Characteristics of rainfall associated with life cycle of deep convection observed from TRMM PR and GOES-W

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The life cycle of deep convective systems over the eastern tropical Pacific (30N to 30S, 180 to 90W) was studied in terms of cloud types, as classified by a split window (11micron and 12micron). Hourly split window image data of Geostationary Operational Environmental Satellite (GOES-W) from January 2001 to December 2002 was used in this study. Deep convection consists mostly of optically thick cumulus type clouds in the earlier stage and a cirrus type cloud area that increases with time in the later stage. During this analysis period and over the analysis area, the life stage of deep convection, to a large extent, can be identified by computing the percentage of cirrus type clouds within the deep convection from a single snap shot of the split window image. Coincident Tropical Rainfall Measuring Mission (TRMM) Precipitation Radar (PR) observations were used to study the relationship between the percentage of cirrus type clouds within a deep convection (i.e., its life stage) and the rainfall rate from TRMM PR. It was found that the rainfall rate tends to be larger in the earlier stage of the lifecycle when a smaller percentage of cirrus type cloud is present within the deep convection.