2016 CPHC SEASON: SUMMARY & OPERATIONAL CHALLENGES

TC Operations and Research Forum
14 March 2017

Tom Birchard
National Weather Service Central Pacific Hurricane Center
RSMC – Regional Specialized Meteorological Center
LOOK BACK AT THE 2016 SEASON OUTLOOK

4-7 Tropical Cyclones

40% Above Normal Season
40% Normal Season (4-5 TCs)
20% Below Normal Season
2016 Season Statistics

6 Tropical Cyclones  
(1 addl. out of season)

<table>
<thead>
<tr>
<th>Name</th>
<th>Dates (UTC)</th>
<th>Max Wind / mph</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hurricane Pali</td>
<td>January 7-15</td>
<td>100</td>
</tr>
<tr>
<td>Tropical Storm Celia</td>
<td>July 15-16</td>
<td>45</td>
</tr>
<tr>
<td>Tropical Storm Darby</td>
<td>July 20-26</td>
<td>65</td>
</tr>
<tr>
<td>Tropical Depression Ivette</td>
<td>August 8</td>
<td>35</td>
</tr>
<tr>
<td>Hurricane Madeline</td>
<td>August 28-Sept 3</td>
<td>135</td>
</tr>
<tr>
<td>Hurricane Lester</td>
<td>September 1-7</td>
<td>135</td>
</tr>
<tr>
<td>Tropical Storm Ulika</td>
<td>September 27-30</td>
<td>50</td>
</tr>
</tbody>
</table>
2016 TRACKS

Jan 2016 (End of last season)
2016 AIR RECONNAISSANCE

- USAF Reserve’s 53rd Weather Reconnaissance Squadron:
  - 15 total missions
  - 104 hours of operational flying time
  - Tropical Storm Darby
  - Hurricane Madeline
  - Hurricane Lester

- NOAA Aircraft Operations Center Hurricane Hunters:
  - G-IV surveillance missions
  - NSF/NCAR G-V High-performance Instrumented Airborne Platform for Environmental Research (GV HIAPER);
    3 high level weather surveillance missions in Hurricane Lester
ANNUAL COMPARISONS

Central Pacific Tropical Cyclones By Year (1970 - 2016)

Strong statistical correlation with ONI (Oceanic Nino Index):
3 mo. running mean SST anomaly, 3.4 region
Transitioned to a weak La Nina during the season:
- Cooler than normal waters across the Tropical East Pacific.
- Above normal SST’s still existed near and east of Hawaii.
TROPICAL STORM DARBY REVIEW

- Importance of looking at wind speed probabilities, not just cone graphic.
- Initial forecasts curved Darby northward too soon.
- Main Impacts:
  - 40-60 mph wind gusts on Big Island.
  - Flash flooding Metro Honolulu (6-12” in 6 hours)
  - High surf E shores.
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“The sheer amount of water that came down all at once may have exceeded the capacity for those drainage canals and those drains on the freeway,” said transportation spokesman Tim Sakahara.
MADELINE/ LESTER TWIN THREATS
MADELINE/ LESTER TWIN THREATS

- Back to back Hurricane threats.

- Main Impacts:
- High surf on E facing shores.
- 2-3’ Coastal Inundation - Kapoho area on Big Island.
2016 PRELIM VERIFICATION

2016 vs 5-year Average Forecast Track Errors (NM)

<table>
<thead>
<tr>
<th>Time</th>
<th>2016</th>
<th>5-year mean</th>
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<tbody>
<tr>
<td>12 hour</td>
<td>21.9</td>
<td>28.6</td>
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<tr>
<td>24 hour</td>
<td>34.4</td>
<td>43.3</td>
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<tr>
<td>36 hour</td>
<td>47</td>
<td>58.2</td>
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<tr>
<td>48 hour</td>
<td>63.1</td>
<td>76.7</td>
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<tr>
<td>72 hour</td>
<td>105.1</td>
<td>123.6</td>
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<tr>
<td>96 hour</td>
<td>160.7</td>
<td>165.4</td>
</tr>
<tr>
<td>120 hour</td>
<td>203.4</td>
<td>213.3</td>
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CHALLENGES & UPDATES

• Consecutive threats of Madeline and Lester: Nearly tested/broke (?) NWS Watch/Warning system

• Darby center tracked outside error cone: CPHC to use central Pacific track errors in TCM and error cone creation; similar to NHC Atlantic values (150 nm at 96h; 200 nm at 120h)

• Updates to CPHC web page to mimic NHC; includes GIS files; numerous graphics options without “skinny black line”

• 5 day Tropical Weather Outlook; 2 & 5 day graphic; potential-TC watches/warnings

• IT support, ATCF and network security
Questions??

Contact info:

Thomas.Birchard@NOAA.gov

www.weather.gov/cphc