



# August Forecast Update for Northwest Pacific Typhoon Activity in 2009

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## Forecast Summary

**TSR continues to anticipate the 2009 Northwest Pacific typhoon season will see activity about 20% above-the 1965-2008 norm**

The TSR (Tropical Storm Risk) August forecast update for Northwest Pacific typhoon activity in 2009 continues to anticipate a season with slightly above-norm activity. The forecast spans the full Northwest Pacific season from 1st January to 31st December 2009 (95% of typhoons historically occur after 1st May) and is based on data available through the end of July 2009. The forecast includes deterministic and probabilistic projections for overall basin activity, and deterministic projections for the numbers of tropical storms, typhoons, intense typhoons and the ACE index. TSR's main predictor at this lead for overall activity is the forecast anomaly in August-September 2009 Niño 3.75 sea surface temperature (SST). We anticipate this will be  $0.67 \pm 0.21^\circ\text{C}$  warmer than normal.

## NW Pacific ACE Index and System Numbers in 2009

		ACE Index	Intense Typhoons	Typhoons	Tropical Storms
TSR Forecast ( $\pm$ FE)	2009	367 ( $\pm$ 77)	10.6 ( $\pm$ 2.4)	18.2 ( $\pm$ 2.9)	28.1 ( $\pm$ 3.8)
44yr Climate Norm ( $\pm$ SD)	1965-2008	300 ( $\pm$ 98)	8.6 ( $\pm$ 3.0)	16.7 ( $\pm$ 3.6)	26.6 ( $\pm$ 4.3)
Forecast Skill at this Lead	1965-2008	38%	34%	33%	21%

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 Wind > 33Kts		
SD	=	Standard Deviation		
FE (Forecast Error)	=	Standard Deviation of Errors in Simulated Real Time Forecasts 1965-2008		
Forecast Skill	=	Percentage Reduction in Mean Square Error Afforded by Cross-Validated Hindcasts 1965-2008 over Hindcasts Made with the 1965-2008 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 62% probability that the 2009 Northwest Pacific typhoon season ACE index will be above average (defined as an ACE index value in the upper tercile historically ( $>342$ )), a 33% likelihood it will be near-normal (defined as an ACE index value in the middle tercile historically (238 to 342)) and only a 5% chance it will be below-normal (defined as an ACE index value in the lower tercile historically ( $<238$ )). The 44-year period 1965-2008 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 (1965-2008).

## Key Predictors for 2009

Following a review of seasonal predictability for the extended 1965-2008 period of reliable data, the TSR predictors are as follows. Tropical storm and typhoon numbers are forecast before May using the Niño 3 sea surface temperature (SST) from the prior September; from May they are forecast using an ensemble of two models. These are (1) the April surface pressure over the region 17.5°N-35°N, 160°E-175°W; (2) the TSR forecast number of intense typhoons in 2009. Intense typhoon numbers and the ACE index are forecast in March and April using the February surface pressure in the central northern tropical Pacific region 10°N-20°N, 145°W-165°W; from May they are forecast from the forecast value for the August-September Niño 3.75 index (5°S-5°N, 140°W-180°W). Above average (below average) Niño 3.75 SSTs are 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.

## Further Information

Further information about the TSR forecasts, verifications and hindcast skill as a function of lead time may be obtained from the TSR website (<http://tropicalstormrisk.com>). This is the final TSR monthly forecast update for the 2009 Northwest Pacific typhoon season. A summary of the 2009 Northwest Pacific typhoon season and verification of the TSR seasonal forecasts will be issued in early January 2010.

## Appendix - Predictions from Previous Months

### a) Deterministic forecasts

<b>NW Pacific ACE Index and System Numbers 2009</b>					
		ACE Index ( $\times 10^4$ knots <sup>2</sup> )	Intense Typhoons	Typhoons	Tropical Storms
Average Number ( $\pm$ SD) (1965-2008)		300 ( $\pm$ 98)	8.6 ( $\pm$ 3.0)	16.7 ( $\pm$ 3.6)	26.6 ( $\pm$ 4.3)
TSR Forecasts ( $\pm$ FE)	4th Aug 2009	367 ( $\pm$ 77)	10.6 ( $\pm$ 2.4)	18.2 ( $\pm$ 2.9)	28.1 ( $\pm$ 3.8)
	6th Jul 2009	359 ( $\pm$ 83)	10.3 ( $\pm$ 2.4)	18.1 ( $\pm$ 3.0)	28.0 ( $\pm$ 3.9)
	7th May 2009	319 ( $\pm$ 80)	9.1 ( $\pm$ 2.5)	17.6 ( $\pm$ 3.0)	27.5 ( $\pm$ 3.8)
	16th Mar 2009	247 ( $\pm$ 89)	6.7 ( $\pm$ 2.6)	16.0 ( $\pm$ 3.4)	25.6 ( $\pm$ 3.9)
Chan Forecasts	24th Jun 2009	-	-	19	27
	18th Apr 2009	-	-	18	27

### b) Probabilistic forecasts

<b>NW Pacific Total ACE Index 2009</b>				
		Tercile Probabilities		
		below normal	normal	above normal
Climatology 1965-2008		33.3	33.3	33.3
TSR Forecasts	4th Aug 2009	5	33	62
	6th Jul 2009	7	35	58
	7th May 2009	16	46	38
	16th Mar 2009	46	40	14

