Lightning jumps are the result of rapid increases in updraft strength and size within the mixed phase region of thunderstorms (Schultz et al. 2017). They are well correlated to severe weather occurrence and have shown utility to nowcast the occurrence of severe weather (Williams et al. 1999, Schultz et al. 2009, 2011, Gatlin and Goodman 2010). Algorithms have been developed to automatically detect these rapid increases in total lightning. These algorithms were developed using lightning mapping array data, which detects 99% of all lightning within 50 km of the center of its network (Rison et al. 1999, Koschak et al. 2004, Fuchs et al. 2016). The limitation to these networks is that they cover very small areas (~40,000 km²).

The most ideal candidate to observing lightning jumps over large areas is the Geostationary Lightning Mapper (GLM; Goodman et al. 2004, Fuchs et al. 2016). The limitation to these networks is that they cover very small areas (~40,000 km²) and size within the mixed phase region of thunderstorms (Schultz et al. 2009, 2011, Gatlin and Goodman 2010). Algorithms have been developed to automatically detect these rapid increases in total lightning. These algorithms were developed using lightning mapping array data, which detects 99% of all lightning within 50 km of the center of its network (Rison et al. 1999, Koschak et al. 2004, Fuchs et al. 2016). The limitation to these networks is that they cover very small areas (~40,000 km²).

The current challenge is transitioning the lightning jump algorithm from its LMA-based roots to GLM. The LMA and GLM measure different properties of lightning (electrical breakdown vs optical energy), and thus the LMA-based algorithm will need to be adjusted to the GLM data. Furthermore, it is known that the term “flash” is defined by the instrument making the measurement, therefore, simply adjusting the algorithm to the GLM flash rate will not produce similar results. Previous works that took the LMA-based jump algorithm and placed NLDN and Earth Networks data into the algorithm. Often sub-severe storms were identified as severe by the algorithm, leading to high false alarm rates (Chronis et al. 2014, Eck et al. 2017).

Therefore, the goal of the present work is to understand how the GLM, LMA, and ground based networks like the NLDN observe lightning. Additionally, GLM provides new measurements of flash size and flash radiance that are more physically connected to the kinematics and microphysics of the parent storm. Therefore, the authors are working to characterize how the trend in these measurements align temporally with the LMA-based lightning jump algorithm.