Changes in scattering properties of precipitating particles are found to take place during the snowflake-to-raindrop transition in the proximity of the freezing level. A maximum in radar reflectivity, known as the radar bright band, is observed in the microwave domain, while a minimum in lidar echoes appears at microwave wavelengths. This phenomenon being referred as lidar dark band (Sassen and Chen, 1995). Radar bright bands have been known and studied for more than 30 years and it is presently a well-understood phenomenon (Battan, 1973; Meneghini and Liao, 2000). On the contrary, the lidar dark band has been poorly investigated and, to date, no systematic and coordinated observation are available.

RESULTS

Figure 4 illustrates the time evolution of the particle backscatter ratio at 1064 nm over a period of approx. 1.5 hours from 13:00 UTC to 14:35 UTC on 23 July 2007 as measured by BASIL. The slope of the precipitation streams in the time-height map allows to roughly quantify the fall speed of falling particles with those measured by MIRA 36 (Figure 6). The slope of the precipitation streams in the time-height map allows to roughly quantify the fall speed of falling particles.

The slope of the precipitation streams in the time-height map allows to roughly quantify the fall speed of falling particles.

References


Simulation approach: a Mix scattering code melting layer model

Mix computations based on a concentric/secularic sphere code.