

NOAA Technical Memorandum NWSTM PR-53

2005 Tropical Cyclones Central North Pacific

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May 2006

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**Overview of the 2005 Central North Pacific Tropical Cyclone Season**

Total activity for the tropical cyclone season was below normal, with three systems occurring within the area of responsibility of the Central Pacific Hurricane Center (CPHC). One tropical cyclone (01C) developed within the central Pacific and the other two, Jova and Kenneth, moved into the area from the eastern Pacific. Jova was the strongest of the systems, maintaining category 3 strength for 36 hours, and the strongest tropical cyclone in the central Pacific since Ele in 2002. Although remnants TD-01C and Kenneth contributed to some locally heavy rainfall across Hawaii, there were no deaths recorded or significant property damage reported in the central North Pacific.

**Table 1. List of Tropical Cyclones .**

\*\* denotes information for only that portion of the storm's lifetime in the central north Pacific (CPHC's area of responsibility).

<b>Name</b>	<b>Dates</b>	<b>Minimum Pressure (hPa)</b>	<b>Maximum Sustained Winds (kt)</b>
<b>Tropical Depression 01-C</b>	<b>August 3-4</b>	<b>1008</b>	<b>25</b>
<b>Hurricane Jova</b>	<b>September 18-25**</b>	<b>951**</b>	<b>110**</b>
<b>Hurricane Kenneth</b>	<b>September 26-30**</b>	<b>988**</b>	<b>65**</b>

**Table 2. Overall Track Verification.**

Table entries are track forecast errors, measured in nautical miles. Values in parentheses indicate the number of forecasts. Values in bold represent guidance forecast errors equal to or less than the official CPHC forecast.

Forecast	12-hr	24-hr	36-hr	48-hr	72-hr	96-hr	120-hr
CPHC	32 (46)	49 (39)	57 (34)	65 (30)	92 (22)	129 (14)	165 (7)
CLP5	38 (46)	77 (40)	122 (34)	156 (30)	196 (22)	215 (14)	207 (7)
BAMD	72 (46)	126 (36)	191 (34)	237 (30)	358 (22)	511 (14)	499 (7)
BAMM	46 (46)	83 (40)	118 (34)	139 (30)	164 (22)	255 (14)	219 (7)
BAMS	35 (46)	61 (40)	90 (34)	118 (30)	151 (22)	157 (14)	164 (7)
GFDL	39 (42)	47 (35)	63 (31)	82 (29)	125 (22)	222 (14)	338 (7)
AVNO	39 (43)	56 (38)	72 (32)	88 (30)	129 (21)	146 (13)	162 (7)
GUNS	31 (40)	51 (34)	64 (32)	68 (30)	110 (22)	161 (13)	206 (7)
GUNA	28 (38)	46 (34)	58 (32)	64 (30)	95 (22)	138 (14)	190 (7)
CONU	29 (44)	49 (38)	61 (34)	66 (30)	106 (22)	152 (14)	163 (7)

**Table 3. Overall Wind Verification.** Table entries are errors in maximum sustained wind speed forecasts, measured in knots. Values in the parentheses indicate the number of forecasts. Values in bold represent guidance forecast errors equal to or less than the official CPHC forecast.

Forecast	12-hr	24-hr	36-hr	48-hr	72-hr	96-hr	120-hr
CPHC	5 (46)	9 (39)	13 (34)	17 (30)	26 (21)	23 (14)	27 (7)
GFDL	14 (40)	14 (35)	15 (31)	20 (29)	26 (21)	27 (13)	28 (7)
AVNO	28 (42)	28 (36)	26 (31)	17 (29)	18 (21)	21 (10)	11 (7)
SHFR5	5 (46)	9 (39)	12 (34)	16 (30)	19 (21)	21 (16)	16 (7)
SHIP	5 (46)	10 (39)	15 (34)	20 (28)	28 (26)	23 (10)	5 (7)

## TROPICAL DEPRESSION 01-C

3-4 August 2005

**OVERVIEW:** Tropical Depression (TD) 01-C developed out of an organized thunderstorm cluster along the Inter-Tropical Convergence Zone (ITCZ) that had persisted for a couple of days just east of 140W. Based upon the satellite appearance of persistent cold cloud tops and cirrus outflow, CPHC issued its initial advisory for TD 01-C at 2140 UTC 3 August. The center of 01-C was near 15N 140.5W or about 1000 miles east-southeast of Hilo, Hawaii. The maximum sustained winds were estimated to be 25 kts. TD-01C moved to the west at 10 kts with a maximum wind speed of 25 kts. TD-01C failed to develop any stronger and dissipated into a remnant low 30 hours later.

**SYNOPTIC FACTORS:** QuikSCAT satellite data indicated that TD 01-C formed within the seasonal east to west surface trough. Conditions appeared generally supportive for some development as high pressure ridging was in place at levels. A weak upper low just east of Hawaii aided in the creation of an upper level out-flow channel to the north of TD 01-C along with sea-surface temperatures around 26 degrees C. The

system continued west and moved into an area of cooler sea-surface temperatures and weakened. The global numerical models, forecast guidance and CPHC forecast all were indicating that TD 01-C would strengthen into a tropical storm. It instead rapidly dissipated within 30 hours. The demise of TD 01-C was likely due to a combination of cool sea surface temperatures and increasing vertical wind shear that interfered with its development.

**IMPACTS:** The remnants of TD-01C passed over the Big Island of Hawaii on 7-8 August bringing very heavy rainfall to the region. Listed below is a table of rainfall totals from that time frame on the Big Island.

Location	48 hour rainfall total
Glenwood	8.80 inches
Kihalani	5.44 inches
Hakalau	3.31 inches
Pahoa	2.60 inches
Mountain View	2.48 inches
Piihonua	2.43 inches

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (hPa)	Wind Speed (kt)	Stage/Notes
03 / 1800	15.0	140.5	1008	25	tropical depression
04 / 0000	15.2	141.1	1008	25	"
04 / 0600	15.2	141.7	1008	25	"
04 / 1200	15.1	142.7	1008	25	"
04 / 1800	14.9	143.8	1008	25	"
05 / 0000	14.7	145.0	1009	25	dissipating

Forecast	12-hr	24-hr	36-hr	48-hr	72-hr	96-hr	120-hr
CPHC	56 (4)	77 (2)	n/a	n/a	n/a	n/a	n/a
CLP5	59 (4)	84 (2)	n/a	n/a	n/a	n/a	n/a
BAMD	48 (4)	59 (2)	n/a	n/a	n/a	n/a	n/a
BAMM	57 (4)	85 (2)	n/a	n/a	n/a	n/a	n/a
BAMS	50 (4)	71 (2)	n/a	n/a	n/a	n/a	n/a
GFDL	31 (2)	79 (1)	n/a	n/a	n/a	n/a	n/a
AVNO	78 (4)	96 (2)	n/a	n/a	n/a	n/a	n/a

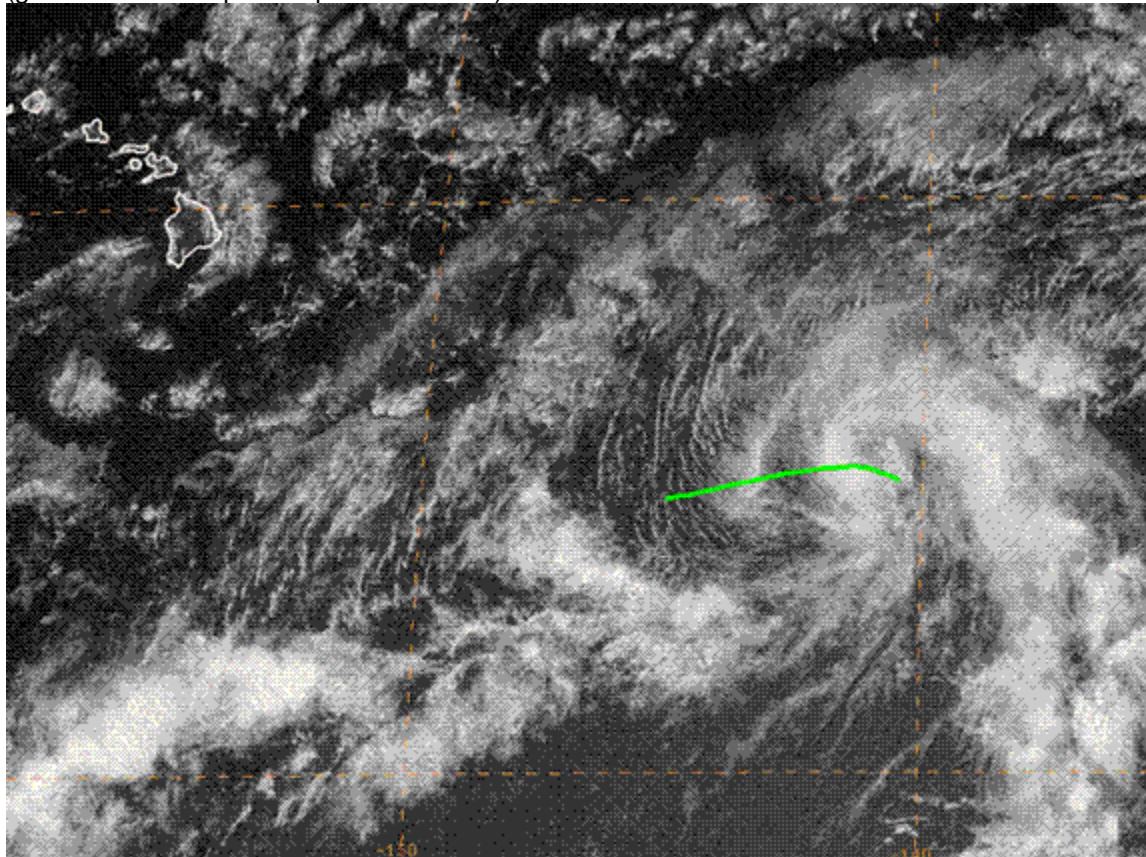
GUNS	n/a	n/a	n/a	n/a	n/a	n/a	n/a
GUNA	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CONU	40 (2)	n/a	n/a	n/a	n/a	n/a	n/a

**Table 6. Overall Wind Verification.**

Table entries are errors in maximum sustained wind speed forecasts, measured in knots. Values in the parentheses indicate the number of forecasts. Values in bold represent guidance forecast errors equal to or less than the official CPHC forecast.

Forecast	12-hr	24-hr	36-hr	48-hr	72-hr	96-hr	120-hr
CPHC	5 (4)	10 (2)	n/a	n/a	n/a	n/a	n/a
GFDL	<b>12 (2)</b>	<b>12 (1)</b>	n/a	n/a	n/a	n/a	n/a
AVNO	<b>4 (4)</b>	<b>2 (2)</b>	n/a	n/a	n/a	n/a	n/a
SHFR5	<b>4 (4)</b>	<b>6 (2)</b>	n/a	n/a	n/a	n/a	n/a
SHIP	<b>5 (4)</b>	<b>12 (2)</b>	n/a	n/a	n/a	n/a	n/a

**Figure 1.** Visible satellite image of TD 01-C at 2200 UTC 3 August. Line indicates the track of the system (green denotes tropical depression status).



**Hurricane Jova**  
**18 September - 25 September 2005**

**OVERVIEW:** Tropical Depression 10E formed at 0600 UTC 10 September near 13.6N 109.0W or about 550 miles south southwest of Puerto Vallarta, Mexico. The system was slow to develop as it moved toward the west at around 10 MPH for the next several days, but then wound up rather rapidly to tropical storm strength at 0000 UTC 15 September near 13.8N 127.6W and then to hurricane strength just 30 hours later at 0600 UTC near 12.9N 133.6W. Hurricane Jova continued toward the west for another 30 hours, gaining strength from the warm ocean water between 12N and 13N east of 140W. Jova then took a turn toward the northwest, passing through 140W and into the Central Pacific Hurricane Center's area at 13.5N just before 1200 UTC on 18 September with a strength of 90 kt sustained winds and a calculated central pressure of 970 mb.

Jova continued to gain strength slowly over the next several days, reaching category 3 strength at 1200 UTC 19 September before peaking at 110 kt intensity 12 hours later when it was near 16.3N 143.3W, or some 850 miles east southeast of Hilo, Hawaii. The storm remained at category 3 strength for 36 hours, continuing on a course between west and west northwest as it moved slowly closer to the Big Island of Hawaii at a speed averageing just slightly over 5 kt. The public and media paid close attention to Jova due to its proximity and strength, especially in the wake of Hurricane Katrina along the Gulf Coast of the United States a few weeks earlier. Jova came under the influence of a trough near the Hawaiian Islands on 22 September, which began to weaken Jova and turned the storm in a more northwestward direction. Jova dropped below hurricane strength at 0000 UTC 23 September near 20.8N 149.1W, or some 400 nm east northeast of Hilo, Hawaii. Jova continued to weaken further due to the strengthening upper level shear associated with the upper trough. Jova passed by to the north of the Big Island of Hawaii while dropping below tropical storm strength at 22.8N 151.1W, or 335 miles northeast of Hilo, Hawaii. Jova then transitioned to a more westerly track as she further weakened, eventually dissipating as a tropical cyclone at 0000 UTC on 25 September near 23.7N 154.6W, or about 280 miles north of Hilo, Hawaii.

**IMPACTS:** Although Jova did not have a direct impact on Hawaii, it did result in the weakening of the tradewinds as the remnants passed by to the north. The upper level trough which had resulted in the demise of Jova brought unstable conditions to the state, allowing locally heavy rainfall to occur.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (hPa)	Wind Speed (kt)	Stage/Notes
18 / 1200	13.5	140.2	970	90	Hurricane (cat 2)
18 / 1800	13.8	140.6	970	90	"
19 / 0000	14.2	141.1	969	90	"
19 / 0600	14.7	141.7	965	95	"
19 / 1200	15.2	142.2	960	100	Hurricane (cat 3)
19 / 1800	15.6	142.7	955	105	"
20 / 0000	16.0	143.3	951	110	"
20 / 0600	16.2	143.9	952	110	"
20 / 1200	16.4	144.6	955	105	"
20 / 1800	16.5	145.1	956	105	"
21 / 0000	16.7	145.7	957	105	"

21 / 0600	17.0	146.2	958	105	"
21 / 1200	17.3	146.6	961	100	"
21 / 1800	17.7	147.0	962	100	"
22 / 0000	18.1	147.3	965	95	Hurricane (cat 2)
22 / 0600	18.7	147.6	970	90	"
22 / 1200	19.4	148.0	976	80	Hurricane (cat 1)
22 / 1800	20.2	148.6	982	70	"
23 / 0000	20.8	149.1	989	60	Tropical Storm
23 / 0600	21.4	149.6	995	55	"
23 / 1200	21.9	150.0	1000	45	"
23 / 1800	22.3	150.4	1005	35	"
24 / 0000	22.8	151.1	1010	30	Tropical Depression
24 / 0600	23.0	152.1	1010	30	"
24 / 1200	23.1	153.1	1014	25	"
24 / 1800	23.3	153.8	1014	25	"
25 / 0000	23.7	154.6	1015	20	dissipating

**Table 8. Overall Track Verification.**

Table entries are track forecast errors, measured in nautical miles. Values in parentheses indicate the number of forecasts. Values in bold represent guidance forecast errors equal to or less than the official CPHC forecast.

Forecast	12-hr	24-hr	36-hr	48-hr	72-hr	96-hr	120-hr
CPHC	28 (25)	47 (23)	58 (21)	66 (19)	94 (15)	128 (11)	165 (7)
CLP5	30 (25)	60 (23)	86 (21)	102 (19)	136 (15)	185 (11)	207 (7)
BAMD	62 (25)	116 (23)	166 (21)	218 (19)	369 (15)	492 (11)	499 (7)
BAMM	37 (25)	66 (23)	89 (21)	102 (19)	104 (15)	191 (11)	219 (7)
BAMS	30 (25)	53 (23)	78 (21)	101 (19)	116 (15)	112 (11)	164 (7)
GFDL	35 (25)	46 (23)	61 (21)	75 (19)	98 (15)	219 (11)	338 (7)
AVNO	33 (25)	50 (23)	69 (21)	87 (19)	135 (15)	155 (11)	162 (7)
GUNS	28 (25)	50 (23)	62 (21)	62 (19)	112 (915)	168 (11)	206 (7)
GUNA	26 (25)	46 (23)	58 (21)	62 (19)	100 (15)	150 (11)	190 (7)
CONU	26 (25)	48 (23)	63 (21)	66 (19)	109 (15)	157 (11)	163 (7)

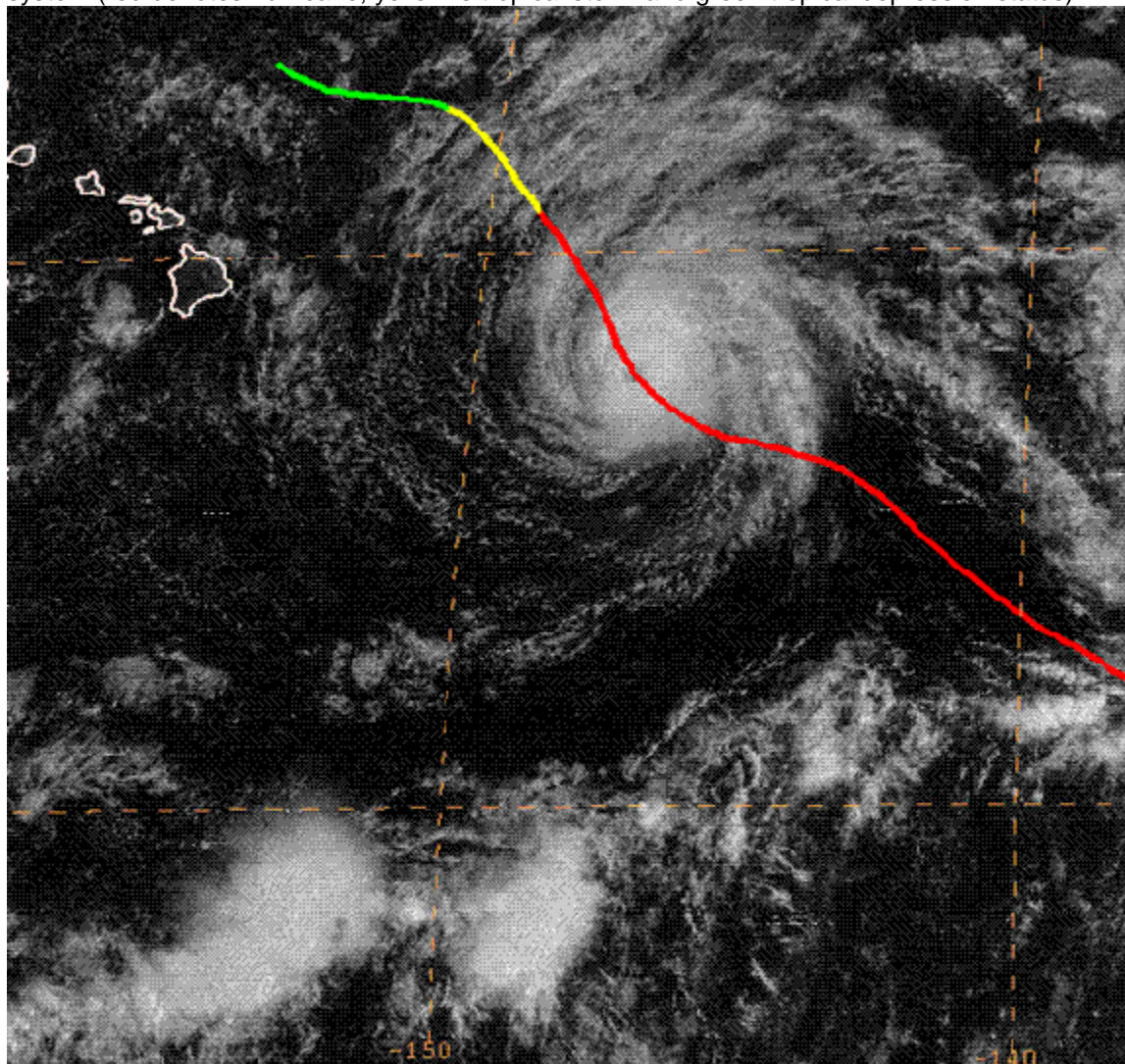
**Table 9. Overall Wind Verification.**

Table entries are errors in maximum sustained wind speed forecasts, measured in knots. Values in the parentheses indicate the number of forecasts. Values in bold represent guidance forecast errors equal to or less than the official CPHC forecast.

Forecast	12-hr	24-hr	36-hr	48-hr	72-hr	96-hr	120-hr
CPHC	6 (25)	13 (23)	19 (21)	25 (19)	34 (15)	28 (11)	27 (7)

GFDL	18 (25)	19 (23)	19 (21)	23 (19)	29 (15)	27 (11)	28 (7)
AVNO	38 (25)	37 (23)	34 (21)	23 (19)	23 (15)	12 (11)	11 (7)
SHFR5	6 (25)	12 (23)	17 (21)	21 (19)	21 (15)	13 (11)	16 (7)
SHIP	6 (25)	11 (23)	17 (21)	22 (17)	26 (12)	17 (7)	5 (7)

Figure 2. Visible satellite image of Jova at 1900 UTC 21 September. Line indicates the track of the system (red denotes hurricane, yellow is tropical storm and green tropical depression status).



### Hurricane Kenneth 25 September - 30 September 2005

**OVERVIEW:** Kenneth was a long-lived tropical cyclone, initially developing as tropical depression 14 September about 790 nm southwest of Cabo San Lucas Mexico. Within two days it attained hurricane strength. Kenneth continued to strengthen as it moved west-northwest, reaching a peak intensity of 115 kt on 18 September. Kenneth then began a weakening trend and dropped to a 45 kt tropical storm by 21 September before again intensifying to a hurricane by 25 September. At this point Kenneth was a slow

mover and drifted southwest across 140 W and into the central Pacific on 26 September. CPHC assumed responsibility for the storm 30 hours after ending forecast advisories on a dissipating Jova. Kenneth continued to slowly drift southwest and began to weaken. As increasing shear above the storm sped up the weakening phase, Kenneth began to turn to the west-northwest on 27 September and increase in forward speed as it was influenced by lower and mid-level steering flow. Once again, residents in Hawaii paid close attention to Kenneth as it moved closer to the state. However, a strengthening upper level trough near the state provided sufficient upper level shear to keep convection away from Kenneth's center and by early on 29 September, it was downgraded to a tropical depression about 350 nm east of the Big Island of Hawaii. The next day, Kenneth was declared dissipated as a tropical cyclone just east of the Big Island.

**IMPACTS:** The remnants of Kenneth, primarily a swirl of low clouds, did move onshore of the Big Island during the day on 30 September. As the remnants interacted with the upper level trough over the state, heavy showers and a few thunderstorms did develop across the eastern portion of the Big Island on 30 September. Locally intense rains fell over portions on Oahu during the night of 1 October causing some flash flooding on Kaukonahua Stream and the overflow of Lake Wilson at Wahiawa Dam. Gauges also recorded 6 to 12 inches of rain fell in Nuuanu and Kalihi Valleys. Thunderstorms over eastern and central Kauai also produced very heavy rains during the night of 1 October with a peak 6-hour total of 6.17 inches recorded at Mount Waialeale. Flash flooding occurred on Hanalei River which forced the closure of Kuhio Highway at the Hanalei Bridge.

**Table 10. Best Track Data**

<b>Date/Time (UTC)</b>	<b>Latitude (°N)</b>	<b>Longitude (°W)</b>	<b>Pressure (hPa)</b>	<b>Wind Speed (kt)</b>	<b>Stage/Notes</b>
26 / 0600	15.3	140.1	988	65	Hurricane (cat 1)
26 / 1200	14.8	140.2	995	60	Tropical Storm
26 / 1800	14.4	140.5	1000	55	"
27 / 0000	14.2	140.9	1000	55	"
27 / 0600	14.3	141.4	1000	55	"
27 / 1200	14.6	141.8	1003	50	"
27 / 1800	15.2	142.4	1005	45	"
28 / 0000	16.0	143.1	1005	45	"
28 / 0600	16.7	143.9	1005	45	"
28 / 1200	17.4	144.7	1006	45	"
28 / 1800	18.0	145.5	1008	40	"
29 / 0000	18.4	146.5	1010	35	"
29 / 0600	18.7	147.6	1010	35	"
29 / 1200	18.9	148.7	1012	30	Tropical Depression
29 / 1800	19.0	149.8	1012	30	"
30 / 0000	19.1	150.9	1012	30	"
30 / 0600	19.2	152.0	1013	25	"
30 / 1200	19.3	153.1	1013	25	"
30 / 1800	19.4	154.2	1013	25	dissipating



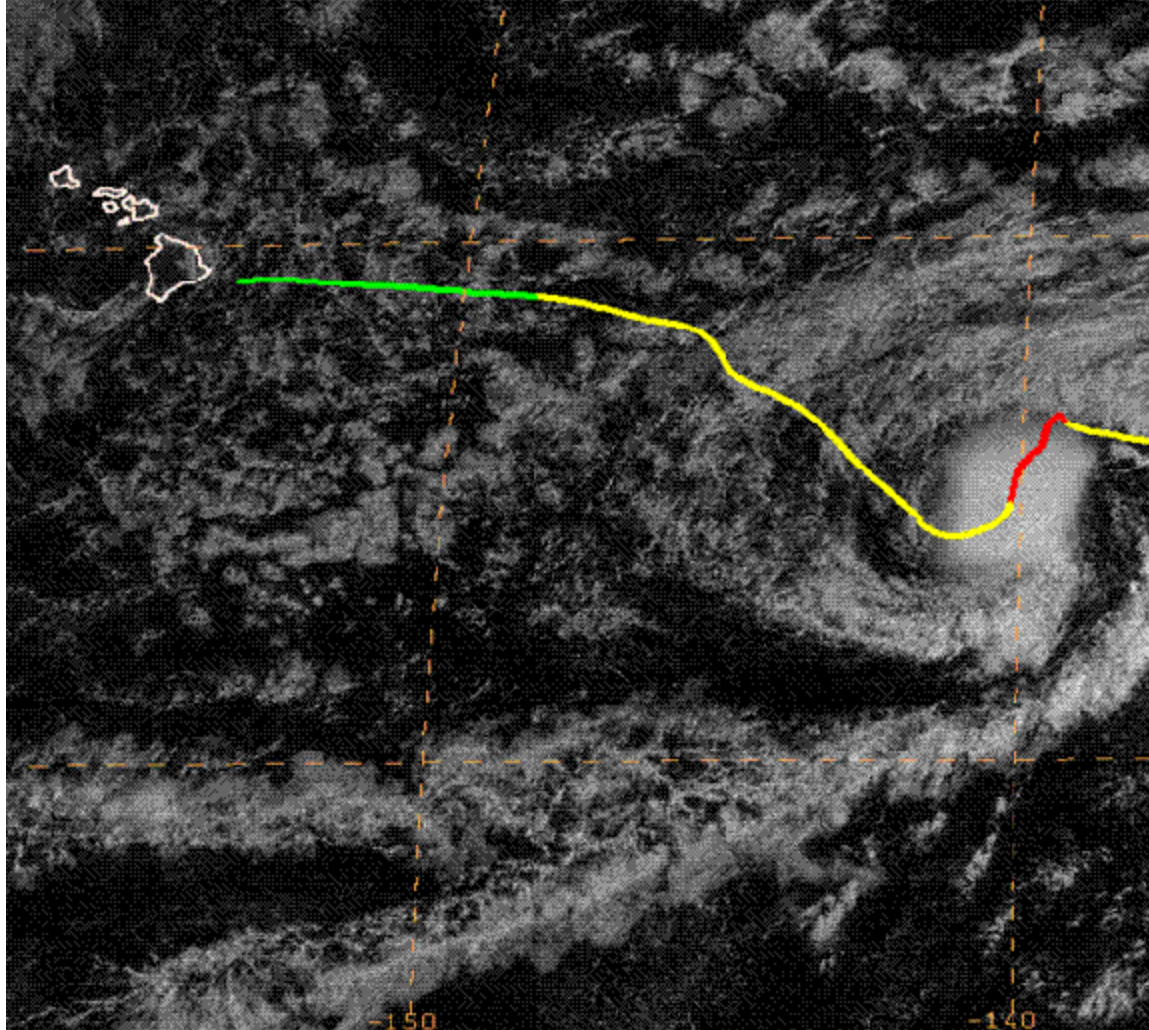
**Table 11. Overall Track Verification.** Table entries are track forecast errors, measured in nautical miles. Values in parentheses indicate the number of forecasts. Values in bold represent guidance forecast errors equal to or less than the official CPHC forecast.

Forecast	12-hr	24-hr	36-hr	48-hr	72-hr	96-hr	120-hr
CPHC	<b>32</b> (17)	<b>49</b> (14)	<b>54</b> (13)	<b>63</b> (11)	<b>87</b> (7)	<b>132</b> (3)	n/a
CLP5	<b>45</b> (17)	<b>103</b> (15)	<b>192</b> (13)	<b>249</b> (11)	<b>324</b> (7)	<b>324</b> (3)	n/a
BAMD	<b>91</b> (17)	<b>169</b> (11)	<b>231</b> (13)	<b>272</b> (11)	<b>334</b> (7)	<b>581</b> (3)	n/a
BAMM	<b>56</b> (17)	<b>110</b> (15)	<b>165</b> (13)	<b>204</b> (11)	<b>291</b> (7)	<b>491</b> (3)	n/a
BAMS	<b>40</b> (17)	<b>71</b> (15)	<b>109</b> (13)	<b>148</b> (11)	<b>225</b> (7)	<b>323</b> (3)	n/a
GFDL	<b>46</b> (15)	<b>45</b> (11)	<b>66</b> (10)	<b>97</b> (10)	<b>182</b> (7)	<b>235</b> (3)	n/a
AVNO	<b>39</b> (14)	<b>62</b> (13)	<b>77</b> (11)	<b>90</b> (11)	<b>116</b> (6)	<b>95</b> (2)	n/a
GUNS	<b>37</b> (15)	<b>53</b> (11)	<b>66</b> (11)	<b>79</b> (11)	<b>105</b> (7)	<b>124</b> (2)	n/a
GUNA	<b>31</b> (13)	<b>47</b> (11)	<b>60</b> (11)	<b>68</b> (11)	<b>84</b> (7)	<b>94</b> (3)	n/a
CONU	<b>34</b> (17)	<b>51</b> (15)	<b>58</b> (13)	<b>68</b> (11)	<b>100</b> (7)	<b>136</b> (3)	n/a

**Table 12. Overall Wind Verification.** Table entries are errors in maximum sustained wind speed forecasts, measured in knots. Values in the parentheses indicate the number of forecasts. Values in bold represent guidance forecast errors equal to or less than the official CPHC forecast.

Forecast	12-hr	24-hr	36-hr	48-hr	72-hr	96-hr	120-hr
CPHC	<b>2</b> (17)	<b>4</b> (14)	<b>3</b> (13)	<b>3</b> (11)	<b>6</b> (6)	<b>7</b> (3)	n/a
GFDL	<b>5</b> (13)	<b>4</b> (11)	<b>6</b> (10)	<b>15</b> (10)	<b>16</b> (6)	<b>26</b> (2)	n/a
AVNO	<b>15</b> (13)	<b>13</b> (11)	<b>9</b> (10)	<b>7</b> (10)	<b>5</b> (6)	<b>1</b> (2)	n/a
SHFR5	<b>3</b> (17)	<b>5</b> (14)	<b>5</b> (13)	<b>7</b> (11)	<b>15</b> (6)	<b>29</b> (3)	n/a
SHIP	<b>2</b> (17)	<b>9</b> (14)	<b>14</b> (13)	<b>18</b> (11)	<b>28</b> (6)	<b>35</b> (3)	n/a

Figure 3. Visible satellite image of Kenneth at 1800 UTC 26 September. Line indicates the track of the



ACRONYMS that may have been used in this report.	
Acronym	Full Spelling/Definition
AOR	Area of Responsibility
AVNO	Operation global forecast system model
BAMD	Deep Layer Beta Advection Model (mean layer averaged between 850 hPa and 250 hPa)
BAMM	Medium Layer Beta Advection Model (mean layer averaged between 850 hPa and 400 hPa)
BAMS	Shallow Layer Beta Advection Model (mean layer averaged between 850 hPa and 700 hPa)
CLIP	Climatology and Persistence
CPHC	Central Pacific Hurricane Center
GFDL	Geophysical Fluid Dynamics Laboratory model

<b>hPa</b>	<b>Hectopascal (formerly millibar)</b>
<b>ITCZ</b>	<b>Inter-tropical Convergence Zone</b>
<b>JTWC</b>	<b>Joint Typhoon Warning Center</b>
<b>kts</b>	<b>knots</b>
<b>LBAR</b>	<b>Barotropic limited area sine transform</b>
<b>mb</b>	<b>millibars</b>
<b>NA</b>	<b>Not Available</b>
<b>NGPS</b>	<b>NOGAPS (Navy Operational Global Atmospheric Prediction System) Vortex Tracking Routine</b>
<b>NHC</b>	<b>National Hurricane Center</b>
<b>nm</b>	<b>nautical miles</b>
<b>P91E</b>	<b>Pacific Statistical Dynamic Model (adapted from NHC90 for the Eastern Pacific)</b>
<b>SHIFR</b>	<b>Statistical Hurricane Intensity Forecast</b>
<b>SHIP</b>	<b>Statistical Hurricane Intensity Prediction</b>
<b>SST</b>	<b>Sea Surface Temperature</b>
<b>TD</b>	<b>Tropical Depression</b>
<b>TPC</b>	<b>Tropical Prediction Center, Miami, FL</b>
<b>TUTT</b>	<b>Tropical Upper Tropospheric Trough</b>
<b>UTC</b>	<b>Universal Time Coordinated</b>
<b>WFO</b>	<b>Weather Forecast Office</b>