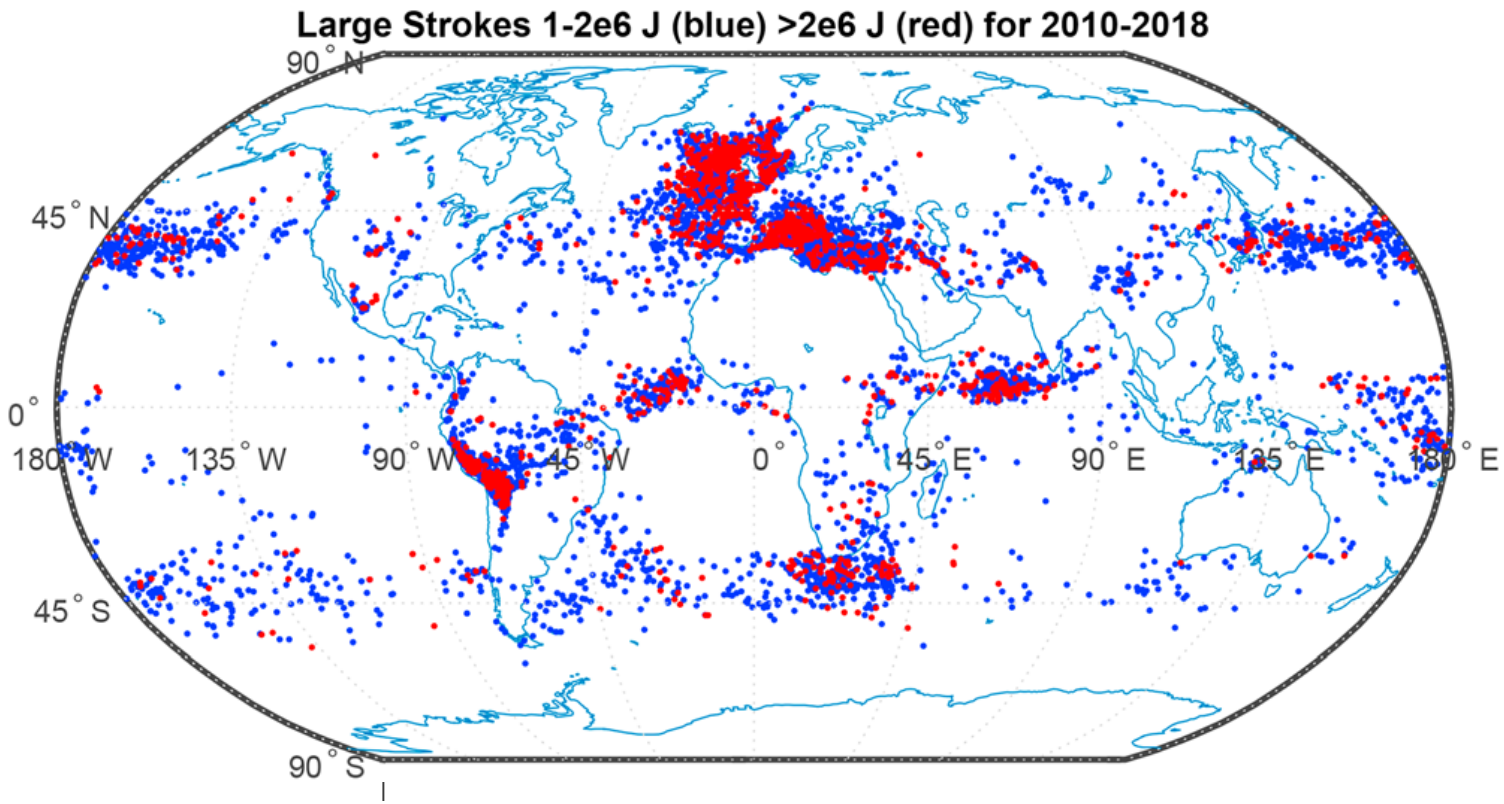
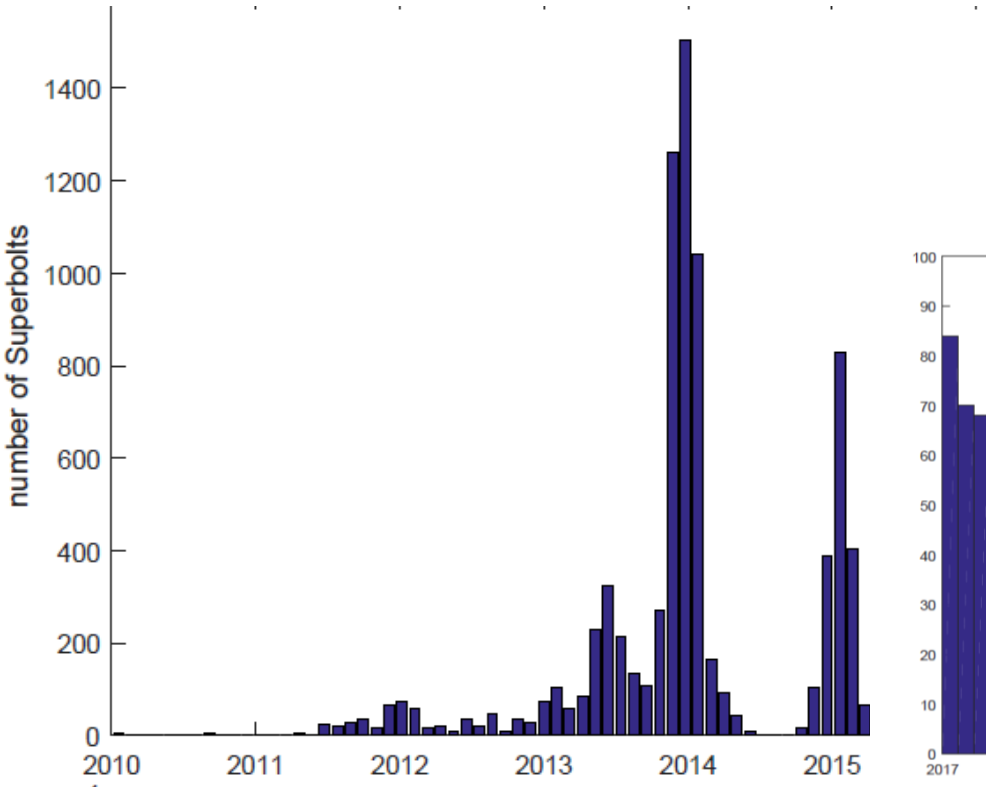
GLM optical power compared to RF measurements

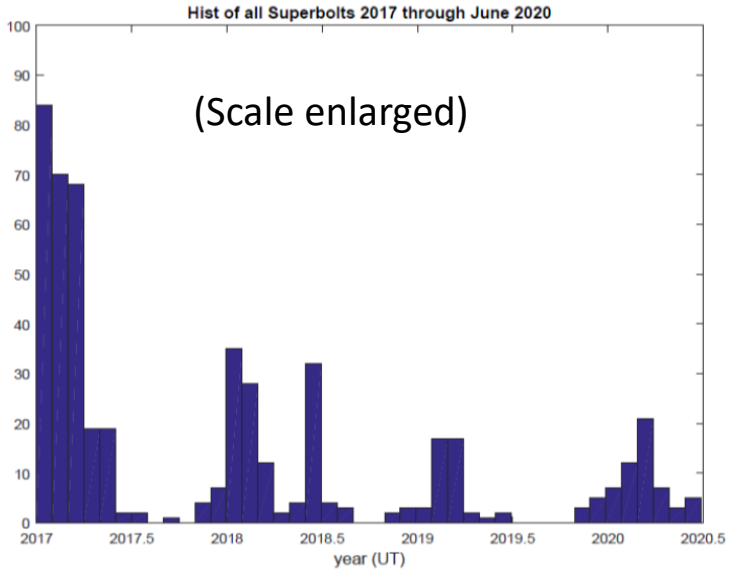
By R. Holzworth and M. McCarthy

Sept 2020

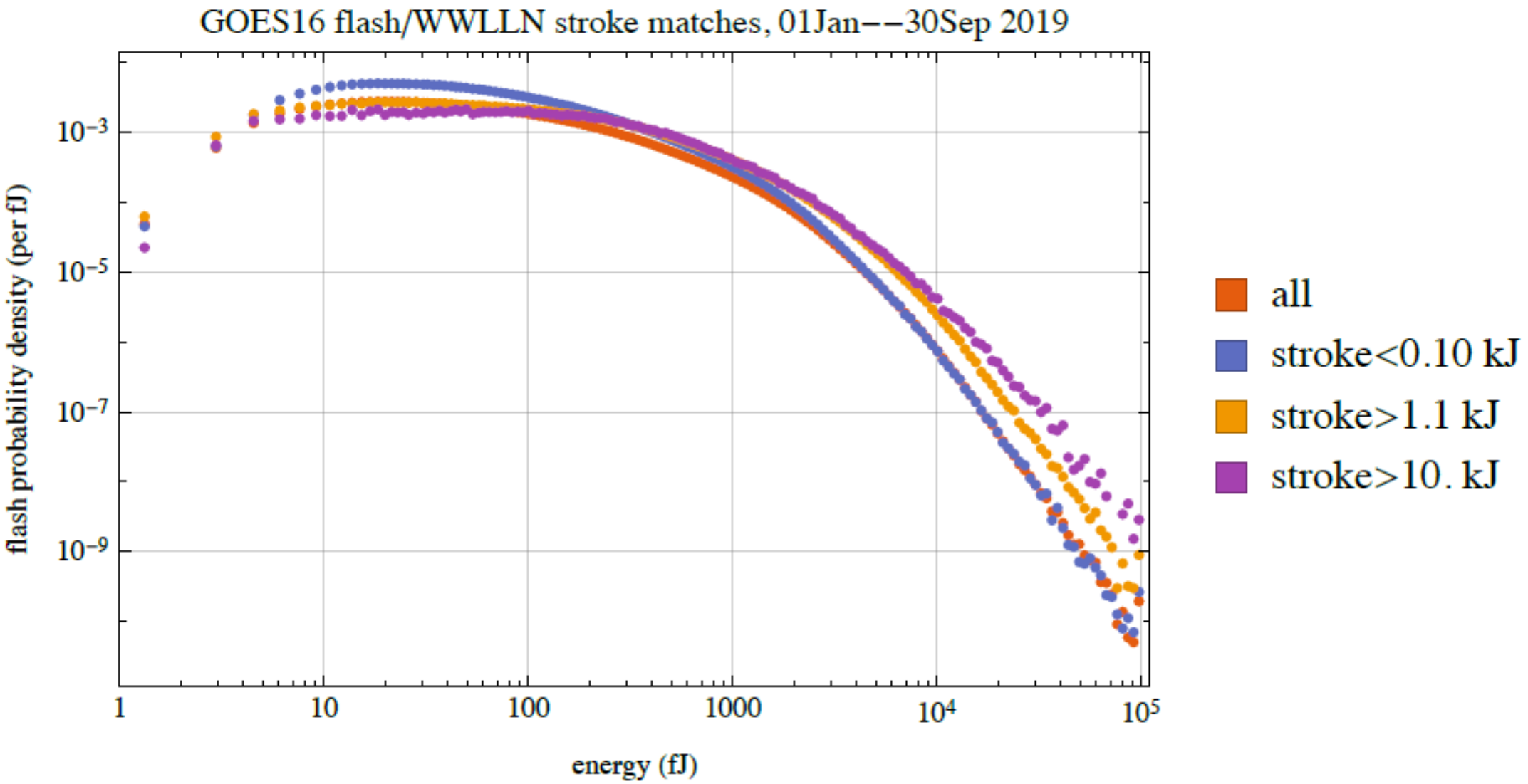
We examined Dec 2019, Jan & Feb 2020
For comparison of the largest GLM GROUPS with the largest WWLLN strokes





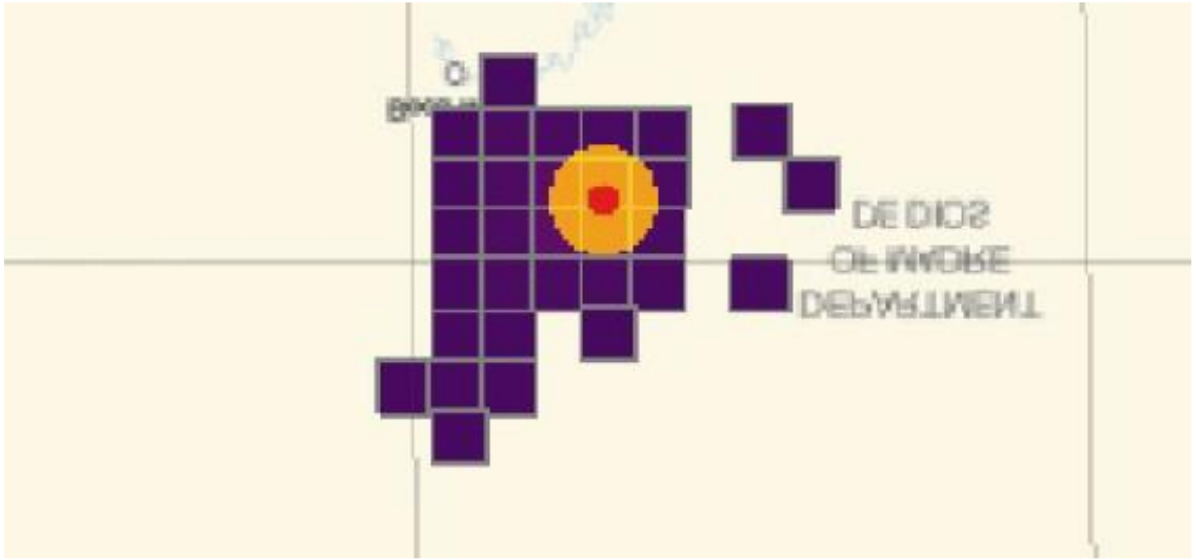


From Holzworth et al JGR 2019 we know that these months are the most likely to find the largest strokes, and that we expect that some will be in the GLM FOV

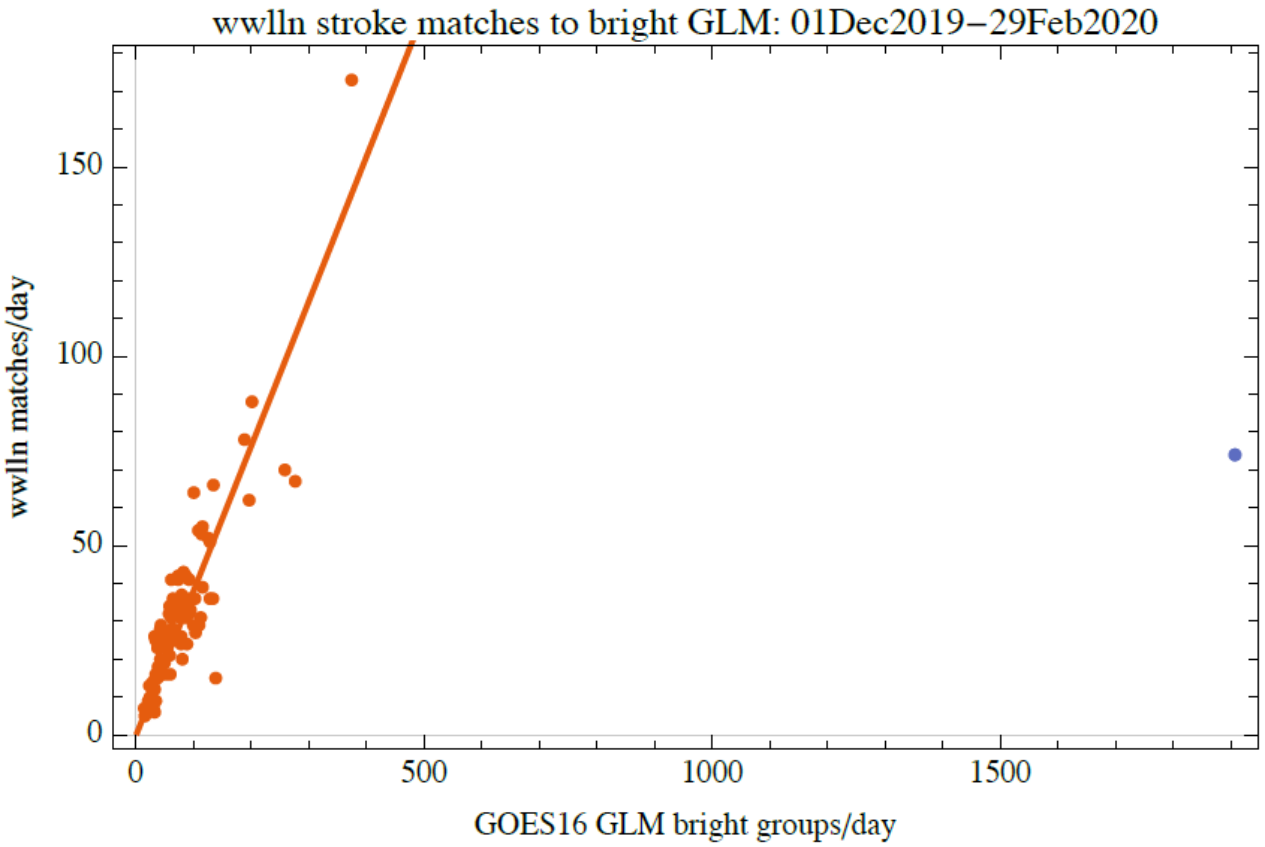


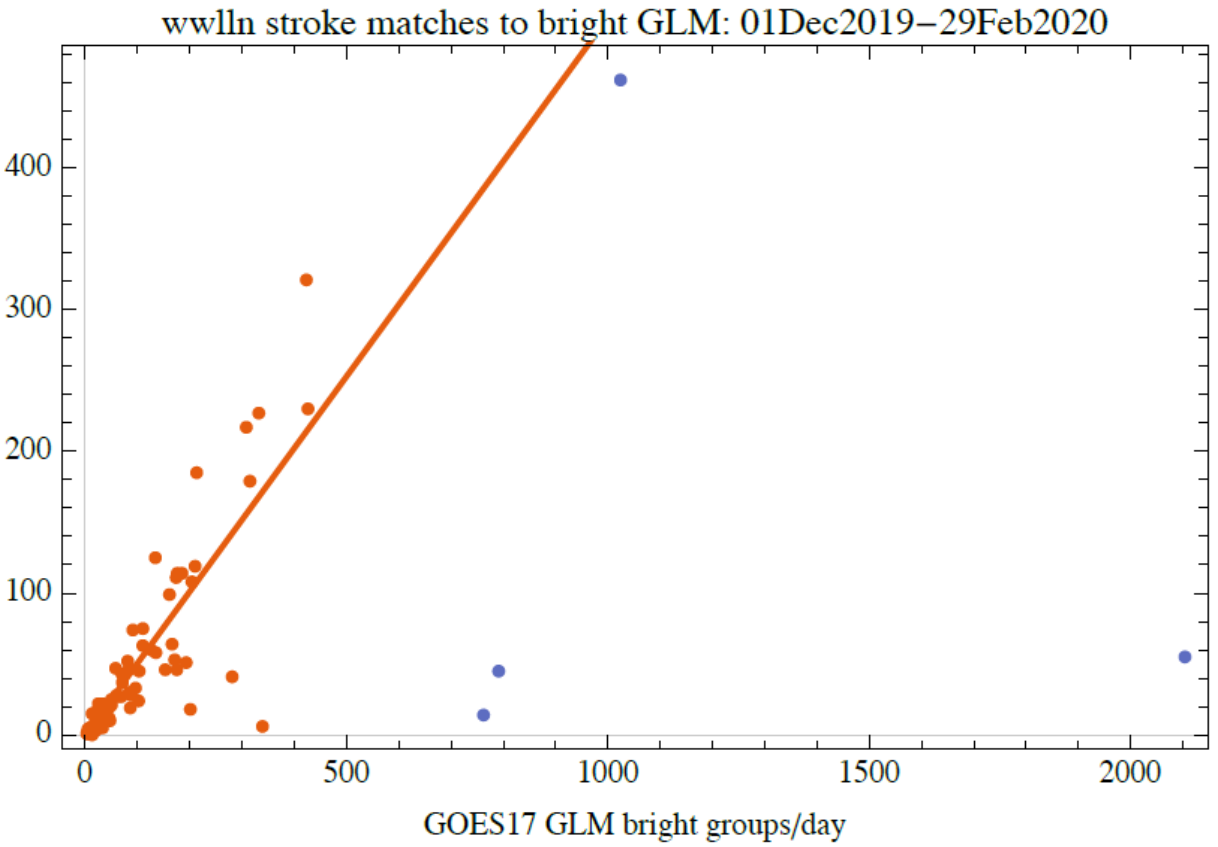
Last year at this meeting we showed that there is no strong relationship between GLM flash energy and WWLLN stroke energy. So that is why we looked at GROUPS this time

Last year we showed that we could find some WWLLN superbolts in the GLM data such as this example



But the optical energy of the GLM group was small – not at the high end of GLM optical energy





Bright Groups are above 35,000 raw units = ½ way of full range
Above 3.5 pJ of optical energy

In overlap FOV of BOTH GOES16 & 17
During Dec 2019, Jan & Feb 2020 (3 months)

Bright Groups (> 3.5 pJ optical energy)

GOES16 1328 groups GOES17 6668 groups (lots more!)

Matches seen by both

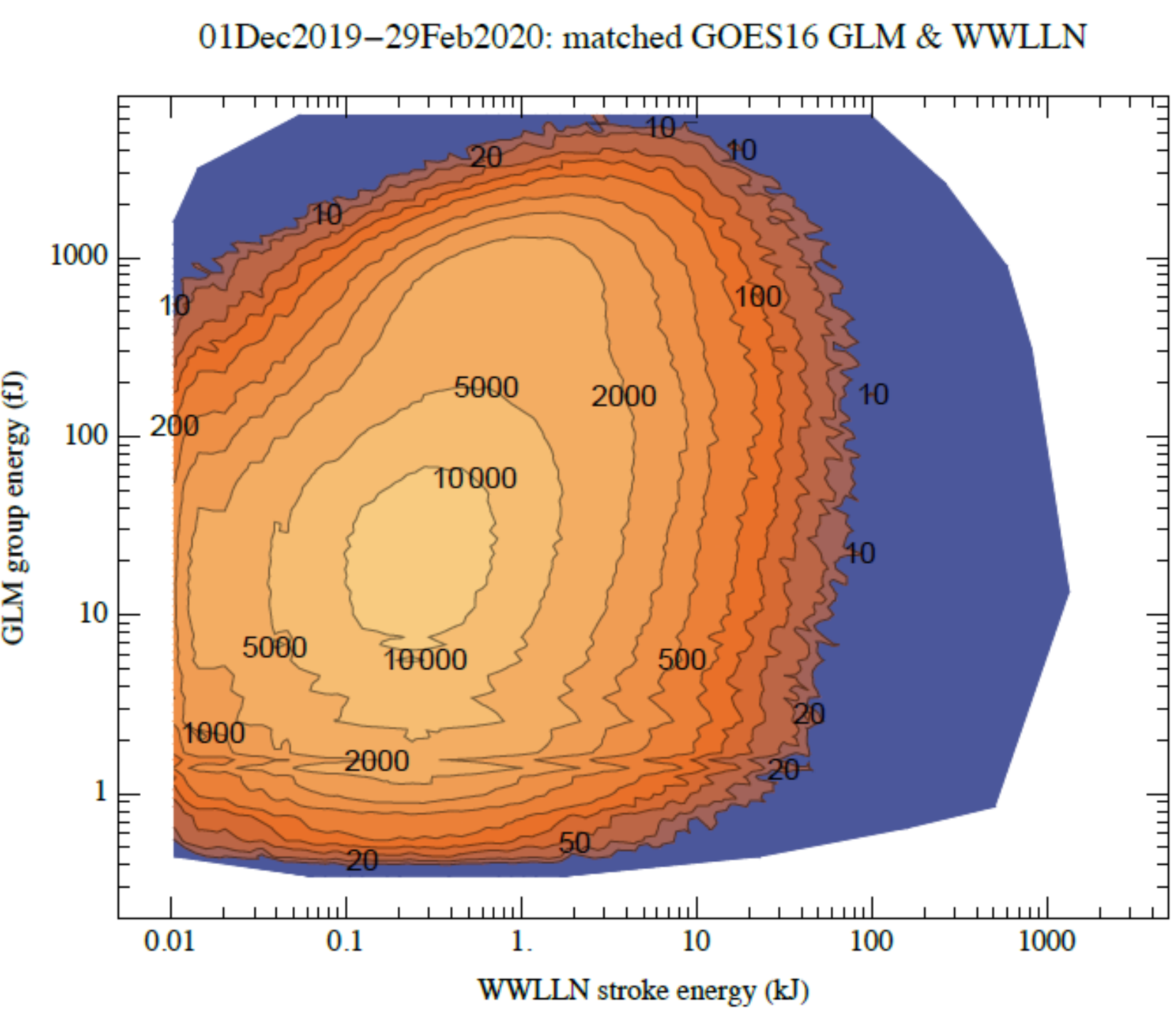
Space: centroid of Group is within 100^2 km around one of the centroid, includes the group centroid of the other

Temporal:

+/-1ms: 130 +/-2ms: 186 +/-3ms: 208 +/-4ms: 217 (matched groups)

Match fraction (GLM only)

GOES16 bright groups with GOES17 bright groups in overlap area is 15%,
GOES17 bright groups the matched rate is just 3%.



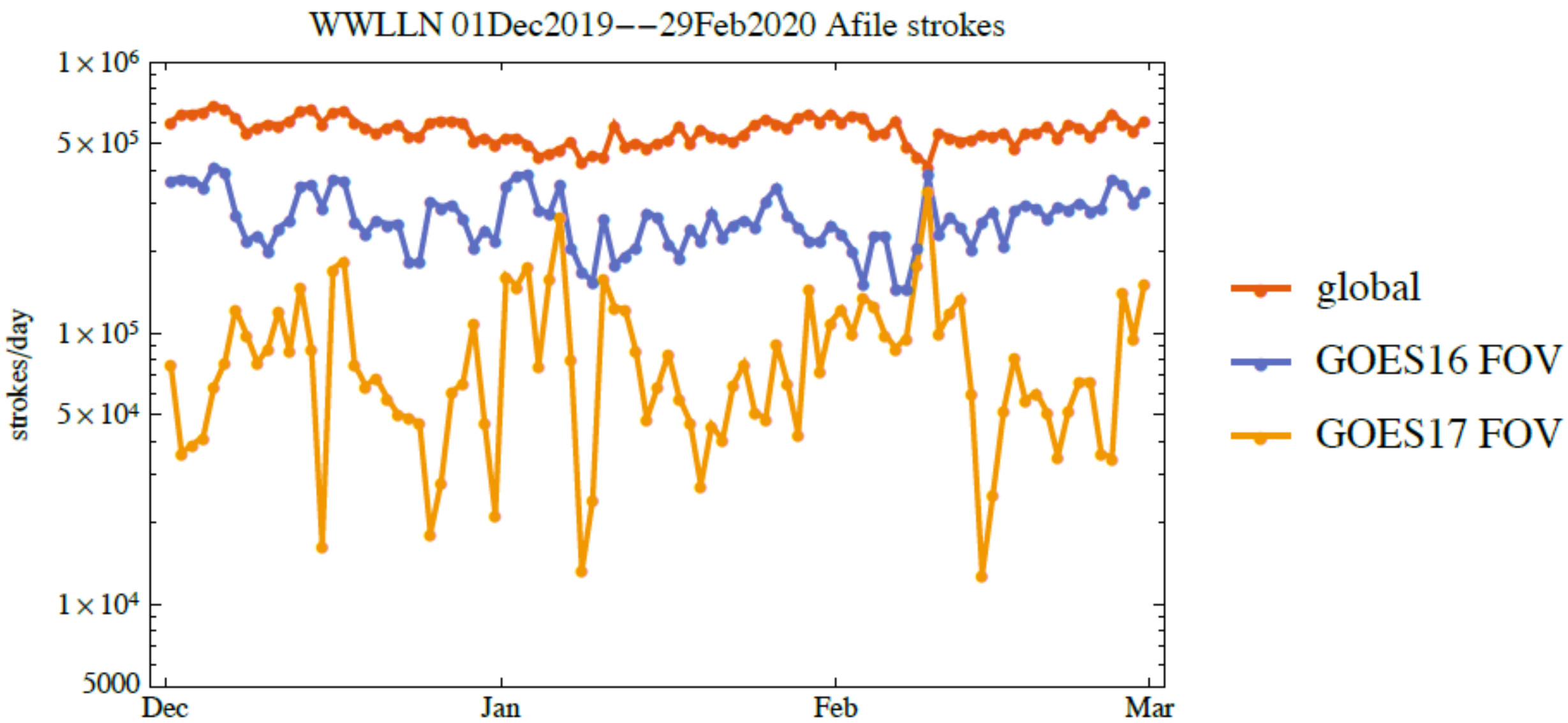
Very weak relation between GLM energy and WWLLN energy

Bright matches with WWLLN superbolts?
no matches of bright groups to any >100kJ WWLLN strokes.

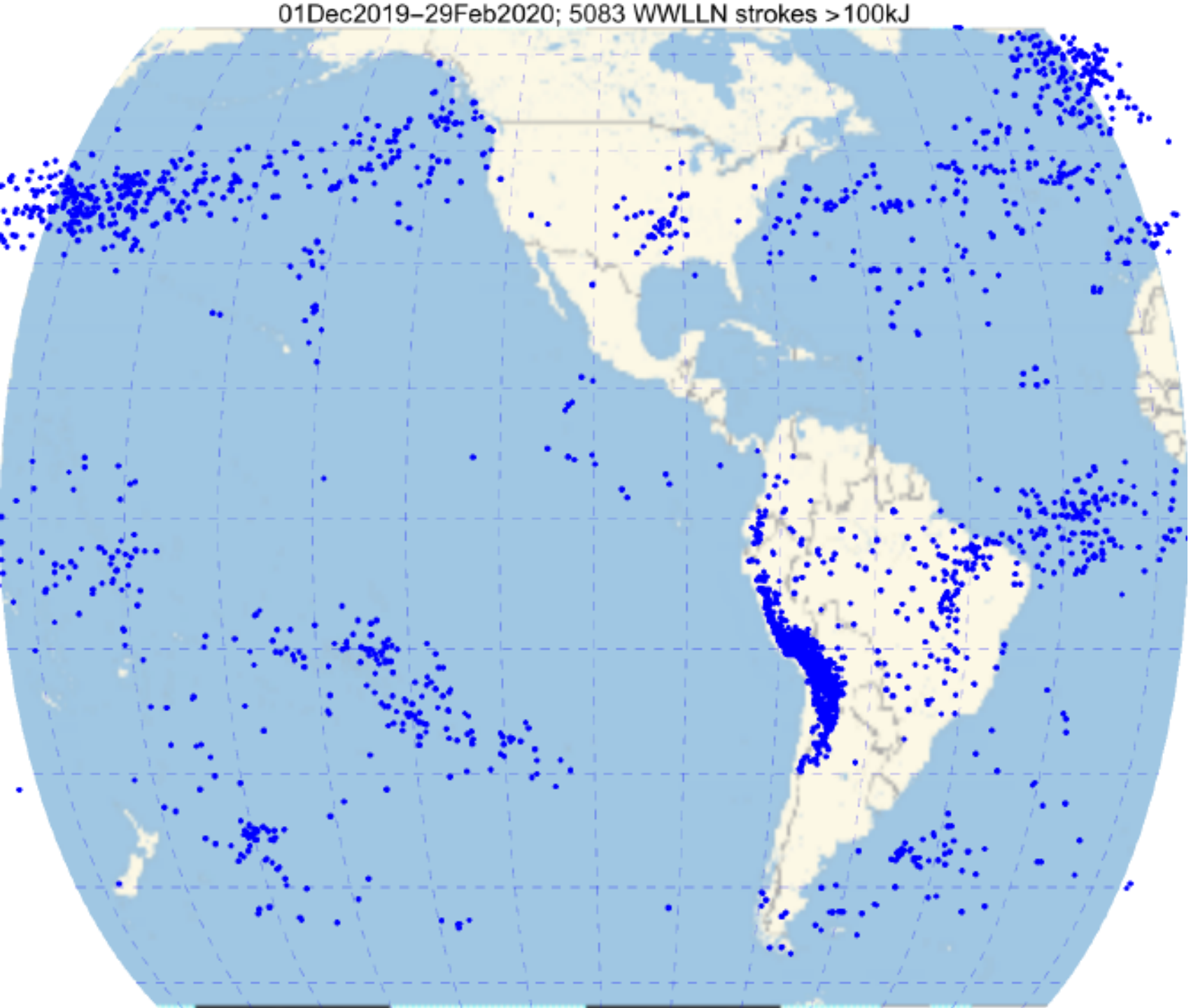
Thanks for listening!

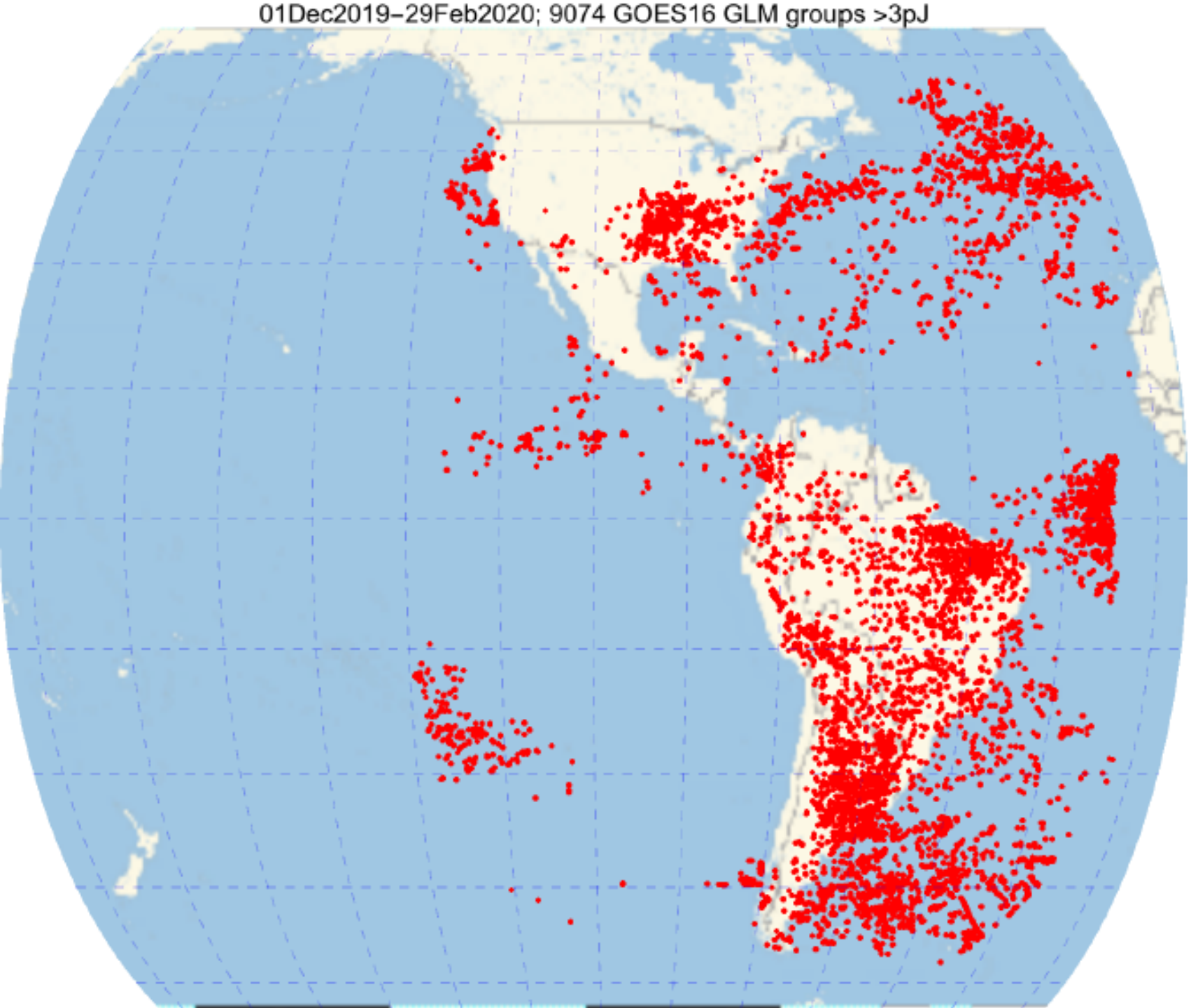
Questions?

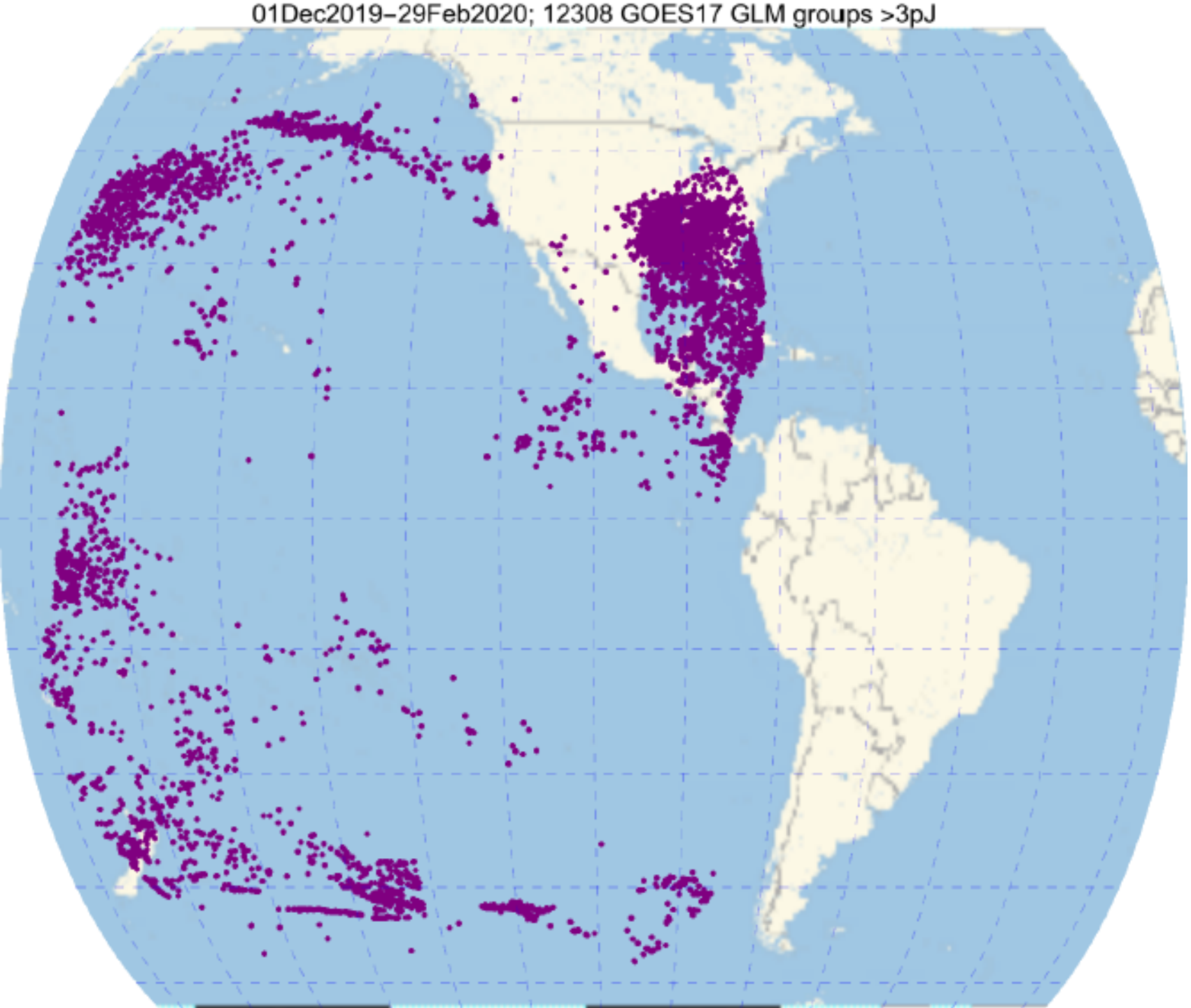
(or email me at bobholz@uw.edu)



Shows that GOES17 is seeing a very different, and more variable lightning enviroment


01Dec2019–29Feb2020; 5083 WWLLN strokes >100kJ


01Dec2019–29Feb2020; 9074 GOES16 GLM groups >3pJ


01Dec2019–29Feb2020; 12308 GOES17 GLM groups >3pJ