還待進一步的診斷研究 (diagnostic study) 才能定論。

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6. 參 考 資 料

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An Equivalent Barotropic Model and Its Forecast Errors in the Area of Taiwan and Its Vicinity

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Abstract

Numerical method for an equivalent barotropic model which includes grid structure, topography, finite difference equation, boundary conditions, data analysis and smoothing methods; are presented.

Three cases have been selected for the study of the limited-area

equivalent barotropic model. Case A predicts the movements of 500mb troughs and ridges related to cold-air outbreak in Taiwan. Case B also predicts the movements of troughs and ridges related to cold-air outbreak. The trough in this case moved afer the cut-off low system opened up. Case C studies the movement of a trough in the eastern slope of Tibetan Plateau. Generally, movements of troughs and ridges in 24 hours were well predicted by the equivalent barotropic model. However, several systematic errors are apparently presented in the predictions after 36 hours. The most serious error is the unrealistic southward movement of a positive vorticity center during a trough passes over the northeastern part of Tibetan Plateau. As a result, an unrealistic low system is separated from the main trough and stays in Southeast Mainland. The error is suspected as the result of the model without considering the blocking, deflecting and frictional effect of Tibetan Plateau. Another systematic error is the displacement of forecast trough being fast in the north and slow in the south. The error may comes from the beta-plane approximation in assuming the Coriolis parameter being constant. The geostrophic wind computed by this assumption is larger in the north and smaller in the south than its real value. The equivalent barotropic model did not predict the open up of cut-off low in case B but well predicted its movement after it opened up. The error is suspected partly due to the equivalent barotropic model being unable to predict the intensification, but mainly due to the scales of the initial low pressure centers being small and not able to be observed correctly by the model.

In the period of case C, a surface cyclone is formed and developed in Central East China. Synoptic analysis suggests that the formation of the cyclone is initiated by the positive vorticity advection ahead of 500mb trough, although the warm advection and moist instability in 1000—500mb layer may play important roles in the development of the cyclone.