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# On the impact of thunder on droplets

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In the lightning channel pressures can be of the order of 100 atm and hence in the produced thunder, sound pressure levels (SPL) can be very high. Additionally, the thunder frequency spectra have peaks for peal and claps at around 100 Hz and around 50 Hz for rumble sounds, with intracloud lightning having peaks at even fewer Hz. These low frequencies are ideal for acoustically induced orthokinetic agglomeration of droplets. Thunder occurs in cloud environments where not only large numbers of droplets are present, but additionally the shockwave front expands at supersonic velocities in excess of 60 km/s and hence could cause also modulations of droplet size distributions through e.g. vibrational breakup. We present calculations for the two mechanisms above (orthokinetic agglomeration and vibrational breakup) for typical cloud droplet sizes and concentrations. In thunderstorm conditions, it is found that acoustic orthokinetic agglomeration of droplets can be very effective and can produce very rapidly changes in the mean cloud droplet diameter. Also, it is found that the critical Weber number, over which breakup occurs, is easily exceeded in thunderstorm environments and may lead to droplet and ice nuclei breakup. We note that these processes need further study to assess how they could interfere with the lightning generation process itself, through charge redistribution in the modified droplet size distribution spectra.