EXTREME EVENTS OF PRECIPITATION IN THE BRAZILIAN NORTHEASTERN IN MAY 2022

SOUSA, T. C. S[1]; SANTOS, G. C.[1]; PALMEIRA, A. C. P. A.[2]

[1]Undergraduate Student of the Meteorology Course at the Federal University of Rio de Janeiro;

[2]Professor at the Department of Meteorology at the Federal University of Rio de Janeiro

1. INTRODUTION

Figure 1: Map of Brazil, with emphasis on the Northeastern region in blue. In red is the State of Pernambuco, where the metropolitan region of Recife can be found.

The month of May was the month where the highest accumulated precipitation was observed so far in this year. The brazilian northeastern (Fig. 1) is known for having its rainy season between the months of March and August, mainly due to the presence of the Intertropical Convergence Zone (ITCZ) in its southernmost position. In the Metropolitan Region of Recife (PE), the municipality that presented the highest accumulated precipitation in May was Cabo (Suape's Dam) with 821.0 mm, which represents a percentage of 285% above the climatological average for that month, according to the Pernambuco Water and Climate Agency (APAC).

In this case study, the authors hope to explain how the dynamics of the tropical atmosphere as well as synoptic and maritime events influenced the extremes of precipitation in the study region.

2. METODOLOGY

To understand the systems that was acting in the Northeastern region, most specific in the State of Pernambuco in 24th May, 2022, the fifth generation ECMWF atmospheric reanalysis data, known as ERA5 and with a spatial resolution of 0.25°, and SST data from NOAA with spatial resolution of 5km were used to generate images using the Python programming language. Satellite images from the infrared channel of GOES-16 were used to confirm the presence of convective clouds in the area analysed.

3. RESULTS

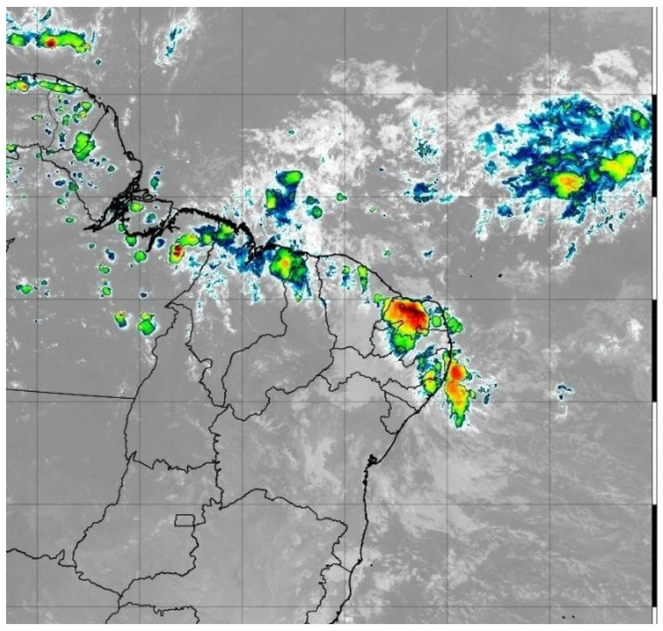

Figure 2: Satellite image on the infrared channel for the 24th of May at 21Z (06 pm at the local time). It's possible to observe the presence of convective clouds on the coast of Recife. Source: CPTEC/INPE

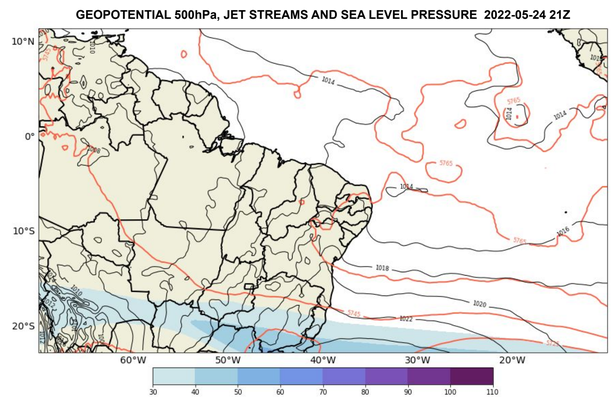

Figure 3: Geopotencial (m) in 500 hPa, jet stream (m/s) in 250 hPa and pressure (hPa) at sea level.

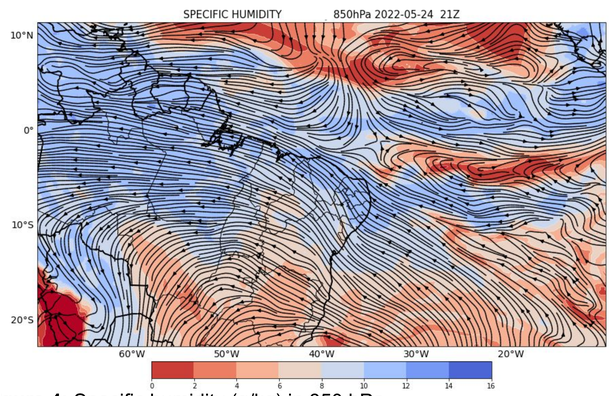

Figure 4: Specific humidity (g/kg) in 850 hPa.

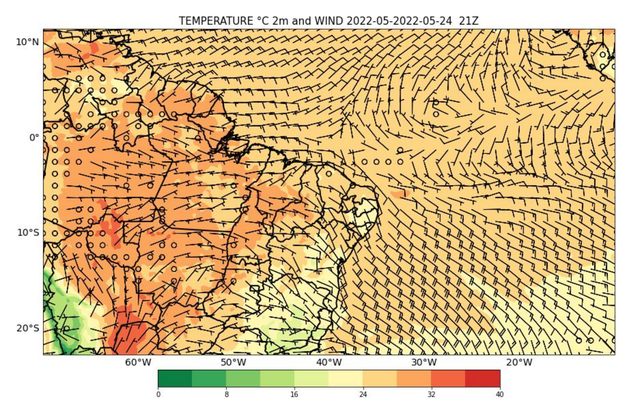

Figure 5: Air temperature (°C) at 2 meters and wind (KT) at 10 meters.

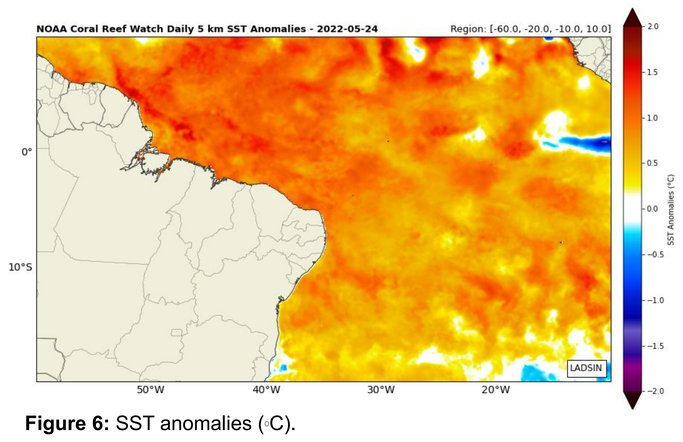

Figure 6: SST anomalies (°C).

4. CONCLUSION

It was observed that the highest precipitation accumulation in the municipality of Cabo (Suape's Dam) in 24th May, was associated with the persistence of an inverted trough under the ocean at surface level since 22th May, that also appeared in medium levels (500 hPa), intense temperature advection and moisture flow from the east in 850 hPa, high air temperature at surface and positive SST anomalies that persisted for most of the month. This configuration persisted for the next months, maintaining the intense precipitation in the region.

5. REFERENCES

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6. ACKNOWLEDGMENT

To all my colleagues in the Dynamic and Synoptic Meteorology Laboratory (LADSIN/UFRJ), especially to Gabryele Santos and Jamyle da Silva, for all the discussions that lead to this presentation.