Koshak/NASA-MSFC

 14 September 2022

**Session 2 (GLM Validation Studies) Summary:**

The session provided an excellent update and overview of numerous fronts being worked to better understand GLM performance, with emphasis on GLM flash detection efficiency (DE) performance and estimates (which is a complex issue as noted below). In addition, details on a new camera system (Daile Zhang), data from the recently launched Radio Frequency Sensor (RFS, Erin Lay), and the attributes of the LI-STAR automated/manual validation system (Sven-Erik Enno) were provided.

*A Tangled Web of Inter-Relations Affecting GLM Flash DE Estimates*

1. **GLM Instrument Thresholds (Cummins/Bruning work)**
	1. geographic location
	2. time of day
	3. season
2. **Reference Network Quality (various Vendors, and Govt.)**
	1. inherent DE/FAR (depends on # sensors, and sensor quality, local noise sources)
3. **Validation Tools (Bateman, Virts, Cummins, Bruning, …)**
	1. reference network(s) data ingested
	2. spatial matching criteria
	3. temporal matching criteria
	4. analysis region & period
4. **Simulation Quality (Virts, Koshak)**
	1. insight for determining optimal space/time matching criteria
5. **GLM Processing Algorithm Applied**
	1. LCFA, and LESA (Mach et al.)
	2. flash merging CIERRA & flash splitting (Peterson et al.)
	3. L0 compared to L1 (Bitzer)
	4. difficulties of glint filtering (Mach, LMATC, …)
6. **Nature (Lightning & Cloud Characteristics)**
	1. lightning optical source strength
	2. lightning size (convective vigor & flash rate … Bruning/MacGorman)
	3. cloud-scattering properties
		1. optical thickness
		2. particle scattering phase function (cloud microphysics)
	4. normal or inverted polarity storms