



# Extended Range Forecast for Northwest Pacific Typhoon Activity in 2018

Issued: 11<sup>th</sup> May 2018

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## Forecast Summary

**TSR predicts the 2018 Northwest Pacific typhoon season will see activity slightly above the 1965-2017 norm. However, forecast uncertainties remain large.**

The TSR (Tropical Storm Risk) extended range forecast for Northwest Pacific typhoon activity in 2018 anticipates a season with activity around 5% above norm. The forecast spans the period from 1<sup>st</sup> January to 31<sup>st</sup> December 2018 (95% of typhoons occur historically after 1<sup>st</sup> May) and employs data through to the end of April 2018. The forecast includes deterministic and probabilistic projections for overall basin activity, and deterministic projections for the ACE index and numbers of intense typhoons, typhoons and tropical storms. TSR's main predictor for overall activity is the forecast anomaly in August-September Niño 3.75 (region 5°S-5°N, 140°W-180°W) sea surface temperature (SST) which we anticipate being 0.11±0.5°C warmer than normal (1965-2017 climatology). A warm Niño 3.75 SST would have an enhancing effect on typhoon activity. However, sizeable uncertainties remain in the ENSO forecast for August-September 2018. Updated forecasts for Northwest Pacific seasonal typhoon activity will be issued in early July and early August.

## NW Pacific ACE Index and System Numbers in 2018

		ACE Index	Intense Typhoons	Typhoons	Tropical Storms
TSR Forecast (±FE)	2018	307 (±87)	9 (±3)	17 (±3)	27 (±4)
53yr Climate Norm (±SD)	1965-2017	294 (±101)	9 (±3)	16 (±4)	26 (±4)
Forecast Skill at this Lead	1965-2017	26%	24%	14%	6%

Key: ACE Index = Accumulated Cyclone Energy Index = Sum of the Squares of 6-hourly Maximum Sustained Wind Speeds (in units of knots) for all Systems while they are at least Tropical Storm Strength. ACE Unit =  $\times 10^4$  knots<sup>2</sup>.

Intense Typhoon = 1 Minute Sustained Wind > 95Kts = Hurricane Category 3 to 5.

Typhoon = 1 Minute Sustained Wind > 63Kts = Hurricane Category 1 to 5.

Tropical Storm = 1 Minute Sustained Winds > 33Kts.

SD = Standard Deviation.

FE (Forecast Error) = Standard Deviation of Errors in Cross-Validated Hindcasts 1965-2017.

Forecast Skill = Percentage Improvement in Mean Square Error Afforded by Cross-Validated Hindcasts 1965-2017 over Hindcasts Made with the 1965-2017 Climate Norm.

Northwest Pacific = Northern Hemisphere Region West of 180°W Including the South China Sea. Any Tropical Cyclone (Irrespective of Where it Forms) Which Reaches Tropical Storm Strength Within this Region Counts as an Event.

There is a 43% probability that the 2018 NW Pacific typhoon season ACE index will be above-average (defined as an ACE index value in the upper tercile historically (>322)), a 36% likelihood it will be near-normal (defined as an ACE index value in the middle tercile historically (238 to 322)) and a 21% chance it will be below-normal (defined as an ACE index value in the lower tercile historically (<238)). The 53-year period 1965-2017 is used for climatology.

Key: Terciles = Data groupings of equal (33.3%) probability corresponding to the upper, middle and lower one-third of values historically (1965-2017).

## Predictors for 2018

The TSR predictors are as follows. Intense typhoon numbers and the ACE index are predicted from the forecast value for the August-September Niño 3.75 index. Tropical storm and typhoon numbers are forecast using an ensemble of two models: the Niño 3 SST from the prior September and the forecast number of intense typhoons in 2018.

The main factor behind the TSR forecast for a slightly above-normal Northwest Pacific typhoon season in 2018 is the small positive Niño 3.75 SST anomaly anticipated in August-September 2018. A positive Niño 3.75 SST is associated with weaker trade wind strength over the region 2.5°N-12.5°N, 120°E-180°E. This in turn leads to higher cyclonic vorticity over the Northwest Pacific region where intense typhoons form.

It should be stressed that sizeable uncertainties remain in the August-September ENSO forecast and thus in the seasonal typhoon forecast. The precision of TSR’s typhoon outlooks issued in early May is low.

## Further Information

For more information about the TSR forecasts and their verifications for Northwest Pacific typhoon activity please see [http://www.tropicalstormrisk.com/for\\_typh.html](http://www.tropicalstormrisk.com/for_typh.html). The next TSR forecast update for the 2018 Northwest Pacific typhoon season will be issued on the 6<sup>th</sup> July 2018.

## Appendix – Predictions from Previous Months

### a) Deterministic forecast

<b>NW Pacific ACE Index and System Numbers 2018</b>					
		ACE Index (x10 <sup>4</sup> knots <sup>2</sup> )	Intense Typhoons	Typhoons	Tropical Storms
Average Number (±SD) (1965-2017)		294 (±101)	9 (±3)	16 (±4)	26 (±4)
TSR Forecast (±FE)	11 May 2018	307 (±84)	9 (±3)	17 (±3)	27 (±4)

### b) Probabilistic forecast

<b>NW Pacific ACE Index 2018</b>				
		Tercile Probabilities		
		below normal	normal	above normal
Climatology 1965-2017		33.3	33.3	33.3
TSR Forecast	11 May 2018	21	36	43