

JAPAN'S ATMOS-A1/GPM MISSION PLAN

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The Tropical Rainfall Measuring Mission (TRMM), which is a unique mission dedicated to rain observation in the tropics and a part of mid-latitudes, has successfully been launched in November 1997. The TRMM satellite carries the Precipitation Radar that is now providing us with important images of three-dimensional rain structure. The results of TRMM stimulated the need for more global observations of three-dimensional structures of precipitation systems from space, that is, wider coverage to observe rain and snow over mid/high latitude regions. Precipitation in the high latitude regions is important not only as the source of diabatic heating of the atmosphere, but as input to the snow accumulation and fresh water flux over cold ocean even if precipitation itself is weak. The next precipitation observation mission has been being studied in Japan, which is called ATMOS-A1, aiming a wider coverage, higher sensitivity, better accuracy than TRMM and new capabilities to discriminate snow from rain. Therefore, dual-frequency radar (DPR) with 14GHz/35GHz is proposed as the major sensor of ATMOS-A1 along with microwave radiometer. Observation with DPR makes it possible to estimate rain drop size distribution (DSD) and to classify the precipitation types (rain or snow). DPR is expected to calibrate other precipitation sensors onboard other satellites. It should also be noted that a non-sun-synchronous orbit is proposed for ATMOS-A1 in order to observe the diurnal variation of precipitation activity. The discussion of ATMOS-A1 has been continued based on the very fruitful TRMM heritage which includes not only the scientific and engineering development but also the excellent partnership between the US and Japan. NASA is proposing the Global Precipitation Mission (GPM), which consists of eight microwave radiometer satellites and a TRMM type CORE satellite, with the basis of international partnership. In GPM, ATMOS-A1 has another role as a core satellite of GPM to work for detailed observation of precipitation systems. The mission concept of GPM is very complementary to the ATMOS-A1 concept. For example, the sampling problem can be mitigated in GPM. The collaboration of ATMOS-A1 and GPM will undoubtedly contribute to enhance the values of both missions.