



Mesoscale Lightning Discharges Seen from Space

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Since the early days of manned space flight astronauts reported occasional observations of lightning flashes having horizontal extents of many hundreds of kilometers and coined the term “sympathetic” lightning to describe discharges occurring between widely separated storms. Now measurements from the Geostationary Operational Environmental Satellite R-series (GOES-R) Geostationary Lightning Mapper (GLM) are showing such discharges are perhaps more common than previously thought and reveal the upscale growth of mesoscale convective weather systems with numerous long discharges extending from the convective storms into the trailing stratiform rain region as well as out front of the leading anvil cloud. Such lightning flashes may discharge numerous cloud-to-ground strikes to earth as they propagate away from the main convective storm region, posing a lightning safety threat to workers and participants in recreational activities outdoors. In this presentation we use the GLM in conjunction with the GOES-R Advanced Baseline Imager, NEXRAD dual-polarization radar measurements, and cloud-to-ground lightning network data to examine the nature of these spatially and temporally long duration discharges. We also explore the use of Big Data and cloud computing to identify the temporal evolution of these mesoscale flashes owing to the fact that billions upon billions of GLM images and the NEXRAD radar data are already accessible through multiple cloud service providers.