COMPARATIVE ANALYSIS OF BRASILDAT TOTAL LIGHTING NETWORK FOR ~~THE VALE DO PARAIBA~~ CHUVA CAMPAIGN

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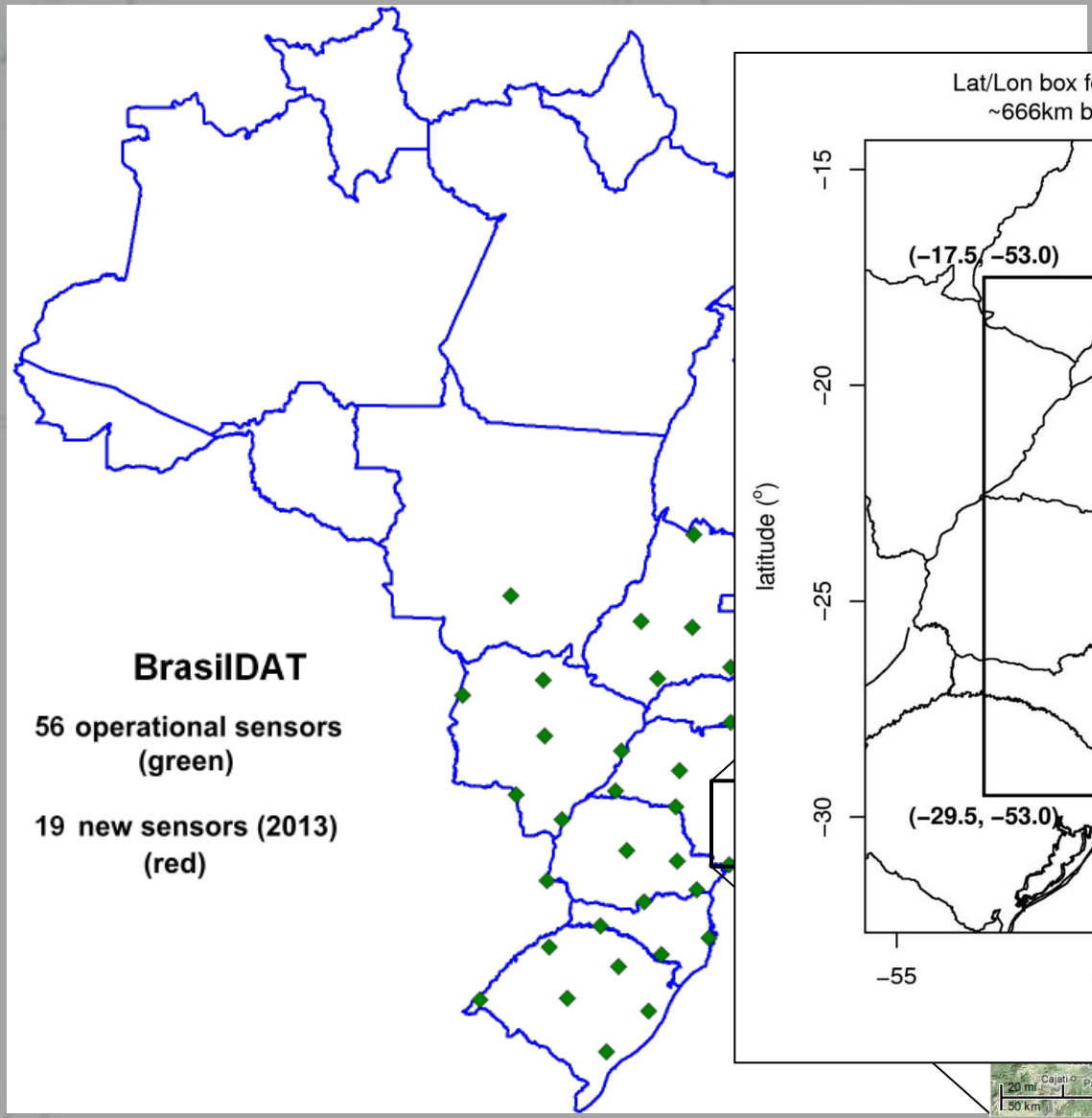
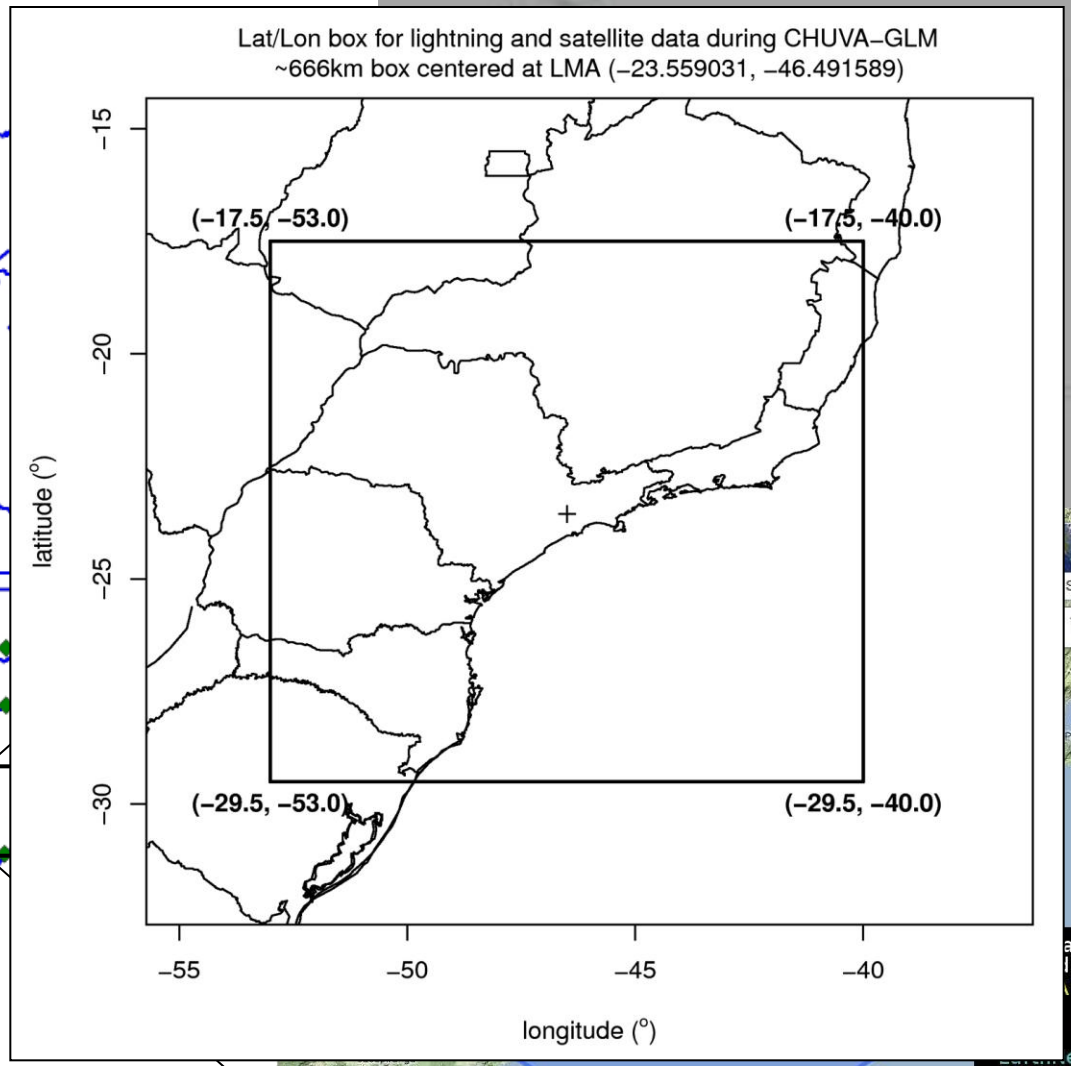
About BrasilDAT (1/2)

- BrasilDAT is a total lightning (TL) detection network system manufactured by EarthNetworks that uses wide-band sensors and time-of-arrival (TOA) method of detection. In our present time with GPS timing capabilities, the TOA methodology has become increasingly more accurate.
- The EarthNetworks Lightning Sensor (ENLS) was designed and built to reduce system noise and to broaden the frequency range (from 1Hz to 12MHz) in order to create an integrated unit capable of detecting both CG and IC discharges.
- The ENLS transmit the whole waveforms of every event to the central processing (CPMS). The recorded waveforms are extremely useful in lightning research since they can be used to study particular events such as narrow bipolar pulses, upward triggered lightning, compact IC discharges, etc.

About BrasilDAT (2/2)





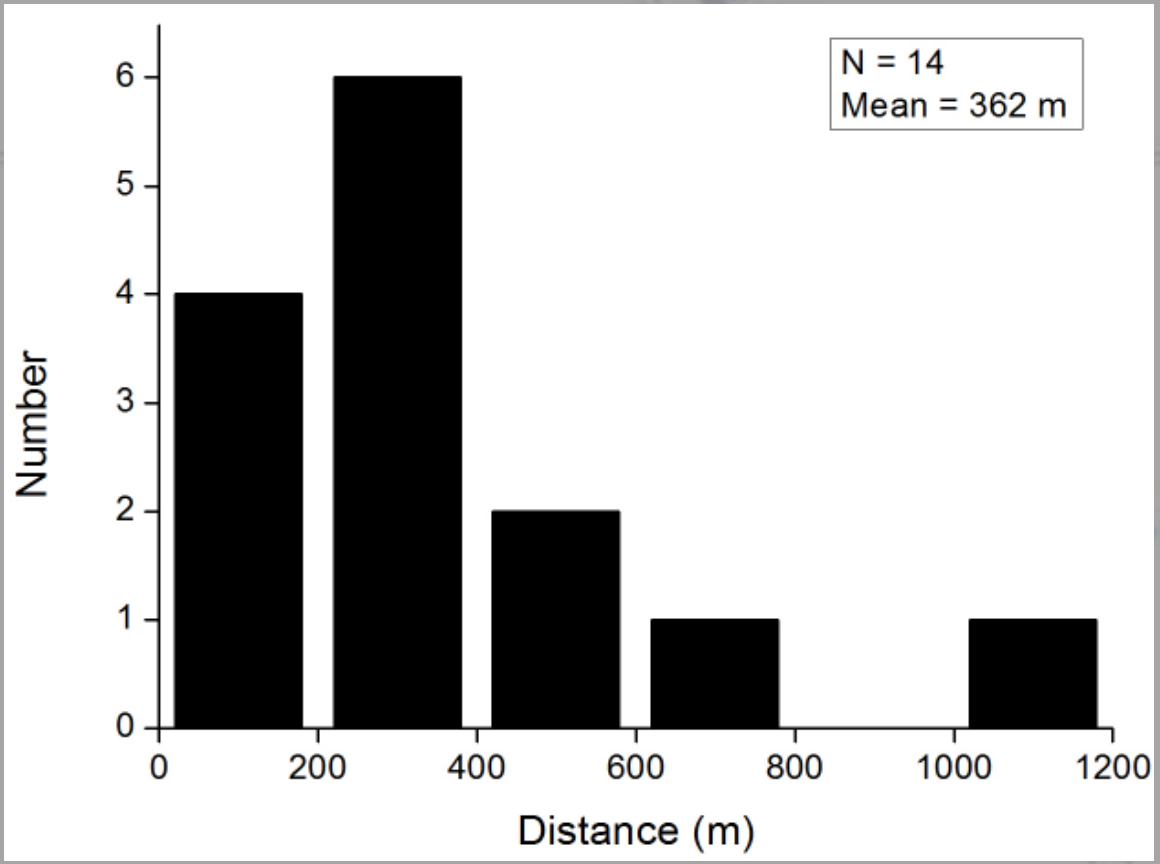
First DE Evaluation

	# CG flashes	# CG strokes	CG Flash DE	CG Stroke DE
RAMMER videos	188	733	-	-
BrasilDAT solutions	166	392	88%	54%

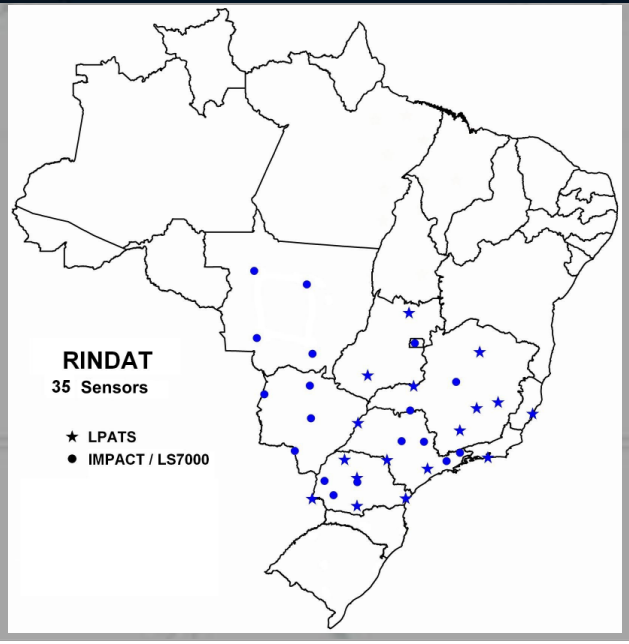
Stroke order (multiplicity)	1	2	3	4	5	6	7	8	9	10	11	12	13	15	16	18	20
RAMMER CG flashes	58	36	25	15	16	10	4	1	3	3	2	4	5	2	2	1	1
BrasilDAT CG flashes	46	33	24	12	14	10	4	1	3	3	2	3	5	2	2	1	1
CG Flash DE (%)	79	91	96	80	90	100	100	100	100	100	100	75	100	100	100	100	100

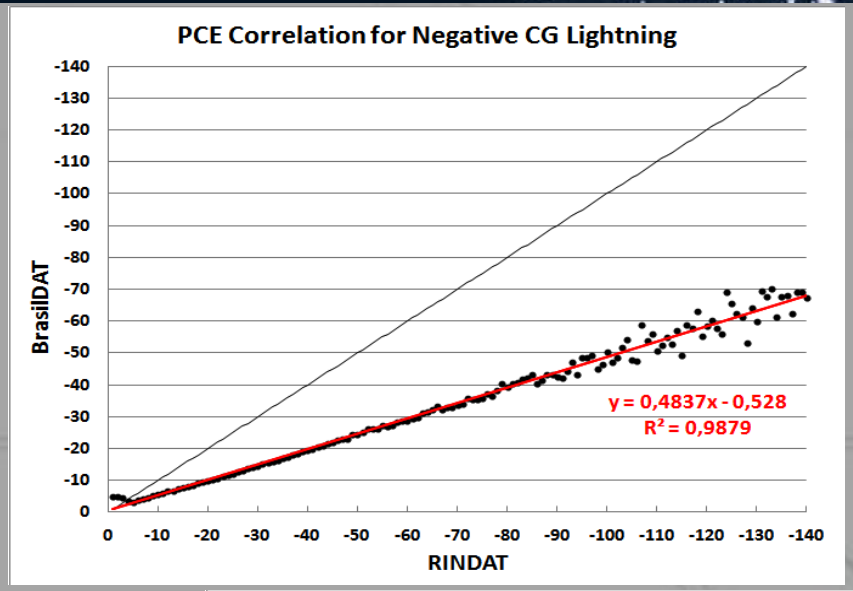
First LA Evaluation

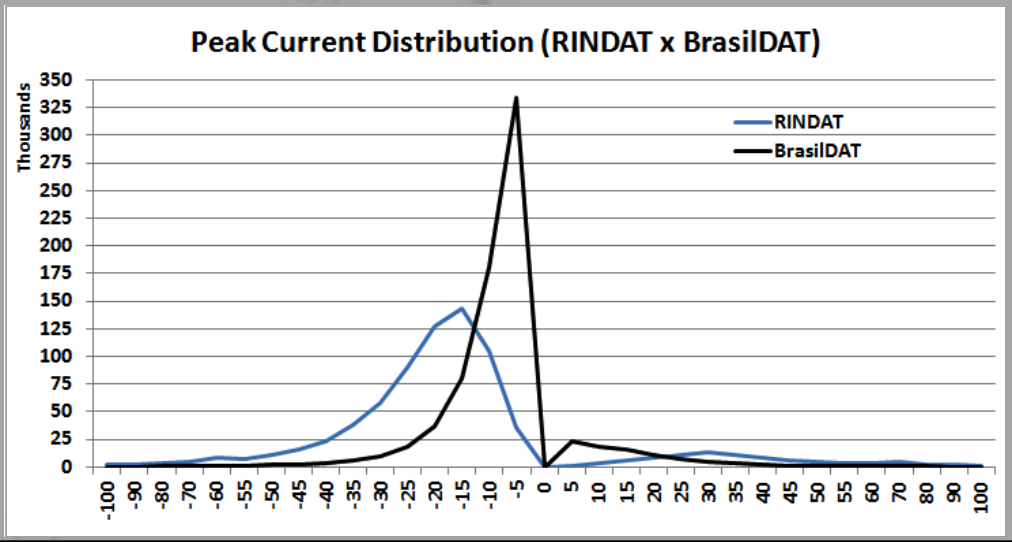
- 16 upward lightning flashes from the 2 towers on Jaraguá Mountain were observed during a thunderstorm at October 29th, 2012. From those, 14 events were detected by BrasilDAT (87,5%)
- For 10 events, the location error is lower than 400m!!
- Upward lightning events can present unusual waveforms or WF similar to CG subsequent strokes

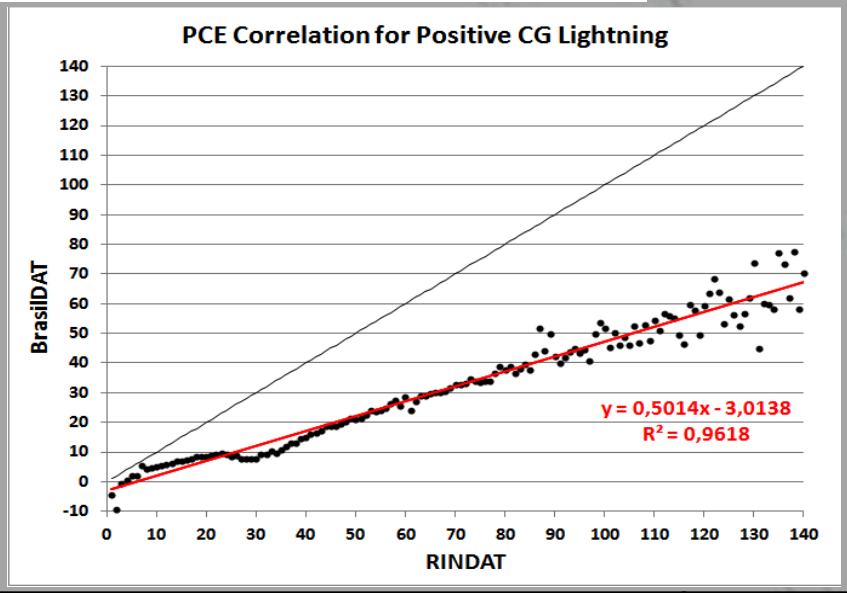


First Peak Current Evaluation







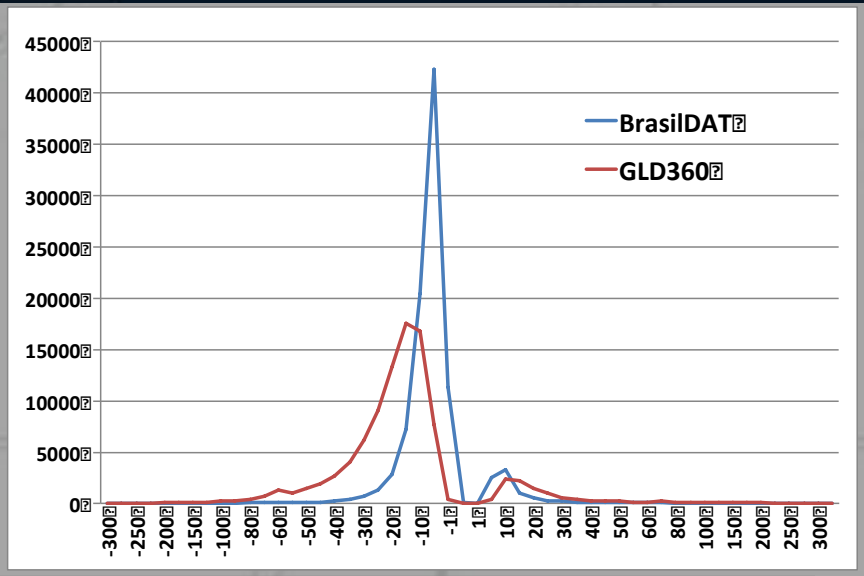


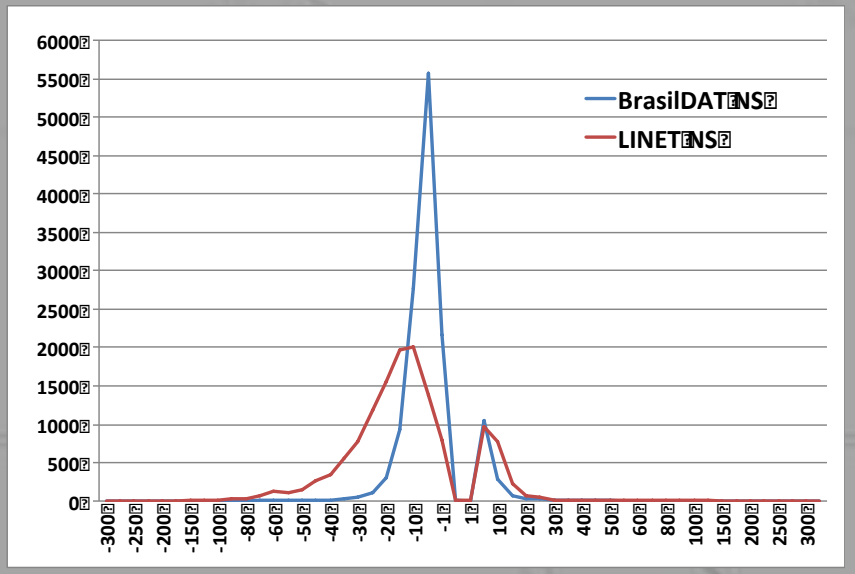
Lightning Detection

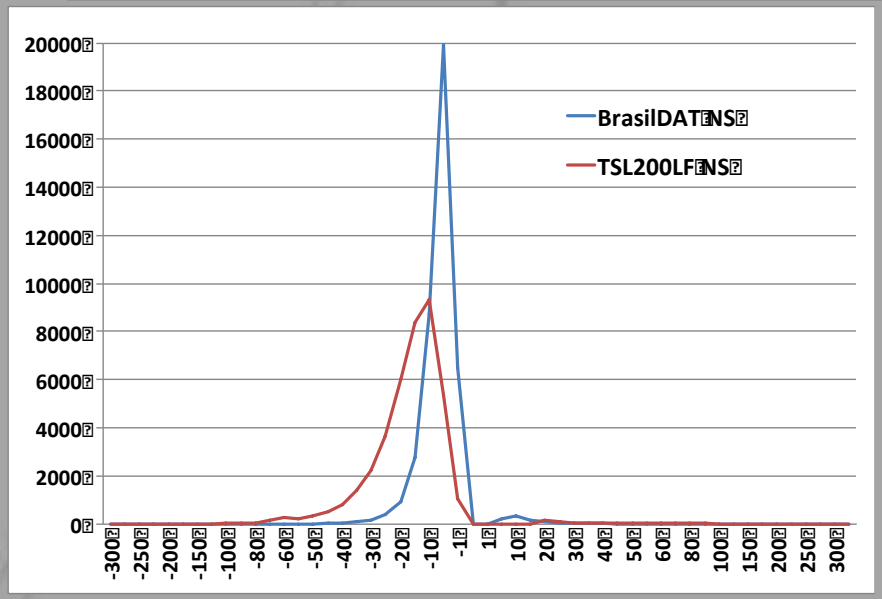
February 2012	# Events	# Matched Events (ms, <10km)
BRASILDAT NS	574,104	18,991
ATDNET NS	119,897	
BRASILDAT NS	574,104	25,446
WWLLN NS	145,203	
BRASILDAT NS	574,104	43,308
STARNET NS	619,934	
BRASILDAT NS	574,104	94,954
GLD360 NS	1,008,237	
BRASILDAT NS	574,104	13,500
LINET NS	290,862	
BRASILDAT IN	2,342,916	52,556
LINET IN	401,646	
BRASILDAT NS	574,104	40,500
TLS200LF NS	280,863	
BRASILDAT IN	2,342,916	177,067
TLS200VHF IN	2,012,990	

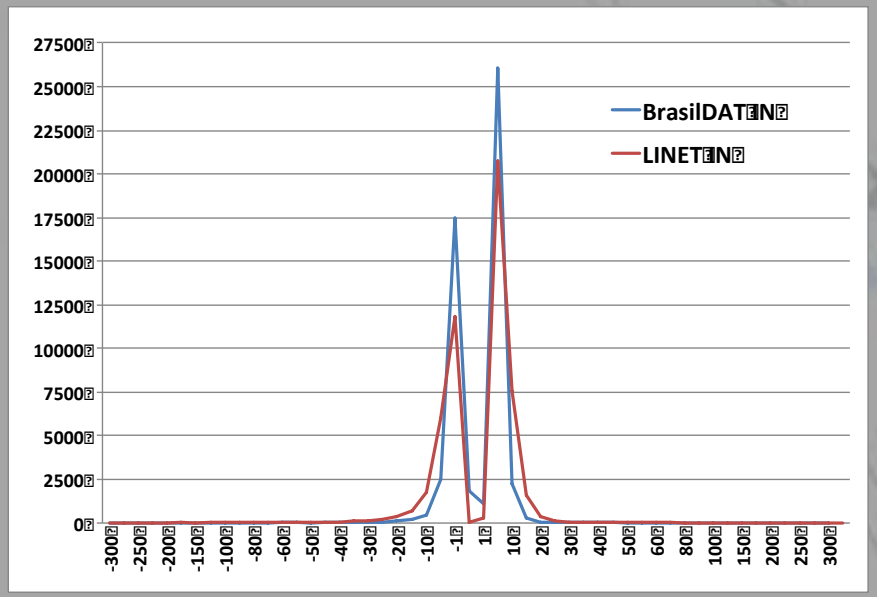
March 2012	# Events	# Matched Events (ms, <10km)
BRASILDAT NS	510,190	14,005
ATDNET NS	107,521	
BRASILDAT NS	510,190	26,609
WWLLN NS	189,929	
BRASILDAT NS	510,190	18,464
STARNET NS	309,605	
BRASILDAT NS	510,190	49,519
GLD360 NS	513,855	
BRASILDAT NS	510,190	7,580
LINET NS	222,364	
BRASILDAT IN	1,842,272	21,113
LINET IN	270,295	
BRASILDAT NS	510,190	27,822
TLS200LF NS	212,330	
BRASILDAT IN	1,842,272	38,180
TLS200VHF IN	751,325	

Peak Current Estimation



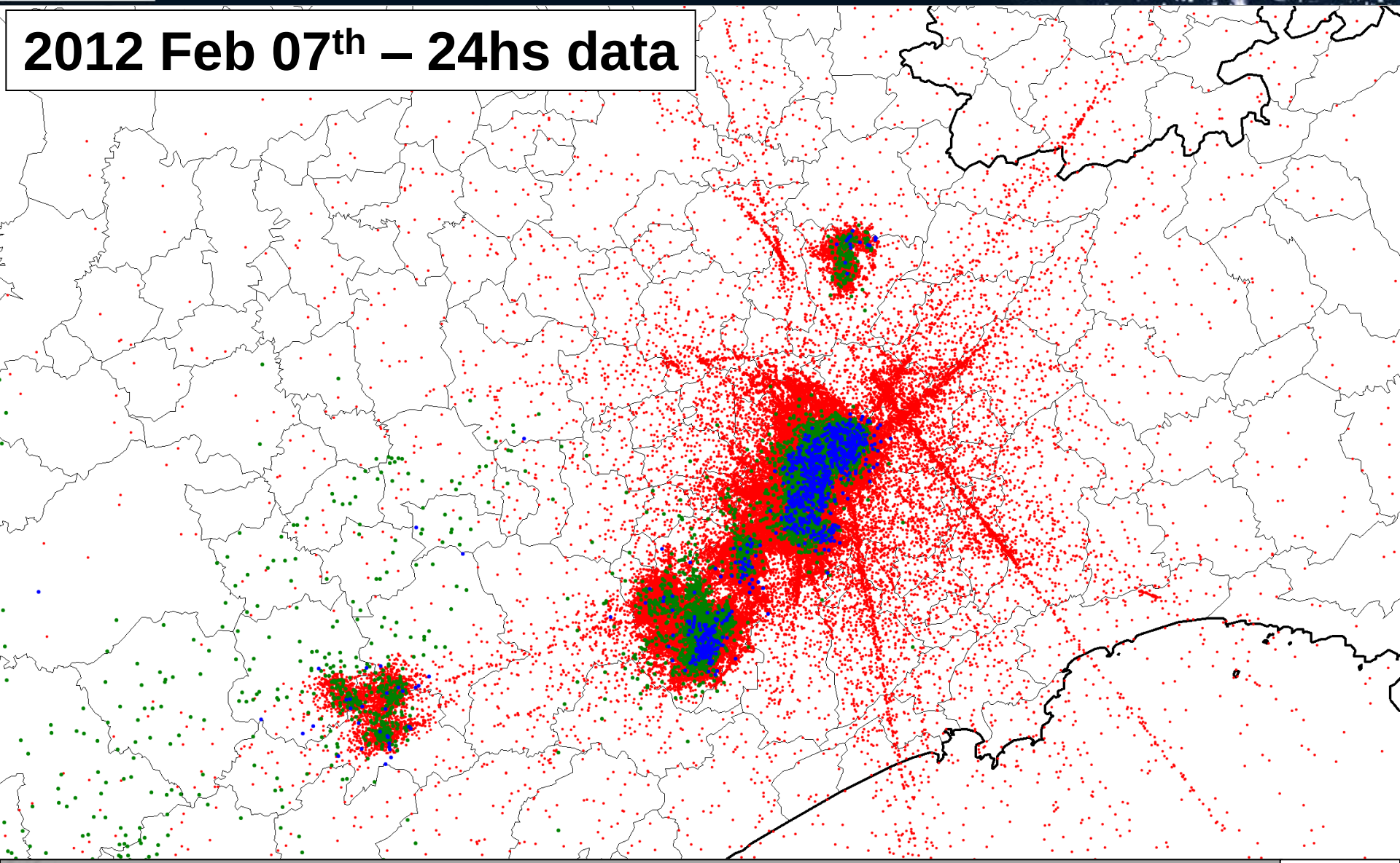




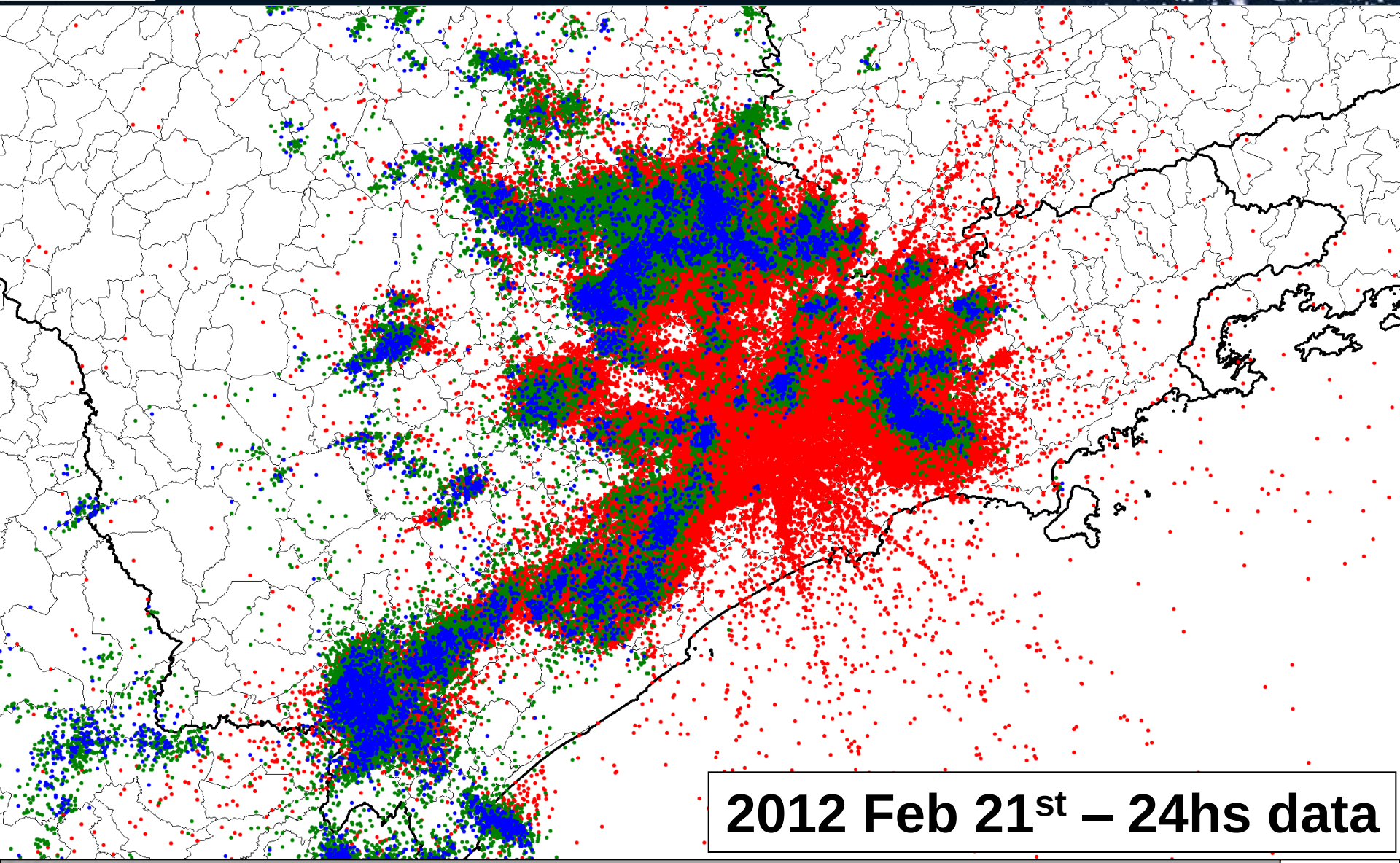


SPLMA x BrasilDAT

2012 Feb 07th – 24hs data

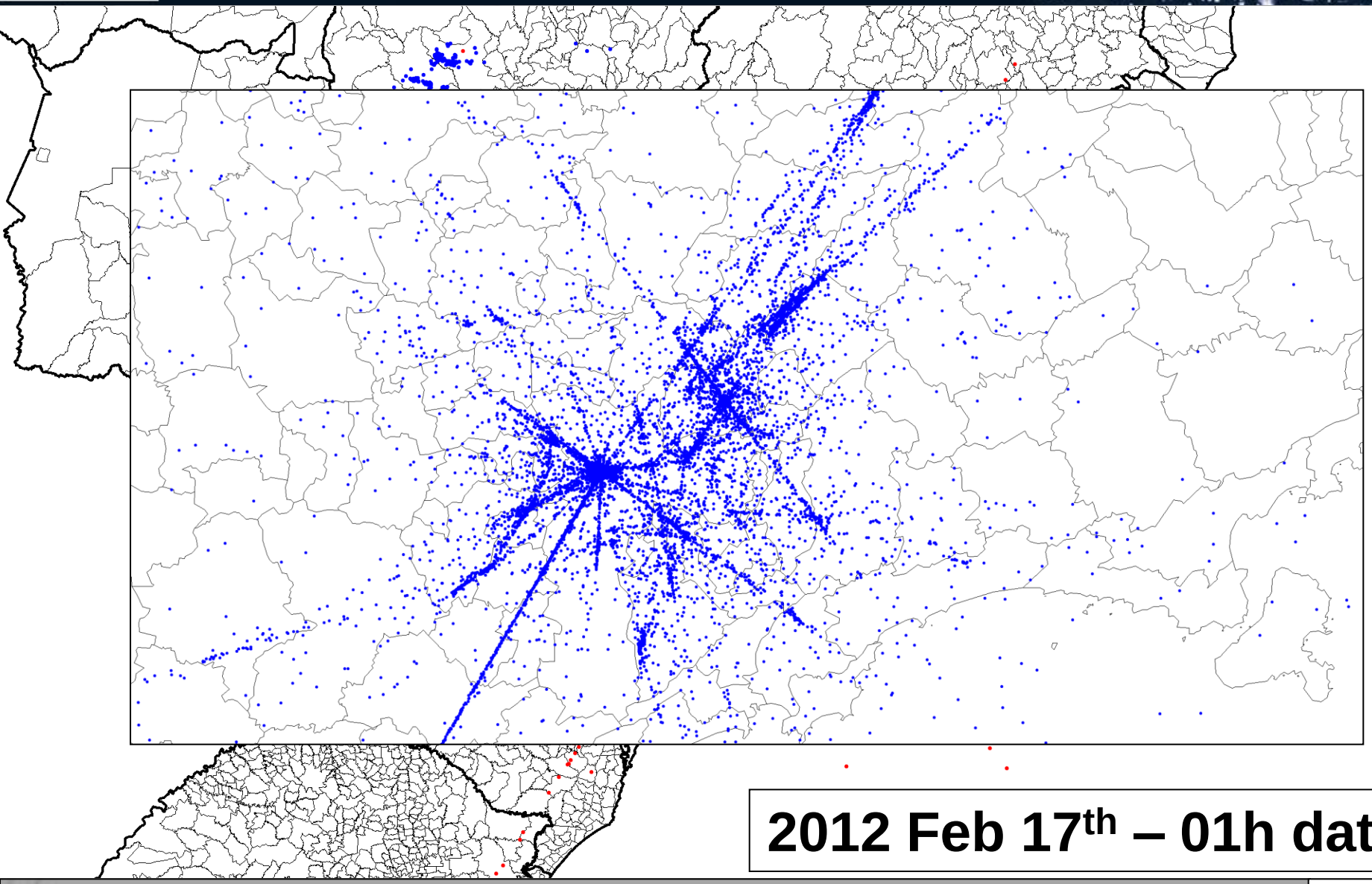


SPLMA x BrasilDAT



2012 Feb 21st – 24hs data

SPLMA x BrasilDAT



2012 Feb 17th – 01h data

SPLMA x BrasilDAT

February, 21st 2012	# Events	# Matched Events (ms, <10km)
BRASILDAT	103,795	110,246
LMA	3,457,884