



Typical patterns of microwave signatures and vertical profiles of precipitation in mid-latitude using TRMM data

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Typical patterns of microwave signatures around Japan in winter and summer from TRMM Microwave Imager (TMI) were identified by EOF analysis. The first three patterns were interpreted using the vertical profile of radar reflectivity, the echo top height, freezing level, etc. with the Precipitation Radar (PR). The first EOF (EOF1) was found to correlate with near surface rain rate. While the eigenvector at 85.5 GHz channel in the summer cases is less significant for EOF1's variation, all channels contribute the variation in winter. This difference shows that summer precipitation accompanies many solid particles. The second EOF (EOF2) represents the amount of solid particles and also correlates with near surface rain rate. EOF2 varies with echo top height in summer, and with both echo top height and freezing height in winter. The third EOF (EOF3) is related with the rain types. These identifications could be useful for characterize the mid-latitude precipitation systems.