

Updated forecasts of the number of tropical cyclones making landfall in (1) South China and (2) the Korea-Japan region in 2010

27 July 2010

1. South China

This is an update of the forecast for the number of tropical cyclone making landfall in South China made in April 2010, using newest information from April and May.

Earlier in the year, various climate centres predicted that neutral El Niño/Southern Oscillation (ENSO) conditions will prevail during the latter half of this year. However, the most current forecast models are suggesting that La Niña conditions would very likely occur for the remainder of this year.

Table 1. Comparison of TCs making landfall along the South China coast (SC) and affecting the KJ region in EN+1 years. Years marked with an asterisk(*) are La Niña years. Green indicates the number is above normal, while blue indicates below normal.

Year	SC main season	KJ main season
1966	4	7
1969	2	2
1973*	9	1
1977	3	1
1978	4	4
1983*	4	4
1987	0	3
1988*	5	0
1992	4	3
1995*	8	2
1998*	1	6
2003	4	2
2005*	3	3
2007*	3	4

With this new information, the prediction made in June now calls for a below-normal number of landfalling TCs along the South China coast (N_{SC}) for the main season (July to December). The predicted number is 3, which is slightly lower than the normal value of 4.

Table 1 shows the number of TCs making landfall on the South China coast in the main season after an El Niño year (EN+1 year). It can be seen that the number tends to be normal to below normal (5 and 6 out of the 14 cases respectively). Specifically, in the three most recent cases in which the EN+1 year is a La Niña year (1998, 2005, and 2007), N_{SC} tends to be below normal. A study of the 500-hPa zonal wind pattern in the peak season (July, August, and September) reveals that the anomalous easterlies found over the South China Sea (SCS) during the earlier cases (1973, 1988, and 1995) (Fig. 1a) has become anomalous westerlies in the three recent cases (Fig. 1b). This could be the reason for the decreased N_{SC} , as the flow has changed from steering TCs into the SCS to one that prohibits TCs from entering SCS.

Figure 2 shows the difference between the 500-hPa zonal wind pattern in 2010 and the average EN+1 year during the months of March, April, and May. It can be seen that anomalous westerlies are present over the SCS in the current year, and this anomaly has been continuing since early May (Fig. 3). If this situation continues, it is very possible that N_{SC} would be below normal during the main season.

Fig. 1. 500-hPa zonal wind anomaly (Unit: ms^{-1}) in the peak season for the (a) earlier cases and (b) recent cases.

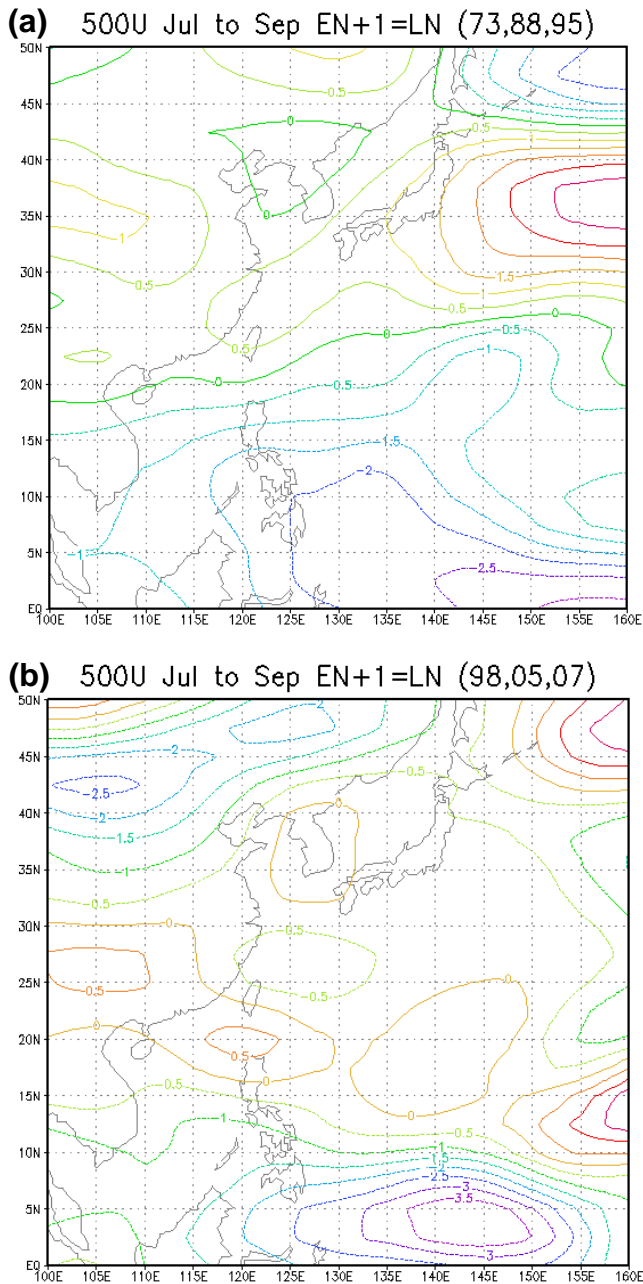


Fig. 2. March to May 500-hPa zonal wind difference (Unit: ms^{-1}) between 2010 and the average EN+1 year.

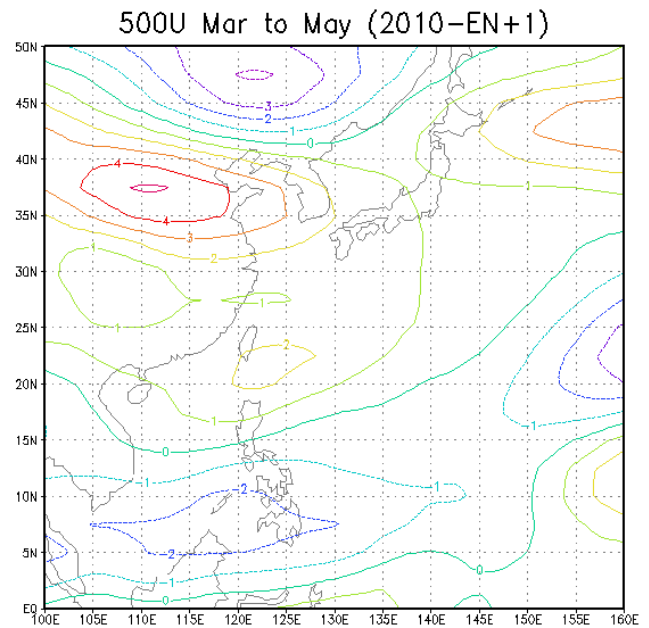
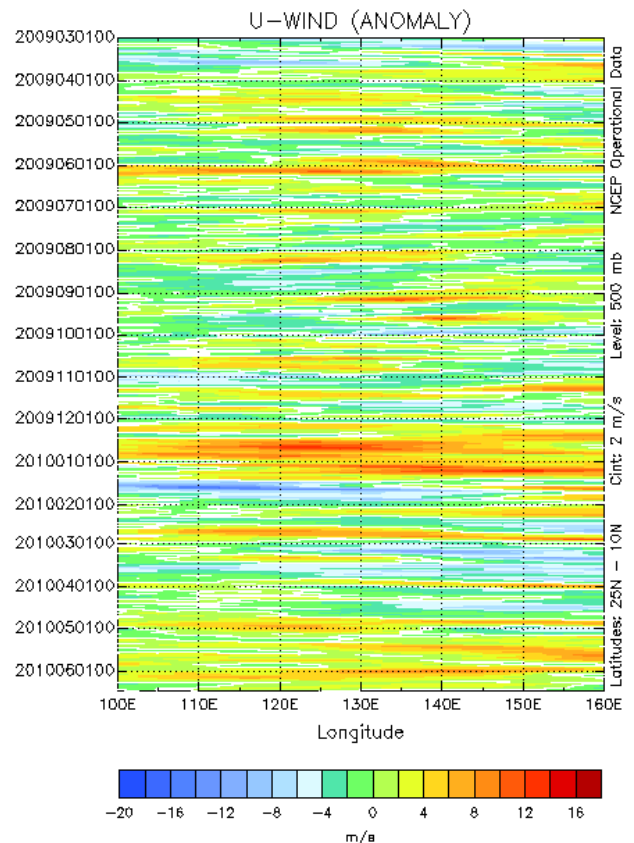


Fig. 3. Time-longitude section plot of 500-hPa zonal wind anomalies from March 2009 to mid-June 2010 over the western north Pacific (between 10°N and 25°N , 100°E and 160°E .) (Image provided by the NOAA/ESRL Physical Sciences Division, Boulder Colorado from their Web site at [http://www.esrl.noaa.gov/psd/.](http://www.esrl.noaa.gov/psd/))



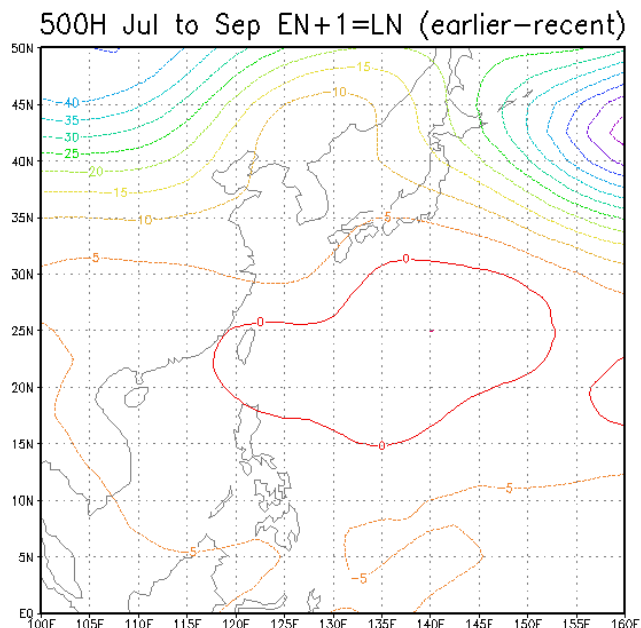
2. Korea and Japan (KJ)

The June prediction continues to suggest a slightly above-normal number of TCs affecting Korea and Japan (N_{KJ}) in the main season. The predicted number is **4**, slightly higher than the normal value of 3.

The results from Goh and Chan (2010) suggested no significant pattern for N_{KJ} in an EN+1 year. In fact, of the 14 cases of EN+1, 6 show below normal N_{KJ} , while 6 are normal. However, as in the case of N_{KJ} , if EN+1 years that are La Niña years are singled out, it can be seen that the earlier cases tend to be below normal, while the recent three cases tend to be normal or above normal (Table 1).

Figure 4 shows that the difference between the earlier and recent cases of the 500-hPa geopotential height is positive over much of the western North Pacific during the peak season, suggesting that the geopotential height anomaly has become lower. It can be inferred that in the recent cases, the flow over this area has at least become less northerly, which increases the chance of TCs being able to be steered towards Japan. In addition, the 500-hPa zonal wind pattern reveals that in the earlier cases, anomalous easterlies are present south of 25°N, steering TCs westwards (Fig. 1a), while in the recent cases, anomalous easterlies can be found over much of the western North Pacific (Fig. 1b). The combination of the height and zonal wind anomalies would suggest the presence of anomalous southeasterlies over the western North Pacific, steering TCs towards Japan and leading to increased N_{KJ} in the recent cases.

Fig.4. Difference between the 500-hPa geopotential height (Unit: gpm) in the earlier and recent cases during the peak season.



3. Summary of predictions

The number of landfalling TCs along the South China coast and affecting the Korea-Japan region is shown in Table 2.

Table 2. Summary of forecasts for TCs making landfall along the coast of South China, and those affecting Korea and Japan.

	<i>Predicted</i>	<i>Normal</i>
South China		
Main season (Jul-Dec)	3 <i>(slightly below normal)</i>	4
Korea-Japan		
Main season (Jul-Dec)	4 <i>(slightly above normal)</i>	3

References

Goh, A. Z. C., and J. C. L. Chan, 2010: Variations and prediction of the annual number of tropical cyclones affecting Korea and Japan. Submitted to *International Journal of Climatology*.