August Forecast Update for Northwest Pacific Typhoon Activity in 2018

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Forecast Summary

TSR continues to predict the 2018 Northwest Pacific typhoon season will see activity slightly above the 1965-2017 norm.

TSR (Tropical Storm Risk) maintains its early-May and early-July forecasts and anticipates that Northwest Pacific typhoon activity in 2018 will either be close-too or slightly above the long-term norm. The forecast spans the period from 1st January to 31st December 2018 (95% of typhoons occur historically after 1st May) and employs data through to the end of July 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 two main predictors are 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 0.37±0.23°C warmer than normal (1965-2017 climatology), and the current year-to-date ACE index which is slightly above-average at 86x10^4 kt^2. Both these factors are slightly enhancing for seasonal Northwest Pacific typhoon activity.

NW Pacific ACE Index and System Numbers in 2018

		ACE Index	Intense Typhoons	Typhoons	Tropical Storms
TSR Forecast (±FE)	2018	319 (±72)	9 (±2)	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	50%	52%	25%	11%

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 = x10^4 $knots^2$.

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 48% 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 39% likelihood it will be near-normal (defined as an ACE index value in the middle tercile historically (238 to 322) and a 13% 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 and the current year-to-date ACE 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 factors behind the TSR forecast for a slightly above-normal Northwest Pacific typhoon season in 2018 are the small positive Niño 3.75 SST anomaly anticipated in August-September 2018 and the current year-to-date ACE index for the Northwest Pacific being slightly above norm. Both these factors are slightly enhancing for overall activity. 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 leads to higher cyclonic vorticity over the Northwest Pacific region where intense typhoons form; a factor that favours the occurrence of more typhoons.

Uncertainties remain in the seasonal typhoon forecast because variance exists in the level of typhoon activity possible from the same August-September climate factors and because there is still uncertainty in the August-September ENSO forecast. The hindcast precision of TSR's typhoon outlooks issued in early August for the 53-year period 1965-2017 is moderate-to-high for the ACE index and intense typhoon numbers, moderate for typhoon numbers, and low for tropical storm numbers.

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*. This is the final TSR forecast update for the 2018 Northwest Pacific typhoon season. An extended range outlook for the 2019 Northwest Pacific typhoon season will be issued in early May 2019.

Appendix – Predictions from Previous Months

a) Deterministic forecast

NW Pacific ACE Index and System Numbers 2018					
		ACE Index ($x10^4$ knots^2)	Intense Typhoons	Typhoons	Tropical Storms
Average Number (±SD) (1965-2017)		294 (±101)	9 (±3)	16 (±4)	26 (±4)
TSR Forecast (±FE)	7 August 2018	319 (±72)	9 (±2)	17 (±3)	27 (±4)
	6 July 2018	331 (±78)	10 (±2)	17 (±3)	27 (±4)
	11 May 2018	307 (±84)	9 (±3)	17 (±3)	27 (±4)

b) Probabilistic forecast

NW Pacific ACE Index 2018				
		Tercile Probabilities		
		Below normal	Normal	Above normal
Climatology 1965-2017		33.3	33.3	33.3
TSR Forecast	7 August 2018	13	39	48
	6 July 2018	11	34	55
	11 May 2018	21	36	43