

The Cross-Equatorial Northerly Surge in the South China Sea and Precipitation Patterns over the Maritime Continent

HATTORI, Miki^{1*}, MORI, Shuichi¹, MATSUMOTO, Jun²

¹Japan Agency for Marine-Earth Science and Technology, ²Tokyo Metropolitan University

Cold surge in the northern South China Sea (hereafter CS) is pointed out to correlate to convective activity over the Maritime Continent, and it is reported as a case study that cold surge which across the equator affect the heavy rainfall in the Maritime Continent. In this study, in order to explain the occurrence of the surge in the equatorial region, we defined cross-equatorial northerly surge (CENS) and investigated background of occurrence and relationship with variation of precipitation.

The CENS in this study was defined as the area-averaged northerly wind exceeding 5 m s^{-1} over 105°E - 115°E , 5°S -EQ based on the QuikSCAT sea surface wind data. During the 10 winters from December 1999 to March 2009, 62 CENS events were extracted and classified into the following patterns: 11 events were associated with cold surges over the northern part of the South China Sea and termed the CS pattern; 20 events were associated with a convectively active phase of the tropical intra-seasonal variations and termed the MJO pattern; 16 events were associated with both cold surges and convectively active tropical intra-seasonal variations and termed the CS-MJO pattern; and other 15 events were not associated with these patterns. In the CS pattern, the increased precipitation to the north of the island of Java was significant. In the MJO pattern, a wide area of northerly winds in the vicinity of the depression around 10°S continued for a longer period than in the CS pattern, and the increased precipitation west of Sumatra and south of Java was significant. The CS-MJO pattern showed features of both the CS and MJO patterns and was associated with the greatest increase in precipitation of the three patterns in particular, in northwestern Java and both north and south of Java. In the CENS events, increases in precipitation were observed in the Maritime Continent region, and notable difference in the precipitation distribution has been brought by difference in background fields.

Keywords: cold surge, Maritime Continent, monsoon, precipitation distribution