

EARTH OBSERVATION SYMPOSIUM (B1)
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GOES-R GEOSTATIONARY LIGHTNING MAPPER (GLM)

Abstract

The Geostationary Lightning Mapper (GLM) is under development by Lockheed Martin to be flown as an operational instrument on the Geostationary Operational Environmental Satellite R-Series (GOES-R) spacecraft. GLM is a unique instrument, unlike any other meteorological instrument, both in how it operates and in the information content that it provides. Instrumentally, it is an event detector, rather than an imager. While processing almost a billion pixels per second with 14 bits of resolution, the event detection process reduces the required telemetry bandwidth by almost 105, thus keeping the telemetry requirements modest and enabling efficient ground processing that leads to rapid data distribution to operational users. Lightning is a product of the electrical energy produced during the collisional interactions of ice hydrometeors. This charging zone is deep in the interior of thunderclouds, where many of the hydrometeors develop and latent heat is released. Thus, the GLM is one of the few geostationary sensors that provides information on the physical processes occurring in the heart of the cloud. Since cloud charging is controlled by ice production, latent heat release, and up-draft development, GLM measurements provide a unique means of monitoring these important parameters. The presentation addresses the unique design of the GLM, the underlying physics that makes lightning observation valuable, and some of the important contributions that the GLM will make during the GOES-R era.