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## Time evolution of activated aerosol particles in low clouds

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Atmospheric aerosol (AA) influences cloud formation, lifetime and other properties; the processes between AA and clouds are source of uncertainty in weather and climate changes estimations [1]. Apart from airborne measurements, the processes in clouds can be also studied on fogs, or low clouds present at a station with high frequency of fog occurrence, such as at Milešovka, Czech Republic, where fog is present for almost 55 % of the time [2]. At the observatory located on the top of the mountain, with a professional meteorological station and measurements of fog/cloud characterization and vertical cloud profile, an additional measurement of aerosol particle number size distributions (PNSD) was done. PNSD from 10 nm to 20  $\mu\text{m}$  was conducted using SMPS and APS spectrometers, measuring activated and interstitial particles. From the activated PNSD (aPNSD), the activated fraction (AF) was estimated [3] i.e. size dependent share of activated particles from all available ones. The AF was fitted with Sigmoidal function and the inflection point,  $D_{50}$ , a lower estimate for an activation diameter of fog [4], was calculated.

The changes in the aPNSD at the beginning of each fog episode have been studied. The largest changes in aPNSD and AF were found within the first two or three hours of the fog episode durations. During the episode, the  $D_{50}$  shifted to the smaller particles, and the AF became steeper. For most episodes, 120 minutes after their beginning the size-dependent AF reached a steady-state. The exceptions were observed during fog episodes preceded by another hydrometeor-related episode. Under such circumstances, the shift in the AF was not observed, as the steady state had been already reached during the preceding episode.

If the time evolution during whole episodes is taken into account, two main groups of AF behavior in time were also found, based on the meteorological situation prior episode beginning. For one group, there is a strong decrease in the  $D_{50}$  in the first three hours, and later the  $D_{50}$  reaches almost a constant value. The steady value is of about 200 nm for all the episodes, independently of the time of the fog occurrence (time of day, season). In the second group, part of a long-term hydrometeor-related situations, the decrease at the beginning of the episode is not visible and the  $D_{50}$  only fluctuates around its original value. Depending on the air mass origin, it is either 90 or 200 nm.

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