Analysis of GOES-R Pseudo GLM (pGLM) case studies for use in the AWC operational setting

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The Aviation Weather Center (AWC) provides aviation forecasts and Significant Meteorological Information (SIGMETs) to the aviation community across the United States and across parts of the world. Satellite, radar, and lightning data are used on a daily basis to assist forecasters when issuing aviation products. The onset of electrification within convection is a significant hazard to the aviation community and is critical to aviation forecasters. The GOES-R Satellite, when launched, will provide several new capabilities. One of these new capabilities will come from the geostationary lightning mapper (GLM) instrument. The GLM data are a measurement of total lightning, meaning it will observe both cloud-to-ground lightning (which is the current standard) and cloud to cloud lightning observations. The GLM is derived from older, low Earth orbiting sensors (e.g., the Optical Transient Detector and the Tropical Rainfall Measuring Mission Lightning Imaging Sensor). Due to their orbital nature, these instruments are of limited operational use. Ground-based lightning mapping arrays can be used to observe total lightning operationally, but have limited locations and range. To highlight how aviation forecasters and their subsequent products might use GLM data several case studies were collected, analyzed, and conclusions were drawn.   These case studies focus on the use of GLM data, which before the launch of GOES-R has been demonstrated by the Pseudo GLM (pGLM) data feed (derived from the ground-based total lightning networks). We focused on the Washington D.C. area, northern Alabama and central Florida, where these ground-based lightning networks are in operation. The first case is a severe weather example and how the pGLM differed for the various stages of the convection. The second case is a more isolated convection day. Individual storms are monitored to determine where new convection will take place and then validate. The last case is an example of on-going convection and how these storms intensify and weaken during the event. New convection is also observed and highlighted. During this event, there is discussion on where the pGLM data is observed and the implications to the aviation community. These cases demonstrate the potential operational utility of the future GLM GOES-R product for aviation forecasters.