A Study of East Asia Strong Cold Wave－Surge Crossing Equator and Influencing the Development of Tropical Cyclone and Heavy Rainfall in the Southern Hemisphere

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In this paper, an East Asian strong cold wave crossing Equator and its impact on the weather systems in the Southern Hemisphere has been investigated. The conclusions are as fallows: (1) There exists the interaction of the weather systems between Southern Hemisphere and Northern Hemisphere: The East Asian cold air broke out, caused strong wind and sharp temperature decrease in South China Sea and lower latitudinal regions, crossed the equator and entered into Southern Hemisphere, Northeast current in Northern Hemisphere shifted into Northwest current in Southern Hemisphere, the Northwest current triggered and then enhanced the monsoon depression in Northwest to Australia, finally, the monsoon depression intensified into a tropical cyclone and brought heavy rainfall in the North Australia. (2) There exists the interaction of the weather systems between the high-middle latitudes and lower latitudes: The mentioned-above tropical cyclone was also influenced by the middle latitude trough in the Southern Hemisphere and then, strong heavy rainfall occurred. (3) The crossing equator current and the development of tropical cyclone are very favorable to the enhancing of upward motion. As compensation there was strong anticyclone circulation at 200 hPa, above the monsoon trough and the tropical cyclone in the Southern Hemisphere. The associated northern current crossing the equator entered into Northern Hemisphere and went down in cold air area near 30°N, while, the cold air in lower troposphere moved southwards and equatorwards. The mentioned-above situation formed a strong and typical Hadley circulation which contributed very importantly to the maintenance of circulation in both Hemisphere. (4) The results in this paper confirm the valuable point of view, suggested by Xianzhi Li in 1930' when there was only sparse data. Li in that time pointed out that strong cold surge in the Winter Hemisphere may cross Equator and some time initiate tropical cyclone and heavy rainfall in Summer Hemisphere. (5) Based on our analysis, a conceptual model of

winter monsoon circulation system accompanying with strong disturbances is proposed.

Key words: cold wave-surge in East Asia, crossing equator current, interactions between Northern and Southern Hemispheres, tropical cyclone, heavy rainfall

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