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**Plain Language Summary:** The processes of tropical cyclone (TC) genesis in strong monsoon trough pattern over the western North Pacific (WNP) are examined using reanalysis data and numerical experiments. Composite analysis showed that more TCs are likely to form in the central WNP and that fewer TCs appear in the western and eastern WNP. Numerical experiments with the same weak artificial vortices inserted into eight different regions of the monsoon trough showed that weak tropical disturbances tend to develop more rapidly in the central WNP, whereas weak tropical disturbances tend to develop more slowly in the eastern and western WNP. The failure of TC genesis in the western WNP is due to the decrease of the moisture and heat. And large vertical wind shear and dry conditions hinder the intensification of tropical disturbances in the eastern WNP.

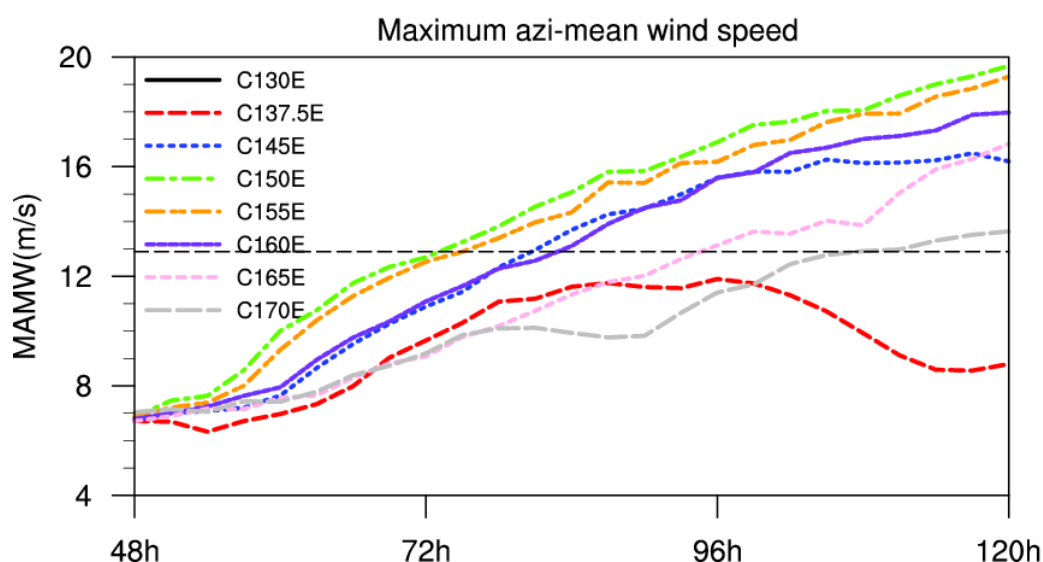


Figure 1. Time evolution of the maximum azimuthal mean wind speed ( $\text{m s}^{-1}$ ) at 10 m in the eight experiments. The abscissa represents time (hours) and the ordinate corresponds to the intensity. The dashed line denotes the time of TC genesis when the wind speed exceeds  $12.9 \text{ m s}^{-1}$ .

- Composite analysis showed that more TCs are likely to form in the central WNP and that fewer TCs appear in the western and eastern WNP when monsoon trough extends southeastward.
- Modeling results showed that weak tropical disturbances tend to develop more rapidly in the central WNP, whereas weak tropical disturbances tend to develop more slowly in the eastern and western WNP.
- The failure of TC genesis in the western WNP is due to the decrease of the moisture and heat, whereas large vertical wind shear and dry conditions hinder the development of tropical disturbances in the eastern WNP.