



July Forecast Update for Northwest Pacific Typhoon Activity in 2012

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by Dr Adam Lea and Professor Mark Saunders
 Dept. of Space and Climate Physics, UCL (University College London), UK

Forecast Summary

TSR raises its forecast and anticipates the 2012 Northwest Pacific typhoon season will see activity about 10% above the 1965-2011 climate norm.

The TSR (Tropical Storm Risk) July forecast update for Northwest Pacific typhoon activity in 2012 anticipates a season with activity 10% above-norm. The forecast spans the full Northwest Pacific season from 1st January to 31st December 2012 (95% of typhoons occur historically after 1st May) and is based on data available through to the end of June 2012. 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 at this lead for overall activity is the forecast anomaly in August-September 2012 Niño 3.75 sea surface temperature (SST). We anticipate this will be $0.27 \pm 0.51^\circ\text{C}$ warmer than normal. Updated forecasts will be issued in early August. The reason for the increase in forecast NW Pacific typhoon activity since early May is because Niño 3.75 sea surface temperatures are expected to be warmer than thought previously.

NW Pacific ACE Index and System Numbers in 2012

| | | ACE Index | Intense Typhoons | Typhoons | Tropical Storms |
|-------------------------------|-----------|------------------|---------------------|-------------------|--------------------|
| TSR Forecast (\pm FE) | 2012 | 324 (\pm 90) | 9.2 (\pm 2.4) | 16.7 (\pm 3.4) | 26.8 (\pm 4.2) |
| 47yr Climate Norm (\pm SD) | 1965-2011 | 295 (\pm 106) | 8.4 (\pm 3.0) | 16.3 (\pm 3.8) | 26.2 (\pm 4.6) |
| Forecast Skill at this Lead | 1965-2011 | 27% | 36% | 21% | 16% |

- 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 = $\times 10^4$ 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 1965-2011.
 Forecast Skill = Percentage Improvement in Mean Square Error Afforded by Cross-Validated Hindcasts 1965-2011 over Hindcasts Made with the 1965-2011 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 45% probability that the 2012 NW Pacific typhoon season ACE index will be above-average (defined as an ACE index value in the upper tercile historically (>336)), a 39% likelihood it will be near-normal (defined as an ACE index value in the middle tercile historically (235 to 336) and a 16% chance it will be below-normal (defined as an ACE index value in the lower tercile historically (<235)). The 47-year period 1965-2011 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 (1965-2011).

Predictors for 2012

The TSR predictors are as follows. Tropical storm and typhoon numbers are forecast using an ensemble of two models: the Niño 3 sea surface temperature (SST) from the prior September and the forecast number of intense typhoons in 2012. Intense typhoon numbers and the ACE index are forecast before May using an ensemble of two models: the February surface pressure in the central northern tropical Pacific region 10°N-20°N, 145°W-165°W and the forecast value for the August-September Niño 3.75 index (5°S-5°N, 140°W-180°W). From May intense typhoon numbers, and the ACE index are predicted from the forecast value for the August-September Niño 3.75 index.

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 TSR forecasts, verifications and hindcast skill as a function of lead time may be obtained from the TSR web site (<http://www.tropicalstormrisk.com>). The final TSR forecast update for the 2012 Northwest Pacific typhoon season will be issued on the 6th August 2012.

Appendix – Predictions from Previous Months

a) Deterministic forecast

| NW Pacific ACE Index and System Numbers 2012 | | | | | |
|---|-------------|---|---------------------|-------------|--------------------|
| | | ACE Index (x10 ⁴ knots ²) | Intense Typhoons | Typhoons | Tropical Storms |
| Average Number (±SD) (1965-2011) | | 295 (±106) | 8.4 (±3.0) | 16.3 (±3.8) | 26.2 (±4.6) |
| TSR Forecasts (±FE) | 9 Jul 2012 | 324 (±90) | 9.2 (±2.4) | 16.7 (±3.4) | 26.8 (±4.2) |
| | 4 May 2012 | 300 (±88) | 8.5 (±2.6) | 15.6 (±3.5) | 25.5 (±4.6) |
| | 13 Apr 2012 | 262 (±96) | 7.3 (±2.7) | 15.6 (±3.5) | 25.5 (±4.6) |
| Shanghai Typhoon Institute | 26 Apr 2012 | - | - | - | 22-24 |

b) Probabilistic forecast

| NW Pacific ACE Index 2012 | | | | |
|----------------------------------|-------------|-----------------------|--------|--------------|
| | | Tercile Probabilities | | |
| | | below normal | normal | above normal |
| Climatology 1965-2011 | | 33.3 | 33.3 | 33.3 |
| TSR Forecasts | 9 Jul 2012 | 16 | 39 | 45 |
| | 4 May 2012 | 23 | 43 | 34 |
| | 13 Apr 2012 | 40 | 38 | 22 |

