



Predictions of Tropical Cyclone Activity over the Western North Pacific for the 2008 Season

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1. Introduction

Since 2000, the Laboratory for Atmospheric Research at City University of Hong Kong has been issuing real-time predictions of the annual number of tropical cyclones (TCs) affecting the western North Pacific (WNP) and the South China Sea. Verifications of the predictions have shown that the predictions are mostly correct within the error bars. Beginning in 2008, these forecasts will be issued by the Guy Carpenter Asia-Pacific Climate Impact Centre.

These are all statistical predictions with predictors drawn from a large group of indices that represent the atmospheric and oceanographic conditions in the previous year up to the spring of the current year. The most prominent ones include the proxies for El Niño/Southern Oscillation (ENSO), the extent of the subtropical ridge, and the intensity of the India-Burma trough. Details can be found in Chan et al. (1998, 2001) and Liu and Chan (2003).

2. ENSO conditions in 2008

As an important determinant is the status of the ENSO condition, it is useful to have a discussion on the possible ENSO situation in 2008. A strong La Niña event has developed in 2007 and shows a sign of weakening in the recent month. In March, SSTs remain colder than normal in the central equatorial Pacific but become warmer than normal in the far eastern equatorial Pacific. A summary of the various ENSO model forecasts from different climate centres suggests that most of them predict a neutral condition in 5 to 7 months time¹. Out of the 6 forecasts, 5 suggest that the ENSO will return to its neutral condition during the summer. Based on these results, it appears that 2008 will likely be an ENSO-neutral year.

3. The predictions for 2008

The ENSO predictor (NINO4 index) suggests a near-normal overall TC activity while the other predictors give an above-normal activity (Table 1). The final forecast is therefore for a slightly above-normal overall TC activity.

For the number of tropical storms and typhoons, all the predictors forecast a slightly above-normal or above-normal activity (ranging from 28 to 31). Therefore, an above-normal activity (30 tropical storms and typhoons) is expected for this category.

Similar forecast is obtained for the number of typhoons. The predicted numbers range from 18 to 20 and the final forecast is 19 typhoons, which is slightly higher than the normal number.

Thus, it is expected that the overall TC activity, the number of tropical storms and typhoons as well as the number of typhoons are likely to be slightly above-normal or above-normal².

Summary of Predictions

	Forecast	Normal
All TC	33 (slightly above-normal)	31
Tropical storms and typhoons	30 (above-normal)	27
Typhoons	19 (slightly above-normal)	17

As pointed out in section 2, 2008 is a year after a strong La Niña event. Therefore, it is useful to discuss the TC activity in a year after a La Niña event. Out of the 12 such years, 6 are associated with above-normal TC activity and the TC activity is normal in 4 years (Table 1, see also Fig. 1). The two years (1975 and 99) with below-normal TC activity are found in the years in which the La Niña event developed in the previous year persisted into the TC season. Therefore, the 2008 TC season will likely to be normal or above normal, which is consistent with our forecast.

The predictor related to the subtropical high suggests an above-normal TC activity. Such forecasts are consistent with the weaker-than-normal subtropical high over the western part of the WNP observed between February and March in 2008 (Fig. 2). This is the first time since 2001 that the subtropical high during these two months is weaker than normal². Even for 2001, which is actually a year after the persistent La Niña event of 1998-2000, only the region over the South China Sea has below-normal geopotential heights. In other words, if the subtropical high in this early season is an indication of TC activity for the summer, it is highly likely that TC activity is above normal in 2008.

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

² For details, please see http://weather.cityu.edu.hk/tc_forecast/2008_forecast_APR.htm



Table 1. Number of tropical storms and typhoons and number of typhoons during the years after La Niña events. Green and blue shadings indicate the above-normal and below-normal TC activity respectively.

	No. of tropical storms and typhoons	No. of typhoons	ENSO status
1965	34	21	El Niño
1972	30	22	
1976	25	14	
1971	35	24	La Niña
1974	32	15	
1975	20	14	
1999	24	12	
2000	25	15	
1985	25	17	Neutral
1989	31	21	
1996	33	21	
2001	29	21	

It might also be noted that this predicted above-normal activity is consistent with the results of Chan (2000) for the TC activity in a year after a La Niña year (Fig. 3). Most of the western North Pacific has positive anomalies in his composite study. The pattern also suggests perhaps more TCs are likely to make landfall in the southern part of East Asia (Philippines, Vietnam and South China).

As discussed in Chan et al. (2001), we will provide an updated forecast sometime in late June.

References

- Chan, J. C. L., J. E. Shi and C. M. Lam, 1998: Seasonal forecasting of tropical cyclone activity over the Western North Pacific and the South China Sea. *Weather Forecasting*, 13, 997-1004.
- Chan, J. C. L., J. E. Shi and K. S. Liu, 2001: Improvements in the seasonal forecasting of tropical cyclone activity over the western North Pacific. *Weather Forecasting*, 16, 491-498.
- 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.

Fig. 1. Time series of the annual number of tropical storms and typhoon. Red circles and blue squares indicate the El Niño and La Niña years respectively. The green triangle indicated the predicted number in 2008.

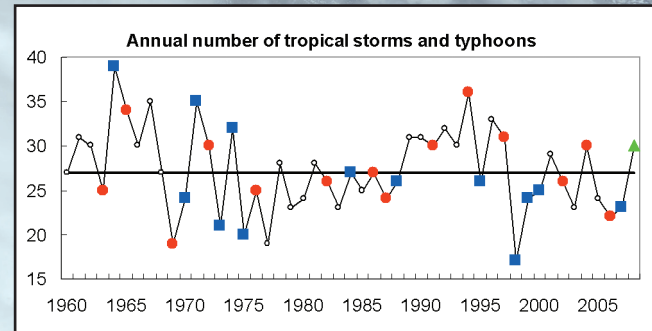


Fig. 2. 500-hPa geopotential height anomalies between February and March in 2008. Thick contour indicates the geopotential height (contour interval = 10 m) \geq 5860 m.

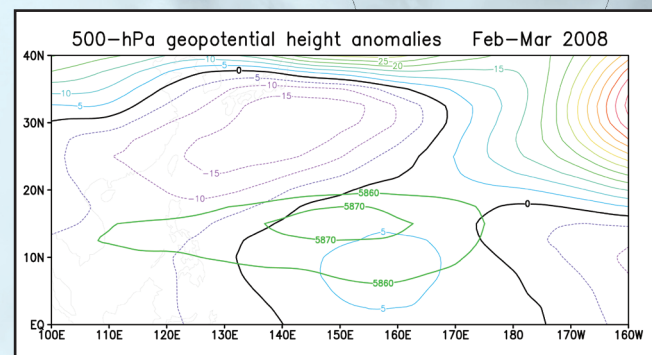


Fig. 3. Composite annual TC activity anomaly during the year after a La Niña event (from Chan 2000). The pink and blue shadings indicate that the anomalies are significant at the 95% and 90% confidence levels respectively.

