

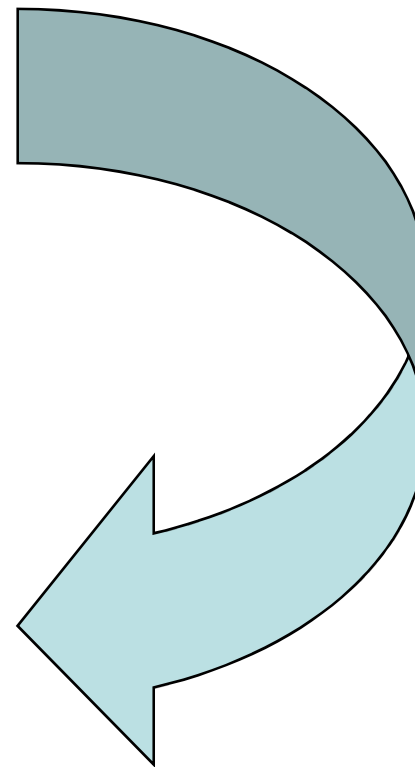


New rain Climatology in the Central Region of the State of Sao Paulo Using Radar Echoes

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Goal





CLIMATOLOGY using gauges

**Is normal in a big area of the world,
calculates:**

Average

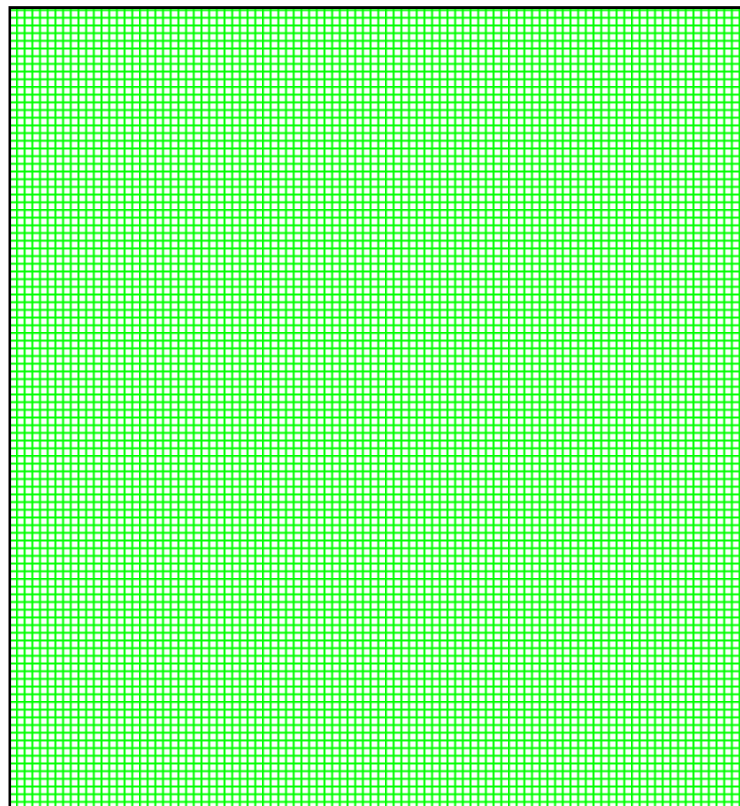
Anomaly

Numbers of days without rain

But where are the storms?????

Problem

The gauges data collection (Gauge)



Orange Plantation

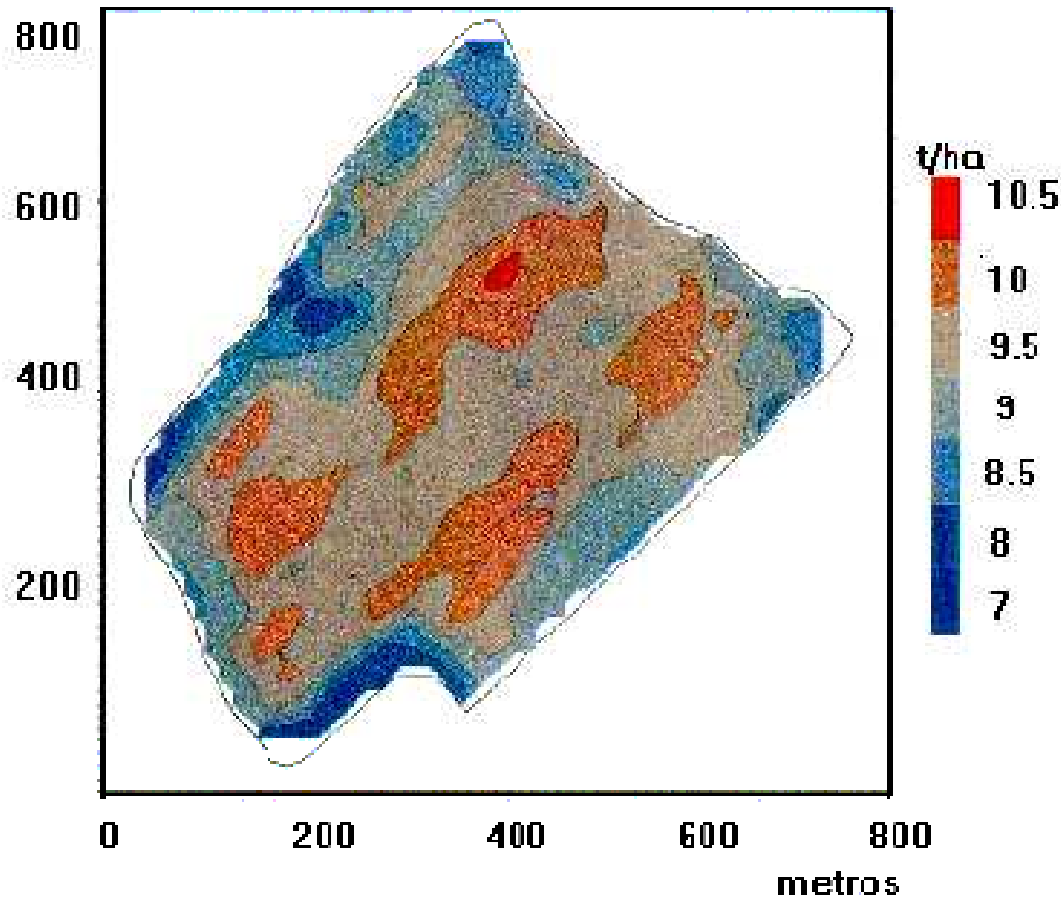
The rainwater collected by the gauges represents all the farm! Is it true????

Gauge



Farmer's house





Productivity Map of oranges in tons per hectares

Agronomist
engineer:

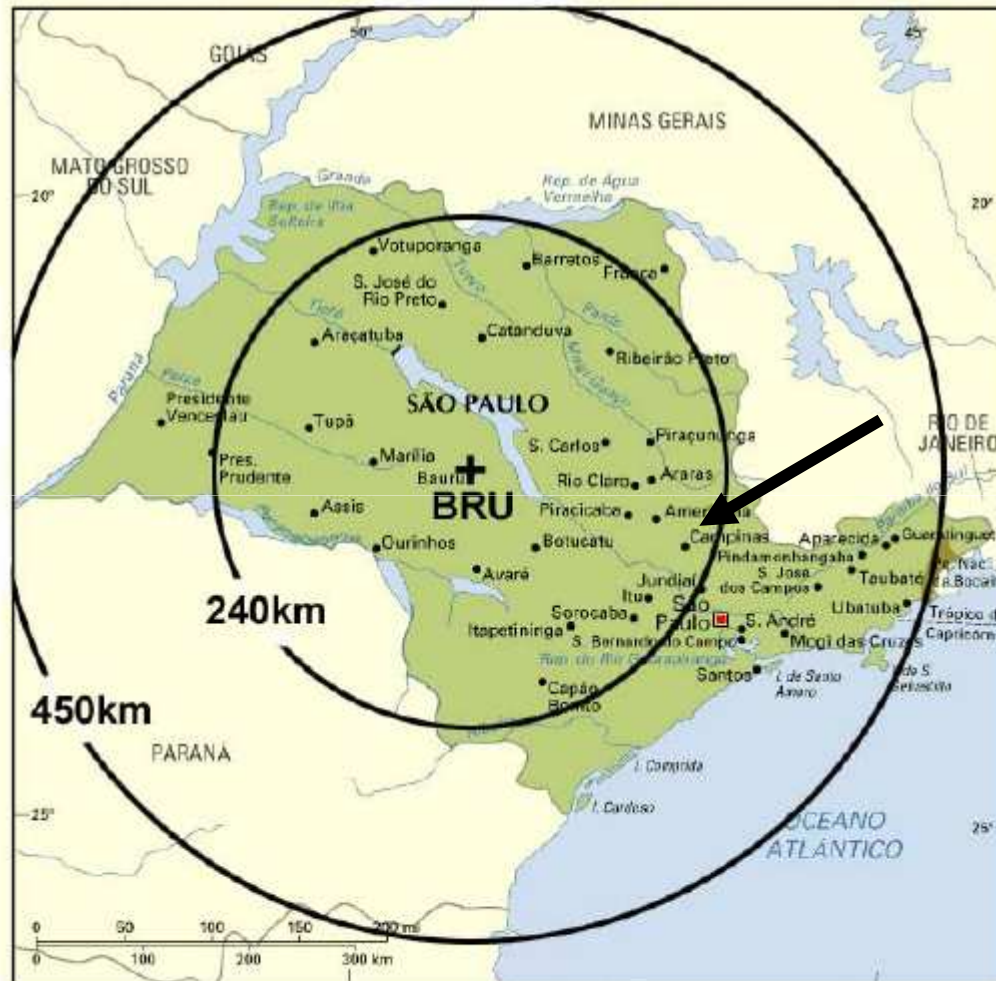
Why
differences?

The treated
soil is the
same

Same slope

First
Suspicious:

THE RAIN!!!



This work presents a rain measurement derived from echoes detected in the central area of state of São Paulo to a range of 240 km by a weather radar located at Bauri.

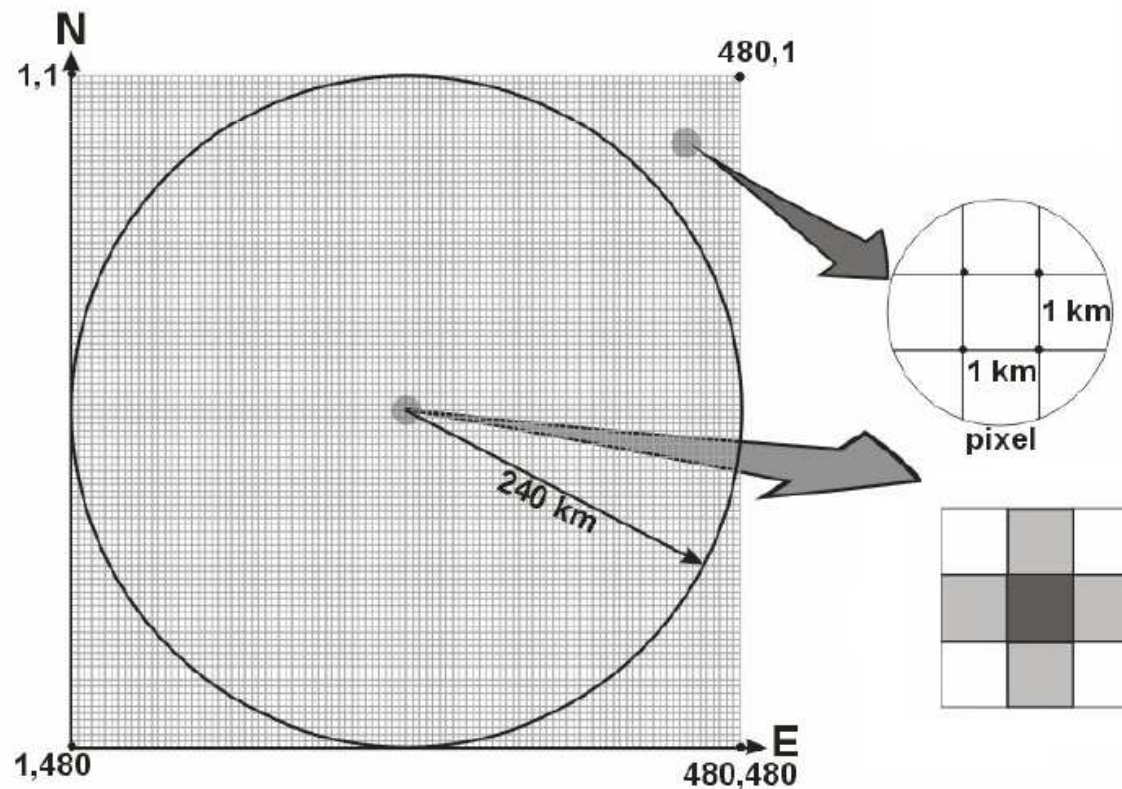
The radar is an S band Doppler system in continuous operation generating maps based on the observed echoes, each 7.5 and 15 minutes interval at a nominal resolution of 1 km².



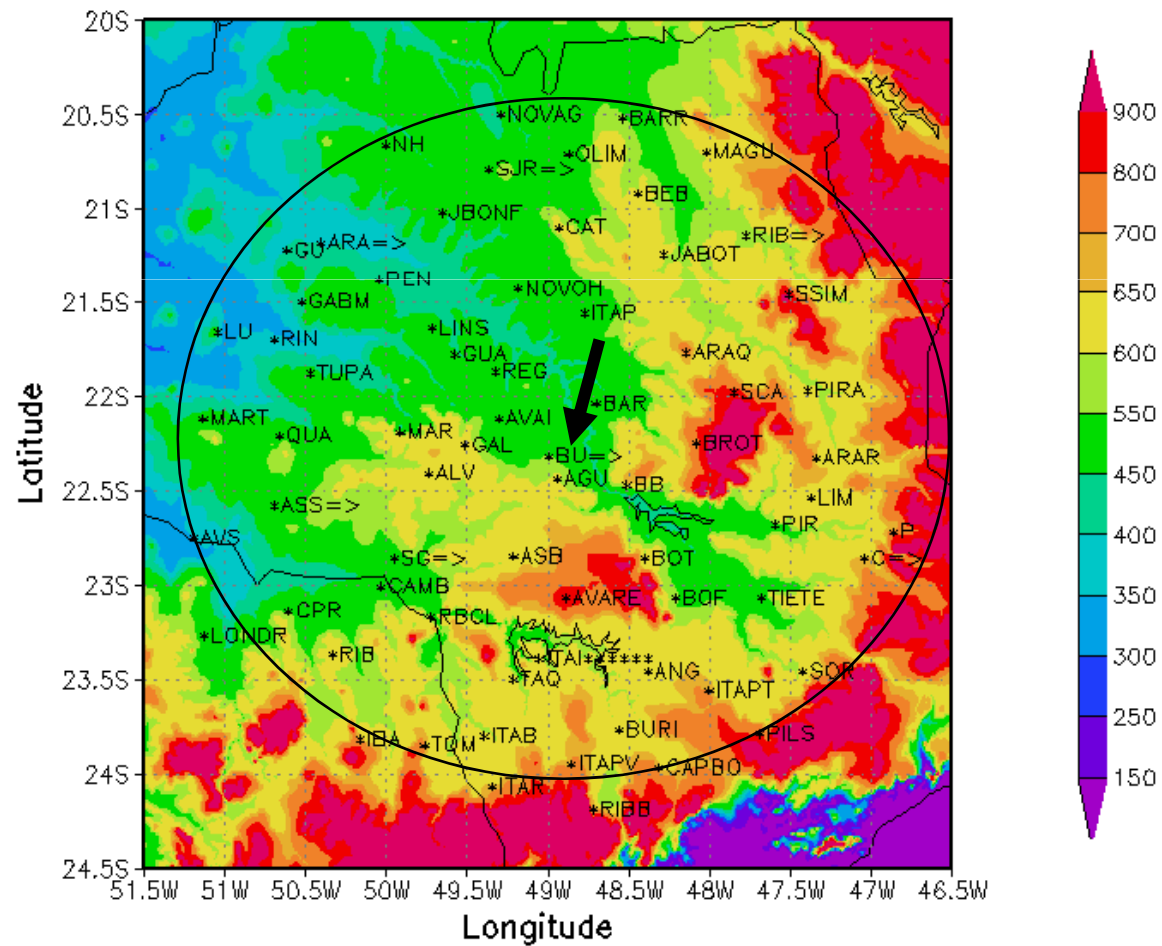


Since most of rain falling in the area is of a convective nature, the research was concentrated on the wet period, i.e. from November-to-march, of the years 1994-to-2004.

Firstly consisted data for each 7.5 - 15 minutes interval was processed with a nominal resolution of 1 km² thus yielding a matrix of 480x480 pixels.



Relief: Red regions of biggest altitude





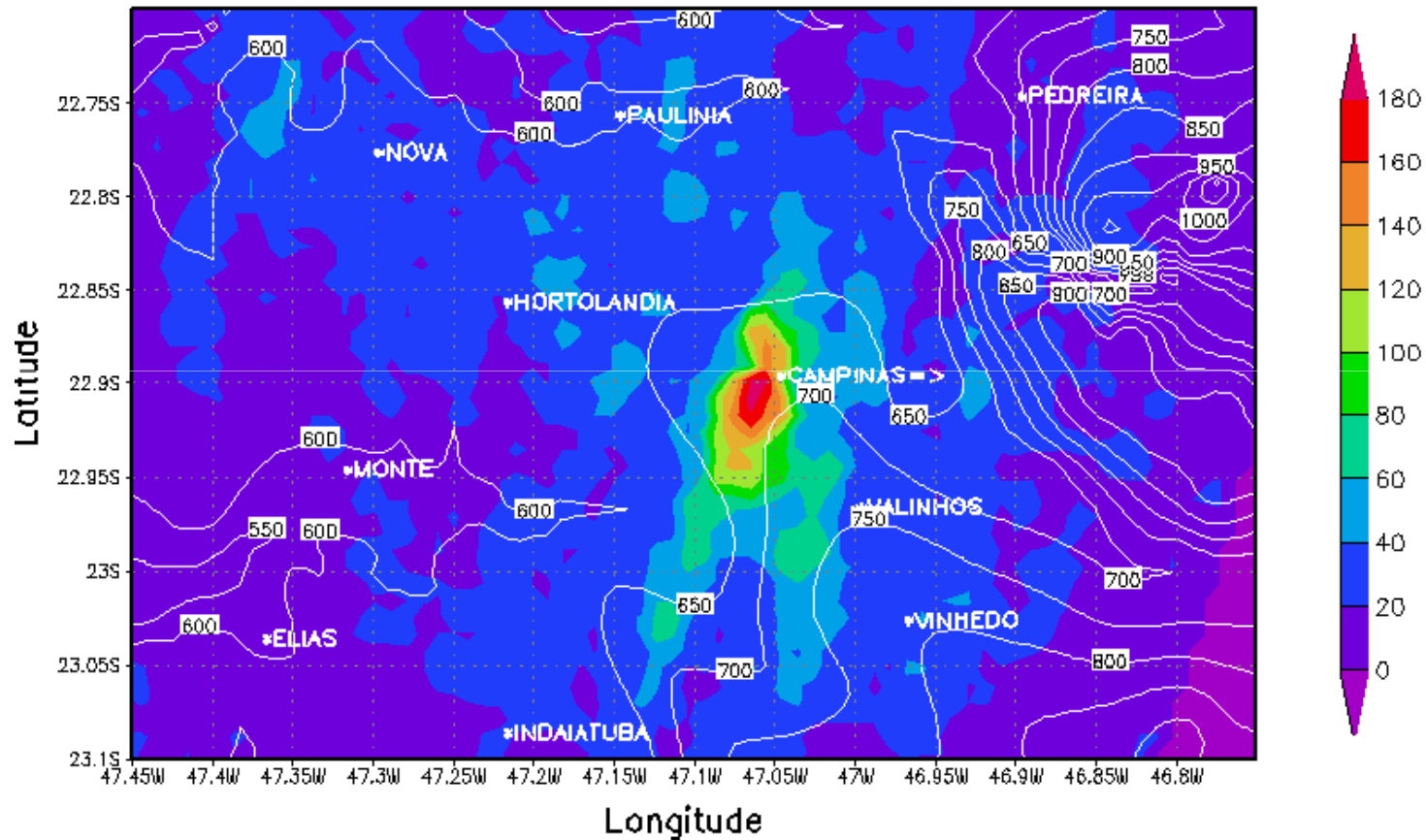
Results

Average total of number of days with rain (NDC), percentual of NDC and number of CAPPIs (NC), used in every rainy month from 1994 to 2004.

	NDC	(%)	NC
NDC			
November	23	77	24.970
December	27	87	27.259
January	29	94	25.377
February	24	86	23.966
March	28	90	27.545
Average			26.87
Total			129.117

Maximum value frequency of dBZ, for all the CAPPI, during the rainy months for a range of 240km in the area of Bauru/SP(1994-2004)

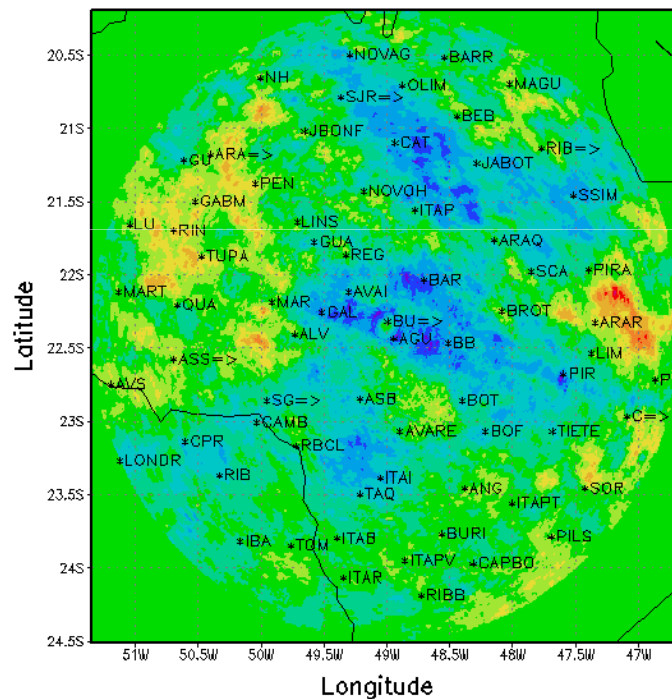
Interval (dBz)	Frequency (%)
15-20	0,8
21-25	1,0
26-30	2,2
31-35	4,3
36-40	10,6
41-45	19,6
46-50	30,7
51-55	20,5
56-60	9,1
>60	1,2



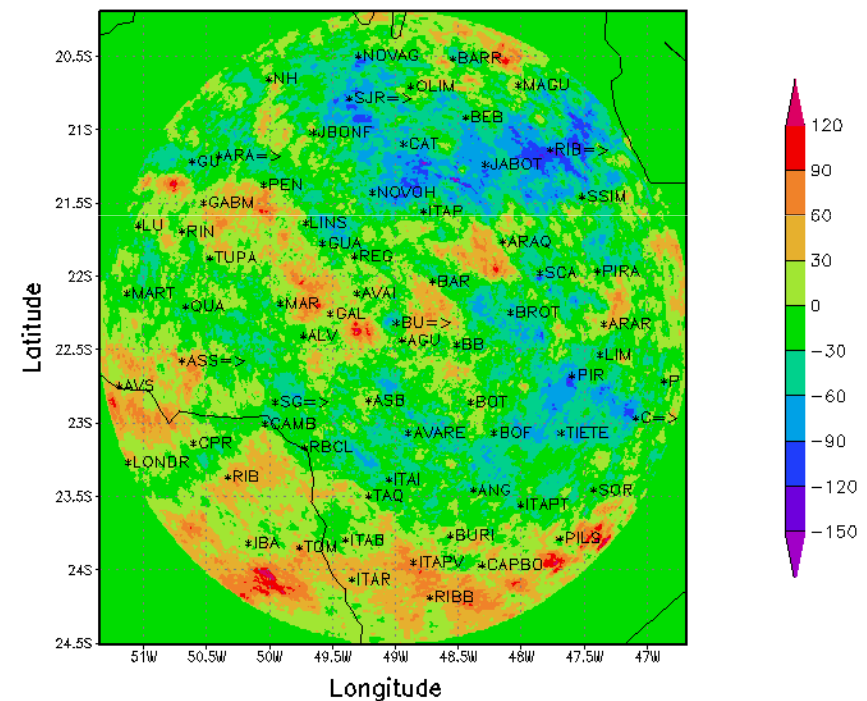
Echoes frequency > 45 dBZ area of Campinas/SP.

Rain Anomaly: $Anomalia_eco = \sum_{i=1}^n (mB - mC)$

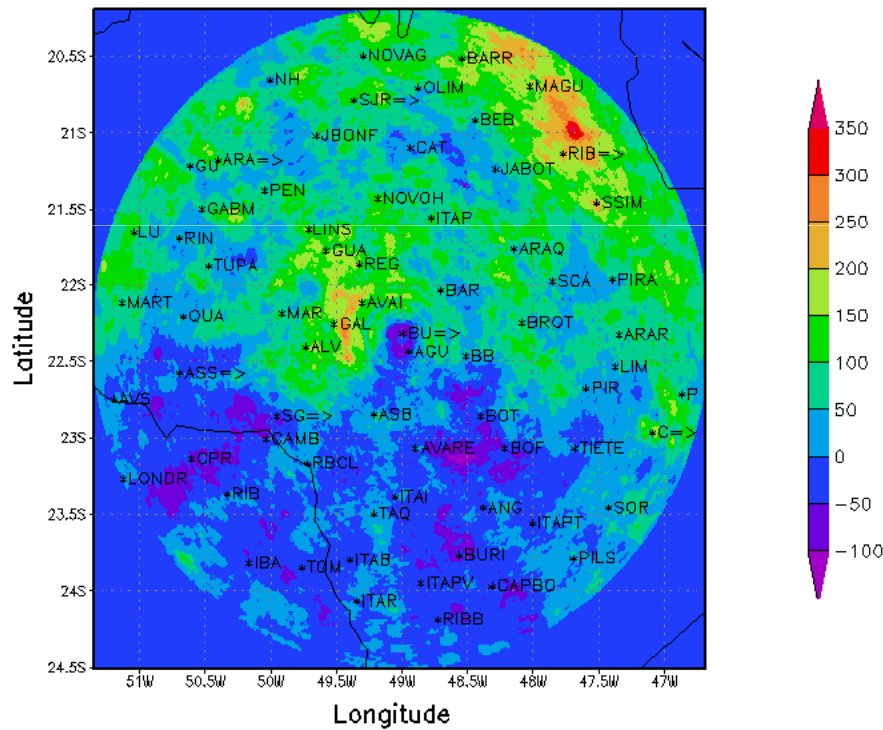
Where, mB average of 2004 and mC average 1994 - 2003



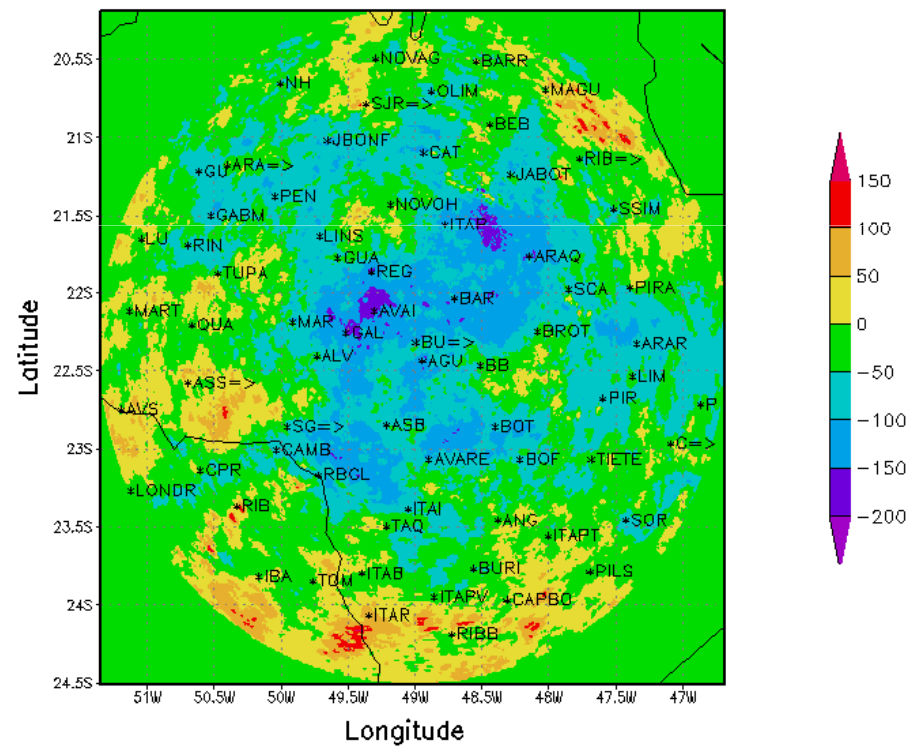
November



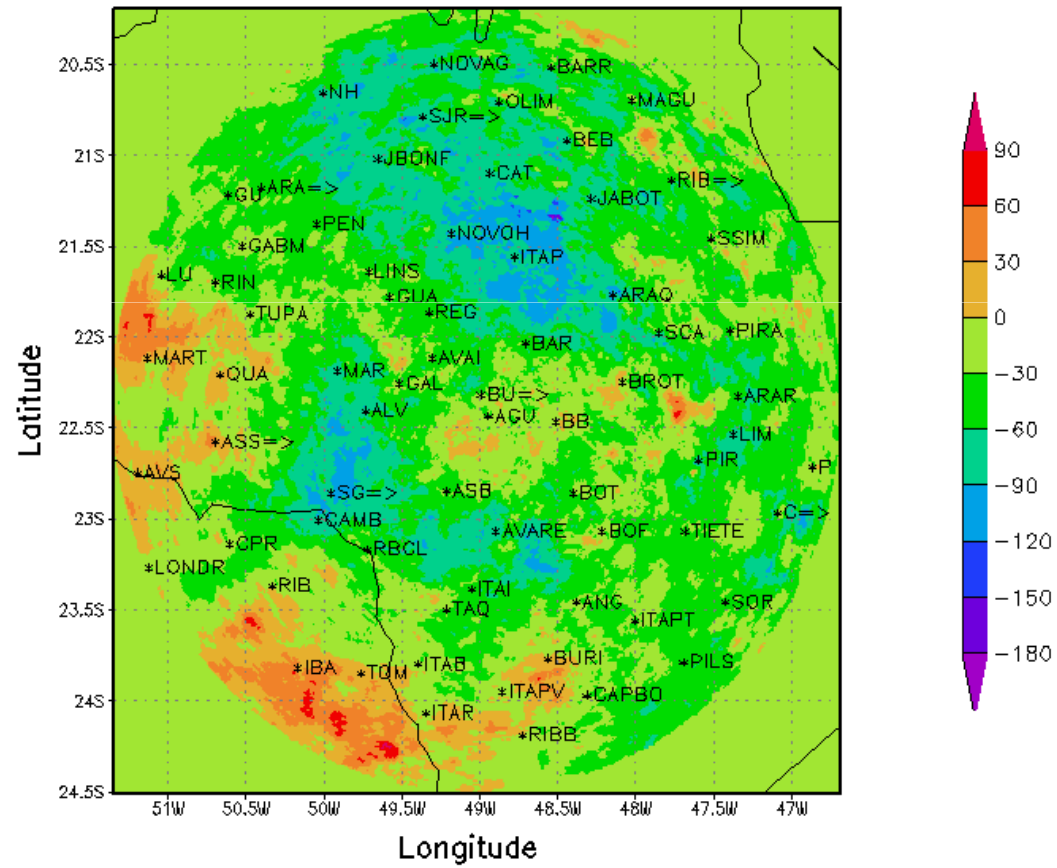
December



January



February



March



- **Conclusions**

The wet period rainfall represents 65% of the annual precipitation.

Areas with echo cores maximal exceeding a reflectivity value of 45 dBZ were concentrated over large metropolitan areas within the 240 km radar range.

It allows to follow the temporary rain variation.

The original Bauru sandwich recipe

- French bread
- Fresh tomatoes slices
- Pickles
- Mozzarella cheese melted in hot water
- Roast beef sliced very thin

PS You will only find the original in Bauru/SP, so come visit the radar in Bauru and try this delicious.

and Bon appetite!

» **THE END**