



Hydrometeor distribution within convective events producing lightning using cloud profiler data of summer 2018

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Although summer 2018 was especially dry in the Czech Republic, several convective events producing lightning were still observed in the vicinity of the Milešovka observatory (Northeastern part of the Czech Republic, 837 m a.s.l.), where we installed a Ka-band cloud profiler (35 GHz) last year. Based on cloud profiler data and retrieved spectral moments, we used our developed algorithms to derive the vertical air velocity (vair), which plays an important role in case of convection. We also used the cloud profiler data to identify 5 kinds of hydrometeors (cloud, ice & snow, graupel, rain, and hail). The algorithm of vair is based on widely applied theory that small particles are tracers of the air, thus their velocity correspond to that of the air. The 5 kinds of hydrometeors are distinguished based on vair, terminal velocity of each kind of hydrometeor, and Linear Depolarization Ratio within three temperature ranges ($T < -20^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T \leq 0^{\circ}\text{C}$, and $T > 0^{\circ}\text{C}$). In this contribution, we studied the relationships between the distinguished hydrometeors and derived vair with respect to the distance of lightning from the Milešovka observatory and lightning peak current, polarity, and type (Cloud-to-Ground / Cloud-to-Cloud) during the convective events of summer 2018. As far as the lightning data are concerned, we made use of the lightning dataset provided by Siemens lightning database (BLIDS) for the events. The results will be presented at the conference.