Geophysical Research Abstracts
Vol. 19, EGU2017-6140, 2017
EGU General Assembly 2017

The Intraseasonal Oscillation of Eastern Tibetan Plateau Precipitation in Response to the Summer Eurasian Wave Train

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This study examines thecharacteristics and mechanisms associated with the dominant intraseasonal oscillation (ISO) that controlled eastern Tibetan Plateau summer rainfall (ETPSR) over the period 1979–2011.The results of both power and wavelet spectrum analysis reveal that ETPSR followsa significant 7–20-day oscillation duringmost summers. The vertical structure of the ETPSR ISO in the dry phase is characterized by a vertical dipolepattern of geopotential height with a positive center on the eastern Tibet Plateau (TP) and a negative center on the western TP. The wet phase shows the opposite characteristicstothe dry phase. The transitions between the dry and wet phases during an ETPSR ISO cycle are related to a Rossby wave train that presents aslarge anomalous anticyclonic and cyclonic centers that alternate along the pathway from the eastern Atlantic to southernChina via the TP. Itcorresponds to the evolution of the phase-independent wave-activity , which implies an eastward/southeastward energy propagation of the ISO. The dominant modes of the daily 200-hPa geopotential height as identified by the rotated empirical orthogonal function (REOF)demonstrate that the different phases of the Rossby wave traininfluence the upper-level circulation over the ETP, whichthen impacts precipitation in the region.Furthermore, fluctuations in the eastern Atlantic may be the key factor for the propagation of the Rossby wave train that influences the upper-level circulation and rainfall variability over the ETP. Results from numerical experiments using an atmospheric general circulation model support the conclusion that the fluctuations over the eastern Atlantic contribute to the ISO of ETPSR.