WindRiskTech NETCDF Event Set Contents

Note: Some of the parameters and variables listed below are only included in circular- or in line segment-filtered event sets.

Simulation parameters in alphabetical order:

Bas (character vector): The genesis ocean basin for this track set.

City_radius (scalar): Used for circular filtering, this is the distance, in kilometers, from a specified point of interest that tracks must pass within to be included in this set. Not used in line-segment or polygon filtering.

Clat (scalar): The latitude of the point of interest, used in circular filtering.

Clong (scalar): The longitude of the point of interest, used in circular filtering.

Eset (character vector): Event set name.

Gmeth (character vector): The genesis method used for this track set. *clim* denotes genesis by random draws from a best-track-based genesis climatology, while *rand* denotes random seeding and natural selection.

Model (character vector): Name of the model or reanalysis dataset used.

Polyfile (character vector): Name of the file of line segments or close polygons used to create the event set. Included only for event sets with line-segment filtering.

Vcrit (scalar): The minimum total surface wind speed (knots) for the events to be included in the event set. For Basin events or closed polygons, this is the minimum value of the storm lifetime maximum wind speed. For circular filters, this is the threshold that the maximum wind speed of each event within the filter must meet. For line-segment filters, this is the minimum value of the storm surface wind as it is crossing a line segment, for inclusion in the data set.

x1 (vector of length p, where p is the number of line segments in the polyfile): Longitudes of the starting points of line segments. This array is only included if line-segment filtering is used.

x2 (vector of length p, where p is the number of line segments in the polyfile): Longitudes of the end points of line segments. This array is only included if line-segment filtering is used.

y1 (vector of length p, where p is the number of line segments in the polyfile): Latitudes of the starting points of line segments. This array is only included if line-segment filtering is used.

y2 (vector of length p, where p is the number of line segments in the polyfile): Latitudes of the end points of line segments. This array is only included if line-segment filtering is used.

Output variables in alphabetical order:

Convention: *In the descriptions below, the index n refers to the event number, while the index m refers to the 2-hour records of each event. For example, Latitude (n,m) is an array containing n tracks each of which has m two-hour observations. (The arrays are padded with zeros between the end of each track and the end of the file.) Latitude (36,65) is the latitude of event number 36 at the 65th 2-hour point along its track.*

Day (n x m array): The day of the month of 2-hour points along each track.

Freq (scalar): The annual frequency of all the events in the event set. For all subsets of size *x*, the annual frequency of the subset is just *x/n*.

Freqyear (vector): Provided only for data sets spanning more than a single year. The annual frequencies of events for each year in the data set. The mean of this vector is equal to *Freq*. Subsetting rules as for *Freq* above.

Hour (n x m array): The Greenwich Mean Time of 2-hour points along each track.

jint (n x 10 array): Number index of line segment crossed when line-segment filtering is used. This will be 1 if the track crosses the first line segment in the polyfile, 2 if it crosses the second line segment in the polyfile, etc. The second dimension denotes the kth crossing of a particular track. So, for example, jint (28,2) is the index of the line segment that storm 28 crosses after it has already passed another line segment. This second index is padded with zeros. Should a particular storm cross more than 10 segments, such crossings are omitted. This array is only included if line-segment filtering is used.

kint (n x 10 array): Along track index of line-segment crossings. For example, Vnet (i, kint(i,2)) would be the maximum surface wind speeds in storm i as it makes its second crossing of the set of line segments. The second index is padded with zeros beyond the last segment crossing of each track. This array is only included if line-segment filtering is used.

kfrac (n x 10 array): The fraction of the 2-hour interval between the last point on a track before line segment crossing and the first point after the crossing. For example, a simple linear interpolation to find the storm's maximum wind at the point it crosses a line segment (following the example in *kint* above) yields Vnet (i, kint(i,2)) x (1-kfrac(I,kint(I,2))+Vnet(I,kint(I,2+1) x kfrac(I,kint(I,2)). This array is only included if line-segment filtering is used.

Latitude (n x m array): The latitude of 2-hour points along each track.

Longitude (n x m array): The longitude of 2-hour points along each track.

Month (n x m array): The calendar month of 2-hour points along each track.

Pc (n x m array): The central surface pressure (hPa) of 2-hour points along each track.

RH600 (n x m array): Relative humidity (%) of the environment at 600 hPa at each 2-hour point along each track.

Rm (n x m array): The radius (km) of maximum circular wind of 2-hour points along each track.

Rmse (n x m array): The radius (km) of maximum circular wind of any secondary wind maxima present (0 if absent), of 2-hour points along each track. Set to zero of there are no secondary eyewalls.

Router (n x m array): The outer radius (km) of each event. This is the radius at which the circular wind vanishes.

Shear (n x m array): The magnitude of the 850-250 hPa environmental wind shear (m/s) at each 2-hour point along each track.

T600 (n x m array): Temperature (K) of the environment at 600 hPa at each 2-hour point along each track.

U850 (n x m array): The zonal component of the 850 hPa environmental wind speed (knots) at each 2-hour point along each track.

Ut (n x m array): Zonal component of the storm translation velocity (knots).

Uinc (n x m array): Zonal component of the background surface wind (knots) one should add to the zonal component of the circular wind speed to get total zonal wind.

V850 (n x m array): The meridional component of the 850 hPa environmental wind speed (knots) at each 2-hour point along each track.

Vc (n x m array): The maximum circular wind speed at each 2-hour point along each track. Note that this is not the maximum 10 m wind speed, only the circular component. One needs to use *vnet* for the maximum surface winds (see entry below).

Vinc (n x m array): Meridional component of the background surface wind (knots) one should add to the meridional component of the circular wind speed to get total meridional wind.

Vnet (n x m array): Maximum 10-m ground relative wind (including the effects of background flow) in knots. One should use this variable, and not *Vc*, for maximum surface winds comparable to best track data. Note: $Vnet = Vc + \sqrt{Uinc^2 + Vinc^2}$

Vp (n x m array): The potential intensity (knots) at each 2-hour point along each track.

Vse (n x m array): The maximum circular wind speed of maximum circular wind of any secondary eyewalls that may be present, at each 2-hour point along each track. Set to zero of there are no secondary eyewalls. Note that this should be combined with Uinc and Vinc (as with Vnet) to get surface-relative wind.

Vt (n x m array): Meridional component of the storm translation velocity.

Year (n x 1 array): This file is only present in event sets spanning multiple years. It contains the year of the first datum of each event. Care should be taken with tracks that begin in December and end in January.

xint (n x 10 array): Longitudes of the intersection points of tracks with line segments. This array is only included if line-segment filtering is used.

yint (n x 10 array): Latitudes of the intersection points of tracks with line segments. This array is only included if line-segment filtering is used.

IBTrACS interpolated and filtered event sets:

We also provide historical best track data from NOAA's IBTrACS. We use tracks from the National Hurricane Center for the North Atlantic, eastern North Pacific and central North Pacific regions, and from the Joint Typhoon Warning Center for all other regions. The 6-hour tracks are linearly interpolated to 2-hour intervals to march the time intervals used in WindRiskTech synthetic tracks. Generally, the tracks are harvested for the same set of years used for the synthetic tracks unless that set of years is very limited, in which case tracks are provided over a longer set of years. The tracks are filtered exactly the same way that the synthetic tracks have been filtered. The names of the best track variables in the NETCDF files are mostly identical to those of the synthetic tracks, but there are some exceptions.