

IMPACT OF THE PHENOMENON LA-NIÑA 1998-2000 ON THE PRECIPITATION REGIMEN IN THE REGION OF THE AMAZON MEDIUM

David Mendes * and Monica C. Damião Mendes
University of Lisbon, Lisbon, Portugal

1 – INTRODUCTION

The La-Niña phenomenon, or cold episode of the Pacific Ocean, is the cooling anomalous of superficial waters in the Pacific Ocean Equatorial Center office and Oriental. In the Amazon region, the outflows of the Amazon Rivers in the rank of Óbidos (Average Amazon - region of studies of this work) and the quotas of the Black River, in Manaus, show bigger

Values that the average during the occurred in 1975/76 and 1988/89, compared episodes of La-Niña with lower values in the years of El-Niño, occurrences in 1982/83 and 1986/87. The rain regimen, in the interior of the Amazonian basin, is not homogeneous, presenting conditional space and secular variability to the interaction of different physical mechanisms. The precipitation indices maximum to coincide with the places where the summer station is verified, this because a bigger frequency of thermal convection which had the biggest availability of solar energy exists, observed at the time (Obregon and Nobre, 1990).

2 - METHODOLOGY

In this work they had been used daily and monthly data of rains of the net of stations of the National Agency of Electric Energy - ANEEL, for a period of 37 years, processed in software GRADs 1.7. The seek area encloses the part west and east of the states of Pará and Amazon (figure 1.0). With objective to evaluate the influence of the La-Niña event, the climatologic distribution of the precipitation of the Region of the Amazon Medium and, later the anomalies, average shunting line was determined initially normalized and the shunting line standard for each station. For this the squinted algorithms had been used:

Precipitation Anomaly (AP):

$$AP = X - Pn$$

Where:

X -> Monthly average precipitation;

Pn -> monthly average Precipitation for previous, posterior years and during the events of La-Niña;

The average monthly (x) is calculated using the sequence formularization:

$$X = \frac{\sum P}{n}$$

Where:

P -> Monthly average precipitation for n years;

And, Pn;

$$Pn = \frac{\sum Y}{m}$$

where:

Y -> Monthly average precipitation for the made up of years that had occurred the La-Niña phenomenon.

Standard Deviation (DP):

$$DP = \sqrt{\frac{\sum (X - \bar{X})^2}{n}}$$

Where:

Y -> Observed monthly precipitation;

\bar{X} -> Climatological monthly average for the month in question:

n -> Number of months of the event La-Niña 1998-2000.

Corresponding author address: David Mendes,
Univ. of Lisbon, Dept. Meteorology, Campo Grande, C8, Piso 6, 1749-016; email: davim@correio.fc.ul.pt.

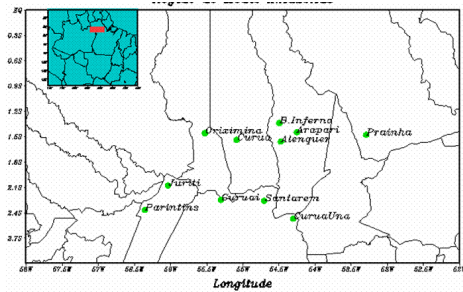


Fig. 1 - Area of study and the distribution of used stations.

3 – RESULTS

3.1. Characteristic of the Rainfall in the Region of the Amazon Medium.

The seasonal variability of the precipitation in the Region of the Amazon Medium is provoked by the performance of some atmospheric systems on the region. Many times combined with other originated systems, had the intrinsic characteristics, as the ground and the ambient one.

In the Region of the Amazon Medium, it is verified that the period rainiest is extended enters the January months the May, while less rainy is enters the September months the November. The rainfall index accumulated per year for all the studied region is of approximately 1930, 0 mm with days of rains to the year around 150. Figure 2 below, presents the monthly rain distribution for each station in study in the Region of the Amazon Medium.

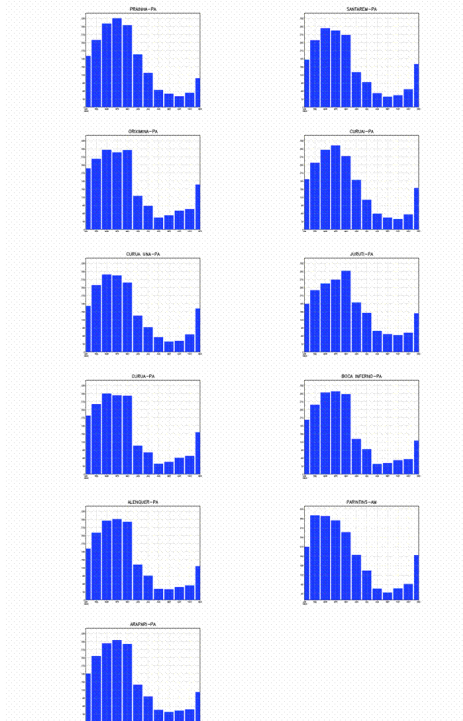


Fig. 2. Monthly average for each station of the study area.

3.2 – La-Niña 1998-2000.

During the event La-Niña 1998-2000, that it had beginning in the month of July of 1998 and end in the month of September of 2000, she was registered positive average anomaly of approximately 50,0 mm (Fig.3), for the made up of months of the event.

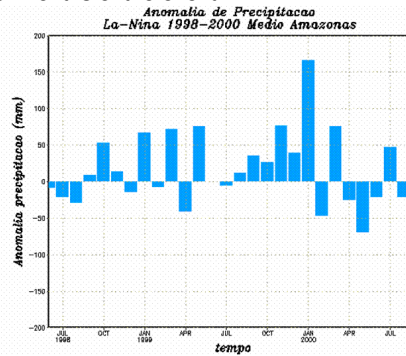
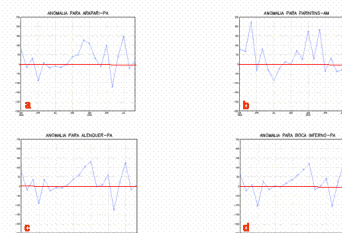
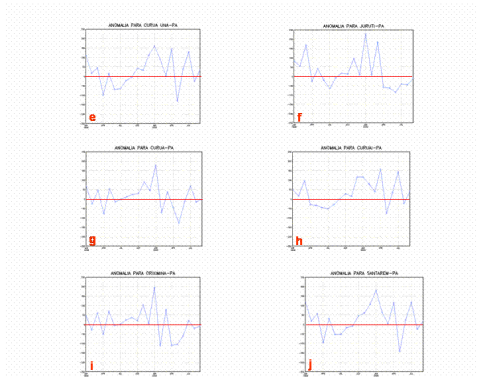


Fig.3. Monthly average anomaly for all the Region of the Amazon Medium of June of 1998 the September of 2000.

In the month of January of 2000, she was registered the biggest positive precipitation anomaly, in the order of approximately 160, 0 mm. In some months during the event, had negative precipitation anomalies, having the month of May of 2000 what the biggest anomaly registered, in the order of 70, 0 mm below of the climatologic average, this if it gave due the weakness of the La-Niña event, has since the Sea Surface Temperature (SST) in Equatorial the Tropical Pacific was almost next the normal one, around. 0.5. C (Source: NCEP).

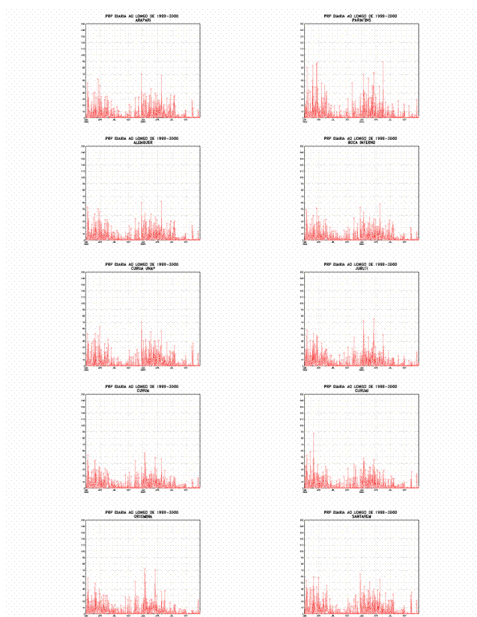
In the station located in the Juruti city, she was registered the biggest positive anomaly during 1998-2000 the La-Niña event, in the order of 170, 0 mm (Fig. 4f). During the period of September of 1999 the May of 2000, all the stations had gotten positive shunting lines. Valley to stand out that in good part of this period to be inserted the rainy period in the region (January the April).





Figs. 4. Monthly anomaly for each station during the period of the La-Niña event. The Standard Deviation (SD) for the region during the 1998-2000 event, was of approximately 17, 5, having the station of registered Juruti the biggest SD of the stations located in the study region.

Through the daily evolution of rain (Figs.6), we can observe the extreme precipitation events during the La-Niña of 1998-2000.



Figs. 6. Daily evolution of the precipitation during the La-Niña event.

4 – CONCLUSIONS

We verify that during the 1998-2000 event La-Niña, the precipitation index in the Region of the Amazon Medium, it was in practically all with positive precipitation anomaly, the stations located in the city of Juruti and Curuai, to obtain the biggest indices of positive precipitation anomaly, approximately 170, 0 mm. The biggest SD was of 17.5 in the city of Juruti.

We conclude that the event La-Niña 1998-2000, had influence in the rain regimen in the region of the Amazon Medium, as well as the

Phenomenon El-Niño 1997-1998 had on the same region (Mendes & Cohen, 2000).

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