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12 March 2019
JTWC: New Products and Services

• Expressing uncertainty (prognostic reasoning)
  • Current process: Uncertainty subjectively assessed by forecasters
  • Developing procedures to objectively classify analysis position, track forecast and intensity forecast spread

• NWS customer support
  • Increasing operational coordination with WSO American Samoa

• Two-week TC formation outlooks
  • Operational products available to DoD entities
New Products and Services: Two-week Formation Outlook

- Regularly issued once every 12 hours; reissued to ensure classifications consistent with existing, corresponding invest areas

JTWC Two-Week TC Formation Outlook. Valid: 27 June 2018 at 1200Z

Potential Formation Area P73W: TC formation may occur between 06281200Z and 06301200Z. Probability: 50%. Corresponding invest: 99W
Potential Formation Area P71S: TC formation may occur between 06281200Z and 06291200Z. Probability: 10%. Corresponding invest: 90S
Potential Formation Area P76W: TC formation may occur between 07071800Z and 07091800Z. Probability: 10%. Corresponding invest: XXX

Potential TC formation timeframe
TC formation probability (specified by the forecaster)
Invest area that corresponds to annotated PFA (if applicable)
New Products and Services: Two-week Formation Outlook

- Detailed information for each area identified in two-week outlook, including prospective formation location and timeline
- Future work: Accompanying text discussion, forecast initial motion vector

Projected invest classification times, based on first warning time estimate (middle of formation timeframe)

Time to formation based on first warning time estimate and graphic update time

Potential Formation Area P73W status
Based on 062712Z forecast
Updated 6/27/2018 at 22:19Z

TC formation probability: 50%
TC may form between 28/12Z and 30/12Z
Est. time to formation: 1.6 days (~29/12Z)

Projected classification timeline:
- Invest: 24/12Z
- Low: 26/12Z
- Medium: 27/12Z
- High: 28/12Z
- First warning: 29/12Z

Corresponding invest designator: 99W

Geographic area within which TC formation may occur
JTWC: Process Development

• AWIPS
  • Hardware installed; training and procedure development in progress
  • Operational application anticipated by end CY 2019
  • Prospective GALWEM GRIB data ingest

• Intensity analysis using microwave satellite imagery
  • AF Institute of Technology students recently completed Masters thesis relating microwave imagery patterns to TC intensity
  • Further work required to apply findings operationally

• SMAP / SMOS
  • Imagery and ATCF fixes available to forecasters for TC intensity analysis
SMAP in ATCF

Image overlays (clickable for data values)

Max intensity and wind radii estimates (fixes)
<table>
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<tr>
<th>Priority</th>
<th>Need</th>
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<tbody>
<tr>
<td>1 TC Intensity Change</td>
<td><em>Baseline</em> (WESTPAC, SHEM, NIO, SIO, and SWPAC) probabilistic and deterministic <strong>forecast guidance for TC intensity change, particularly</strong> the onset, duration, and magnitude of <strong>rapid intensity change</strong> events (including ERC, over-water weakening, etc.) at 2-3 day lead times.</td>
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<td>2 TC Structure Specification</td>
<td><em>Baseline</em> (WESTPAC, SHEM, NIO, SIO, and SWPAC) probabilistic and deterministic guidance for the <strong>specification</strong> (analysis and forecast) of <strong>key TC structure variables</strong>, including the production of 34-, 50- and 64- knot wind radii and a <strong>dynamic</strong> (situational) confidence-based <strong>swath</strong> of potential 34-kt wind impacts.</td>
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<td>3 Data Exploitation</td>
<td>Techniques or products that <strong>improve</strong> the utility and <strong>exploitation</strong> of microwave satellite, ocean surface wind vectors, and <strong>radar data</strong> for fixing (center, intensity, radii) TCs, or for diagnosing RI, ETT, ERC, etc. (e.g., develop a &quot;Dvorak-like&quot; technique using microwave imagery).</td>
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<td>4 TC Track Improvement</td>
<td>Model enhancements or guidance to <strong>improve TC track forecast skill and the conveyance of probabilistic track uncertainty</strong>. Includes development of guidance-on-guidance to identify and reduce forecast error outliers resulting from large speed (e.g., accelerating recurvers) and directional (e.g., loops) errors, or from specific forecast problems such as upper-level trough interaction, near/over-land, elevated terrain, and extratropical transition.</td>
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<td>5 TC Genesis Timing and Forecast</td>
<td>Guidance to <strong>improve the forecasting of TC genesis timing</strong> and the subsequent track, intensity and structure of pre-genesis tropical disturbances at both the short-range (0-48 hours) and the medium-range (48-120 hours), that exhibits a high probability of detection and a low false alarm rate. Techniques to diagnose and predict the formation of TCs via transition of non-classical disturbances (e.g. monsoon depressions, sub-tropical, hybrids, etc).</td>
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JTWC R&D Efforts

1) TC intensity change
   • SHIPS-RI forecasts (through 48 hours) presented to forecasters and included in intensity consensus when available

2) TC structure specification
   • SHIPS forecasts incorporated into wind radii consensus
   • TC diagnostics website development (M. Fiorino)

3) Data exploitation
   • MK-IVB satellite imagery enhancements and ATCF overlay generation
   • GIS-based observation and model data display systems

4) TC track forecast improvement
   • Updated track forecast consensus

5) TC genesis timing and forecast
   • Processing NCEP and ECMWF pre-formation track and intensity forecasts for two-week formation areas
   • JHT project: WAIP (analog) technique for pre-formation intensity outlook
RIPA (SHIPS-RI)

Obj. Aid Time Intensity for 17S

Intensity (kts)

0302 0302 0303 0304 0305 0306 0307 0308 0309
06z 18z 06z 18z 06z 18z 06z 18z 06z 18z 06z

ICNW
RI45

Date
Observe-Predict → Fight-Win
Questions?