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Radiative Energy Budget in the Tropical Upper Troposphere and Lower Stratosphere: Cloud Impact

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Processes involved in tropical troposphere-to-stratosphere transport (TST) strongly influence the composition and climate of the global stratosphere. Although it is well known that air enters the stratosphere preferentially through upwelling in the tropics, the exact mechanisms of the TST are still unknown. The raditive energy budget determines the direction and magnitude of vertical motion in the lower stratosphere and also exerts a critical constraint on how air enters the stratosphere from the tropical tropopause layer. In this work we will quantify the radiative energy budget in the tropical upper troposphere and lower stratosphere, focusing on the impact of clouds using both ground-based and space-borne cloud observations. Its implication to vertical mass transport in the tropical upper troposphere and lower stratosphere will be discussed.