

Updated 2011 Predictions of

- (1) Seasonal Tropical Cyclone Activity over the Western North Pacific,**
- (2) Number of Tropical Cyclones Making Landfall in South China, and**
- (3) Number of Tropical cyclones Affecting Korea and Japan**

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1. Introduction

This is an update of the predictions of the annual number of tropical cyclones (TCs) in the western North Pacific (WNP) and the number of TCs making landfall in South China and the Korea and Japan region (KJ) for 2011 that we issued on 09 May 2011. These updates are made based on new information for the months of April and May 2011.

Table 1. Summary of model forecasts extracted from the Australian Bureau of Meteorology homepage¹.

MODEL / GROUP	1-3 MONTHS (May to Jul)	5-7 MONTHS (Aug to Oct)
POAMA (Australian Bureau of Met.)	Neutral	Neutral/Warm
System 3 ECMWF (EU)	Neutral	Neutral
GloSea UK Met. Office	Neutral	Neutral
CSF NCEP (US)	Neutral	Neutral
CGCMv1 NASA Goddard GMAO (US)	Warm	Warm/Neutral
JMA-CGCM02 Japan Met. Agency	Neutral/Warm	Neutral/Warm
KMA-SNU Korean Met. Administration	Neutral	Neutral

2. ENSO conditions in 2011

The La Niña event developed in 2010 has dissipated and the oceanic and atmospheric conditions in the Pacific are now in neutral status. The Niño3.4 and Niño4 indices in May are -0.45 and -0.53 respectively. The warming of the central and east equatorial Pacific Ocean is expected to continue into the summer. A summary of the various ENSO model forecasts from different climate centres suggests that most of them predict a neutral condition in 4 to 6 months time (Table 1). In other words, 2011 will most likely be an ENSO-neutral year.

3. Predictions for the WNP

No significant change is found on the predicted total number of TCs (Table 2). All the predictors give numbers similar to those in the April forecast and therefore the final predicted number is 31.

For the number of tropical storms and typhoons, the prediction from the index of the strength of the India-Burma trough gives a decrease in TC number (from 28 to 27). No change occurs using other predictors. With this small change, the final predicted number is therefore still 27 (Fig. 1).

For the number of typhoons, the prediction from the west Pacific index gives a decrease in TC number (from 18 to 17). A greater decrease, from 19 to 17, occurs using the index of the strength of the India-Burma trough. No change occurs using the ENSO predictors and the final predicted number therefore decreases from 16 to 15.

With these changes, it is expected that the overall TC activity and the number of tropical storms and typhoons are likely to be near-normal and the number of typhoons is likely to be slightly below normal.

As 2011 is a year with a moderate La Niña event in the preceding year and will most likely be an ENSO-neutral year as suggested in section 2, it is useful to discuss the TC activity in a year after a La Niña event and becoming neutral. During the past five decades,

¹ <http://www.bom.gov.au/climate/ahead/ENSO-summary.shtml>

the TC activity exhibited a significant interdecadal variation, with the active periods of 1960-76 and 1989-97 and the inactive periods of 1977-1988 and 1998-2010 (Fig. 1). The variations of the TC activity are quite different in the active and inactive periods (Table 3). Since the inactive TC period 1998–2010 will likely to continue into 2011, it is more appropriate to discuss the TC activity in the inactive periods. All the 3 years are associated with near-normal number of tropical storms and typhoons (Table 3), which is consistent with our forecast. However, the variations are quite large for the number of typhoons, with below-normal, normal as well as above-normal TC numbers. Our prediction for the number of typhoons therefore has the larger spread (see Table 2) and thus the lower predictability.

Table 2. Forecasts from various predictors and the weighted average of the forecasts issued in (a) April and (b) June.

(a) April Forecast

All TC		
Predictor	Prediction	Weight
HIB	31	0.68
NINO4	31	0.73
Final forecast	31	
Normal	31	

Tropical storms and typhoons		
Predictor	Prediction	Weight
HIB	28	0.67
WP	27	0.58
NINO3.4	27	0.66
Final forecast	27	
Normal	27	

Typhoons		
Predictor	Prediction	Weight
HIB	19	0.57
WP	18	0.59
NINO3.4	14	0.77
ESOI	15	0.66
Final forecast	16	
Normal	17	

(b) June Forecast

All TC		
Predictor	Prediction	Weight
HIB	31	0.68
NINO4	31	0.73
Final forecast	31	
Normal	31	

Tropical storms and typhoons		
Predictor	Prediction	Weight
HIB	27	0.71
WP	27	0.59
NINO3.4	27	0.66
Final forecast	27	
Normal	27	

Typhoons		
Predictor	Prediction	Weight
HIB	17	0.59
WP	17	0.61
NINO3.4	14	0.77
ESOI	15	0.66
Final forecast	15	
Normal	17	

HIB	Index of the strength of the India-Burma trough (15°-20°N, 80°-120°E)
WP	Primary mode of low-frequency variability over the North Pacific
NINO3.4	Sea surface temperature (SST) anomalies in the NINO3.4 region (5°S-5°N, 170°-120°W)
NINO4	Sea surface temperature (SST) anomalies in the NINO4 region (5°S-5°N, 160°E-150°W)
ESOI	Equatorial Southern Oscillation Index (Equatorial SOI) Equatorial Eastern Pacific SLP - Indonesia SLP (standardized anomalies)

Fig. 1. Time series of the annual number of tropical storms and typhoons. Red circle and blue squares indicate the El Niño and La Niña years respectively. The green triangle indicated the predicted number in 2011. The thick horizontal line indicates the normal number of tropical storms and typhoons. The green vertical lines divide the years 1960-2010 into the active and inactive periods.

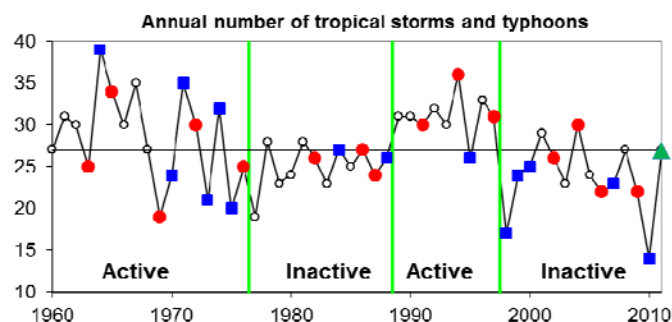


Table 3. Number of tropical storms and typhoons and number of typhoons during the years after La Niña events and becoming neutral. Green and blue shadings indicate the above-normal and below-normal TC activity respectively.

		No. of tropical storms and typhoons	No. of typhoons
Active period	1989	31	21
	1996	33	21
Inactive period	1985	25	17
	2001	29	20
	2008	27	12

Table 4. Summary of all forecasts.

	Forecast	Normal
Entire western North Pacific		
All TC	31 (normal)	31
Tropical storms and typhoons	27 (normal)	27
Typhoons	15 (slightly below normal)	17
No. of landfalling TCs over South China		
Main season (Jul to Dec)	7 (above normal)	4
No. of TCs affecting Korea and Japan		
Main season (Jul to Dec)	7 (above normal)	3

4. Predictions for the number of landfalling TCs over South China

Considering the newest information, the predicted number of landfalling tropical cyclones along the South China coast in the main season (July to December) is 7, which is above the normal value of 4 (Table 4).

As mentioned in the April forecast, TC activity in the South China Sea (Chan 2000) and chances of TCs making landfall along the South China coast (Liu and Chan 2003) is enhanced in the year after a La Niña event. Since the current La Niña episode, albeit weakening, is still continuing, its effect might be extended into the latter part of the TC season.

5. Predictions for the number of TCs affecting Korea and Japan

The June prediction suggests an above-normal number of TCs affecting Korea and Japan in the main season (July to December). The predicted number is 7, higher than the normal value of 3 (Table 4).

Referring to the April forecast, an increased number of TCs tends to affect KJ in the year after a La Niña event. This could be due to the enhanced TC activity in the whole Western North Pacific basin in such years, as suggested by Chan (2000).

References

Chan, J. C. L., 2000: Tropical Cyclone Activity over the Western North Pacific Associated with El Niño and La Niña Events. *Journal of Climate*, **13**, 2960–2972.

Liu, K. S. and J. C. L. Chan, 2003: Climatological characteristics and seasonal forecasting of tropical cyclones making landfall along the South China coast. *Monthly Weather Review*, **131**, 1650–1662.