

# Climatological Properties of Reported Cloud-to-Ground Lightning for Alaska from Several Lightning Detection Systems \*



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## Historical Lightning Data for Alaska

GLD360 (Vaisala, Inc) Cloud-to-Ground (CG) strokes with sparse In-Cloud (IC) pulses (2013-2019)

BLM (Bureau of Land Management, Alaska Fire Service) (2013-2019); Upgraded detection system

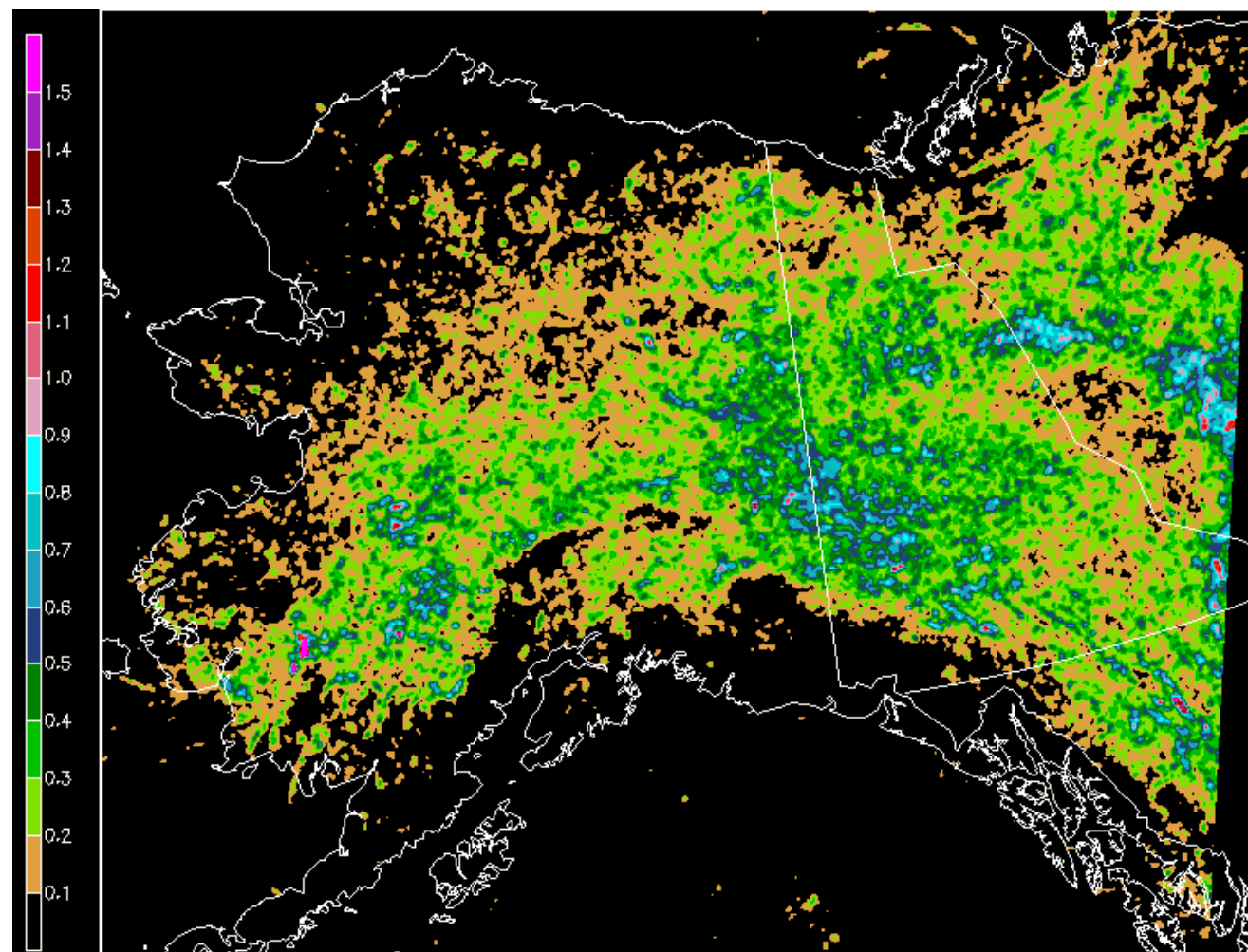
ENI (Earth Networks, Inc.) CG strokes with sparse IC pulses (World-wide network (2013-2019) / Sparse over Alaska)

## Merging Three Lightning Datasets

Tabulate hourly strokes in 6-km square grid boxes separately for GLD360, BLM, and ENI every hour during May – September 2013 – 2019

Merge GLD360, BLM, & ENI grids by selecting maximum strokes per grid box

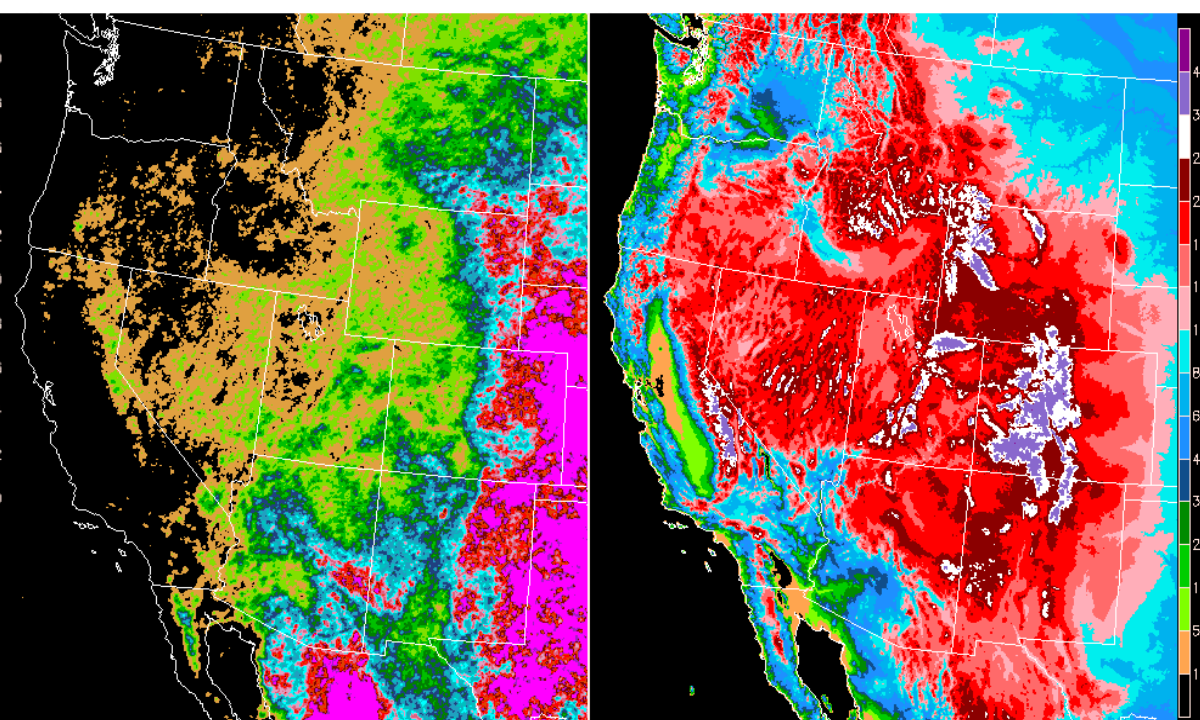
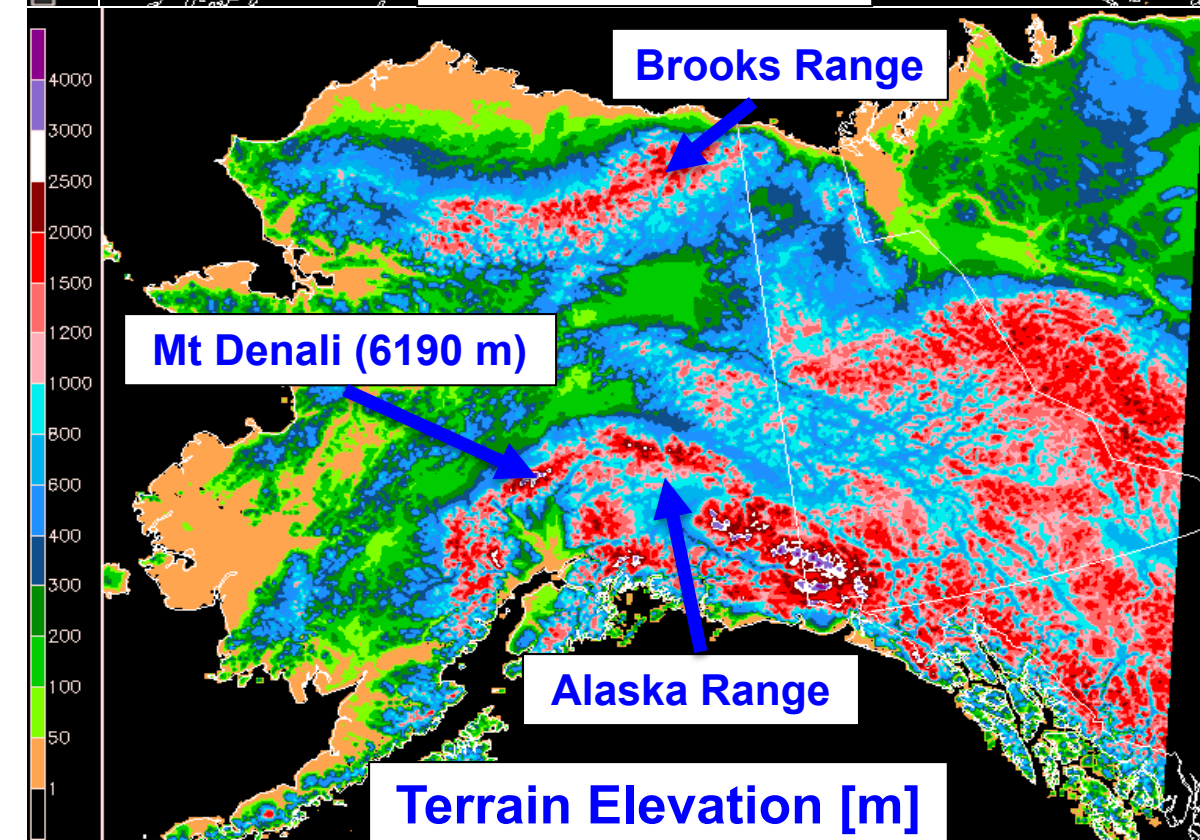
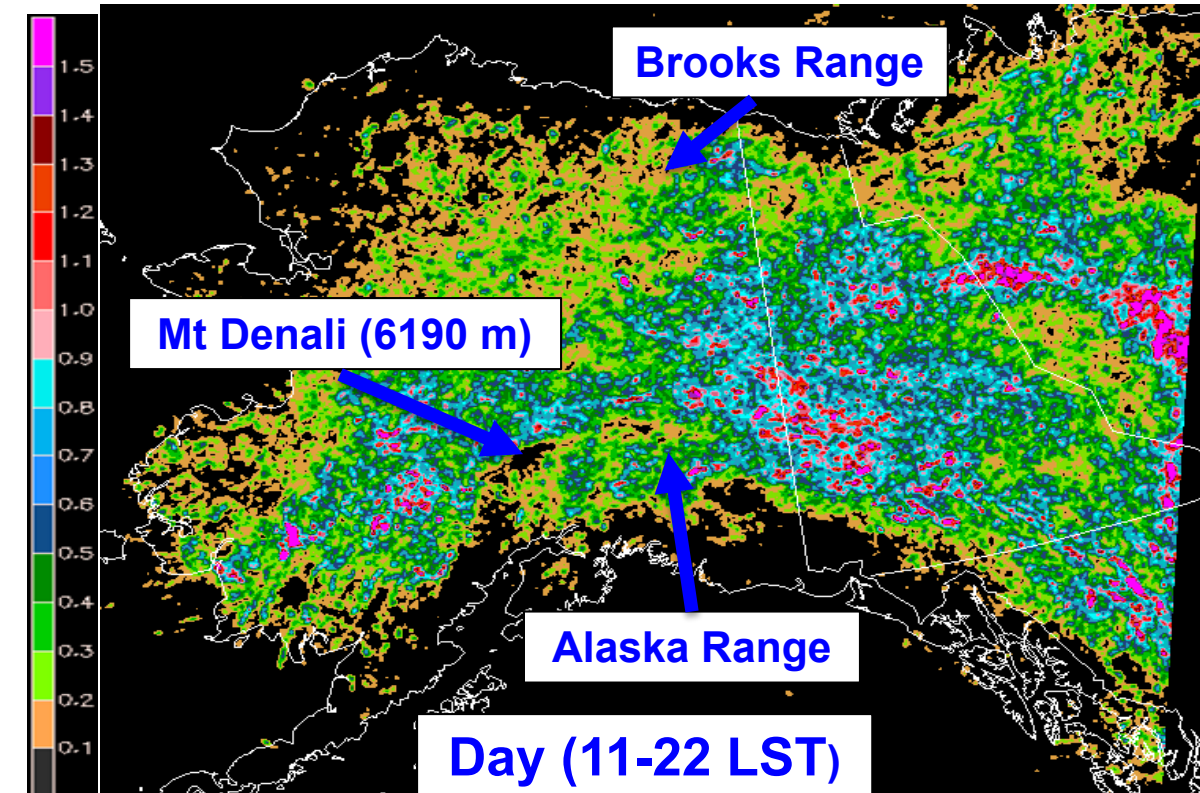
Merged Mean Hourly Strokes (X100)



All Hours

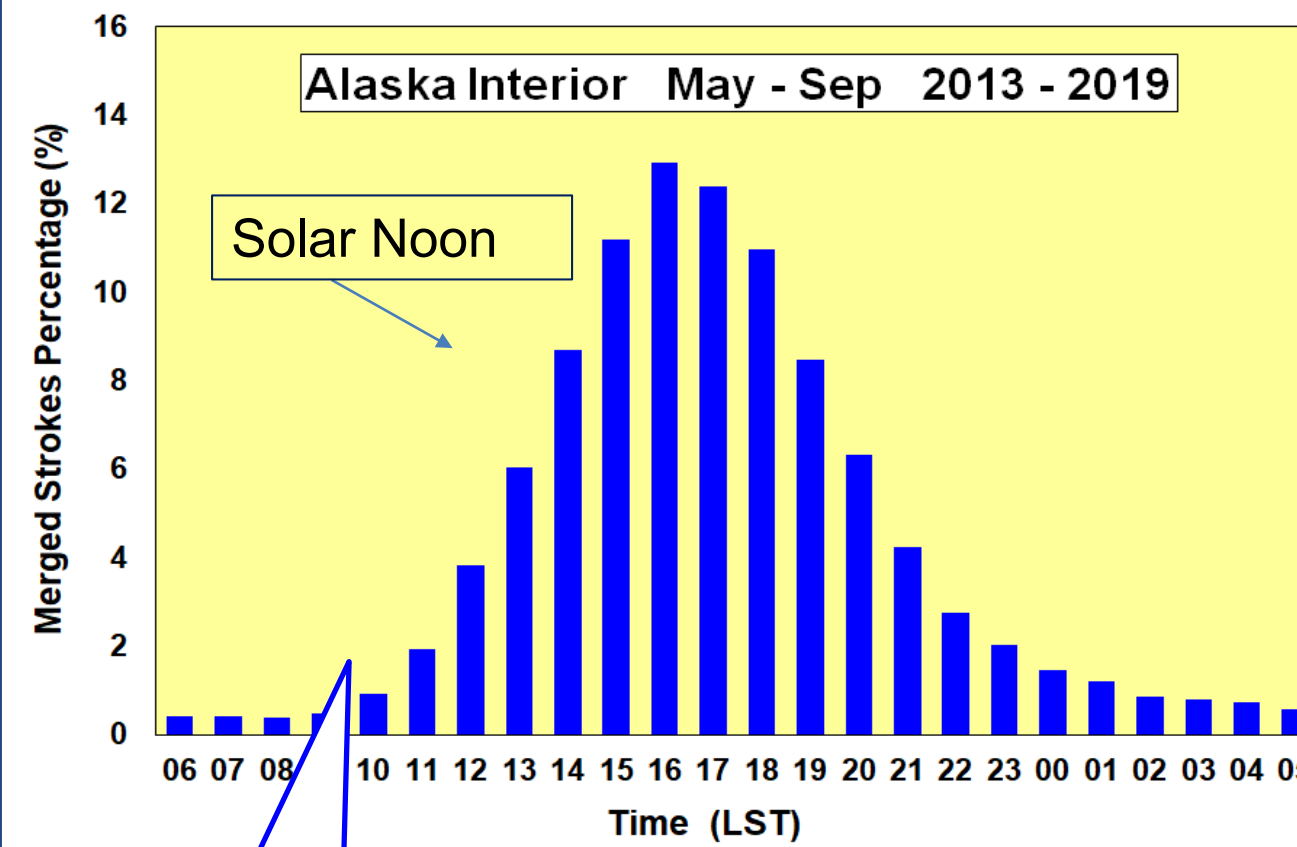
## Lightning versus Terrain

Merged Mean Hourly Strokes (X100)



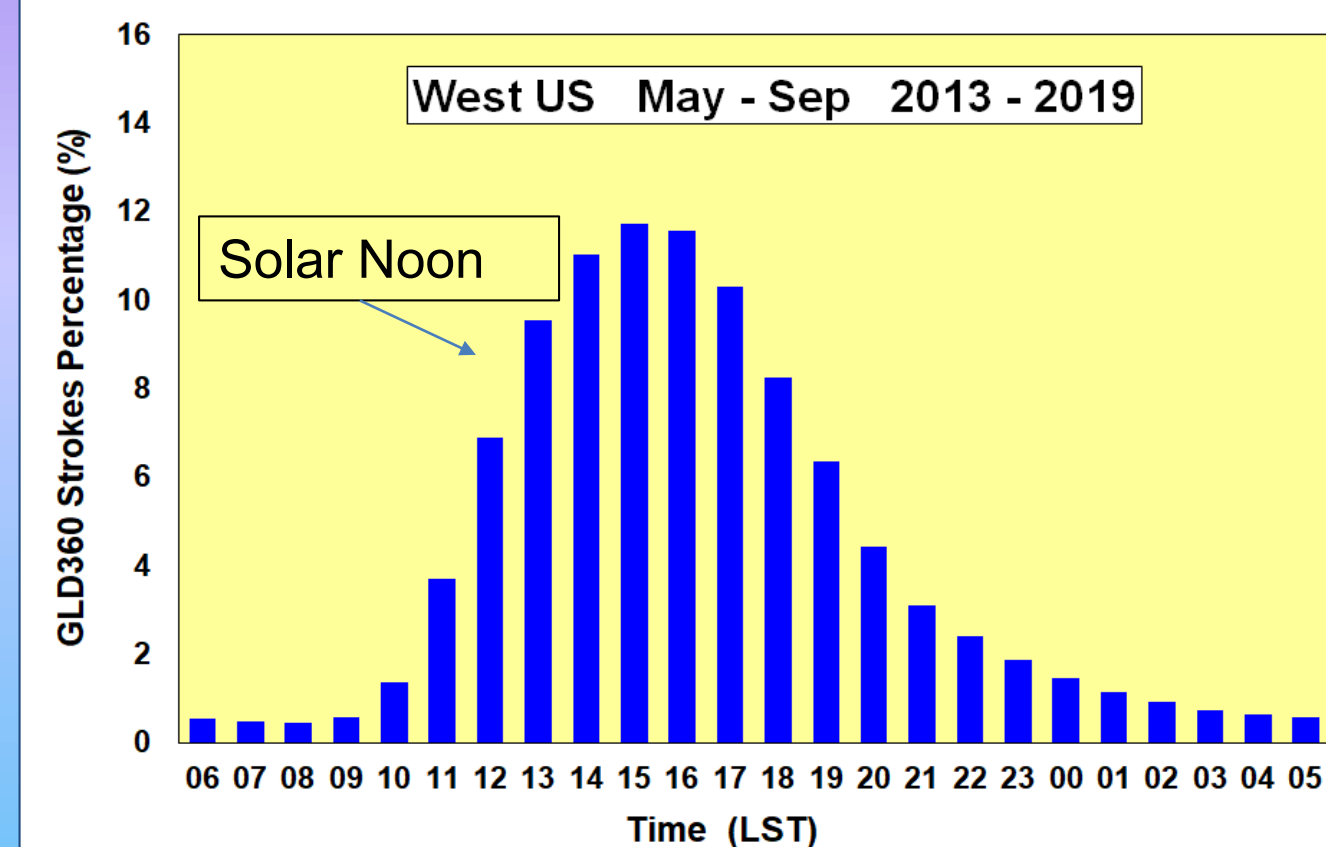
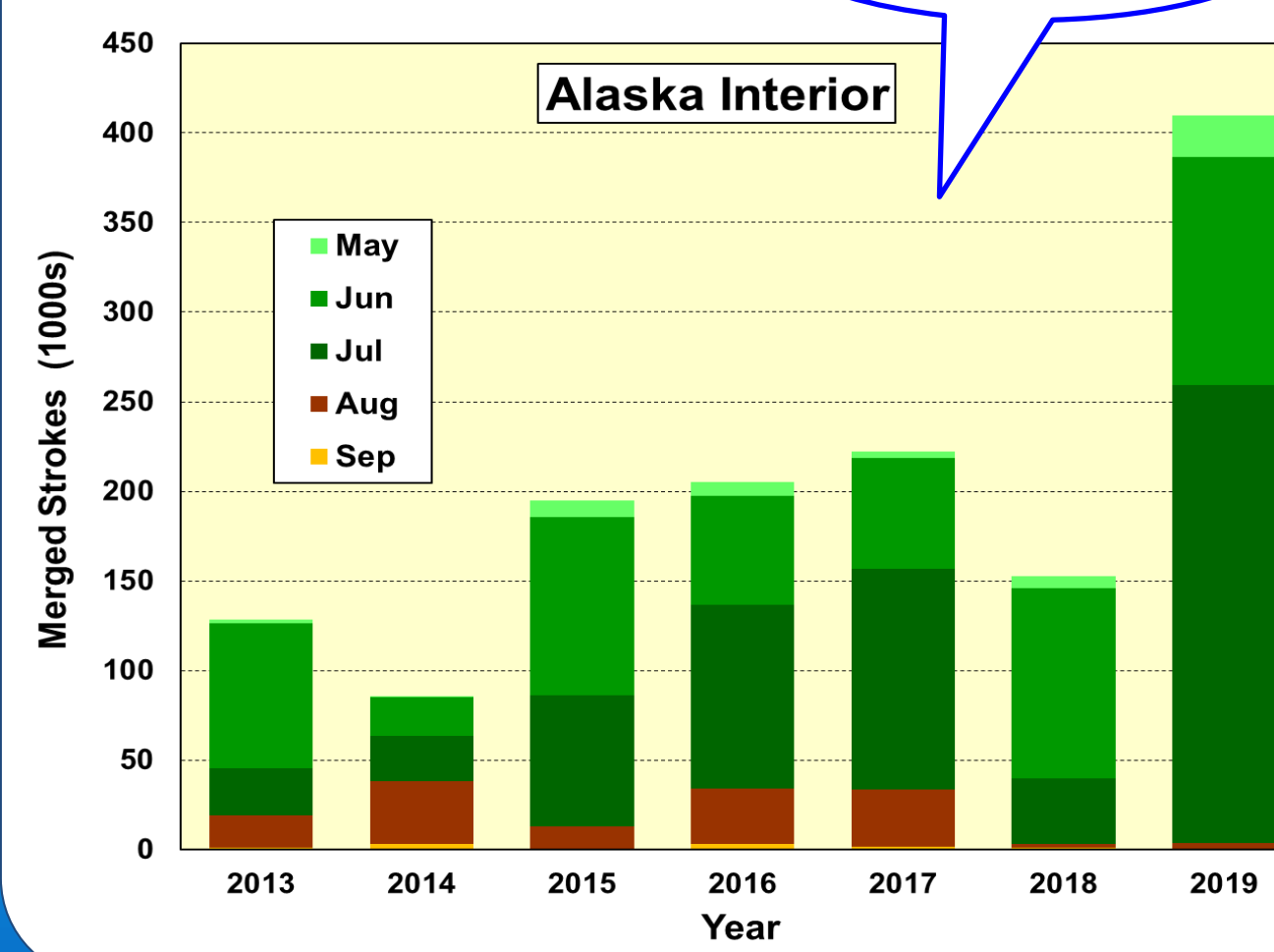
Day (11-22 LST)

Terrain Elevation [m]



Intense diurnal cycle

Slight general upward trend



## Findings

Marked inter-annual lightning variability during 2013-2019, with slight, general increased detection over years.

Three lightning data sets have complementary geographical detection efficiency... supports merging them.

Using maximum hourly strokes in a grid box is an effective merging strategy.

- Alaska lightning data show –
- June – July frequency peak
  - Mid-afternoon frequency peak
  - Weak daytime relationship to terrain elevation

Lightning diurnal cycle and relationship to terrain is generally similar in Alaska and western US.

\* Disclaimer: This material is based upon work supported by the Joint Technology Transfer Initiative (JTTI) Program within NOAA/OAR Office of Weather and Air Quality.

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