

# Combining GLM and ABI for Enhanced GOES-R Rainfall Estimates

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This study is using TRMM data to develop the basis and eventually the algorithms to combine GOES-R Infrared (IR), Geostationary Lightning Mapper (GLM) data, and microwave calibrator to provide an improved geosynchronous rainfall product. Lightning and rainfall relationships are first examined to gain the basis and insights in applying lightning information to improve rainfall estimates. A simple IR-lightning rainfall algorithm is developed through coupling lightning measurements into the Convective/Stratiform technique (CST) proposed by Adler and Negri (1988). Preliminary results show that CST is improved significantly in retrieving convective (or heavy) rainfall after lightning observations are coupled. Specifically, lightning information can aid to identify convective cores missed by the IR-only technique (improving detection), eliminate misidentified convective cores (lowering false alarm), and more correctly assign heavy convective rainfall rate. The IR-lightning technique will be further tested and adjusted through the comparison with other satellite rainfall estimates (e.g., SCaMPR) and in-situ observations. In addition, the use of lightning information is shown to improve the estimate of convective-stratiform separation for use in passive microwave techniques that are used to calibrate the GOES-R baseline IR rain algorithm.