Reply to Short Comment by Dr. Alexei Korolev:

We agree with Dr. Korolev that a comparison of the two probes with the original tip configuration would be optimum. Unfortunately, the SPARTICUS project was not designed to be an instrument study, and instead we were contracted to collect a large dataset in cirrus and anvils. However, we selected the next best possible option and about one hour previous to the data collected and shown in Fig. 5, the Learjet collected data in a cumulus cloud with only small cloud drops, which did not contribute to shattering of ice crystals. Particle size distributions from the penetration of the cumulus cloud with only cloud drops, are shown below. The flight on 23 July took place after the official close of the SPARTICUS field season and was a dedicated flight outside the normal SPARTICUS flight profile. The figure below shows that the two probes were in reasonably good agreement measuring cloud drops in concentrations on the order of 50 /cc in a cumulus cloud. If there were significant differences in the counting efficiency of small particles between the two probes, one would expect to see this difference reflected in the figure shown below.



2D-S drop size distributions from penetration of а small cumulus containing only water drops. The light green trace is from the probe with standard tips and includes shattered particles. A dark green trace is from the probe with standard tips after applying the shattering algorithm, but is not visible behind the light green trace. The red trace is from the probe with modified tips and includes shattered particles. A blue trace is from the probe with modified tips after applying the shattering algorithm is barely visible near the red trace.