
ENV_PRES_UNCERTAINTY	9
MN_RADIUS_OUTER_ISOBAR	9
MN_RADIUS_OUTER_ISOBAR_UNCERTAINTY	9
MN_RADIUS_GF_WND	10
MN_RADIUS_GF_SECNE	10
MN_RADIUS_GF_SECSE	10
MN_RADIUS_GF_SECSW	10
MN_RADIUS_GF_SECNW	10
MN_RADIUS_SF_WND	10
MN_RADIUS_SF_SECNE	10
MN_RADIUS_SF_SECSE	10
MN_RADIUS_SF_SECSW	10
MN_RADIUS_SF_SECNW	10
MN_RADIUS_HF_WND	10
MN_RADIUS_HF_SECNE	10
MN_RADIUS_HF_SECSE	10
MN_RADIUS_HF_SECSW	10
MN_RADIUS_HF_SECNW	10
MN_RADIUS_MAX_WND	11
MN_RADIUS_MAX_WND_UNCERTAINTY	11
MN_RADIUS_GF_WND_UNCERTAINTY	11
MN_RADIUS_SF_WND_UNCERTAINTY	11
MN_RADIUS_HF_WND_UNCERTAINTY	11
MN_RADIUS_MAX_WND_METHOD	11
MN_RADIUS_GF_METHOD	11
MN_RADIUS_SF_METHOD	11
MN_RADIUS_HF_METHOD	11
WIND_SPD_PER	11
MAX_WIND_SPD	12
MAX_WIND_SPD_UNCERTAINTY	12
MAX_WIND_SPD_METHOD	12
MAX_WIND_GUST_PER	13
MAX_WIND_GUST	13
MAX_WIND_GUST_METHOD	13
MN_EYE_RAD	14
MN_EYE_RAD_UNCERTAINTY	14
MN_EYE_RAD_METHOD	14
MAX_REP_WIND_SPD	15

MAX_REP_WIND_DIR	15
MAX_REP_WIND_METHOD	15
MAX_REP_WIND_LON	15
MAX_REP_WIND_LAT	15
MAX_REP_WAV_HT	16
MAX_REP_WAV_METHOD	16
MAX_REP_WAV_LON	16
MAX_REP_WAV_LAT	16
MAX_REP_SWL_HT	17
MAX_REP_SWL_DIR	17
MAX_REP_SWL_PER	17
MAX_REP_SWL_METHOD	17
MAX_REP_SWL_LON	17
MAX_REP_SWL_LAT	17
MAX_REP_TIDE_ANOM	18
MAX_REP_TIDE_ANOM_UNCERTAINTY	18
MAX_REP_TIDE_ANOM_METHOD	18
MAX_REP_TIDE_ANOM_LON	18
MAX_REP_TIDE_ANOM_LAT	18
COMMENT	18

Database Structure in Detail:

NAME VARCHAR2 (30)

Name of Cyclone: This will be one of three text values,

- Cyclone name – if it was named
- **NULL** – if the cyclone was not given a name because there was no naming convention at the time (pre 1964)
- “Unnamed” – If the cyclone was not named, usually occurs when a system is only recognised as a cyclone after the event (post 1963) – these are referred to as Unnamed.

DISTURBANCE_ID VARCHAR2 (12)

This is a unique ID code for easy reference.

Since 2005, the last three characters (e.g. 02U) have been used to identify the disturbance sequence in real time. Since some systems do not reach cyclone strength, there are some gaps in the numerical sequence.

TM DATE

Units: [date-time – UTC](#) (to the nearest minute)

This is the date/time to which the information in this table entry is related. All dates are indicated in UTC.

TYPE VARCHAR2(1)

This provides a description of the system as a whole. If the system evolves during its lifetime, then its overall type is the highest on this chart.

Note that creation of a properly quality assured “Best Track” takes time. In the interim, a “Draft” version of the track may be uploaded which would normally be the un-checked operational track.

Code	Originating Office
------	--------------------

- | | |
|---|--|
| D | DRAFT – Operational track provided awaiting completion of Best Track |
| T | Tropical cyclone |
| E | Extra-tropical Cyclone or East Coast Low |
| L | Tropical low failed to attain TC strength |
| O | Other type of system |
| U | Unknown |

DATA_SRC NUMBER (2)

This is a two digit number that indicates the source of the data. Generally this is the Region that performed the original best-track analysis.

Code	Originating Office
NULL	Default – unknown
1	La Reunion
2	Perth
3	Darwin
4	Brisbane
5	Papua New Guinea
6	Fiji
7	New Zealand
10	Mauritius
11	New Caledonia
12	Central Pacific Hurricane Center, Honolulu
13	Joint Typhoon Warning Center, Honolulu
19	Indonesia
20	Australia - generic
21	Australia – generic Woodside Study 05
30	S Hemisphere D'base

SURFACE_CODE NUMBER (1)

This indicates the type of surface (land or water) that the **cyclone centre** is located above.

Code	Surface Information
NULL	Default - unknown
1	over water
2	over land
3	moving from water to land
4	moving from land to water
5	moving over island of length < 60 nautical miles

CYC_TYPE NUMBER (2)

This indicates the type of system that this cyclone was at the time of the observation. Note that cyclones can evolve during their lifetimes and hence change type mid-stream (e.g. Extra-tropical transition (ETT))

Code	Type of Cyclone
NULL	Default – unknown
10	Tropics; disturbance (no closed isobars)
20	<34 knot (17m/s) winds, and at least one closed isobar
21	34-63 knots (17-32m/s) two or less quadrants
30	34-63 knots (17-32m/s) more than two quadrants
40	>63 knots (>32m/s)
50	Extra-tropical (no gales)
51	Extra-tropical (with gales)
52	Extra-tropical (max wind unknown)
60	Dissipating (no gales)
70	Subtropical cyclone (non-frontal, low pressure system that comprises initially baroclinic circulation developing over subtropical water) (no gales)
71	Subtropical cyclone (non-frontal, low pressure system that comprises initially baroclinic circulation developing over subtropical water) (with gales)
72	Subtropical cyclone (non-frontal, low pressure system that comprises initially baroclinic circulation developing over subtropical water) (max wind unknown)
80	Overland (no gales)
81	Overland (gales)
91	Tropical Cold-cored – Monsoon Low (with surrounding gales away from centre)

LAT NUMBER (4, 2)

LON NUMBER (5, 2)

Units are [decimal degrees](#)

Sign convention: east positive, west negative & north positive, south negative

Latitude & Longitude of cyclone centre.

POSITION_METHOD NUMBER (2)

This indicates the tools that were used to derive the centre location of the system.

Code	Method to derive position
NULL	Default - unknown
1	no sat, no rad, no obs
2	no sat, no rad, obs only
3	Sat IR/Vis; no clear eye
4	Sat IR/Vis; clearly defined eye
5	aircraft radar report
6	land-based radar report
7	Sat IR/Vis & rad & obs
8	report inside eye
10	Sat- Scatterometer
11	Sat- Microwave
12	Manned Aircraft Reconnaissance
13	UAV Aircraft Reconnaissance

POSITION_UNCERTAINTY NUMBER (3)

Units are [kilometres](#)

Uncertainty in position fix for the cyclone (in km)

Default (unknown) should be NULL

DVORAK_DATA_T_NO NUMBER (2, 1)

DVORAK_MODEL_T_NO NUMBER (2, 1)

DVORAK_PATTERN_T_NO NUMBER (2, 1)

DVORAK_FINAL_T_NO NUMBER (2, 1)

DVORAK_CI_NO NUMBER (2, 1)

DVORAK pattern analysis parameters. The titles of these DVORAK codes are self-evident.

Default – (nil-data) should be NULL

CENTRAL_PRES NUMBER (4)

Units are [hectopascals](#)

Central pressure of the cyclone

Default (unknown) should be **NULL**

CENTRAL_PRES_UNCERTAINTY NUMBER (2)

Units are [hectopascals](#)

Estimated uncertainty in the central pressure value

Default (unknown) should be **NULL**

CENTRAL_PRES_METHOD NUMBER

(2)

This code may need to be expanded to handle new systems in the future, and also to differentiate between pressure-wind relationships used to derive the central pressure.

code	Method
NULL	Unknown or N/A
1	Aircraft or Dropsonde observation
2	Over water observation (e.g. buoy)
3	Over land observation
4	Instrument – unknown type
5	Derived Directly from DVORAK
6	Derived from wind via a P-W equation
7	Estimate from surrounding obs
8	Extrapolation from radar
9	Other

PRES_WIND_RELATION_USED NUMBER (2)

Presents the pressure-wind relation used to derive the estimated central pressure and winds from DVORAK analysis or observations.

Note that the lookup table may be further populated as other relationships are pressed into service.

code	CI - Wind > Pressure Relation
NULL	N/A
1	Crane (Qld small)
2	Crane (Qld system)
3	Atkinson & Holliday (1977)
4	Love & Murphy (1985)
5	Dvorak (1975)
6	Dvorak Atlantic (1984)
7	Dvorak NWP (1984)
8	Courtney & Knaff Aust. (2009)
49	Other

ENV_PRES NUMBER (4)

Units: [hectopascals](#)

Environmental pressure in which the cyclone is embedded.

Default (unknown) should be **NULL**

ENV_PRES_UNCERTAINTY NUMBER (2)

Units: [hectopascals](#)

Estimated accuracy in Hectopascals of the above- mentioned environmental pressure in which the cyclone is embedded.

Default (unknown) should be **NULL**

MN_RADIUS_OUTER_ISOBAR NUMBER (4)

Units: [kilometres](#)

The estimated mean radius of the outermost closed isobar (1hPa spacing).

If there is no closed isobar the value is zero, if it is unknown, the value should be **NULL**

MN_RADIUS_OUTER_ISOBAR_UNCERTAINTY NUMBER (3)

Units: [kilometres](#)

The estimated accuracy of the abovementioned mean radius of the outermost closed isobar.

Default (unknown) should be **NULL**

MN_RADIUS_GF_WND NUMBER (4)

MN_RADIUS_GF_SECNE NUMBER (4)

MN_RADIUS_GF_SECSE NUMBER (4)

MN_RADIUS_GF_SECSW NUMBER (4)

MN_RADIUS_GF_SECNW NUMBER (4)

Units: [kilometres](#)

This is the mean radius (from the system centre) of the extent of winds; gale-force (17m/s) or above. The four sectors show the mean extent in the respective quadrant centred on the cardinal point. (value 0 if no gales, [NULL](#) if unknown)

MN_RADIUS_SF_WND NUMBER (4)

MN_RADIUS_SF_SECNE NUMBER (4)

MN_RADIUS_SF_SECSE NUMBER (4)

MN_RADIUS_SF_SECSW NUMBER (4)

MN_RADIUS_SF_SECNW NUMBER (4)

Units: [kilometres](#)

These are the mean radius (from the system centre) of the extent of winds; storm-force (25m/s) or above. (value 0 if no storm-force winds, [NULL](#) if unknown)

MN_RADIUS_HF_WND NUMBER (4)

MN_RADIUS_HF_SECNE NUMBER (4)

MN_RADIUS_HF_SECSE NUMBER (4)

MN_RADIUS_HF_SECSW NUMBER (4)

MN_RADIUS_HF_SECNW NUMBER (4)

Units: [kilometres](#)

These are the mean radius (from the system centre) of the extent of winds; hurricane-force (33m/s) or above. (value 0 if no hurricane force winds, [NULL](#) if unknown)

MN_RADIUS_MAX_WND NUMBER (4)

Units: [kilometres](#)

This is the mean radius (from the system centre) of the maximum mean wind.

Default value **NULL** if unknown

MN_RADIUS_MAX_WND_UNCERTAINTY NUMBER (2)

MN_RADIUS_GF_WND_UNCERTAINTY NUMBER (2)

MN_RADIUS_SF_WND_UNCERTAINTY NUMBER (2)

MN_RADIUS_HF_WND_UNCERTAINTY NUMBER (2)

Units: [kilometres](#)

These are the estimations of accuracy of the mean radius (from the system centre) of the relevant parameter.

Default value **NULL** if unknown; Value of 99 for 99km or greater

MN_RADIUS_MAX_WND_METHOD NUMBER (2)

MN_RADIUS_GF_METHOD

NUMBER (2)

MN_RADIUS_SF_METHOD

NUMBER (2)

MN_RADIUS_HF_METHOD

NUMBER (2)

These are the code values to indicate the method used to estimate the respective mean radii.

code	Method for radius estimate
------	----------------------------

NULL	Default – unknown or N/A
1	aircraft observation
2	surface observation
3	Radar: defined circulation (no eye)
4	Radar: well defined eye
5	Radar: poorly defined eye
6	Radar: Doppler wind
7	Satellite: defined circulation (no eye)
8	Satellite: well defined eye
9	Satellite: poorly defined eye
10	Satellite: Scatterometer data
11	Estimate from outer closed isobar
20	Other

WIND_SPD_PER NUMBER (2)

Units are [minutes](#)

This is the period used for all mean wind speeds (estimated and derived).

This parameter will only be used when receiving data in WMO format that is not based on 10 min average winds. All Australian based should be based on 10-minute mean winds.

Default: **NULL** if unknown or not applicable.

MAX_WIND_SPD NUMBER (4, 1)

Units are [metres per second](#)

This is the **estimated maximum mean wind** around the cyclone – that is in the vicinity of the centre.

The decimal place is required to account for round-off error. Numbers are recorded in integral knot or kph values – then stored as m/s to one decimal place. When extracted again and reported as an integer in knots or kph, the original recorded value will be restored without the problem of cumulative round-off errors.

MAX_WIND_SPD_UNCERTAINTY NUMBER (3, 1)

Units are [metres per second](#)

Estimate of accuracy of estimated mean maximum wind speed.

Default (unknown or not applicable) is **NULL**

MAX_WIND_SPD_METHOD NUMBER (2)

This indicates the method used to estimate the value of the maximum wind speed.

code	Method
NULL	Default – unknown or N/A
1	aircraft reconnaissance
2	Dropsonde
3	ship estimate
4	ship instrument
5	Other marine instrument (eg buoy)
6	land estimate
7	land instrument (other)
8	land instrument (Dynes)
9	land instrument (prop.)
10	land instrument (not stated)
11	Satellite radar/scatterometer
12	Derived from pressure measurement
13	DVORAK Estimate
20	Other

MAX_WIND_GUST_PER NUMBER (2)

Units are [seconds](#)

This is the period of the gust used when measuring max wind gusts.

This parameter will only be used when receiving data in WMO format that is not based on 3-sec gusts. All Australian based data should be based on 3-sec gusts.

Default: [NULL](#) if unknown or not applicable

MAX_WIND_GUST NUMBER (4, 1)

Units are [metres per second](#)

This is the **estimated maximum wind gust** around the cyclone – that is in the vicinity of the centre based on open terrain estimate.

Default (unknown or not applicable) is [NULL](#)

MAX_WIND_GUST_METHOD NUMBER (2)

This indicates the method used to estimate the value of the maximum wind speed.

code	Method
NULL	Default – unknown or N/A
1	Estimate from mean wind
2	Direct observation
3	Impact analysis
20	Other

MN_EYE_RAD NUMBER (3, 1)

Units are [kilometres](#)

Mean **radius** of the cyclone eye.

Defaults: 0 if no eye, **NULL** if unknown.

MN_EYE_RAD_UNCERTAINTY NUMBER (2)

Units are [kilometres](#)

Accuracy of eye-radius estimation

Default: **NULL** if unknown or not applicable.

MN_EYE_RAD_METHOD NUMBER (2)

Code for the method for determining of eye-radius estimation

code	Method
NULL	Unknown – or N/A
1	sat image with clear eye
2	aircraft radar
3	land based radar
4	direct observation
20	other

MAX_REP_WIND_SPD NUMBER (4, 1)

Units are [metres per second](#)

This is the maximum **reported** wind speed (note that this will likely be less than the maximum wind speed occurring in the cyclone). This is not recorded if no winds greater than 17m/s are observed.

Default: **NULL** if unknown or not applicable.

MAX_REP_WIND_DIR NUMBER (3)

Units are [degrees](#)

This is the wind direction for the maximum **reported** wind.

Default: **NULL** if unknown or not applicable.

MAX_REP_WIND_METHOD NUMBER (2)

Code represents the method used to obtain the maximum reported wind

code	Method
NULL	Default – unknown or N/A
1	aircraft reconnaissance
2	Dropsonde
3	ship estimate
4	ship instrument
5	Other marine instrument (eg buoy)
6	land estimate
7	land instrument (other)
8	land instrument (Dynes)
9	land instrument (prop.)
10	land instrument (not stated)
11	Satellite radar/scatterometer
20	Other

MAX_REP_WIND_LON NUMBER (5, 2)

MAX_REP_WIND_LAT NUMBER (4, 2)

Units are [decimal degrees](#)

Sign convention: east positive, **west negative** & north positive, **south negative**

These are the latitude and longitude of the location of the observation.

Default: **NULL** if unknown or not applicable.

MAX_REP_WAV_HT NUMBER (3, 1)

Units are [metres](#)

This is the maximum **reported** sea wave height (only reported if within 556km (300nm) of cyclone centre).

Default: **NULL** if unknown or not applicable.

MAX_REP_WAV_METHOD NUMBER (1)

Code represents the method used to obtain the maximum reported wave height

code	Method
NULL	Default – unknown or N/A
1	Ship estimate
2	Land estimate
3	Ocean instrument
4	Satellite radar/scatterometer
5	Aircraft
6	Other

MAX_REP_WAV_LON NUMBER (5, 2)

MAX_REP_WAV_LAT NUMBER (4, 2)

Units are [decimal degrees](#)

Sign convention: east positive, west negative & north positive, south negative

These are the latitude and longitude of the location of the wave height observation.

Default: **NULL** if unknown or not applicable.

MAX_REP_SWL_HT NUMBER (4, 1)

Units are [metres](#)

This is the maximum **reported** sea swell height (only reported if within 56km (30nm) of cyclone centre).

Default: **NULL** if unknown or not applicable.

MAX_REP_SWL_DIR NUMBER (3)

Units are [degrees](#)

This is the direction of the maximum **reported** swell.

Default: **NULL** if unknown or not applicable.

MAX_REP_SWL_PER NUMBER (2)

Units are [seconds](#)

This is the period of the maximum **reported** sea swell.

Default: **NULL** if unknown or not applicable

MAX_REP_SWL_METHOD NUMBER (1)

Code represents the method used to obtain the maximum reported wind

code	Method
NULL	Default – unknown or N/A
1	Ship estimate
2	Land estimate
3	Ocean instrument
4	Satellite radar/scatterometer
5	Aircraft
6	Other

MAX_REP_SWL_LON NUMBER (5, 2)

MAX_REP_SWL_LAT NUMBER (4, 2)

Units are [decimal degrees](#)

Sign convention: east positive, west negative & north positive, south negative

These are the latitude and longitude of the location of the observation. This has been changed from previous location relative to TC centre.

Default: **NULL** if unknown or not applicable.

MAX_REP_TIDE_ANOM NUMBER (3, 1)

Units are [metres](#)

This is the maximum **reported** positive tidal anomaly (that is in excess of expected astronomical tide)

Default: **NULL** if unknown or not applicable.

MAX_REP_TIDE_ANOM_UNCERTAINTY NUMBER (2, 1)

Units are [metres](#)

This is the estimated accuracy – need precision of this parameter to one decimal place.

Default: **NULL** if unknown or not applicable.

MAX_REP_TIDE_ANOM_METHOD NUMBER (2)

Code represents the method used to obtain the maximum reported tide

code	Method
NULL	Default – unknown or N/A
1	Subjective estimate
2	Post-analysis of debris
3	Instrument
9	other

MAX_REP_TIDE_ANOM_LON NUMBER (5, 2)

MAX_REP_TIDE_ANOM_LAT NUMBER (4, 2)

Units are [decimal degrees](#)

Sign convention: east positive, **west negative** & north positive, **south negative**

These are the latitude and longitude of the location of the observation. This has been changed from previous location relative to TC centre.

Default: **NULL** if unknown or not applicable.

COMMENT VARCHAR2(240)

Free text comments on the data.
