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M.S. Defense Announcement

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SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY

DIAGNOSTIC ANALYSIS OF HEAVY RAINFALL EVENTS OVER THE YANGTZE RIVER VALLEY DURING THE MEI-YU SEASON 2020

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Date: **Monday, November 30, 2020**
Time: **3:00pm HST**
Zoom Meeting: https://zoom.us/j/92500493986?pwd=QlJUbHBVeWo4d2E5ZkdCRlZZNG5Bdz09
Meeting ID: 925 0049 3986
Passcode: FiaE4F

Abstract:

During the 2020 early summer rainy season of the southern China plain, a series of unprecedented heavy Mei-Yu precipitation events occurred over the Yangtze River Valley region accompanied by widespread extreme flooding. Compared with the past long-term mean (2011–2019), the Mei-Yu precipitation over the Yangtze River Valley in 2020 shows extremely heavy rainfall events that occurred throughout the prolonged Mei-Yu season (62 days in total). Using the CFSv2 reanalysis data with a 6-hourly interval, a low-level boundary layer jet (> 10 meters per second) around the 925-hPa over the northern Southern China Sea is diagnosed. This is referred to as the Marine Boundary Layer Jet (MBLJ) and it lasted for almost the entire Mei-Yu season (from June 1st to July 31st) in 2020. The MBLJ is mainly related to the large sub-synoptic scale pressure gradients between a stronger than normal West Pacific Subtropical High (WPSH) and a pronounced Southwest Vortex originating from the lee side of the Tibet Plateau. During the Mei-Yu season in 2020, the MBLJ over the northern Southern China Sea plays a key role in transporting the low-level moisture from the subtropical ocean to the southern China plain. In addition to the moisture supply by the MBLJ, a southwesterly subsynoptic Low-Level (SLLJ) along the Mei-Yu front was present as a result of the secondary circulation associated with the frontal circulation. The MBLJ encountered the SLLJ along the Mei-Yu front after reaching the southern China plain. The MBLJ brought in excessive moisture from the northern South China Sea to the central China plain whereas the rainfall production is mainly related to the secondary circulation associated with the Mei-Yu jet/front system. Moreover, the moisture transport is dominated by the mean flow with much less contribution by the transient mode. Under this favorable synergistic effect caused by MBLJ and SLLJ together, a series of unprecedented long-lasting rainfall events occurred over the Yangtze River Valley during the entire 2020 Mei-Yu season.