

Radar Measurement of Precipitation from Space

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Abstract

The Precipitation Radar (PR) onboard the Tropical Rainfall Measuring Mission (TRMM) satellite realized the radar measurement of precipitation from space for the first time. The TRMM satellite survived 17 years and brought many fruitful scientific results. In particular, three dimensional data obtained with the PR have expanded our knowledge of precipitation structure at various locations and climate regimes over the globe. The Dual-frequency Precipitation Radar (DPR) on the core satellite of the Global Precipitation Measurement (GPM) mission succeeds the PR's legacy and continues to provide us with radar echoes of precipitation with higher sensitivity and better accuracy than the PR.

This talk is concerned with the characteristics of the PR and DPR and the rain retrieval algorithms for them. Because of the size constraints, both PR and DPR use higher frequencies than general ground-based weather radars. Since high frequency electromagnetic waves suffer from attenuation due to precipitation itself, the attenuation correction is essential in the retrieval algorithms. The surface reference technique (SRT), which uses the difference in the apparent surface echoes between the raining area in question and non-raining areas, give a reliable constraint for the attenuation correction. However, there are several other factors that are entangled in a complicated way to affect the attenuation. The talk will mention some of these factors and other peculiarities of space-borne radar data. It will also mention possible future radar for precipitation measurements from space.



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Toshio Iguchi received the B.S. degree from Hokkaido University, Hokkaido, Japan, the M.S. degree from the University of Tokyo, Tokyo, Japan, and the Ph.D. degree from York University, Toronto, ON, Canada. He is currently an Invited Executive Researcher at the National Institute of Information and Communications Technology (NICT), Tokyo. He is a fellow of NICT as well. He was Executive Director of the Applied Electromagnetic Research Center of NICT until March 2015. He has been a member of the TRMM Science Team since the beginning and responsible for the development of the operational algorithm for the precipitation radar. He is the leader of the Us-Japan joint algorithm development team for the Dual-frequency Precipitation Radar (DPR) on the Global Precipitation Measurement (GPM) program's core satellite.

Dr. Iguchi is a fellow of IEEE and a member of the American Meteorological Society and the Meteorological Society of Japan. He received a Culture, Sports, Science and Technology Minister's Award (2007), Maejima Hisoka Award (2012) and Horiuchi Award of the Meteorological Society of Japan (2015). He has also received several NASA Awards.

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