The vertical flux of water can be computed using the radar measured vertical velocity and the lidar-radar derived water content. The flux of water computed an altitude of 250 m using several crystal type assumptions is compared with surface measurements of precipitation in the next figure.

Particle size measurements in the form of effective diameter prime are derived for M-PACE data acquired between Sept 27 and Oct 1. Lidar and radar data are shown along the derived particle size.

The surface depolarization measurement between 13:00 and 16:00 on Sept 27. High depolarizations (red) indicate scattering from ice crystals while low depolarizations (blue) indicate that the optical scattering is dominated by scattering from spherical water droplets. Note that the largest range observed by the radar is 200 m, thus it is not possible to make the flux computation below the water.

When the surface measurement of the accumulated precipitation (blue) is compared to the lidar-radar derived fluxes after 5:00 UT on 28 Sept. The measurements fall between the results derived for bullet rosettes and spheres. During this period low level water clouds were not present in 250 m lidar and radar data used for the flux computations. Fall velocity as a function of particle size is another potential means of distinguishing between ice crystal types. This plot shows particle fall velocities computed as a function of maximum dimension of the ice crystal (see Mitchell & Heymsfield, J Atmos. Sci, Vol 2, May 2005).