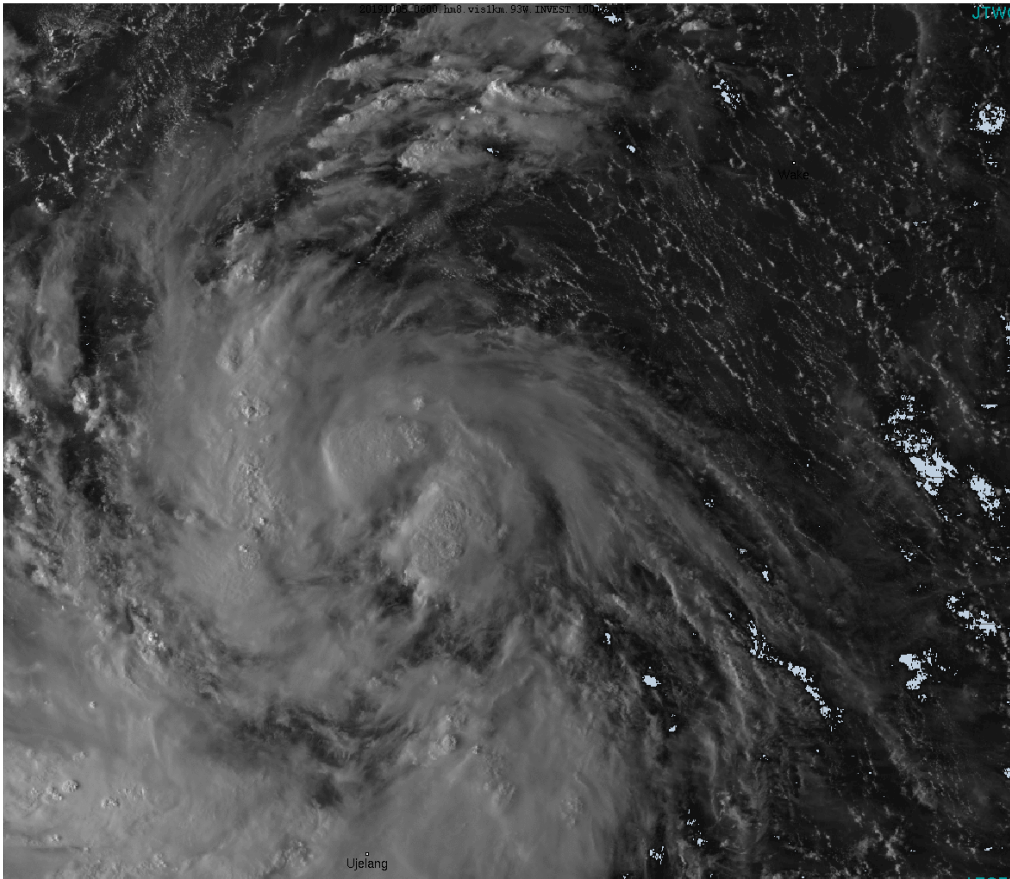
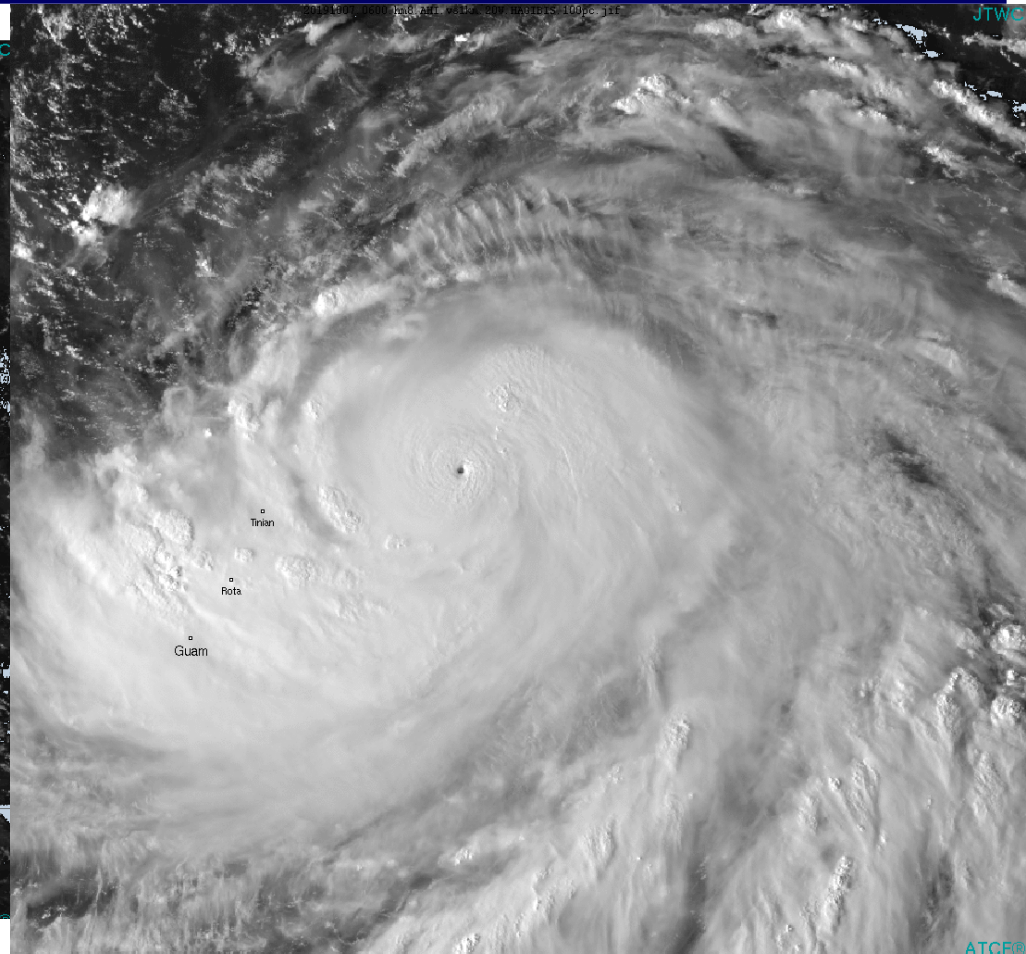


2019 Year in Review: Joint Typhoon Warning Center TC Activity, Forecast Challenges, and Priorities



TD 20W, 5 Oct 2019 06Z



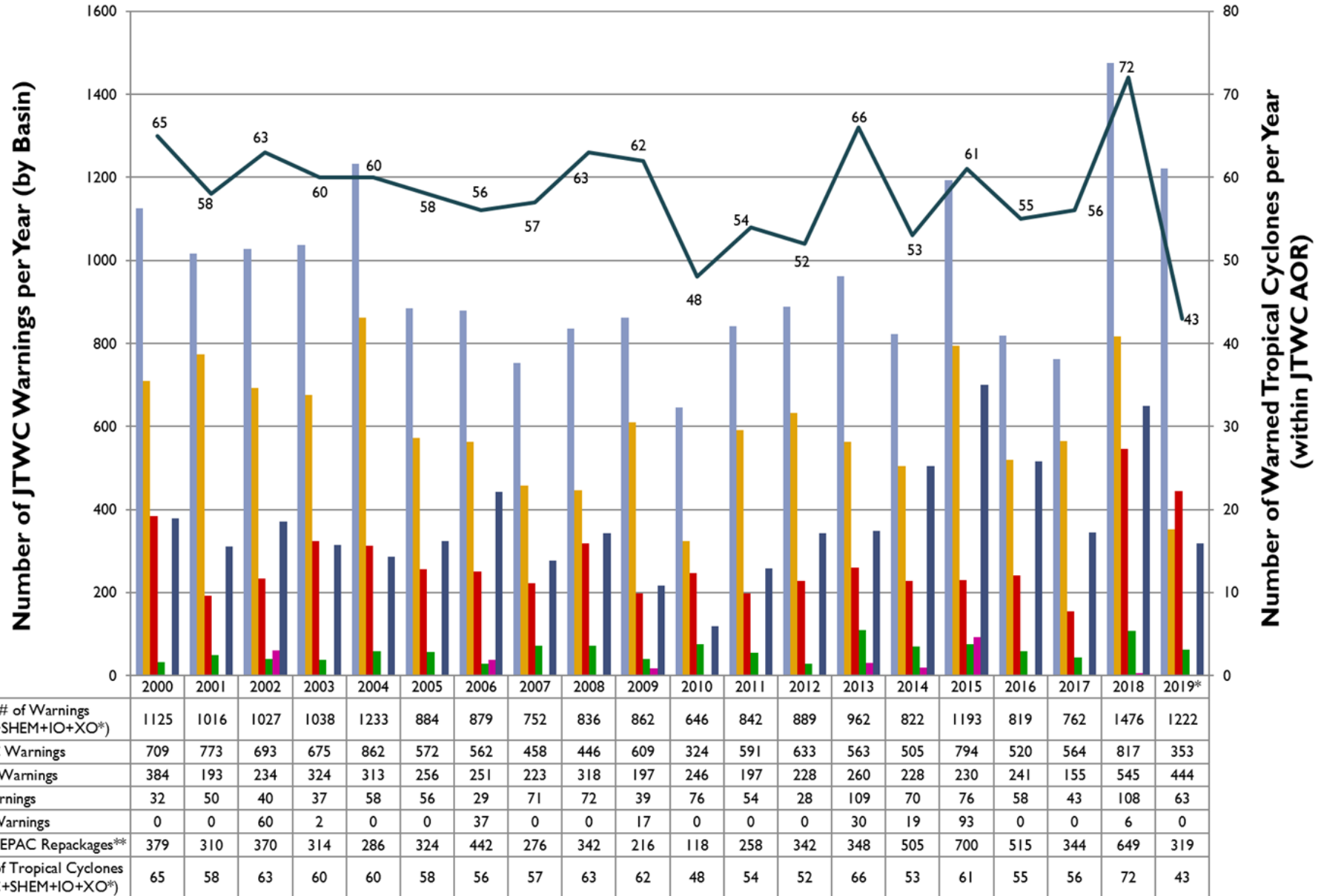
STY 20W, 7 Oct 2019 06Z

4-6 November 2019
Brian Belson, Joint Typhoon Warning Center

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Annual Totals



* Denotes Central or Eastern Pacific tropical cyclones that have crossed over into the JTWC Area of Responsibility

** Denotes NHC/CPHC advisories re-issued by JTWC for the Department of Defense

* As of 06OCT2019

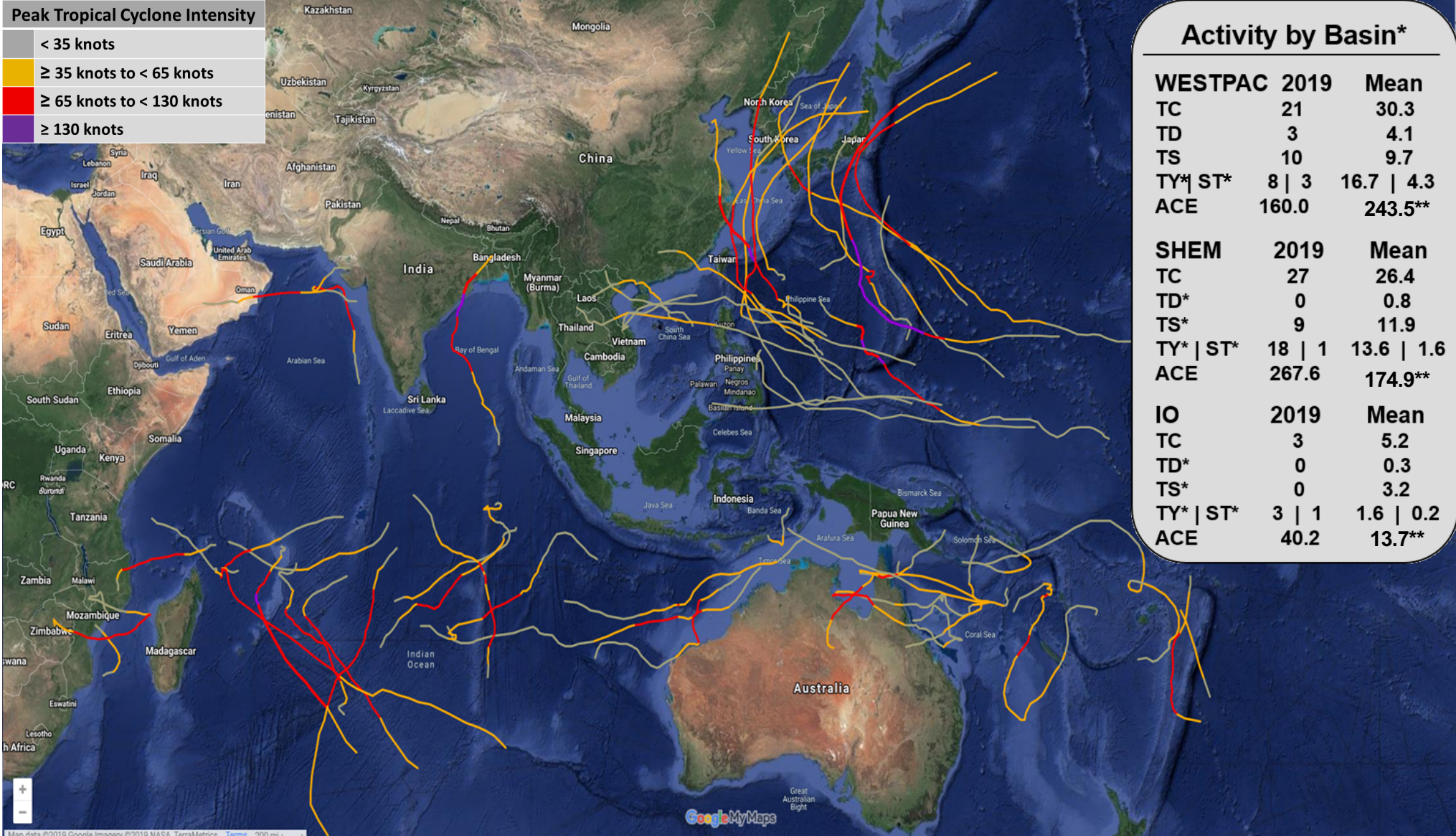


JTWC Warned Tropical Cyclones (as of 17 Oct 2019)



Peak Tropical Cyclone Intensity

< 35 knots
≥ 35 knots to < 65 knots
≥ 65 knots to < 130 knots
≥ 130 knots



Activity by Basin*

Basin	2019	Mean
WESTPAC		
TC	21	30.3
TD	3	4.1
TS	10	9.7
TY* ST*	8 3	16.7 4.3
ACE	160.0	243.5**
SHEM		
TC	27	26.4
TD*	0	0.8
TS*	9	11.9
TY* ST*	18 1	13.6 1.6
ACE	267.6	174.9**
IO		
TC	3	5.2
TD*	0	0.3
TS*	0	3.2
TY* ST*	3 1	1.6 0.2
ACE	40.2	13.7**

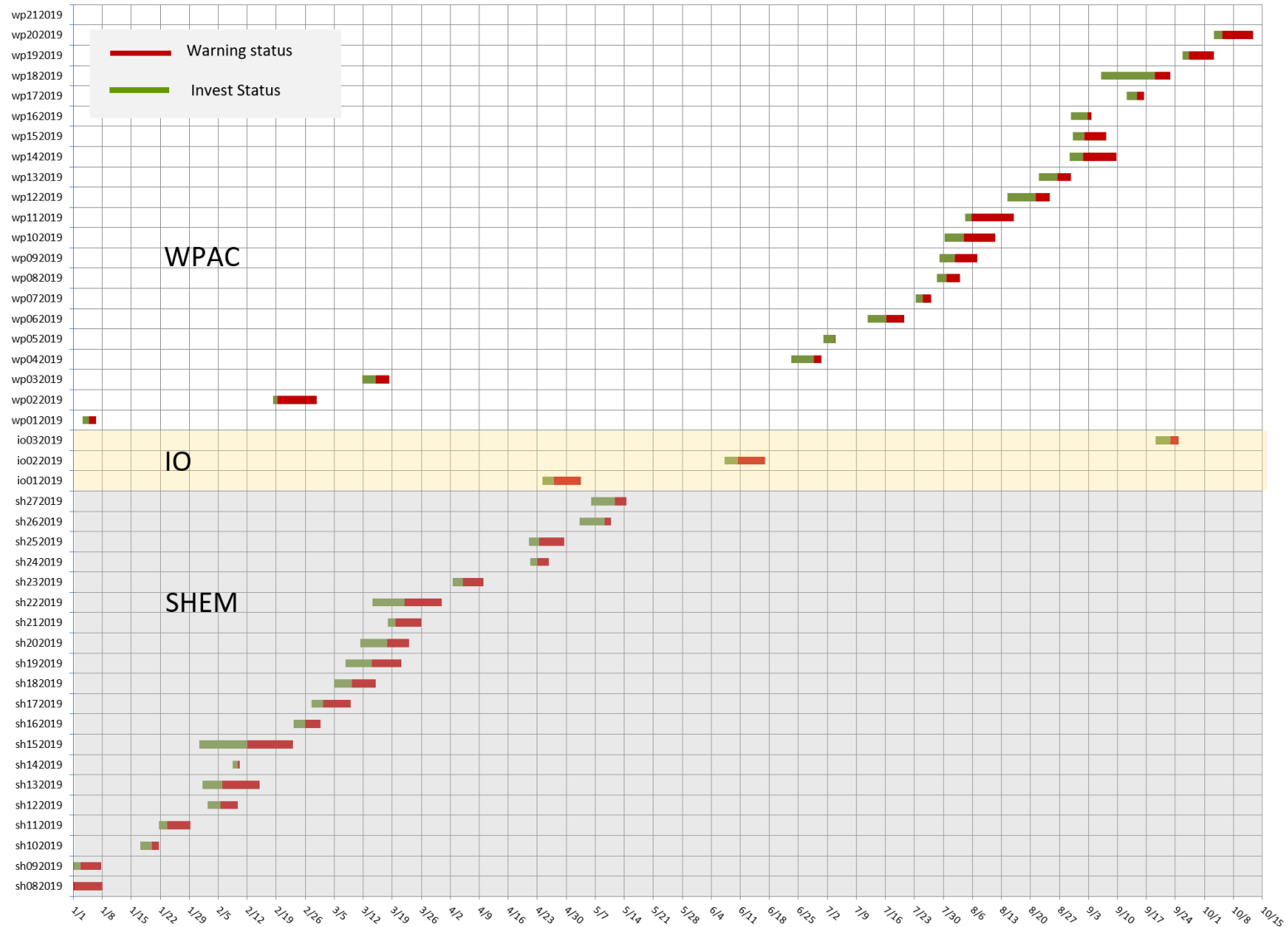
* Preliminary Results ** As of October 2018 **UNCLASSIFIED**



JTWC Tropical Cyclone Timeline



2019 JTWC Tropical Activity Timeline



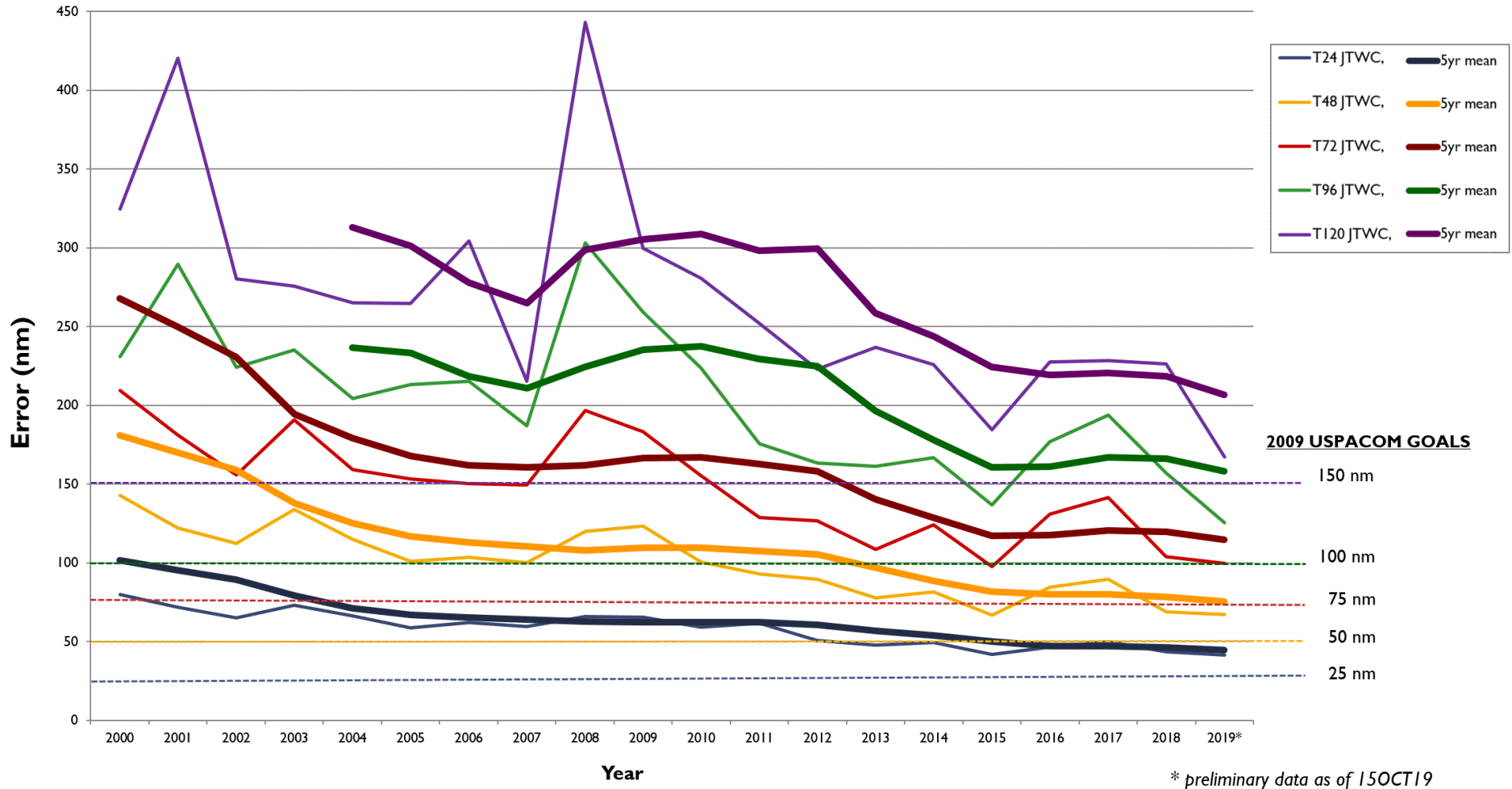
UNCLASSIFIED



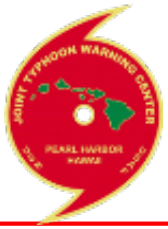
JTWC WESTPAC Forecast Track Errors (Preliminary)



JTWC WESTPAC Forecast Track Errors 2000-2019*



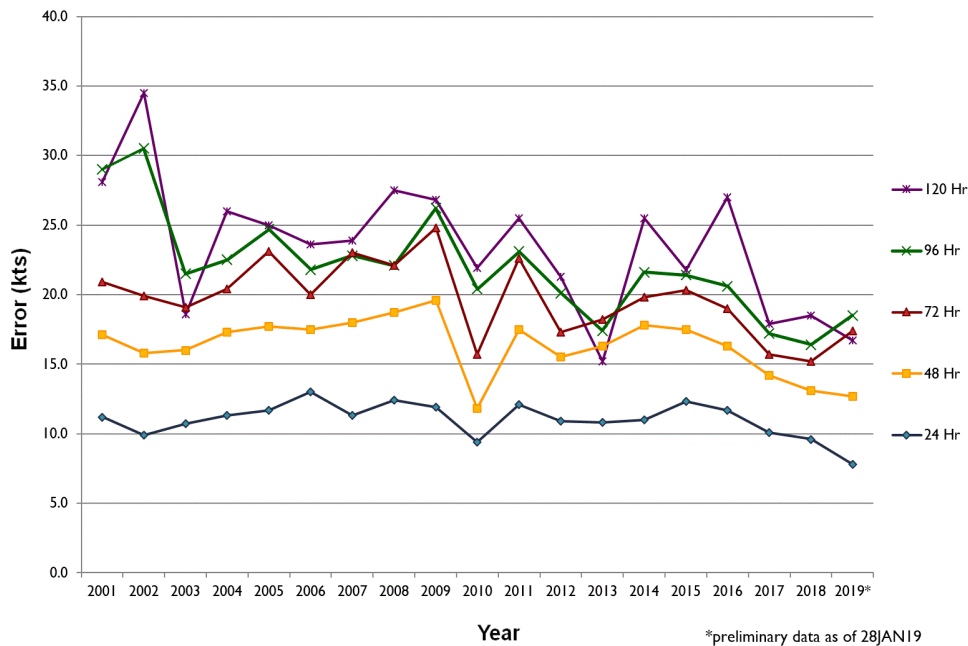
UNCLASSIFIED



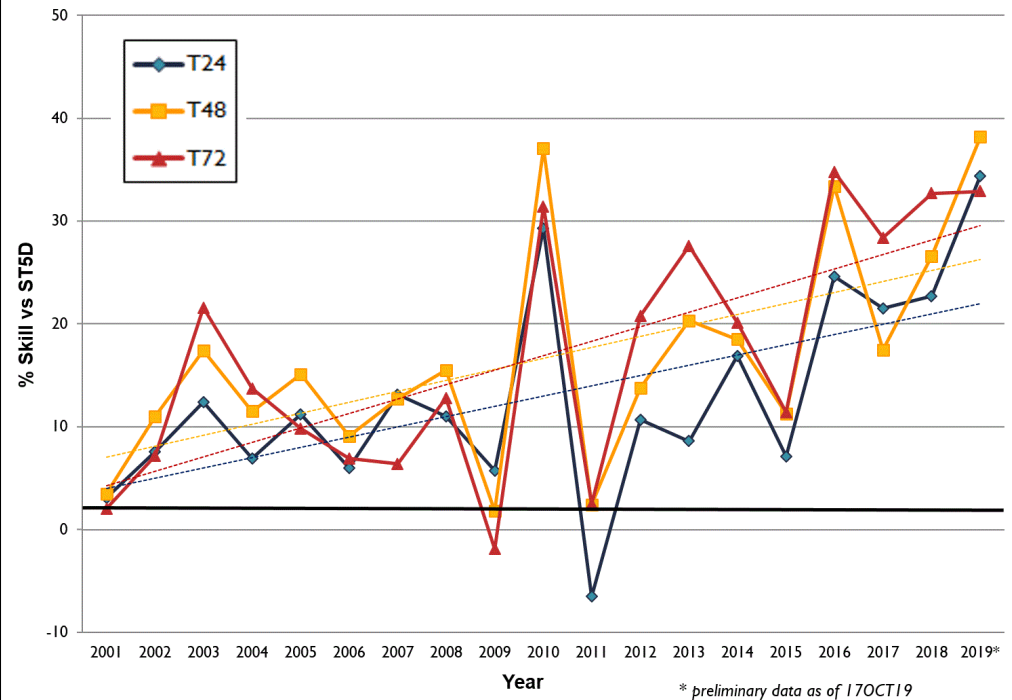
JTWC WESTPAC Forecast Intensity Errors (Preliminary)



JTWC Mean Absolute Intensity Errors (WESTPAC), 2001-2019*



JTWC WESTPAC Forecast Intensity Skill 2001-2019*



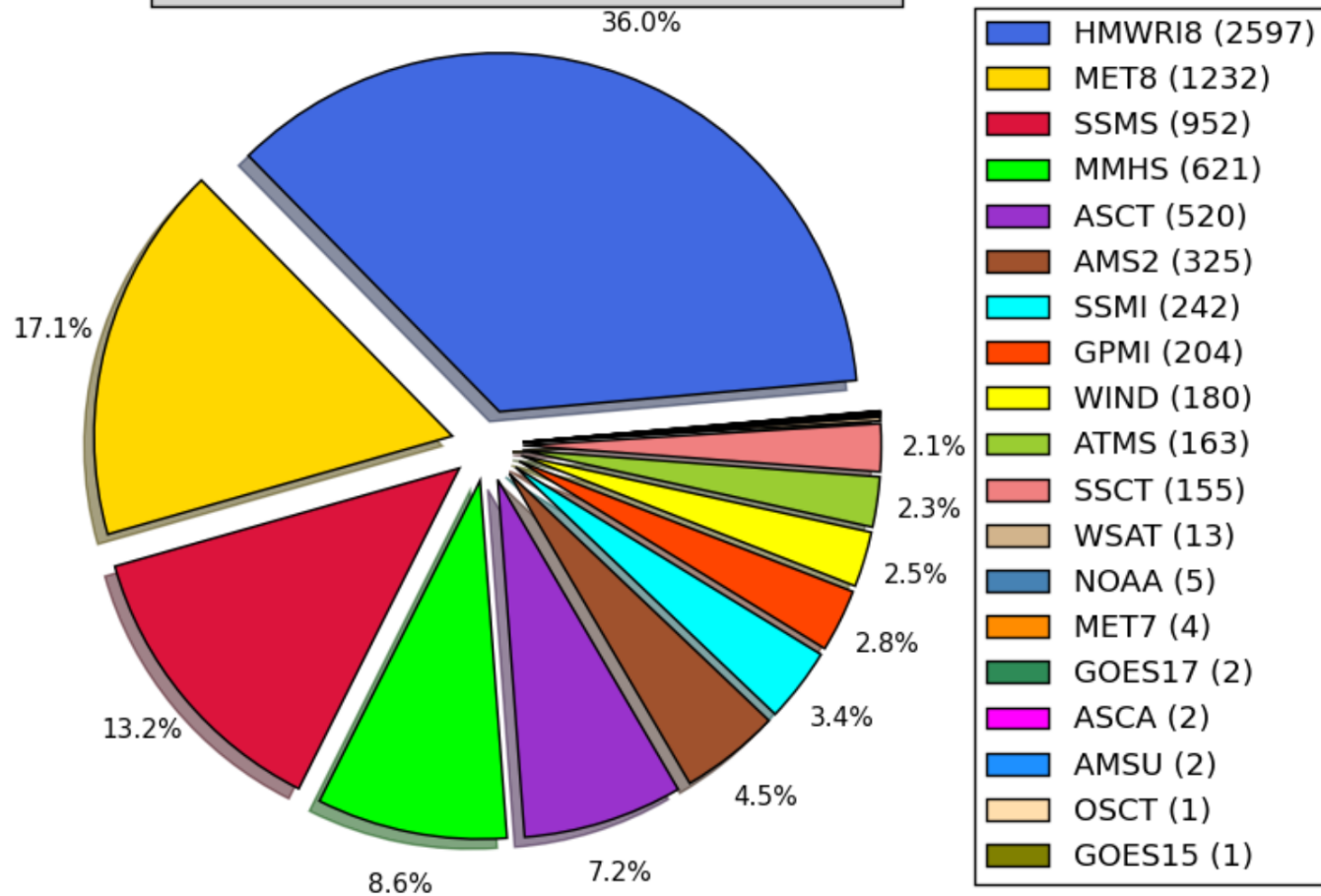
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JTWC Fixes (Preliminary)



**Total PGTW Fixes by Sensor
(7221 Total Fixes)**



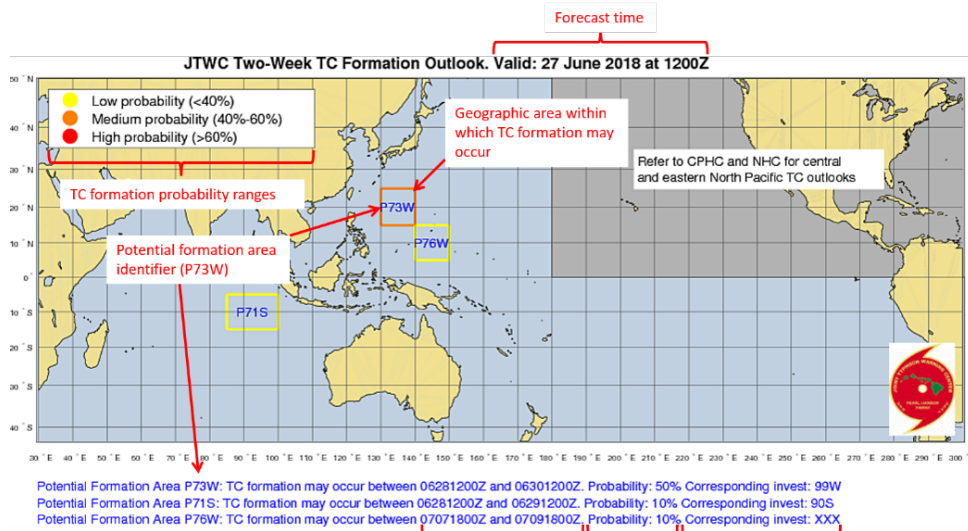
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JTWC Two Week Outlooks - Overview



- **Two-week outlooks consist of an AOR-scale graphic and detail graphics for each identified potential formation area (examples below)**
- **Outlooks will be incorporated into JTWC Collaboration site in the next few months**
- **Two-week outlook performance statistics were computed for the 01 July 2018 through 10 April 2019 time period**



Potential TC formation timeframe

TC formation probability (specified by the forecaster)

Invest area that corresponds to annotated PFA (if applicable)

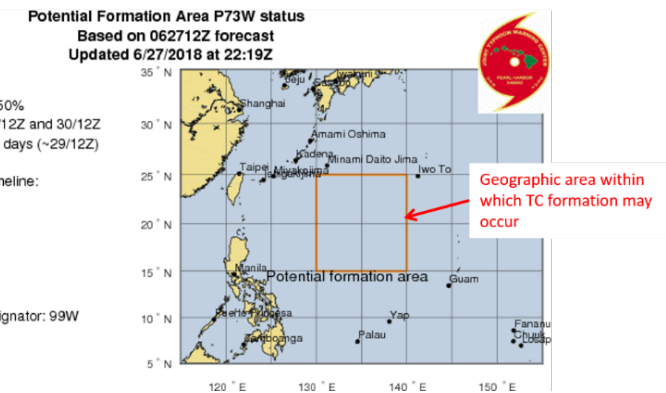
Time to formation based on first warning time estimate and graphic update time

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

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 designer: 99W



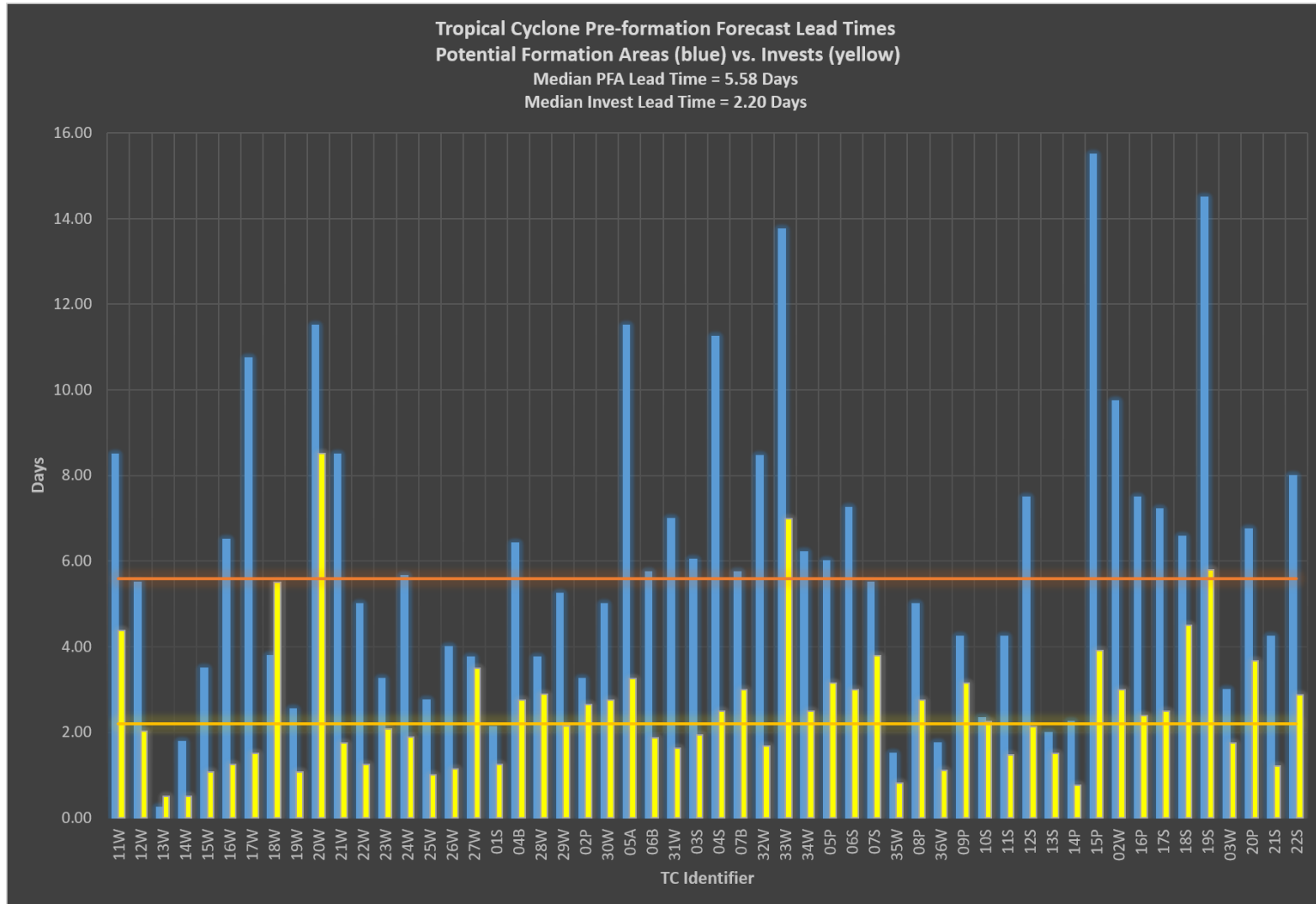
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Potential Formation Area Lead Times Developing Tropical Cyclones



Two-week outlooks extended first notification lead-times for developing TCs by 250%



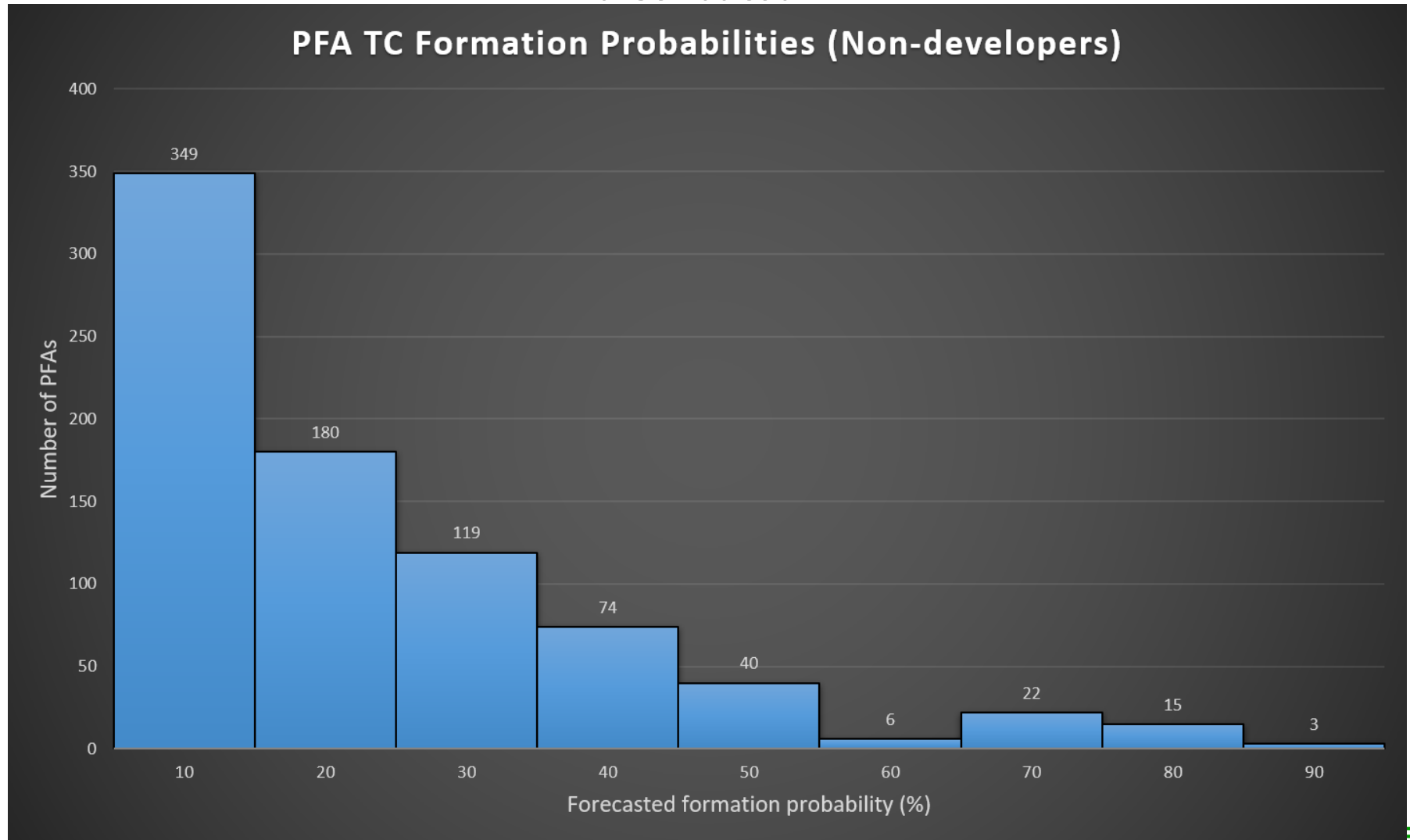
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Potential Formation Area Forecasts: Non-Developers



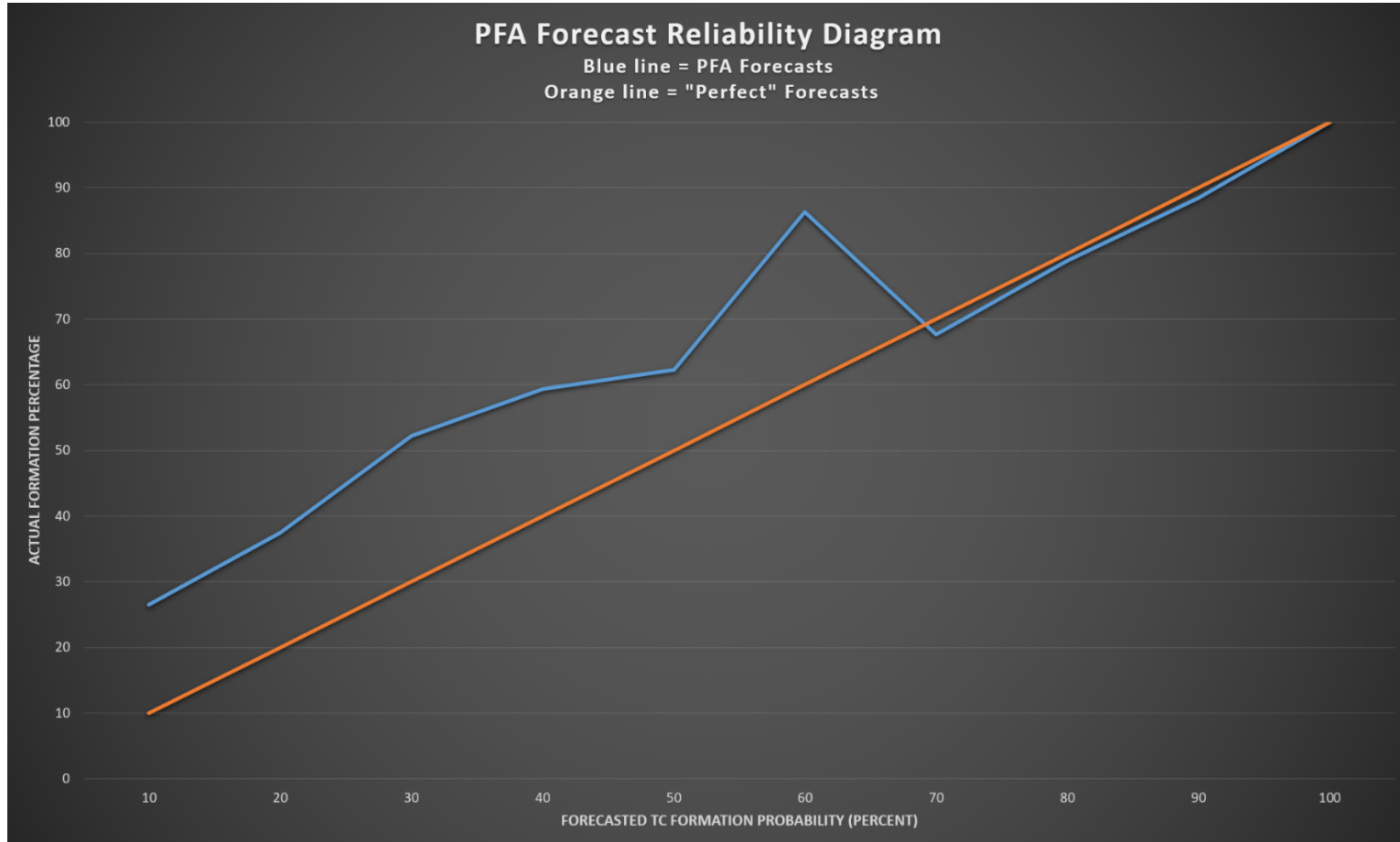
PFA formation probabilities for non-developing areas were “well-distributed”



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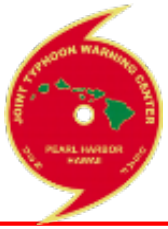
Two-week Outlook Forecast Reliability



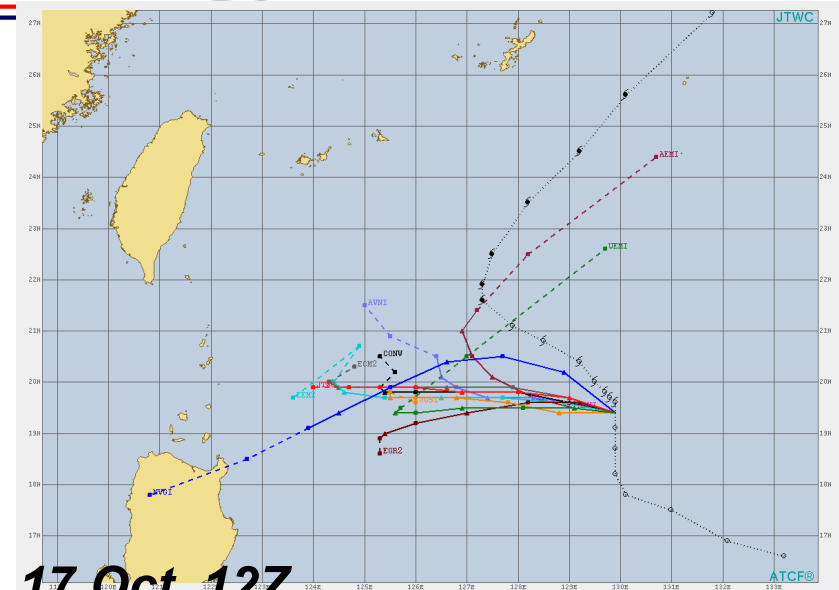
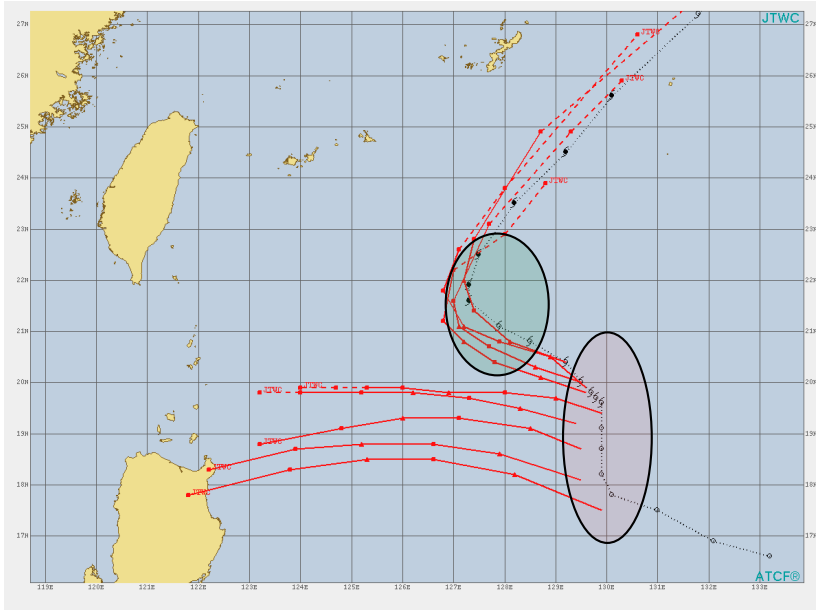
#Cases

10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
475	288	249	182	106	44	68	71	26	1

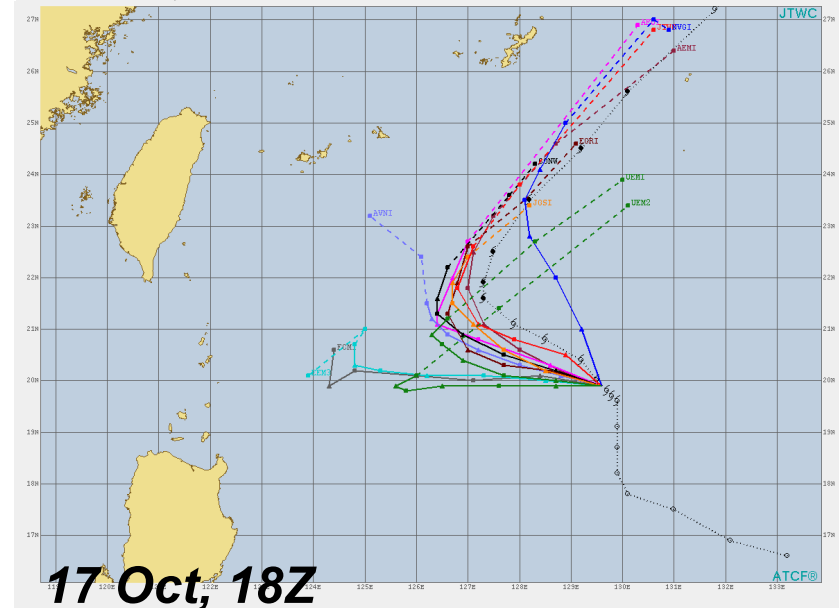
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TY 21W (NEOGURI) Track (and intensity)



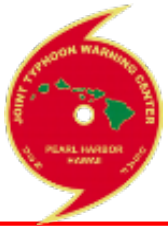
17 Oct, 12Z



17 Oct, 18Z

- **Unanticipated northward movement**
- **System passed through break in STR**
- **RI started 18/18Z (currently 45 kts in 24 hrs) as it rounded STR axis**

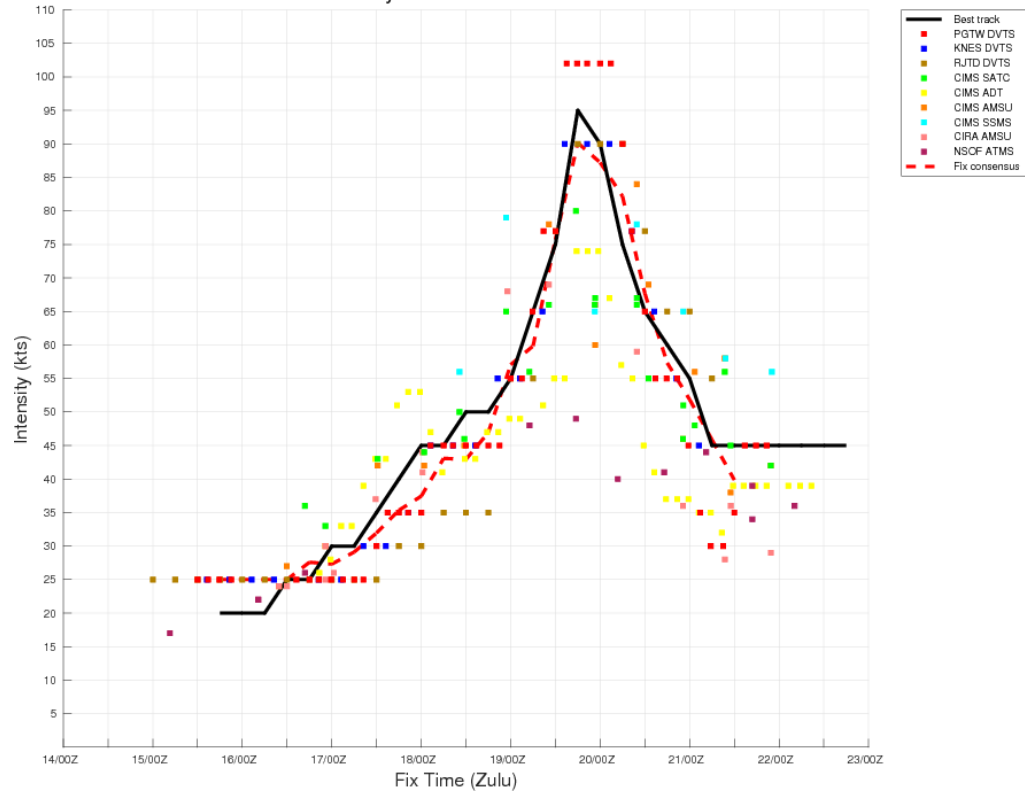
Average track errors (NM) FOR HOMOGENEOUS SAMPLE							
	00	12	24	36	48	72	96
JTWC	8.0	54.6	104.2	154.5	212.0	429.9	819.8
CONW	8.6	52.9	100.6	155.7	226.9	431.5	797.1
#CASES	23	21	19	17	15	11	4



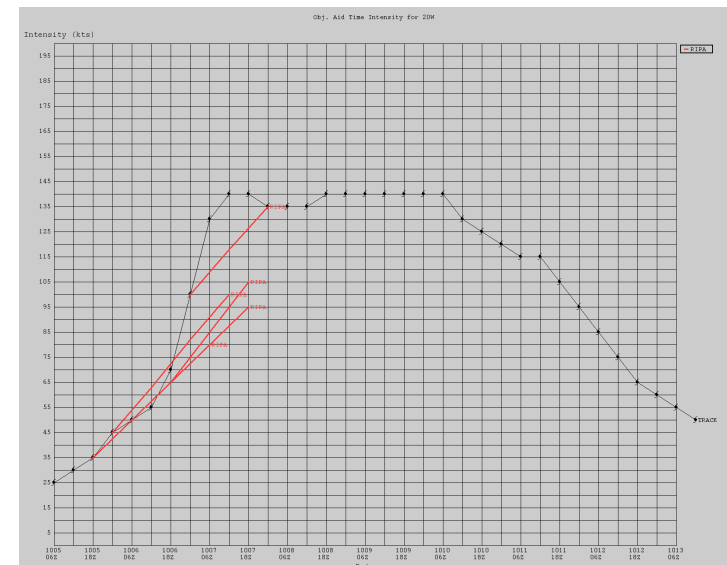
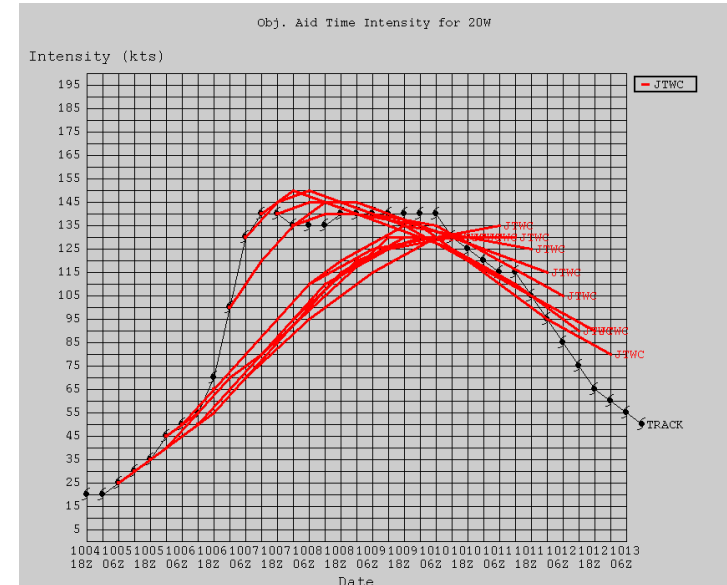
STY 20W (Hagibis) Rapid Intensification



Fix Time vs. Intensity for EX 21W for 2019102218



- Results are preliminary
- Intensity increased 90 kts in 30 hrs
- JTWC forecasts showed RI (below observed rate)
- RIPA id'd start and end of RI period





Thank You!



The collaborative efforts of the many agencies, labs, and academia through HFIP are making a difference.

Questions?

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