



Challenges in modeling lightning in weather and climate models

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Lightning is a process that develops on very small spatial and time scales (micrometers and microseconds). Hence, it is very difficult to simulate these processes in models that have coarse spatial and time resolution. To overcome these problems, we need to look for proxies that can be empirically related to the development and observation of lightning discharges. In weather forecast models we can use cloud microphysical parameters to estimate the probability of lightning discharges at a particular time. However, in global climate models such microphysical parameters are not available, and hence other proxies need to be used to estimate spatial and temporal variations of global lightning. Obviously all these estimates have large uncertainties, but still allow us to assess changes in lightning activity under different climatic conditions.