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Winter lightning behavior in non-severe and severe thundersnow events

Two cases of convective snow are examined with one being a typical event and another which was severe. The non-severe case was associated with a well developed surface low pressure system over southwest Missouri on the morning of 10 December, 2003. This event had 16 cloud-to-ground (CG) strikes in a time span of just greater than three hours, most of which occurred on the western side of the band axis. Snowfall amounts were as high as 36 cm (14 in). This event only had one positive strike with Doppler radar reflectivity values exceeding 30 dBz only once as well. The severe case occurred in the evening in northern Illinois on 11 February 2003. This case was associated with a cold front and a clipper-type system moving south out of Canada. At least three locations observed winds that exceeded the wind criterion for a severe thunderstorm that evening. There were 33 CG strikes associated with this system in a time span of just over two hours. All of the strikes CG strikes were of negative polarity, most of which were located in areas with the highest radar reflectivities. Deeper convection aided the high flash count and flash rate for the severe case.