Abstract Details

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Category: Ocean and Atmospheres

Paper ID: 57-OOA-A1816

Title: Estimation of path integrated attenuation and its non-uniformity from profile data of TRMM/PR

Abstract:

The non-uniform beam filling (NUBF) effect is one of the remaining i for improving rain retrieval algorithm for the Precipitation Radar (PR) onboard the Tropical Rainfall Measuring Mission (TRMM) satellite. The in a footprint of PR is normally estimated by assuming the similarity c standard deviation between that in the footprint and that among adja footprints. Takahashi et al. showed the use of the range profile data o surface echo for estimate the horizontal (scan directional) variation of path integrated attenuation (PIA) within a footprint of TRMM/PR (here this method is called as profile method). This technique, however, est the PIA at an oblong where the radar pulse is intersected by the Earth surface. The purposes of this paper are 1) to establish the relationshi between the true standard deviation of PIA and the estimated standa deviation of PIA from the profile method, 2) to evaluate the PIA estim using the profile method by comparing with a ground based radar and evaluate the standard deviation of PIA using the profile method by co with a ground based radar and with the conventional method using a 8-footprints. First of all, the relationship between the true standard de of PIA and the standard deviation of the profile method is examined u NICT's Okinawa C-band polarimetric radar. The procedure is as follo three dimensional data (1 km resolution) of radar reflectivity factor (Z created. Horizontal distribution of PIA of 14 GHz, which is the frequen the TRMM/PR, is calculated with this dataset. Since the footprint size TRMM/PR is about 5 km, the standard deviation of PIA in a 5 x 5 grids calculated. As for the profile method, PIAs are averaged each row in t 5 grids box and the standard deviation of PIA is calculated using aver PIA data. The result of this simulation indicates that the estimated sta deviation is about 70% of the truth in average but large scattering of estimation because of lack of the information of standard deviation in averaging box. The standard deviation in along track direction can be alternated by the standard deviation of PIA using along track footprin footprint-average PIA and the standard deviation of PIA of the profile are compared with ground based radar and 9-footprint data of TRMM/ Kwajalein radar data coinciding with TRMM's over-flight is used for t analysis. The average PIA of the profile method and the Kwajalein rad shows good correlation. On the other hand, PIA from TRMM's standa