

The Diurnal Cycle of Winds, Rain, and Clouds Over Taiwan During the Mei-Yu, Summer, and Autumn Regimes

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Weather on and around a tropical or subtropical mountainous island varies in time and space because of the terrain's aerodynamic and thermodynamic influences. Predicting island-scale weather requires an understanding of how the various planetary and synoptic scale circulations combine with orographic effects and with local, thermal circulations to create weather that is different than what would occur in the absence of the terrain. The diurnal variations in surface winds, rain, and clouds over Taiwan are presented for three rainfall regimes with characteristic environment winds, stability, and moisture: the Mei-Yu (16 May - 15 June); summer (16 July - 31 August); and autumn (16 September - 15 October). It is shown that though the overall average strength of the island circulations is similar under each regime, the diurnal variations of rain and clouds vary considerably between the regimes. These differences are related to the seasonal changes in environment winds, stability, and moisture. The evolution of mean hourly winds during the morning (6 - 9 LST) and evening (18 - 21 LST) transitions are presented together with the locations of stations with rainfall maxima during each hour. These locations are different for each regime, and the differences are linked to orographic effects and interactions between the island-induced flow with the mean environment flow.