UAV + TTT. However, 5 of 7 flights failed (the failure is defined as the radar stops working and no data are recorded.). One possibility may be the UAV is too close to the RPG radar and the backscattering echo is too large that the radar protects itself by turning off the measurements, which may also be attributed to saturation. We have only one UAV + absorber TTT and one UAV+TTT measurement at hand, and their results are shown in Figure 6. The maximum power from UAV+TTT is 35.9dB, while that of UAV + absorber TTT is 23.5dB. The 12.4dB difference is because of the absorbing material covering the TTT. More analysis is going to conducted and better experiments for future campaigns are now under consideration.

4. Conclusion and outlook

In this report, 3 calibration techniques are developed to calibrate the Doppler cloud radars (DCRs), namely 1) one trihedral is fixed the top of a mast; 2) UAV + trihedral; 3) UAV + sphere. All the techniques can be used for scanning DCRs, while the later 2 techniques are designed specifically for vertical-pointing radars. The preliminary results show the possibility of calibrating the W-band cloud radars using Technique 2, which shows the standard deviation of BML radar constant within 1dB for several measurements from different days. However, the mismatch of the derived radar constant with Technique 1 (around 9dB) is worthwhile exploring. For Technique 3, the backscattering echoes from UAV and sphere are not so obvious in the radar image because of the short connecting lines. In addition, for the RPG radar calibration, we have only one measurement at hand, which makes it difficult to calculate the standard deviation of radar constant. The frequent measurement failures should be explored and solved for the future calibration experiments.

This work is a also conducted in preparation of the Centre for Cloud Remote Sensing of the ACTRIS research infrastructure to be operational in 2025. The procedures described still need further developed, but will be implemented in the standard procedures for quality control and assurance of cloud profiling in ACTRIS.