

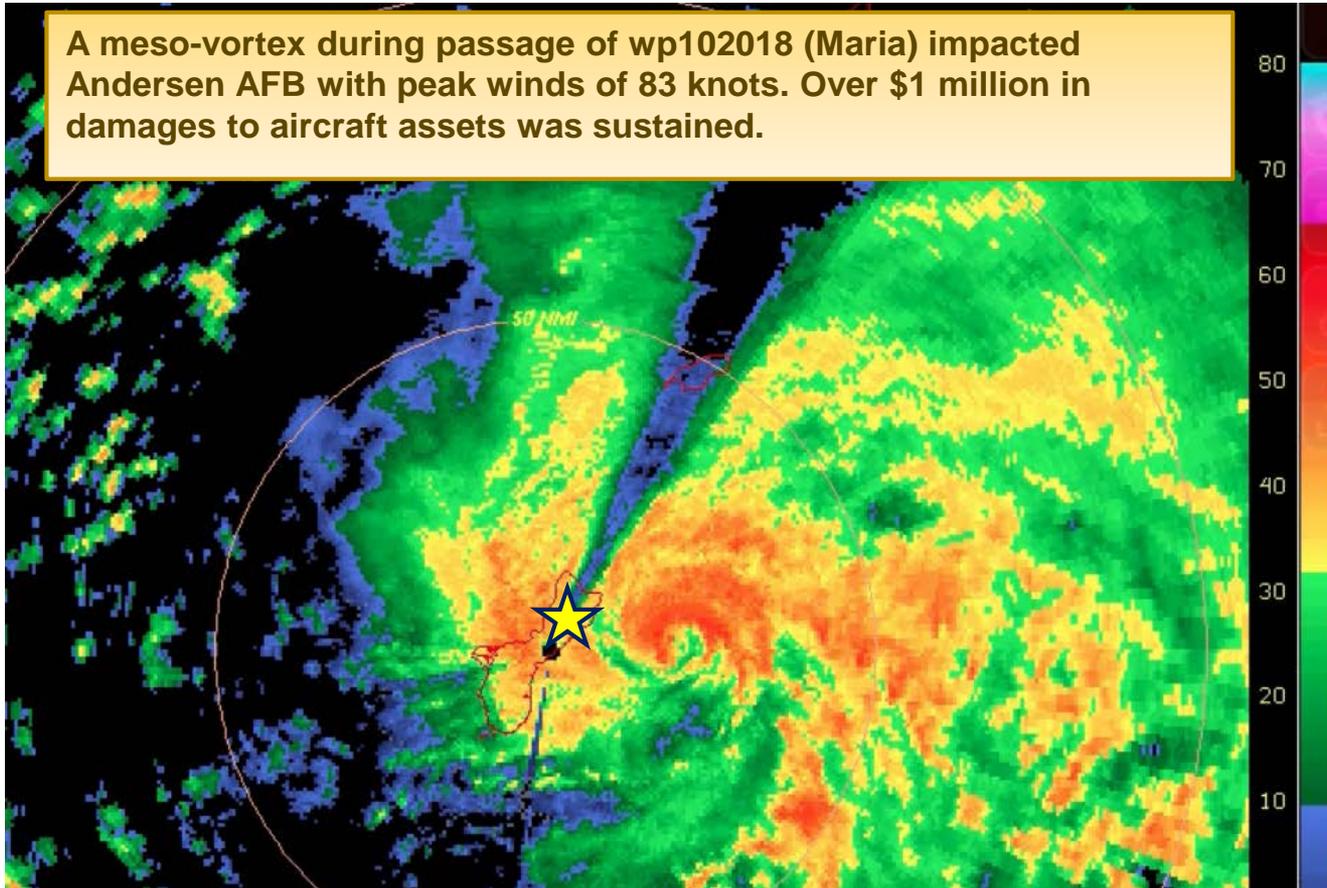


JTWC – 2018 Year in Review

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A meso-vortex during passage of wp102018 (Maria) impacted Andersen AFB with peak winds of 83 knots. Over \$1 million in damages to aircraft assets was sustained.



**Presented by CDR R. C. Cherrett, Commanding Officer
March 12, 2019**



Tropical Cyclone Threat

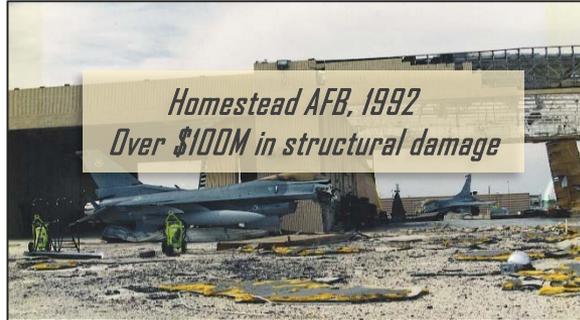


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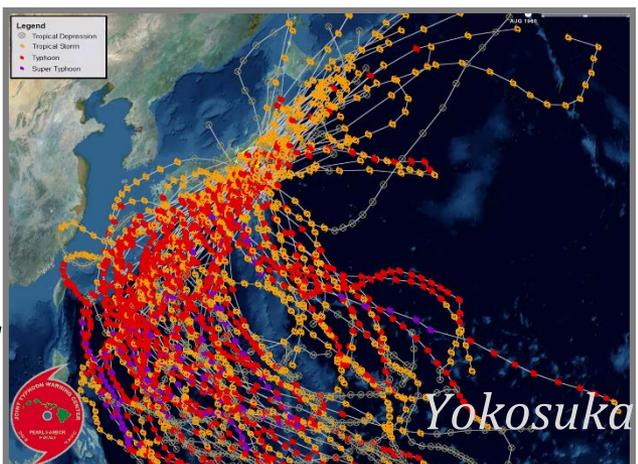
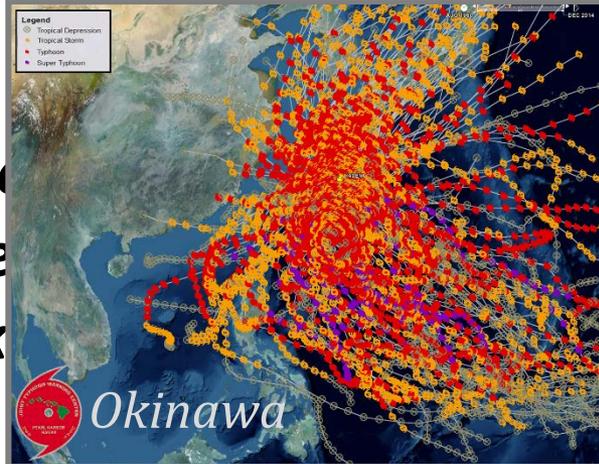
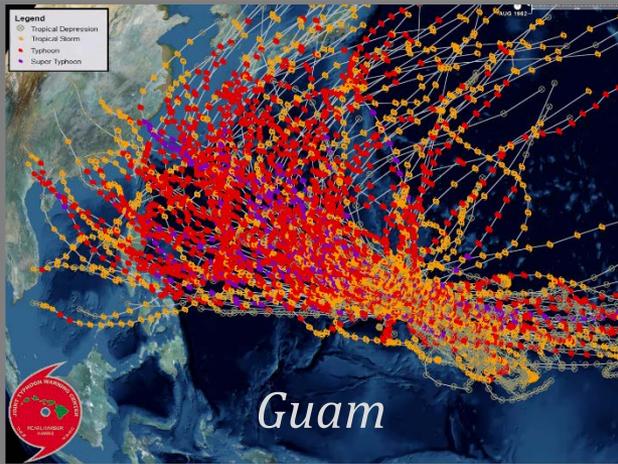
Typhoon Cobra, 1944
3 destroyers, 100+ aircraft, nearly 800 lives



Homestead AFB, 1992
Over \$100M in structural damage



Tyndall AFB, 2018
Over \$1B in aircraft losses alone



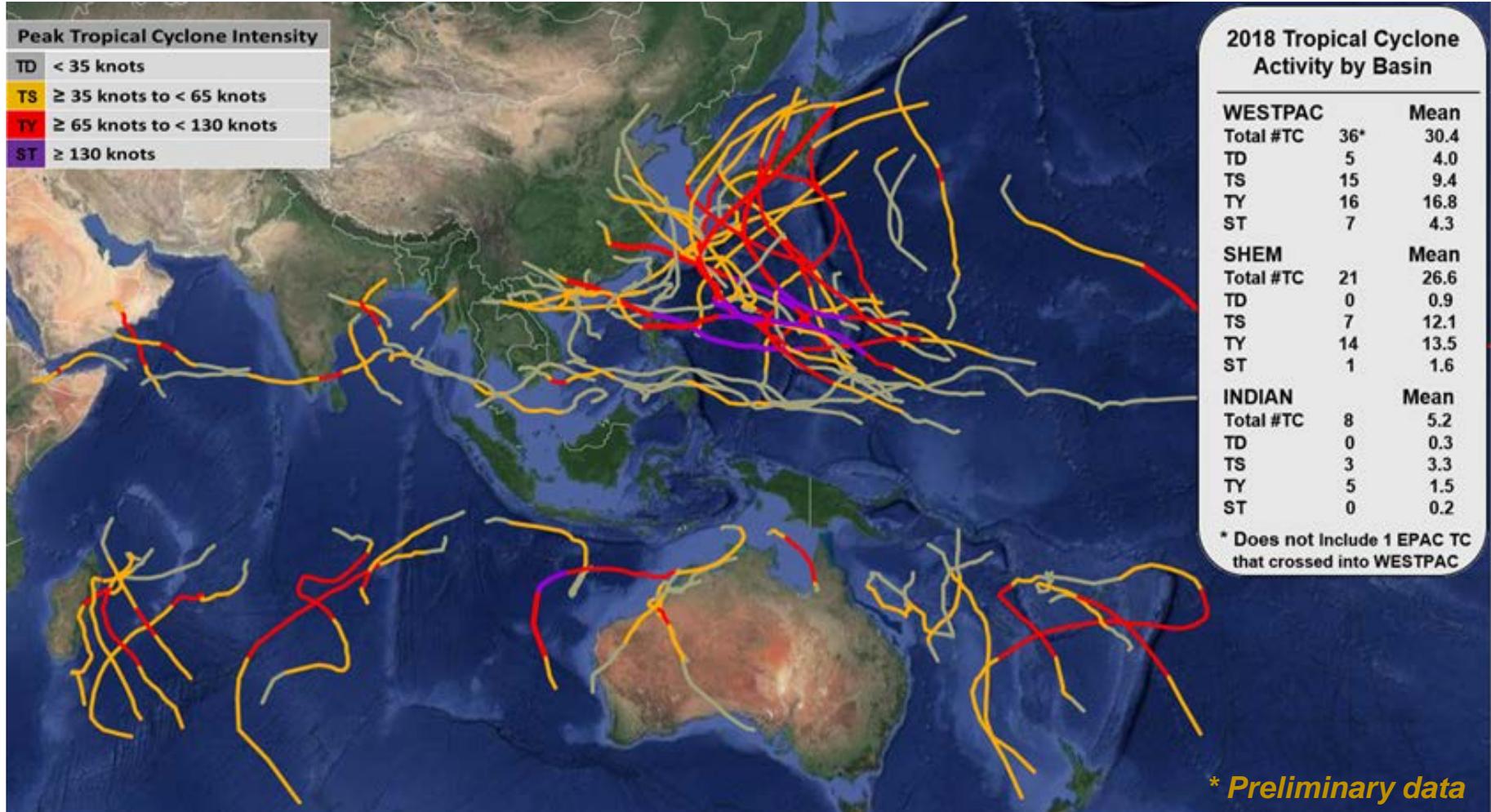


2018 Tropical Activity*

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Highest number of Western North Pacific tropical cyclones since 1996



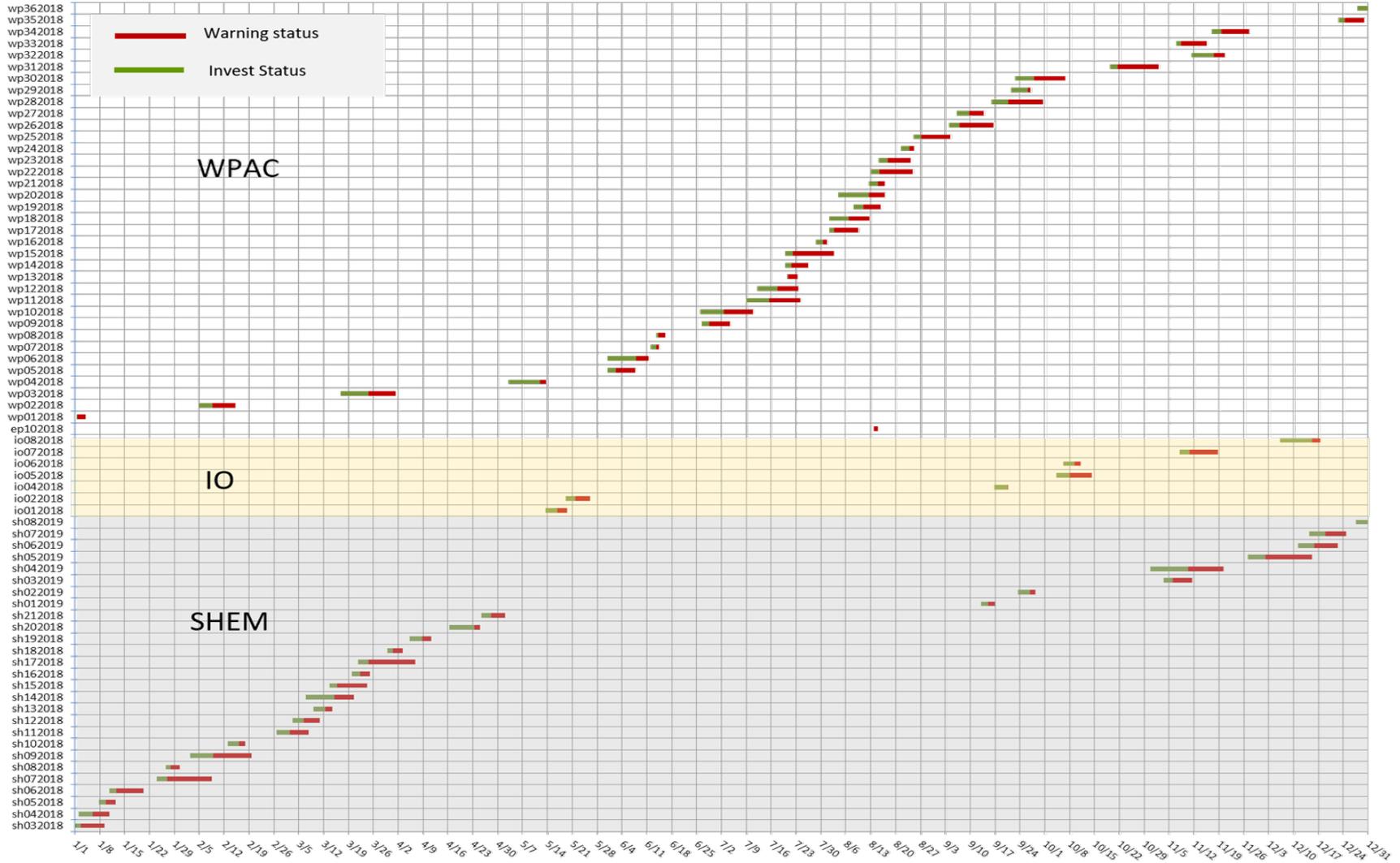


2018 Timeline

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2018 JTWC Tropical Activity Timeline



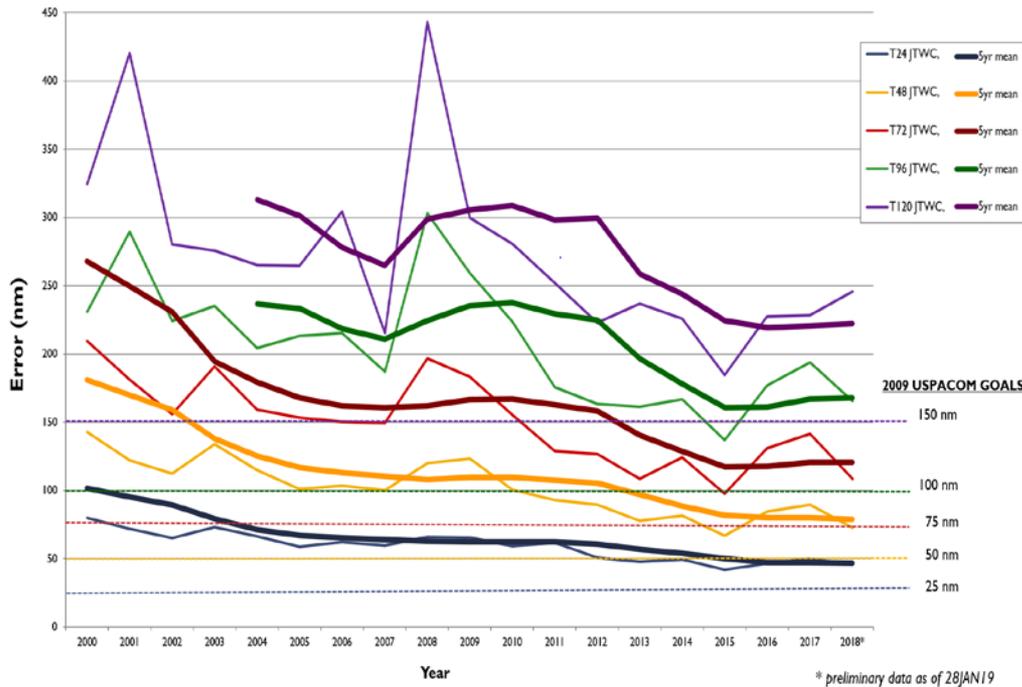


2018 WESTPAC Track Errors*

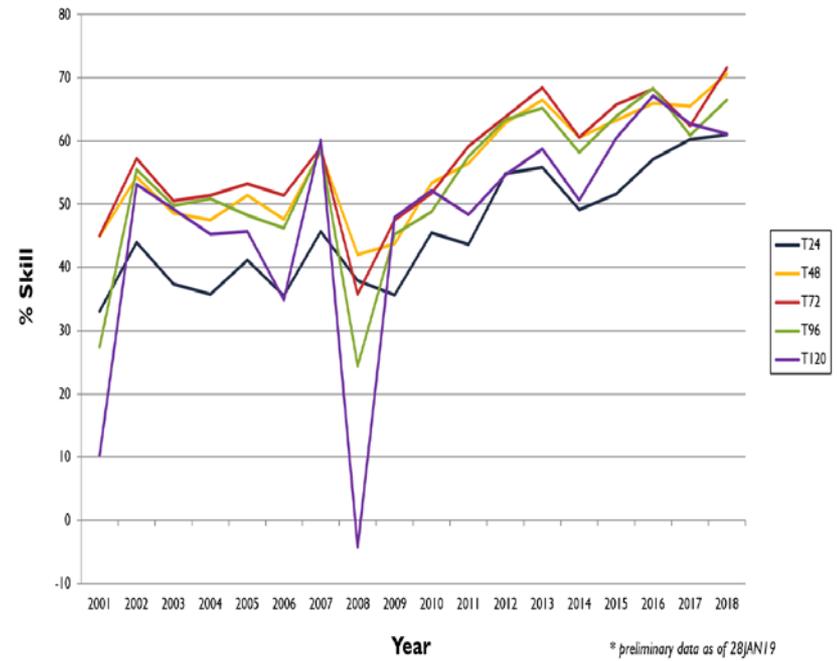
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JTWC WESTPAC Forecast Track Errors 2000-2018*



2001-2018* JTWC WESTPAC Track Forecast Skill



* Preliminary data



Forecast Challenges

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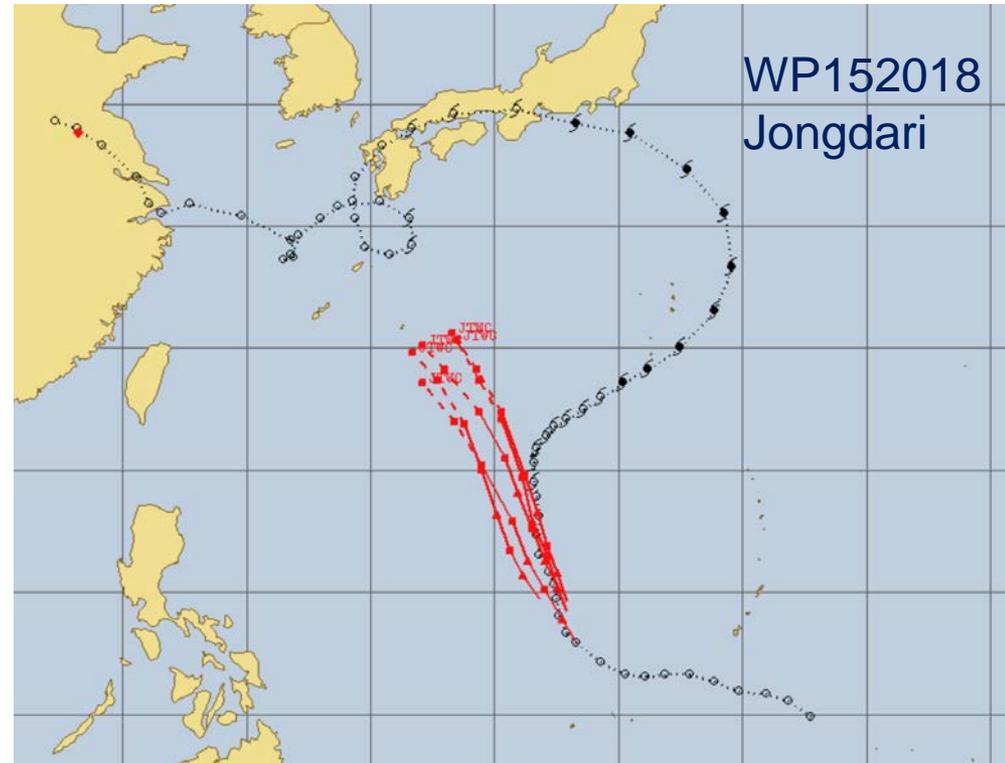


Complex track motion

- Track improvement **#4 R&D priority**
- Jongdari, for example, with numerous changes in track direction and/or looping motion
- Jongdari alone accounts for 21 nm of the annual T120 mean error

Early TC development (i.e., weak TD, TS)

- Typically large mean errors in the first few forecasts, e.g. WP15 (Jongdari)
- Errors where initial Vmax < 35 kts accounts for ~ 11 nm of 2018 T120 mean error
- Partially an NWP issue, but also attributable to **environmental sensing challenges and TC Genesis process**





Forecast Challenges, cont'd



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Along-track speeds

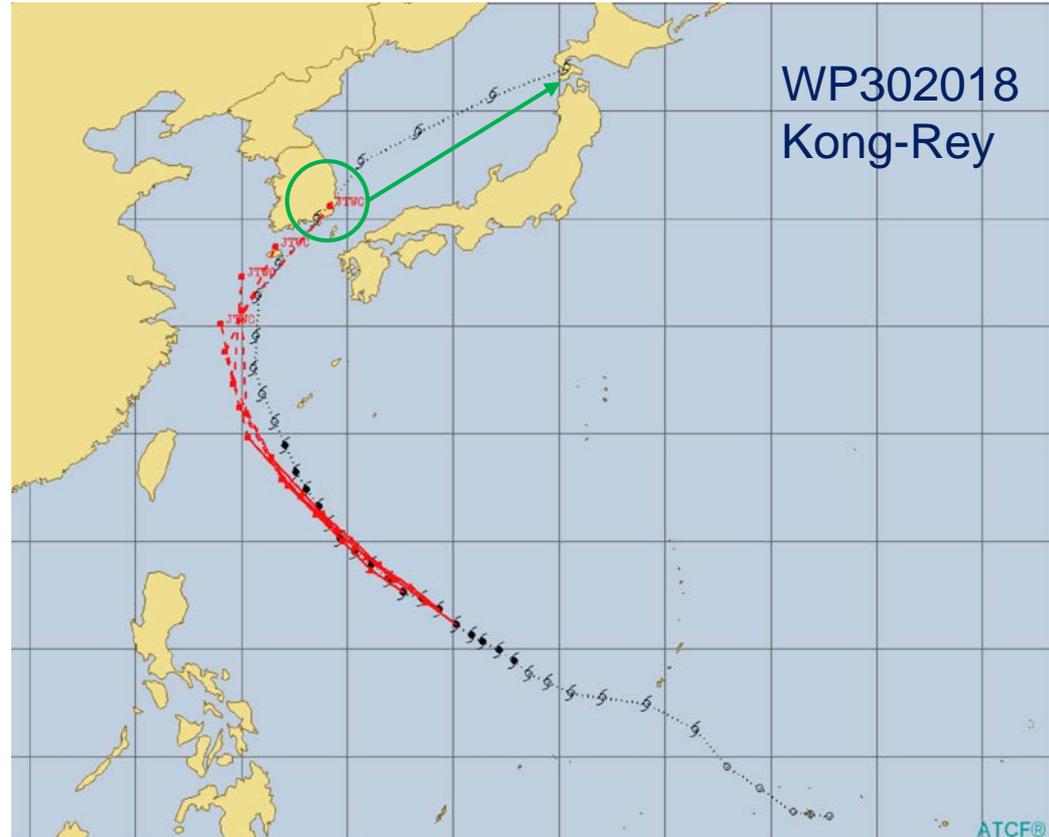
- Tracks speeds, particularly after re-curvature are still not well modeled

Reducing the outliers

- Out of 233 verifying 5-day forecasts, Kong-Rey and Jongdari account for 9 out of the 13 total 2- and 3-sigma errors.

Forecast confidence estimation

- Tied to TC Track improvement, #4 R&D priority





Forecast Challenges, cont'd

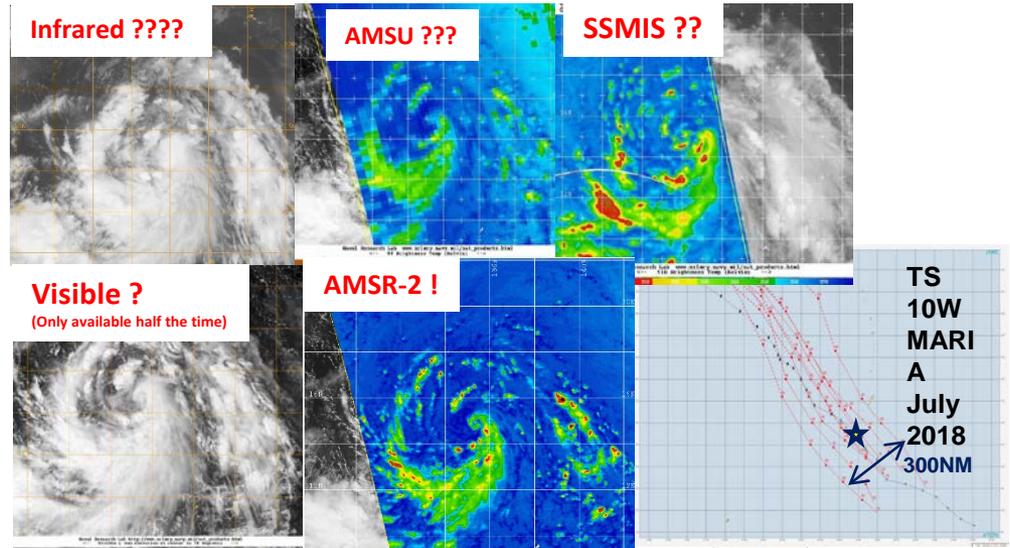
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Environmental Sensing

- Satellite data exploitation **#3 R&D priority**
- High Res Polar Sat Recon assets critical, but aging/dwindling
- Indian Ocean Geo replacement
- Wind speed and radii from SMAP/SMOS via the ATCF
- Improvements coming to NRL TC Web
- CubeSat data not operational

Accurately Find the Low-level Circulation Center

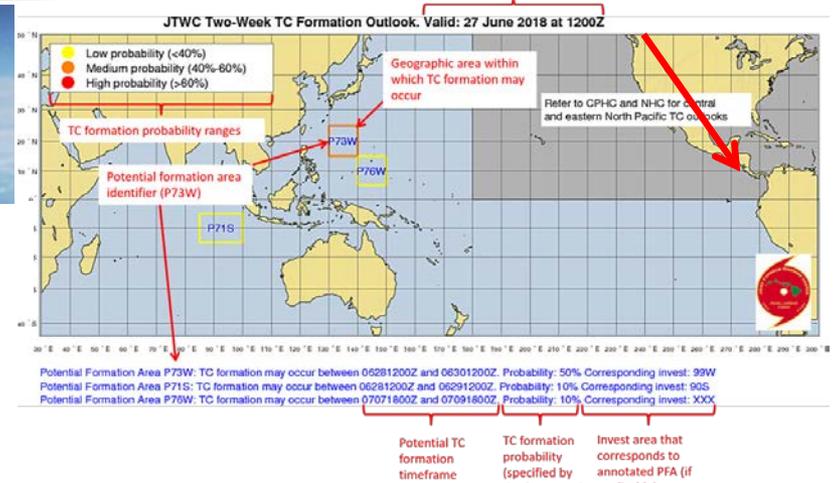


Manned reconnaissance

- INDOPACOM CDR interest item
- Currently Limited to DOTSTAR dropsondes near Taiwan



Dropsondes from DOTSTAR



TC Genesis

- **#5 R&D priority**
- New Potential Formation Area product recently implemented



Forecast Challenges, cont'd

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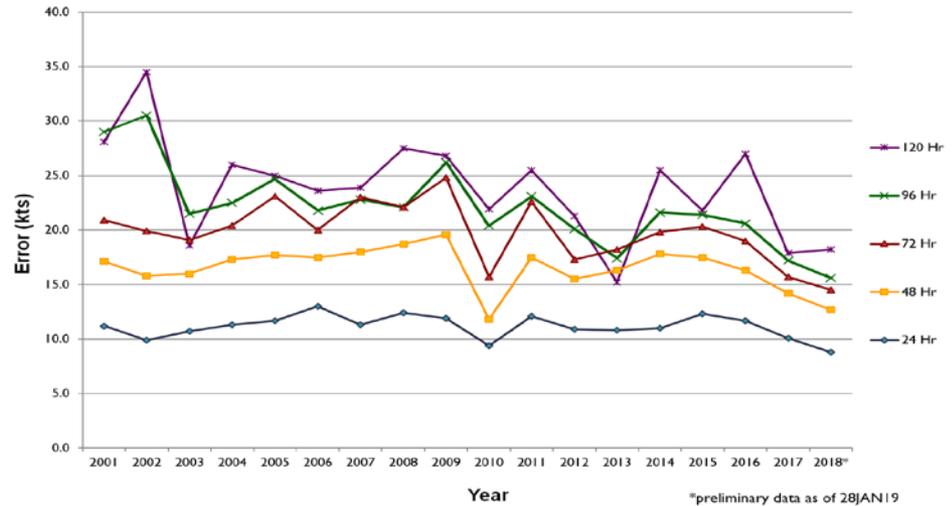
Intensity

- Forecast intensity (particularly RI) remains top forecast challenge and **#1 R&D priority**
- Good progress** - steady consensus guidance improvement, focus on initial analysis and addition of CIRA Rapid Intensification Aid (RIPA)
- Strong interest in experimental 3km nested FV3 real-time runs in WESTPAC with JET reservation

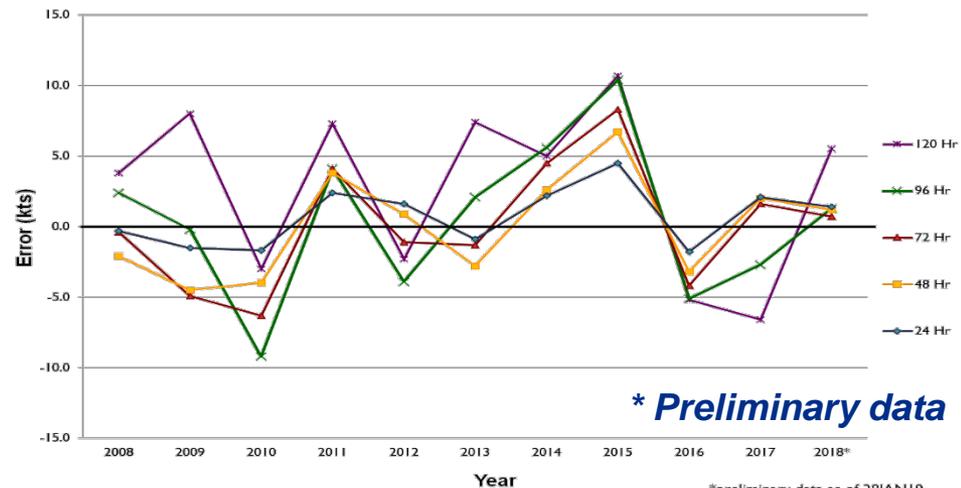
Structure, #2 R&D priority

- Tweaking 34 kt RVCN guidance; R50, R64 radii and Rv_{max} estimates remain challenging
- Evaluating modifications to 2016 experimental GPCE based dynamic 34-kt potential wind swath

JTWC Mean Absolute Intensity Errors (WESTPAC), 2001-2018*



JTWC WESTPAC Average Intensity Biases 2008-2018*



* Preliminary data



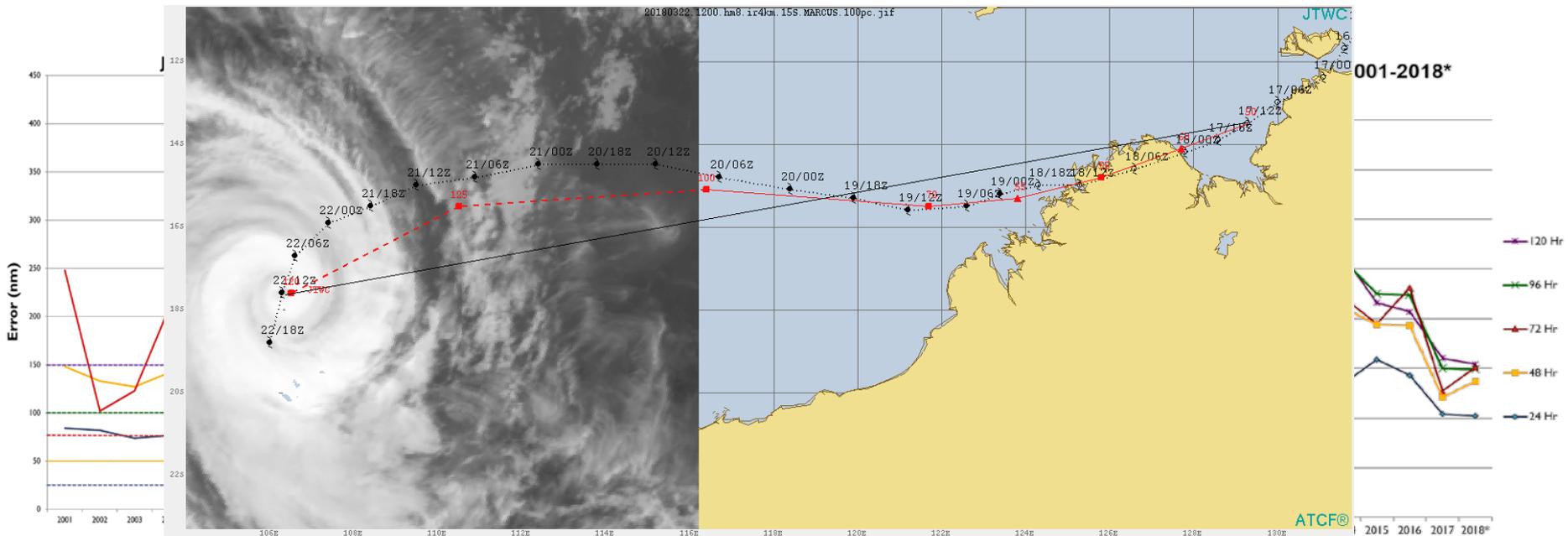
2018 Southern Hemisphere



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Record breaking SHEM track and intensity forecast accuracy

- Model and forecast errors typically lag WESTPAC performance
- Transition to 6-hourly cycle resulted in robust sample size, with 415 total forecasts, and 111 verifications at day 5.
- 2009 USPACOM seasonal mean track forecast goals for 3, 4, and 5-day lead times met for the first time in *any* JTWC basin
- Intensity MAEs also as good or better than WESPAC counterparts



*preliminary data as of 28JAN19

the mouse to select two points.

Dis: 1350.0 nm, 1554.7 miles Dir: 256.3 W8W 22.478-104.23E

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NOAA Collaborations

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American Samoa coordination

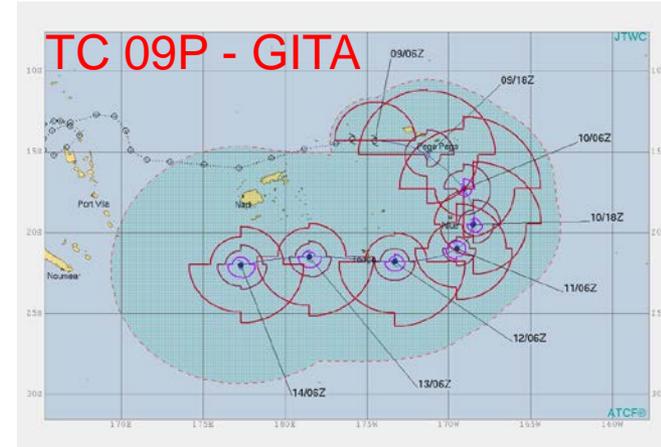
- Develop a relationship with WSO Pago Pago (similar to WFO Tiyan)
- Utilize JTWC products as official source of TC information
- JTWC provides telephone support

Effective Hurricane Messaging Course

- Atlantic version of course, adapted to Pacific region for first time in 2019
- JTWC assisting with instruction
- Collaboration with CPHC and NHC
- Two JTWC personnel attending the course

Military Academies Internship at JTWC

- 3rd year hosted by JTWC
- Cadets and Midshipmen (USNA, USMA, USAFA)
- Interns visit NOAA facilities across Oahu





Multi-Agency Collaboration

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Questions?