

GLM and STARNET/LINET/Tower measurements in South America: Cross Validation and IC/CG ratio

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<http://www.starnet.iag.usp.br>

GLM Science Meeting – September 8th 2020

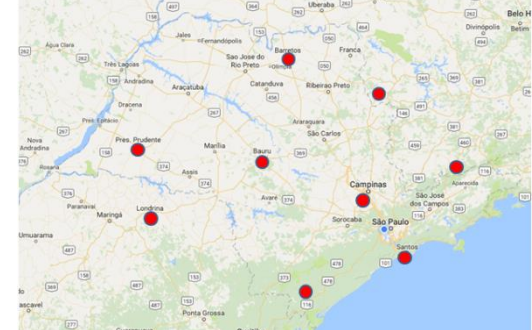
Ground Validation Dataset

- **STARNET** - VLF LONG RANGE LIGHTNING DETECTION NETWORK IN SOUTH AMERICA
- **13 SENSORS**
- **LOCATION ACCURACY:** 2-5 km
- **DETECTION EFFICIENCY:**
30-39% Strokes and 50-70% Flashes.



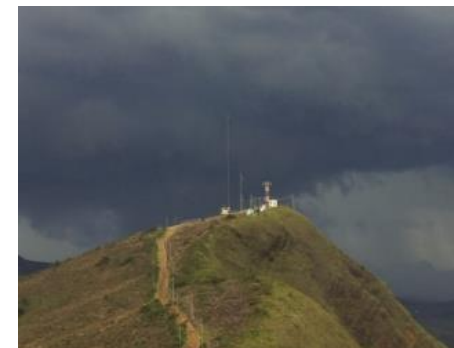
- **LINET** - VLF/LF Total lightning detection system
- **9 SENSORS** - STATE OF SÃO PAULO
- **LOCATION ACURRACY:** 0.5-2 km
- **DETECTION EFFICIENCY:**
Estimated: 80-90% CG - **30% IC strokes**

Cooperation with DLR+NOWCAST



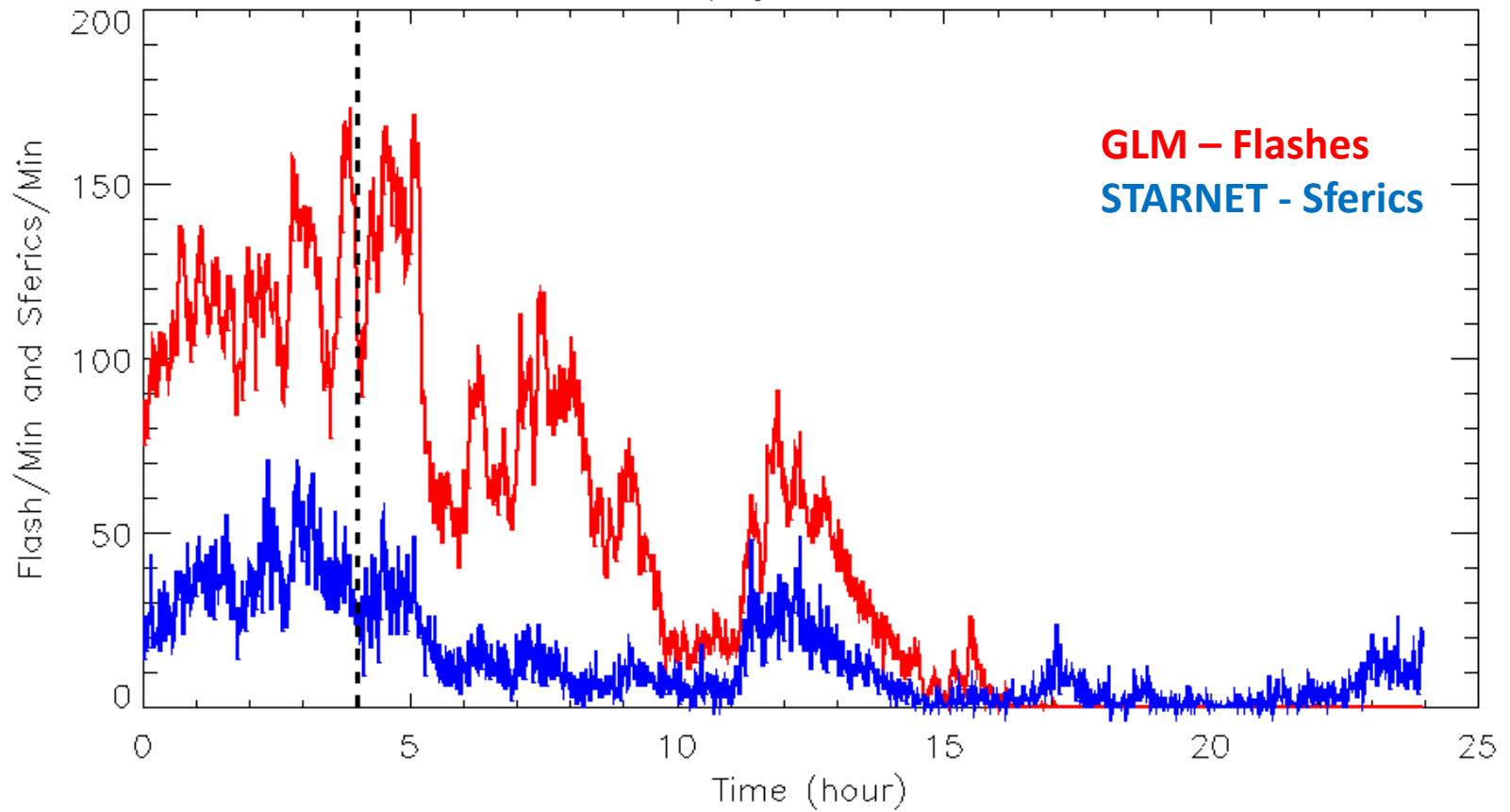
MCS - Morro do Cachimbo Station

- **60 meter tall tower at 1,430 m sea level**
20°000´S and 43°580´W
- Lightning current, slow/fast E-Field and
Fast lightning video camera



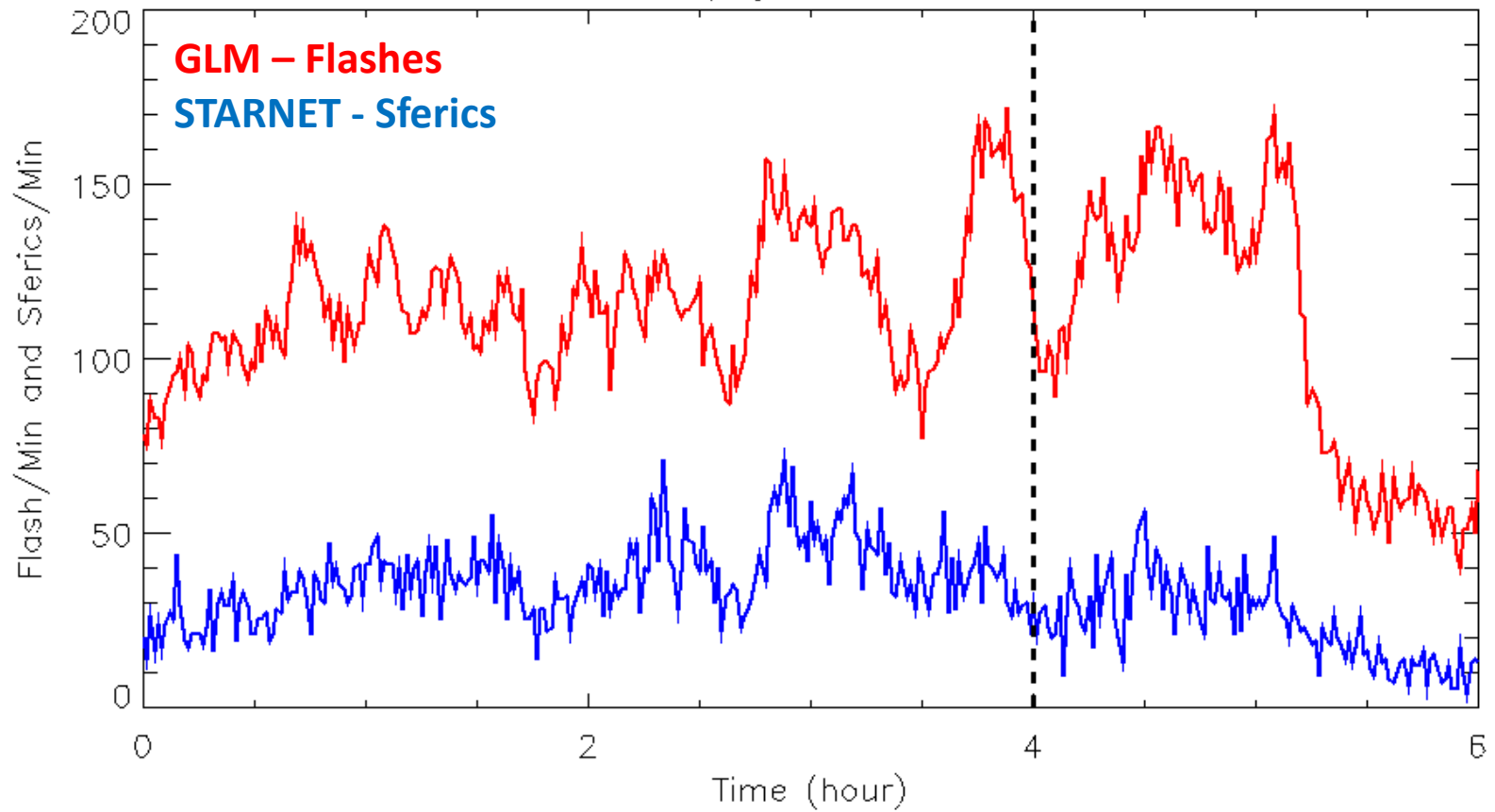
Tornado: F3/F4

Cochila and Tapejara-RS 2018-06-12

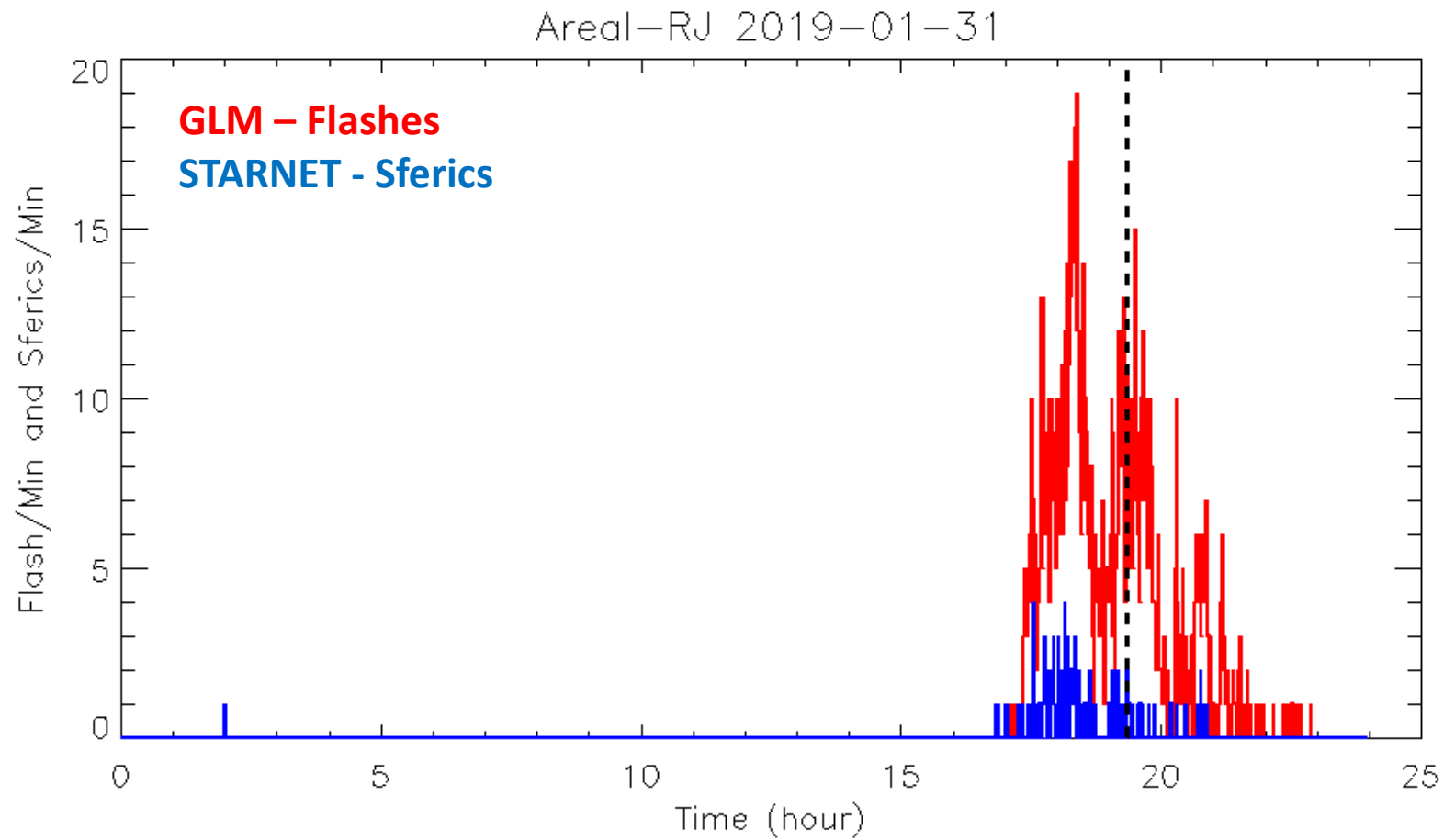


Tornado: F3/F4

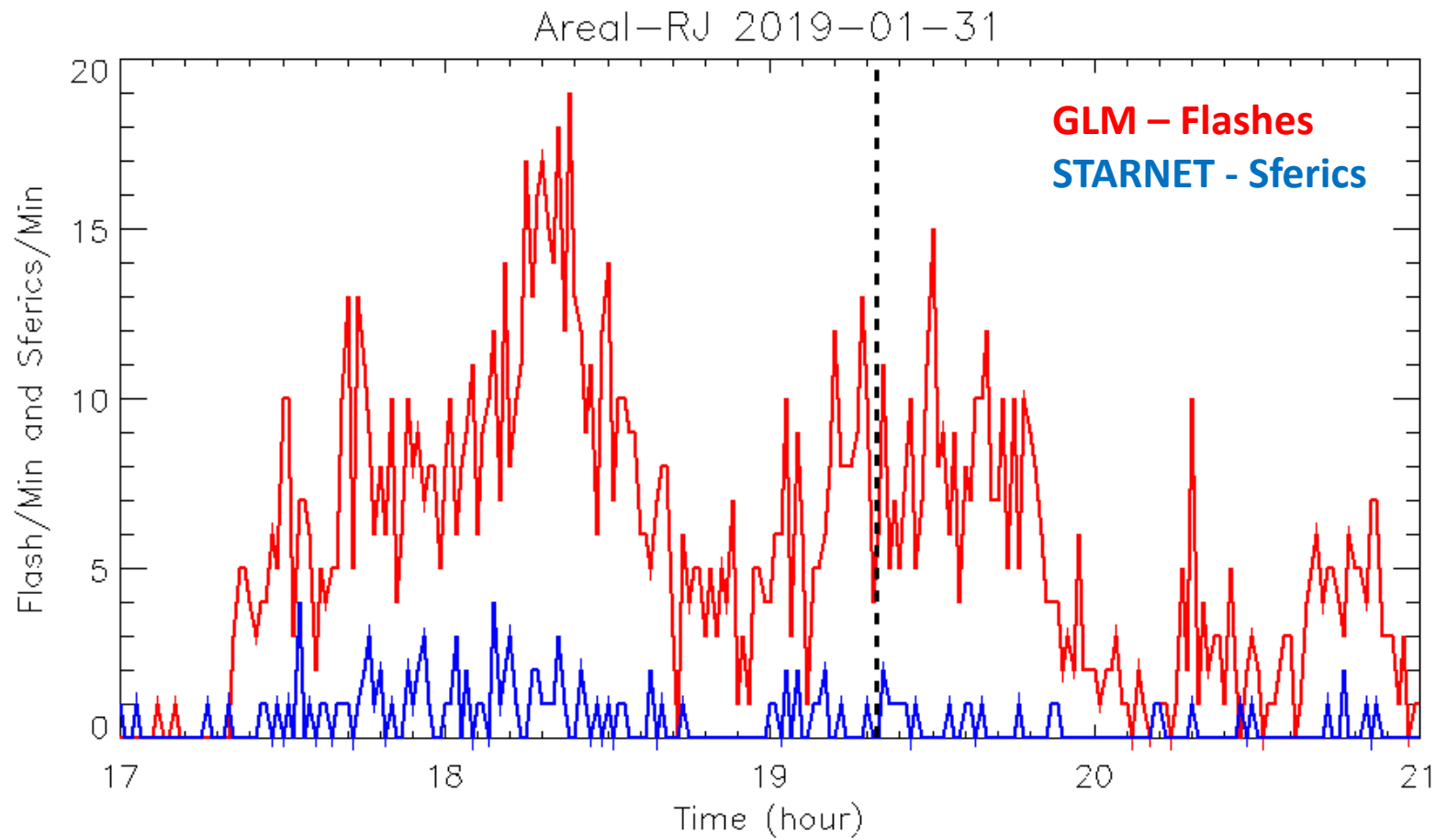
Cochila and Tapejara-RS 2018-06-12



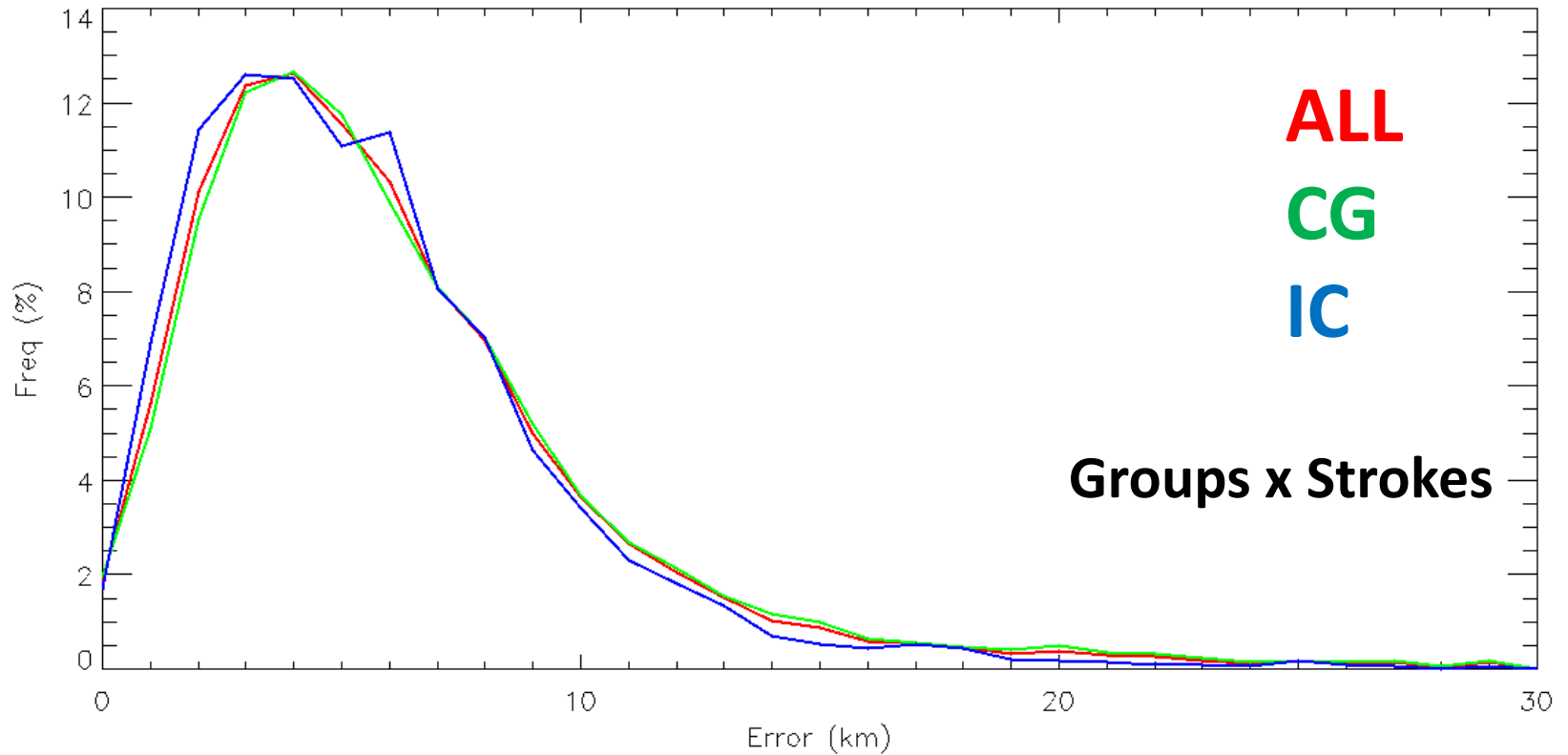
Tornado: F2



Tornado: F2

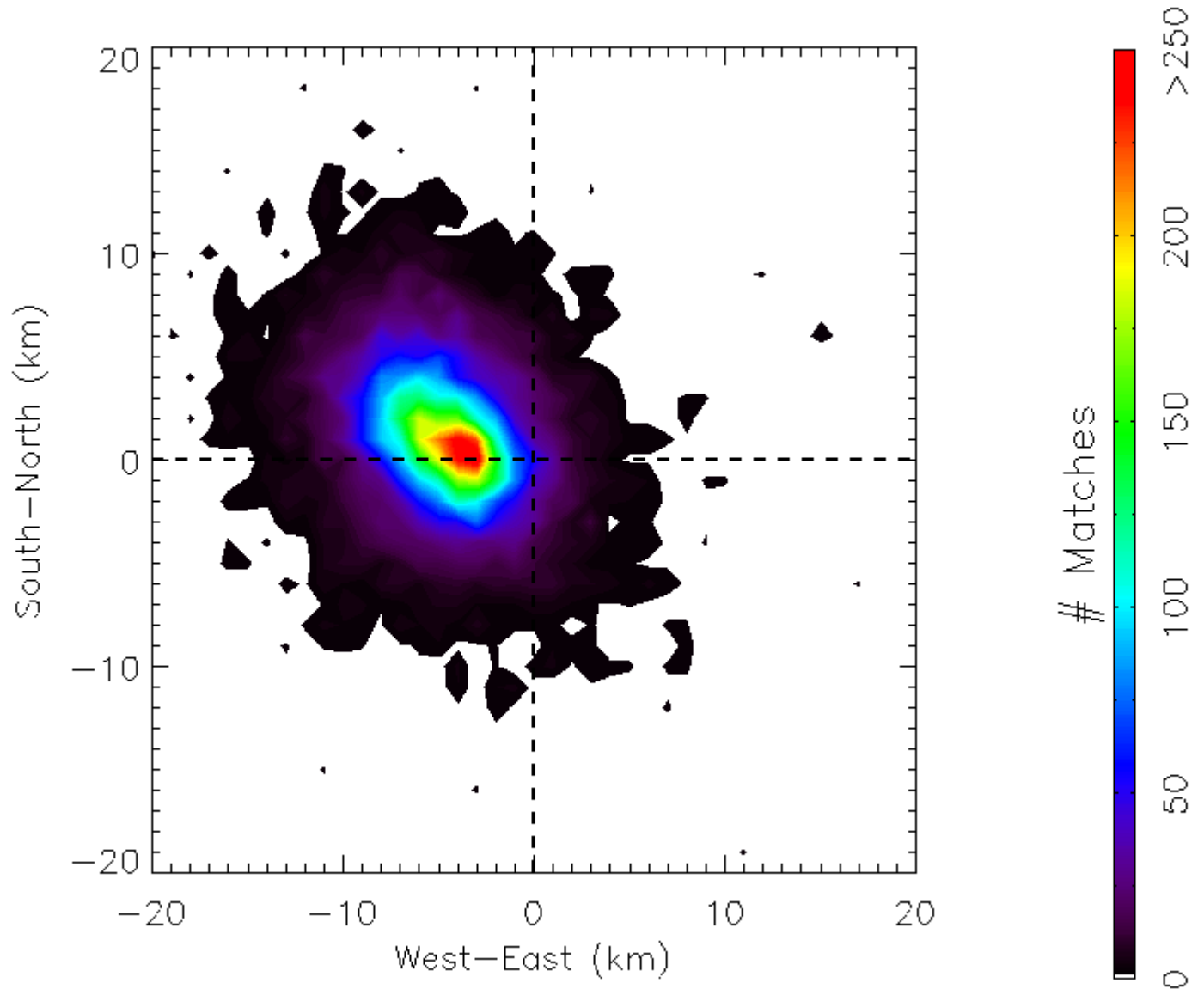


Location Differences: GLMxLINET

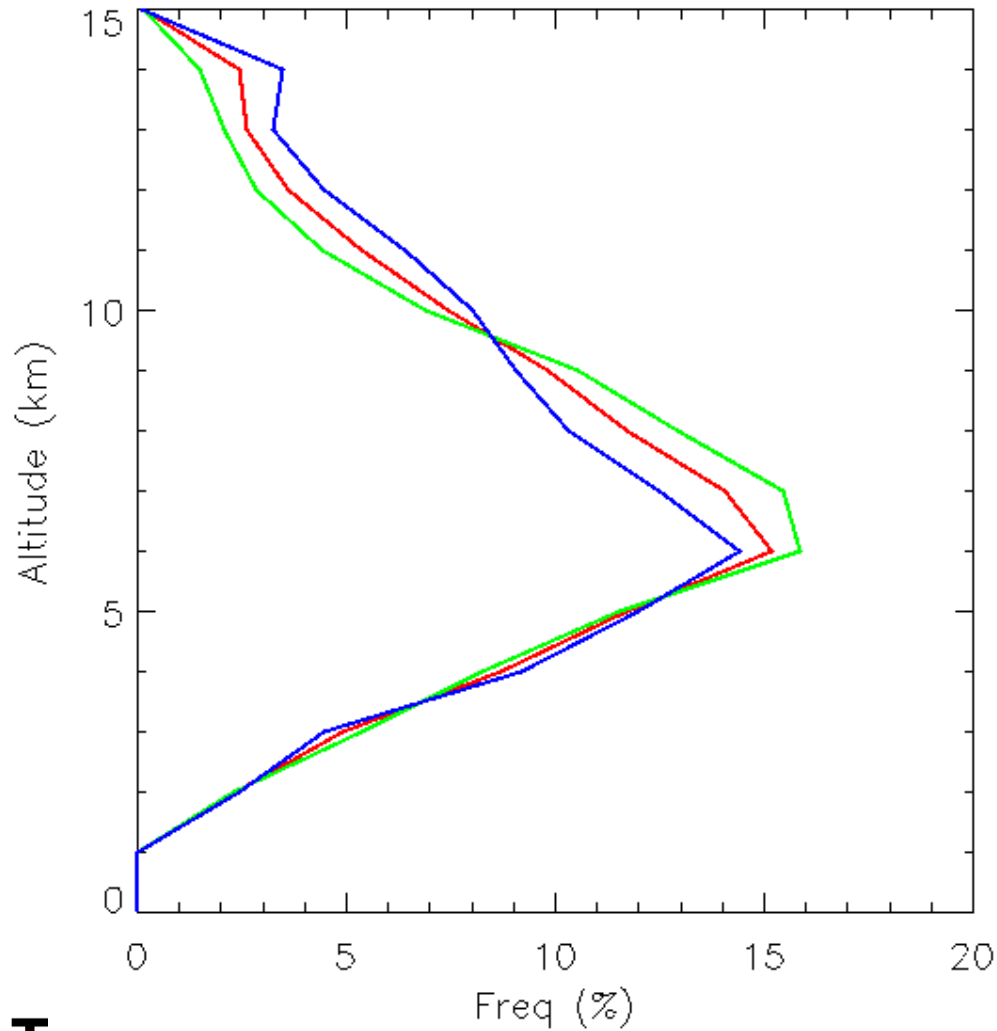


Groups/Strokes	All	CG	IC
Matches	13,861	9,318	4543(4203)
Difference (km)	6.52	6.71	6.12

Location Differences: GLMxLINET

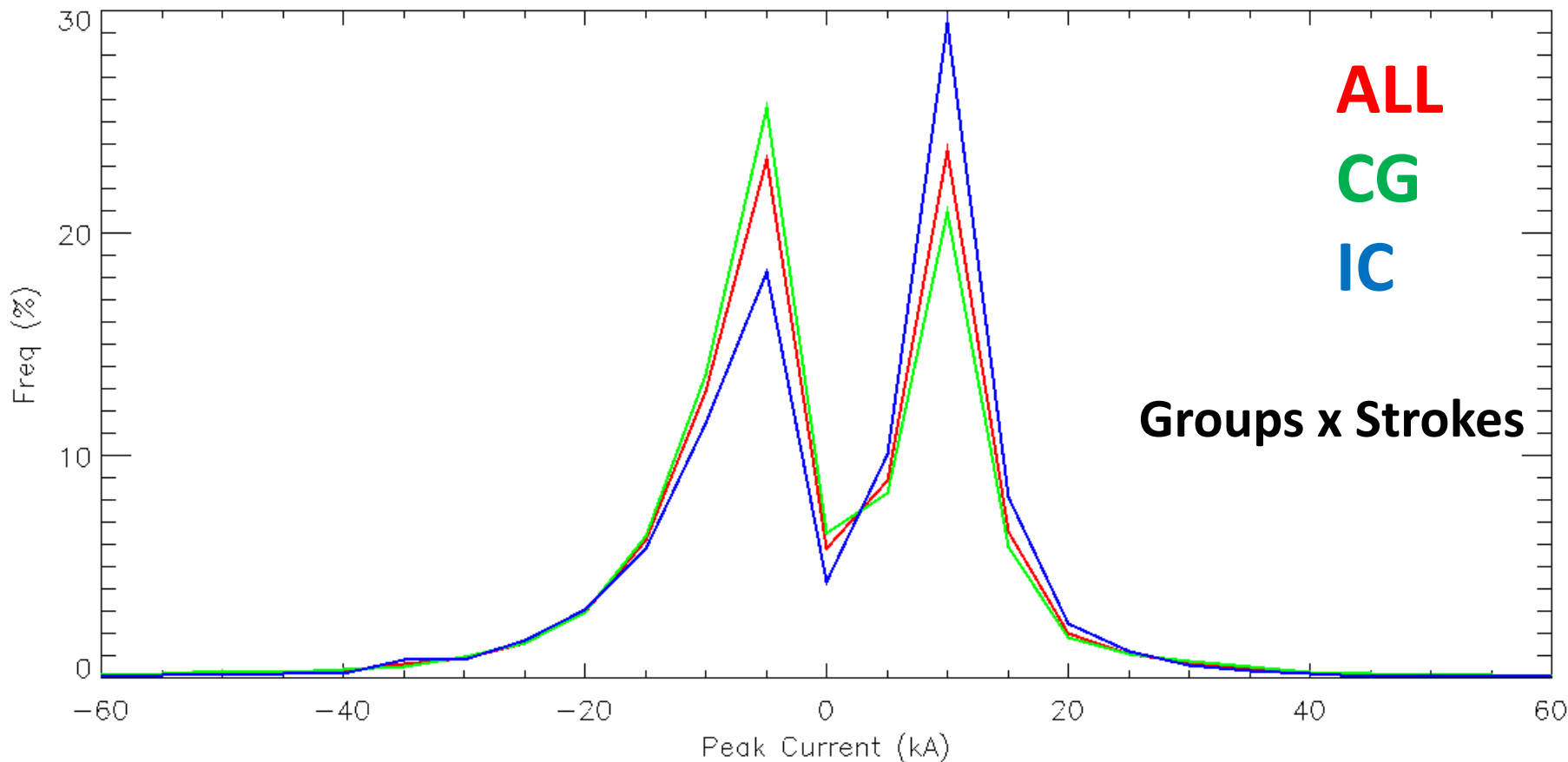


IC height distribution



ALL - 7.76 km
IC+ - 7.59 km
IC- - 7.94 km

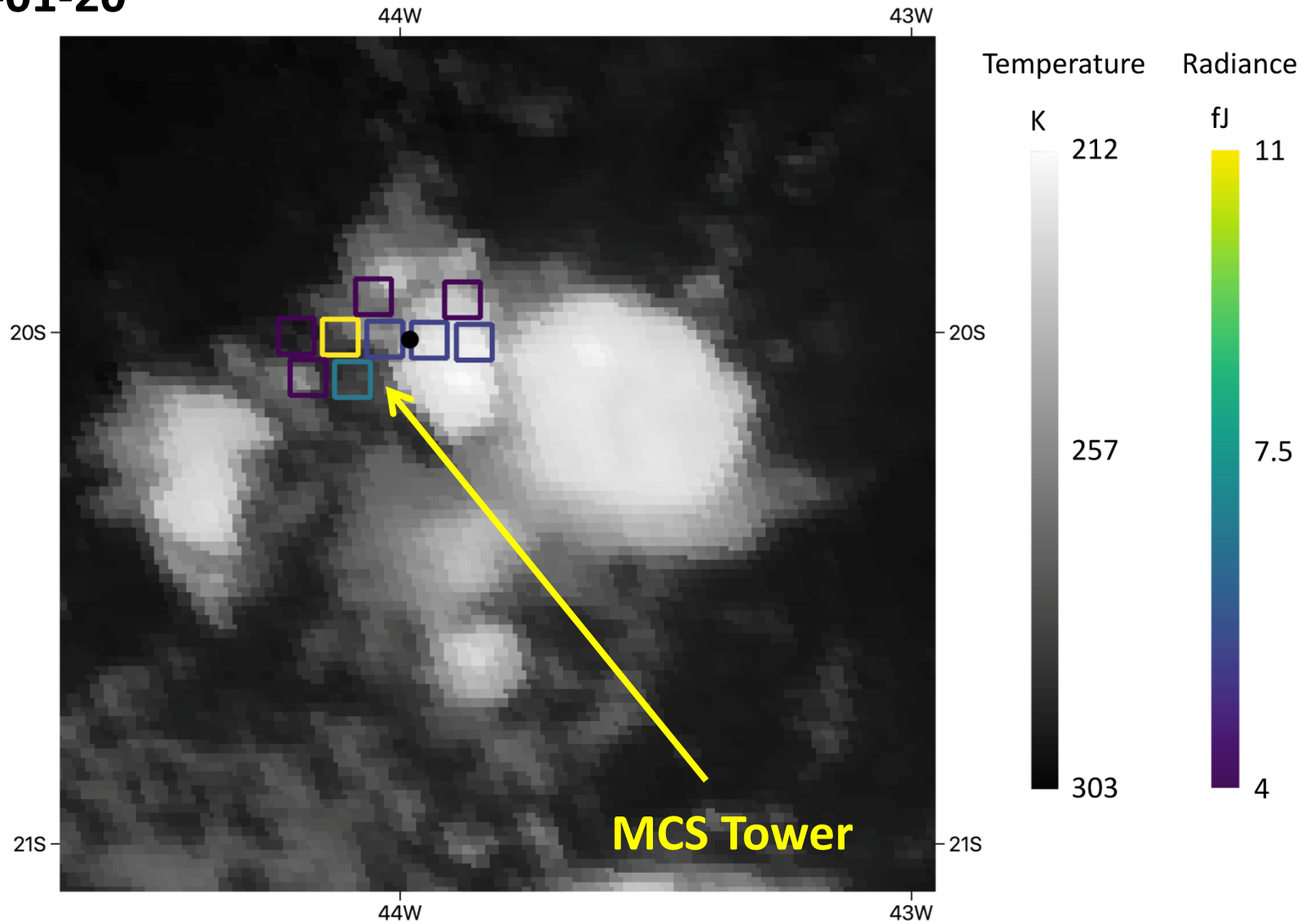
Peak Current Distribution



Groups/Strokes	All	CG	IC
Matches – Pos(Neg)	6,136(7,725)	3,752(5,566)	2,224(1,979)
Peak Current (kA)	9.61(-12.75)	9.86(-12.58)	9.26(-13.13)

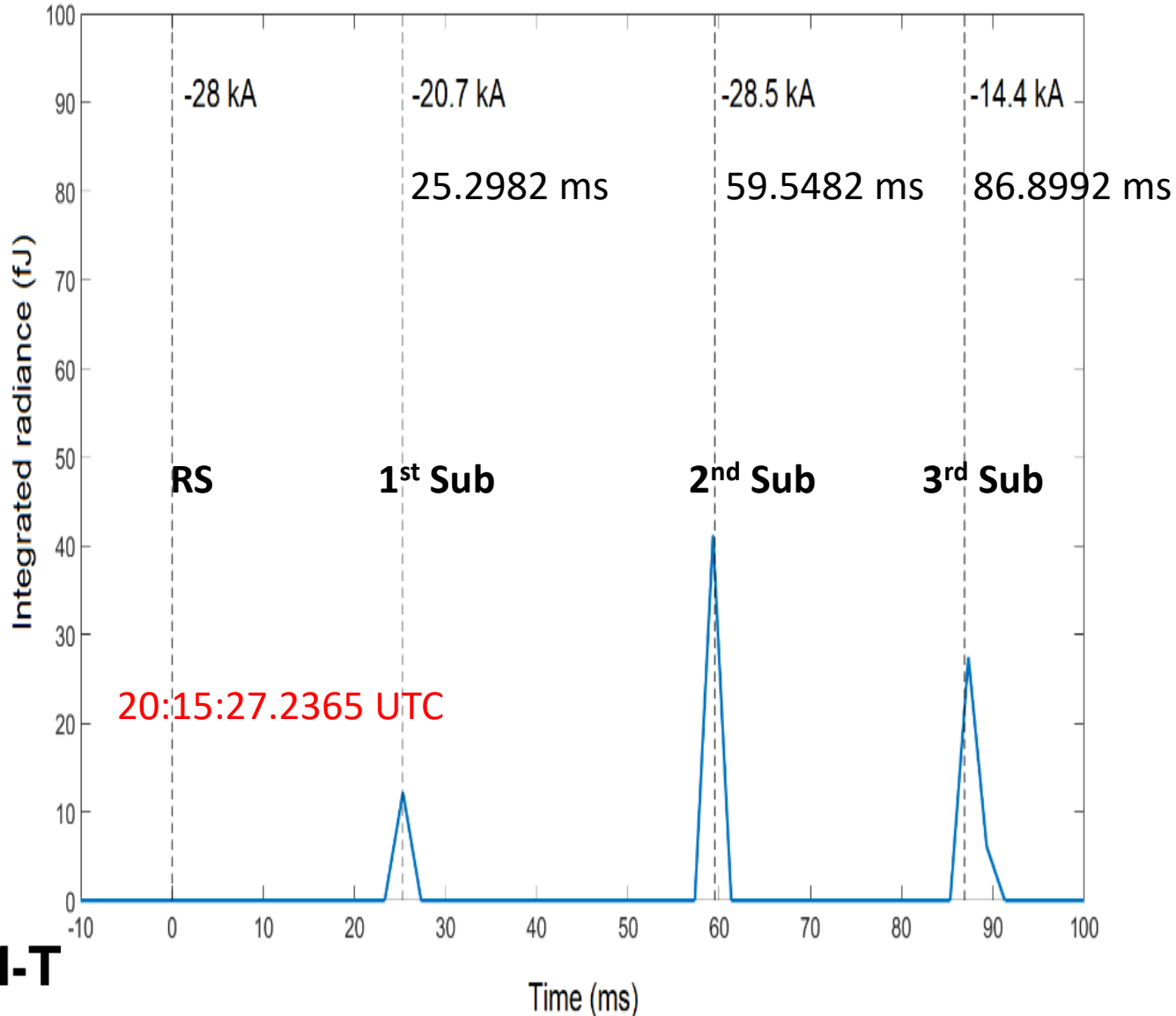
Stroke description: GLMxMCS Tower

2019-01-20



Stroke description: GLMxMCS Tower

GLM radiance and measured peak currents at Morro do Cachimbo station



CONCLUSIONS

- NEXT STEPS:
 - *SEVERE WEATHER ANALYSIS – GLM/STARNET*
 - *EVALUATE FLASHES AND GROUPS – TOWERS*
 - *RADIANCES X PEAK CURRENT*
 - DESCRIMINATE HEIGHT DISTRIBUTIONS – GLM/LINET
 - DEPLOY INTERFEROMETRY AND LMA NET IN SP
 - Integrate with existing Slow/Fast Antennas, Fast video cameras, MRR+XPOL+SPOL radar measurements