

# **PRODUCT DESCRIPTION DOCUMENT**

## **Tropical Cyclone Surface Wind Speed Probabilities in the National Digital Forecast Database**

**Approved by: //SIGNED//  
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# Tropical Cyclone Surface Wind Speed Probabilities in the National Digital Forecast Database

## Part I - Mission Connection

- a. Product Description –The National Digital Forecast Database (NDFD) contains a seamless mosaic of digital forecasts from NWS field offices working in collaboration with the National Centers for Environmental Prediction (NCEP). The Tropical Cyclone Surface Wind Speed Probabilities (TCSWSP) is a centrally produced product and is available via the NDFD.

The TCSWSP elements depict probabilities, in percent, of sustained surface wind speeds. These probabilities are provided for wind speed thresholds equal to or exceeding 34-, 50-, and 64-knots. These wind speed probabilities are based on the track, intensity, and storm structure (size in terms of wind radii) uncertainties in the official tropical cyclone forecasts. The TCSWSP elements are available in the NDFD, operational, for the continental U.S. and coastal waters and the North Pacific Ocean. A total of six elements are available:

- Tropical Cyclone Wind Speeds >34 kts (incremental)
- Tropical Cyclone Wind Speeds >34 kts (cumulative)
- Tropical Cyclone Wind Speeds >50 kts (incremental)
- Tropical Cyclone Wind Speeds >50 kts (cumulative)
- Tropical Cyclone Wind Speeds >64 kts (incremental)
- Tropical Cyclone Wind Speeds >64 kts (cumulative)

- b. Purpose – The TCSWSP elements are used to better convey the uncertainty in forecasts. Customers have requested additional tropical cyclone probabilistic information and the National Research Council's (NRC) Fair Weather Report encourages probabilistic products.
- c. Audience – A major audience for NDFD gridded data includes large volume users of forecast information, such as utilities, emergency managers, businesses/industry, academia, and any others who wish to decode and explore various potential applications of the NWS digital data.
- d. Presentation Format – As with all NDFD elements, the TCSWSP elements are available in Gridded Binary Data Edition 2 (GRIB2) via hypertext transfer protocol (http) and file transfer protocol (ftp); eXtensible Markup Language (XML); Geographic Markup Language (GML); and images via web browser, as described below:

1. GRIB2 format: The GRIB2 files can be decoded and converted to other formats, such as shapefiles, netCDF files, etc. A tutorial to download NDFD elements, decode them and generate images is posted online at:

[http://www.weather.gov/ndfd/gis/ndfd\\_tutorial.pdf](http://www.weather.gov/ndfd/gis/ndfd_tutorial.pdf)

The GRIB2 files are available from the NWS ftp server and/or the http server via the Internet. High volume users can also choose to subscribe to the Server Access Service of the Family of Services (ftp via dedicated line–cost-recovery fee).

ftp server: [http://www.weather.gov/ndfd/anonymous\\_ftp.htm](http://www.weather.gov/ndfd/anonymous_ftp.htm)

http server: [http://www.weather.gov/ndfd/access\\_http.htm](http://www.weather.gov/ndfd/access_http.htm)

Server Access Svc: <http://www.weather.gov/datamgmt/fos/fospace.html>

A user-defined GRIB2 access method is also available. That service allows the user to input latitude/longitude points for two corners to define an area and select a single weather element. The resulting GRIB2 message is built “on-the-fly” and downloaded by the user. For more information about User Defined GRIB2 access, please refer to the Service Description Document at:

[http://products.weather.gov/PDD/User\\_Defined\\_Grib2.pdf](http://products.weather.gov/PDD/User_Defined_Grib2.pdf)

2. Extensible Markup Language (XML): Users can request NDFD elements over the Internet using the NDFD XML Simple Object Access Protocol (SOAP) server. The response to the user request is returned in XML format. For more information, please refer to the NDFD XML Service Description Document online at:

[http://products.weather.gov/PDD/Extensible\\_Markup\\_Language.pdf](http://products.weather.gov/PDD/Extensible_Markup_Language.pdf)

and the NDFD SOAP web service web page at:

<http://www.nws.noaa.gov/forecasts/xml/>

3. NDFD graphics via web browser: Graphical versions of the TCSWSP are provided for:

the continental US and coastal waters at:

<http://www.weather.gov/forecasts/graphical/sectors/conusTropicalDay.php>

the North Pacific Ocean domain, the Guam NDFD subsector, and the Hawaii NDFD subsector, respectively, at:

<http://www.weather.gov/forecasts/graphical/sectors/npacocnTropicalDay.php>

<http://www.weather.gov/forecasts/graphical/sectors/guamTropicalDay.php>

<http://www.weather.gov/forecasts/graphical/sectors/hawaiiTropicalDay.php>

A static example of the graphical version is available at:

<http://www.nhc.noaa.gov/aboutnhcgraphics.shtml>

To access the TCSWSPs and other NDFD elements, or for further technical information (e.g., temporal and spatial resolutions, forecast projections, and geographic coverage), please visit the following URL:

<http://www.weather.gov/ndfd/technical.htm>

- e. Feedback Method - We are interested in your feedback to ensure NDFD meets your needs for data and services. User feedback is also important in our effort to improve the quality and usefulness of products and services.

For general or technical questions or comments regarding the NDFD, please e-mail: [nws.ndfd@noaa.gov](mailto:nws.ndfd@noaa.gov).

Technical questions regarding the NDFD may be addressed to:

National Weather Service Headquarters  
Attn: David Ruth, W/OST21  
1325 East West Highway, SSMC2  
Silver Spring, MD 20910  
email: david.ruth@noaa.gov

Technical questions about this probabilistic product may be addressed to:

National Weather Service  
Attn: Richard Knabb  
Central Pacific Hurricane Center  
2525 Correa Road  
Honolulu, HI 96822  
e-mail: richard.knabb@noaa.gov

National Weather Service  
Attn: James Franklin  
National Hurricane Center  
11691 SW 17th Street  
Miami, FL 33165  
e-mail: james.franklin@noaa.gov

## **Part II - Technical Description**

- a. Format & Science Basis - The TCSWSP for NDFD contain two types of probability values: cumulative probabilities and incremental probabilities. Cumulative probabilities are defined as the overall probability the event will occur sometime during the specified *cumulative* forecast period (0 – 6 hours, 0-12, 0-18, etc.) at each specific point. Incremental probabilities are defined as the probability the event will occur sometime during the *specified* forecast period (0 - 6 hours, 6-12, 12-18, etc.) at each specific point. The TCSWSP are based on the track, intensity, and wind structure uncertainties in the official tropical cyclone forecasts. The product provides probabilities of sustained wind speeds equal to or exceeding three wind speed thresholds: 34-, 50- and 64- knots, valid for the cumulative and incremental forecast periods specified above. The product will be updated with each advisory package for each active tropical and/or subtropical cyclone, which occurs every six hours (except if a special advisory is issued). Probabilistic values change with each forecast advisory package.
- b. Product Availability – Products are available no earlier than 15 minutes following the issuance deadlines for routine tropical cyclone advisories (03, 09, 15, and 21 Coordinated Universal Time – UTC) and after special advisories for all tropical and/or subtropical

cyclones. These products are sent to the NDFD Central Server and are disseminated from there.

NOTE: Files received at the NDFD Central Server by 45 minutes past the hour will be updated in NDFD near the top of the following hour. Files received after H+45 will be updated in NDFD one hour later.

c. Additional Information

A full description of this and other NWS Tropical Cyclone Weather Services Program products is provided in NWSI 10-601, which is available online:

<http://www.nws.noaa.gov/directives/sym/pd01006001curr.pdf>