UNIVERSITY of HAWAI'I MĀNOA

Department of Atmospheric Sciences Seminar Announcement

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SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY

Characteristics of the Marine Boundary Layer Jet over the South China Sea during the Early Summer Rainy Season of Taiwan

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You are invited to our weekly online Atmospheric Sciences Spring 2022 seminars via Zoom meeting.
When: February 23, 2022 at 3:30PM HST
Meeting admission: 3:15PM HST

Register in advance for this meeting:
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After registering, you will receive a confirmation email containing information about joining the meeting.
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Abstract:

The marine boundary layer jets (MBLJs) over the northern South China Sea during the early summer rainy season over Taiwan are analyzed using 5-yr (2008–12) National Centers for Environmental Prediction Climate Forecast System Reanalysis data with a 6-h interval. The MBLJ is distinctly different from the low-level jets associated with the subsynoptic frontal systems. During this period, the MBLJ events over the northern South China Sea mainly occur during the second half of the monsoon rainy season over Taiwan (after 1 June) and have a wind speed maximum around the 925-hPa level. The MBLJs are mainly related to the subsynoptic-scale pressure gradients related to a relatively deep mei-yu trough over southeastern China and a stronger-than-normal west Pacific subtropical high. Within the MBL, there is a three-way balance among pressure gradients, Coriolis force, and surface friction, with cross-isobar ageostrophic winds pointing toward the mei-yu trough throughout the diurnal cycle. At the jet core, the vertical wind profile resembles an Ekman spiral with supergeostrophic winds >12 m s^{-1} near the top of the MBL. The MBLJs are strongest at night and close to geostrophic flow in the late afternoon/early evening. This is because the friction velocity and ageostrophic wind decrease during daytime in response to mixing in the lowest levels. The MBLJs play an important role in horizontal moisture transport from the northern South China Sea to the Taiwan area. In the frontal zone, the moisture tongue extends vertically upward. The rainfall production is related to vertical motions in the frontal zone or localized lifting due to orographic effects.