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LMODEL: A Lagrangian cloud development model for satellite precipitation estimation.

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Two types of satellite sensors provide information pertinent to global precipitation monitoring: active and passive microwave sensors on low orbiting platforms are directly sensitive to precipitation-related hydrometeors and provide instantaneous precipitation estimates at sampling frequencies up to 3 hours. Geostationary visible and infrared images provide higher temporal resolution (up to 15 mins.) information on cloud patterns but do not provide a direct measurement of precipitation processes. This paper describes a cloud development model in which geostationary imagery is used to derive forcing factors affecting a simplified atmospheric state as it traverses a Langrangian streamline tracing equivalent points within the same cloud through successive geostationary images. Model parameters are initialised using a global calibration and locally updated where information is available from the microwave sensors. The LMODEL algorithm has been implemented over the continental USA and the results of a validation against NEXRAD ground radar data will be presented.