July Forecast Update for Northwest Pacific Typhoon Activity in 2017

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Forecast Summary

TSR reduces its extended range outlook and anticipates the 2017 Northwest Pacific typhoon season will likely see activity below the 1965-2016 climate norm.

The TSR (Tropical Storm Risk) July forecast update anticipates the 2017 Northwest Pacific typhoon season will have activity 10-20% below the 1965-2015 norm. This is a sizeable decrease on our extended range outlook. The forecast spans the period from 1st January to 31st December 2017 (95% of typhoons occur historically after 1st May) and employs data through to the end of June 2017. 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. The TSR forecast has decreased since early May for three reasons: the anticipated development of El Niño has not happened, early season typhoon activity has not occurred and May-June trade wind strength is consisted with a below norm typhoon season.

The current ENSO conditions over the central and NW Pacific are unusual and uncertainties remain in the ENSO outlook. However, the development of an El Niño during the 2017 main typhoon season is now thought unlikely. Our prediction of a below norm activity season is supported by the absence of typhoon activity through the end of June (the nine years since 1965 when this has happened have subsequently all had an annual ACE which is below norm). Additionally the May-June 2017 trade wind speed for the region 2.5°N-12.5°N, 120°E-180°E which is moderately linked to ACE indicates a below-norm activity season. An updated forecast for Northwest Pacific seasonal typhoon activity will be issued in early August.

NW Pacific ACE Index and System Numbers in 2017

		ACE Index	Intense Typhoons	Typhoons	Tropical Storms
TSR Forecast (±FE)	2017	250 (±86)	7 (±2)	15 (±3)	25 (±4)
52yr Climate Norm (±SD)	1965-2016	297 (±101)	9 (±3)	16 (±4)	26 (±4)
Forecast Skill at this Lead	1965-2016	28%	40%	16%	4%

Key: ACE Index   = <u>A</u>ccumulated <u>C</u>yclone <u>E</u>nergy 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 = x10⁴ knots².

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 1965-2016.
Forecast Skill	=	Percentage Improvement in Mean Square Error Afforded by Cross-Validated Hindcasts 1965-2016 over Hindcasts Made with the 1965-2016 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 18% probability that the 2017 NW Pacific typhoon season ACE index will be above-average (defined as an ACE index value in the upper tercile historically (>328)), a 35% likelihood it will be near-normal (defined as an ACE index value in the middle tercile historically (243 to 328) and a 47% chance it will be below-normal (defined as an ACE index value in the lower tercile historically (<243)). The 52-year period 1965-2016 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 (1965-2016).

Predictors for 2017

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 2017. Our prediction of the August-September Niño 3.75 index includes the current (15th June 2017) consensus ENSO outlook for the August-September 2017 Niño 3.4 index issued by the International Research Institute for Climate and Society.

The TSR forecasts are weighted by the recent prior trade wind speed over the region 2.5^oN-12.5^oN, 120^oE-180^oE and by the observed typhoon activity up to the date of forecast issue. A stronger trade wind speed (as occurred in May-June 2017) leads to lower cyclonic vorticity and to fewer intense typhoons over the Northwest Pacific.

It should be stressed that sizeable uncertainties remain in the seasonal typhoon forecast for 2017.

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*. The final TSR forecast update for the 2017 Northwest Pacific typhoon season will be issued on the 7th August 2017.

Appendix – Predictions from Previous Months

a) Deterministic forecast

NW Pacific ACE Index and System Numbers 2017		ACE Index (x10⁴ knots²)	Intense Typhoons	Typhoons	Tropical Storms
Average Number (±SD) (1965-2016)		297 (±101)	9 (±3)	16 (±4)	26 (±4)
TSR Forecast (±FE)	6 July 2017	250 (±86)	7 (±2)	15 (±3)	25 (±4)
	5 May 2017	357 (±84)	10 (±3)	17 (±3)	27 (±4)

b) Probabilistic forecast

NW Pacific ACE Index 2017		Tercile Probabilities		
		below normal	normal	above normal
Climatology 1965-2016		33.3	33.3	33.3
TSR Forecast	6 July 2017	47	35	18
	5 May 2017	9	28	63