

# Current status of the calibration of the GPM/DPR

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The Global Precipitation Measurement (GPM) mission is an international collaboration mission between the United States and Japan to observe global precipitation using a GPM Core Observatory satellite and some collaborating satellites. The GPM Core Observatory, which was launched in 2014, carries the Dual-frequency Precipitation Radar (DPR) and the GPM microwave imager (GMI). The DPR consists of the Ku-band precipitation radar (KuPR) and the Ka-band precipitation radar (KaPR), which were developed by Japan Aerospace Exploration Agency (JAXA) and National Institute of Information and Communications Technology (NICT).

Calibration of the DPR is one of the most important works to estimate a precipitation rate precisely using the data observed by the DPR. In order to calibrate the DPR, we have adapted two calibration methods as onboard calibration; one is the internal calibration and the other one is the external calibration. The internal calibration is utilized for calibrating the receiver system of DPR, especially that calibration obtains the input-output characteristic between a power received by the DPR and a digital count value converted by the System Control Data Processing (SCDP). The external calibration which is conducted with the Active Radar Calibrator (ARC) determines an intercept of that characteristic while the internal calibration determines a slope of that. The parameters of the transmitter system of DPR are also calibrated by that external calibration.

As the result of three-years calibration from the launch, the parameters of both receiver and transmitter system were reexamined in version 5 of the DPR level-1 products and those were released in Oct, 2017. With the changes of the parameters, the radar reflectivity factors of the KuPR and the KaPR increased by approximately 1.3 dB and 1.2 dB, respectively from the products in version 4, which employ the parameters obtained by pre-launch tests on the ground.

Onboard calibration continues to confirm the validity of the parameters which have been adopted in the current version 5 products and to monitor the health of the sensor regularly. According to the recent results of the calibration, the parameters and the sensor are working well.

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