Don was a category 1 hurricane (on the Saffir-Simpson Hurricane Wind Scale) that remained over the open Atlantic Ocean without any direct impacts on land.

1 This is an abbreviated Tropical Cyclone Report since there were no coastal watches or warnings issued and no direct fatalities reported in association with Don.
Hurricane Don

14-24 JULY 2023

BEST TRACK

The “best track” positions and intensities for Hurricane Don are listed in Table 1. The best track chart of Don’s path is given in Fig. 1, with the wind and pressure histories along with available observations shown in Figs. 2 and 3, respectively. There were no ship reports of tropical-storm-force winds in association with Don.

Origin

Don developed on 14 July from a non-tropical area of low pressure roughly midway between Bermuda and the Azores. The system was assessed at genesis as being subtropical because it was embedded within an upper-level trough and displayed a relatively large radius of maximum wind. By 17 July, Don had acquired a smaller radius of maximum wind and a more concentrated area of deep convection, which resulted in it becoming a tropical cyclone.

Peak Intensity and Minimum Pressure

Don’s peak intensity of 65 kt from 1800 UTC 22 July to 0000 UTC 23 July is supported by a blend of the TAFB and SAB subjective Dvorak estimates and the objective SATCON guidance.

The estimated minimum central pressure of 986 mb from 1800 UTC 22 July to 0000 UTC 23 July is based on applying the Knaff-Zehr-Courtney pressure-wind relationship.

CASUALTY AND DAMAGE STATISTICS

There were no reports of damage or casualties associated with Don.

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2 A digital record of the complete best track, including wind radii, can be found on line at ftp://ftp.nhc.noaa.gov/atcf. Data for the current year’s storms are located in the btk directory, while previous years’ data are located in the archive directory.

3 Observations include subjective satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB) and the Satellite Analysis Branch (SAB), objective Advanced Dvorak Technique (ADT) estimates and Satellite Consensus (SATCON) estimates from the Cooperative Institute for Meteorological Satellite Studies/University of Wisconsin-Madison. Data and imagery from NOAA polar-orbiting satellites including the Advanced Microwave Sounding Unit (AMSU), the NASA Global Precipitation Mission (GPM), the European Space Agency’s Advanced Scatterometer (ASCAT), and Defense Meteorological Satellite Program (DMSP) satellites, among others, were also useful in constructing the best track of Don.
FORECAST AND WARNING VERIFICATION

Table 2 provides the number of hours in advance of formation with the first NHC Tropical Weather Outlook (TWO) forecast in each likelihood category. Figure 4 shows composites of 7-day TWO genesis areas for each category prior to the formation of Don. While there were no forecasts of a High chance of genesis before Don formed (based upon post-storm analyses), all of the 7-day genesis areas did correctly enclose the actual genesis location.

A verification of NHC official track forecasts for Don is given in Table 3a. Official track forecast errors were much lower than the mean official errors for the previous 5-yr period, despite the climatology/persistence errors being substantially larger than average, which suggests that this sample includes more difficult track forecasts than usual. A homogeneous comparison of the official track errors with selected guidance models is given in Table 3b.

A verification of NHC official intensity forecasts for Don is given in Table 4a. Official intensity forecast errors likewise were much lower than the mean official errors for the previous 5-yr period, though the climatology/persistence errors were also small which implies easier intensity forecasts than is typical. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 4b.

There were no coastal watches or warnings issued for Don.
Table 1. Best track for Hurricane Don, 14-24 July 2023.

<table>
<thead>
<tr>
<th>Date/Time (UTC)</th>
<th>Latitude (°N)</th>
<th>Longitude (°W)</th>
<th>Pressure (mb)</th>
<th>Wind Speed (kt)</th>
<th>Stage</th>
</tr>
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<tr>
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<td>25</td>
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</tr>
<tr>
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<td>51.0</td>
<td>1007</td>
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<td>&quot;</td>
</tr>
<tr>
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<td>31.3</td>
<td>50.2</td>
<td>1006</td>
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</tr>
<tr>
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<td>31.2</td>
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Table 2. Number of hours in advance of formation associated with the first NHC Tropical Weather Outlook forecast in the indicated likelihood category. Note that the timings for the “Low” category do not include forecasts of a 0% chance of genesis.

<table>
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<tr>
<th>Likelihood</th>
<th>48-Hour Outlook</th>
<th>168-Hour Outlook</th>
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<tr>
<td>Low (&lt;40%)</td>
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<td>114</td>
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<tr>
<td>Medium (40%-60%)</td>
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<td>78</td>
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<tr>
<td>High (&gt;60%)</td>
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Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Hurricane Don. Mean errors for the previous 5-yr period are shown for comparison. Official errors that are smaller than the 5-yr means are shown in boldface type.

<table>
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<tr>
<th></th>
<th>Forecast Period (h)</th>
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<tr>
<td></td>
<td>12</td>
</tr>
<tr>
<td>OFCL</td>
<td>16.3</td>
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<td>Forecasts</td>
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<td>OFCL (2018-22)</td>
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</tr>
<tr>
<td>OCD5 (2018-22)</td>
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</table>
Hurricane Don

Table 3b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Hurricane Don. Errors smaller than the NHC official forecast are shown in boldface type. The number of official forecasts shown here will generally be smaller than that shown in Table 3a due to the homogeneity requirement.

<table>
<thead>
<tr>
<th>Model ID</th>
<th>Forecast Period (h)</th>
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<td>FSSE</td>
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<tr>
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Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Hurricane Don. Mean errors for the previous 5-yr period are shown for comparison. Official errors that are smaller than the 5-yr means are shown in boldface type.

<table>
<thead>
<tr>
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<th>36</th>
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<td>20.2</td>
<td>22.9</td>
<td>23.4</td>
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Hurricane Don

Table 4b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Hurricane Don. Errors smaller than the NHC official forecast are shown in boldface type. The number of official forecasts shown here will generally be smaller than that shown in Table 4a due to the homogeneity requirement.

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<tr>
<th>Model ID</th>
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<td>HFBI</td>
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Figure 1. Best track positions for Hurricane Don, 14-24 July 2023. Tracks during the post-tropical stage are partially based on analyses from the NOAA Ocean Prediction Center.
Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Don, 14-24 July 2023. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.
Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Don, 14-24 July 2023. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. KZC P-W refers to pressure estimates derived using the Knaff-Zehr-Courtney pressure-wind relationship. Dashed vertical lines correspond to 0000 UTC.
Figure 4. Composites of 7-day tropical cyclone genesis areas depicted in NHC’s Tropical Weather Outlooks prior to the formation of Hurricane Don for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) medium (40–60%) category, and (d) high (>60%) category. The location of genesis is indicated by the black star.