

Tropical cyclone formations over the South China Sea during late season

Yung-Lan Lin and Cheng-Shang Lee

Department of Atmospheric Sciences, National Taiwan University

Abstract

In past 34 years, there are almost thousand tropical cyclone (TC) formations in the western-North Pacific (WNP). A total of 131 TC formations in the South China Sea (SCS) occurred during 1972–2005 with an annual average of 3.85. Almost no formations occur in the SCS from January to March, but the number increases rapidly to 18.3% (of the total number of formations in the SCS) during May and June, which indicates that the two months of the mei-yu season are particularly favorable for TC formations in the SCS (Lee et al. 2006). Furthermore the percentage of formations in the SCS during November and December is relatively larger (16%).

Chang et al. (1979) showed that the northeasterly cold surge off the Asia continent lead to intensify the convective disturbances in the near equatorial region. These disturbances which may have originated from the semi-stationary near-equatorial trough over the coast of North Borneo or from a westward propagating wave in the WNP to be intensify to a TC.

Preliminary analyses show that there are 22 TC formations over the SCS during late season (November to January) from 1972-2005. 12 of these storms are originated from the southern SCS (the semi-stationary case) and the others are associated with westward propagating wave (the westward case) in the WNP. The composites of the westward case show that the northeasterlies north of disturbance is more persistent than the semi-stationary case, therefore the 925-hPa relative vorticity of the westward case is greater. Applications of an all-season real-time multivariate MJO index (Wheeler and Hendon 2004), about two-third of formation cases occurred during active MJO signal which was over the maritime continent. However the 925-hPa relative vorticity of the formation cases without the MJO signal are greater and have persistent northeasterlies north of the system. For this reason, the formation cases associated with the significant MJO signal need more development time to intensify a tropical storm, even could only maintain the intensity of tropical depression. The result is possibly associated with the frequency of Borneo vortex which is reduced during periods when the MJO is present (Chang et al. 2005).