



Extended Range Forecast for Northwest Pacific Typhoon Activity in 2015

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Forecast Summary

TSR predicts the 2015 Northwest Pacific typhoon season will be the most active since 2004, with activity one standard deviation above the 1965-2014 climate norm. However, forecast uncertainties remain large.

The TSR (Tropical Storm Risk) extended range forecast for Northwest Pacific typhoon activity in 2015 anticipates a season with upper tercile activity to high probability. The forecast spans the period from 1st January to 31st December 2015 (95% of typhoons occur historically after 1st May) and employs data through to the end of April 2015. 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 1.0±0.5°C warmer than normal. Sizeable uncertainties remain in the ENSO forecast but a very warm Niño 3.75 SST would have a strong enhancing effect on typhoon activity. The prediction of an active typhoon season is supported by the current ACE Index (through 5th May) being the second highest since reliable records began in 1965. Updated forecasts will be issued in early July and early August.

NW Pacific ACE Index and System Numbers in 2015

		ACE Index	Intense Typhoons	Typhoons	Tropical Storms
TSR Forecast (±FE)	2015	400 (±87)	11 (±3)	17 (±3)	27 (±4)
50yr Climate Norm (±SD)	1965-2014	294 (±103)	8 (±3)	16 (±4)	26 (±5)
Forecast Skill at this Lead	1965-2014	28%	22%	14%	13%

- 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 = 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 1965-2014.
Forecast Skill = Percentage Improvement in Mean Square Error Afforded by Cross-Validated Hindcasts 1965-2014 over Hindcasts Made with the 1965-2014 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 81% probability that the 2015 NW Pacific typhoon season ACE index will be above-average (defined as an ACE index value in the upper tercile historically (>322)), a 16% likelihood it will be near-normal (defined as an ACE index value in the middle tercile historically (238 to 322) and only a 3% chance it will be below-normal (defined as an ACE index value in the lower tercile historically (<238)). The 50-year period 1965-2014 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 (1965-2014).

Predictors for 2015

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 2015.

The main factor behind the TSR forecast for an active Northwest Pacific typhoon season in 2015 is the moderate positive Niño 3.75 SST anomaly anticipated in August-September 2015. Above-average (below-average) Niño 3.75 SST is associated with weaker (stronger) trade winds over the region 2.5°N-12.5°N, 120°E-180°E. These in turn lead to enhanced (reduced) 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. Indeed the precision of TSR’s typhoon outlooks issued in early May is low. However, the expectation of an active 2015 Northwest Pacific typhoon season is supported by the current ACE Index (through 5th May). Its value of 52 is the highest since 1971 and is over three times the climatological ACE value through 5th May. Six of the nine years which recorded an ACE of at least 30 through the 5th May subsequently recorded an annual ACE of at least 350.

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 next TSR forecast update for the 2015 Northwest Pacific typhoon season will be issued on the 7th July 2015.

Appendix – Predictions from Previous Months

a) Deterministic forecast

NW Pacific ACE Index and System Numbers 2015					
		ACE Index (x10 ⁴ knots ²)	Intense Typhoons	Typhoons	Tropical Storms
Average Number (±SD) (1965-2014)		294 (±103)	8 (±3)	16 (±4)	26 (±5)
TSR Forecast (±FE)	6 May 2015	400 (±87)	11 (±3)	17 (±3)	27 (±4)

b) Probabilistic forecast

NW Pacific ACE Index 2015				
		Tercile Probabilities		
		below normal	normal	above normal
Climatology 1965-2014		33.3	33.3	33.3
TSR Forecast	6 May 2015	3	16	81