INFLUENCE OF LOCAL CIRCULATION ON SPATIAL AND TEMPORAL DISTRIBUTION OF THE PRECIPITATION NEAR THE NEGRO AND SOLIMOES RIVERS CONFLUENCE REGION

A presentation by

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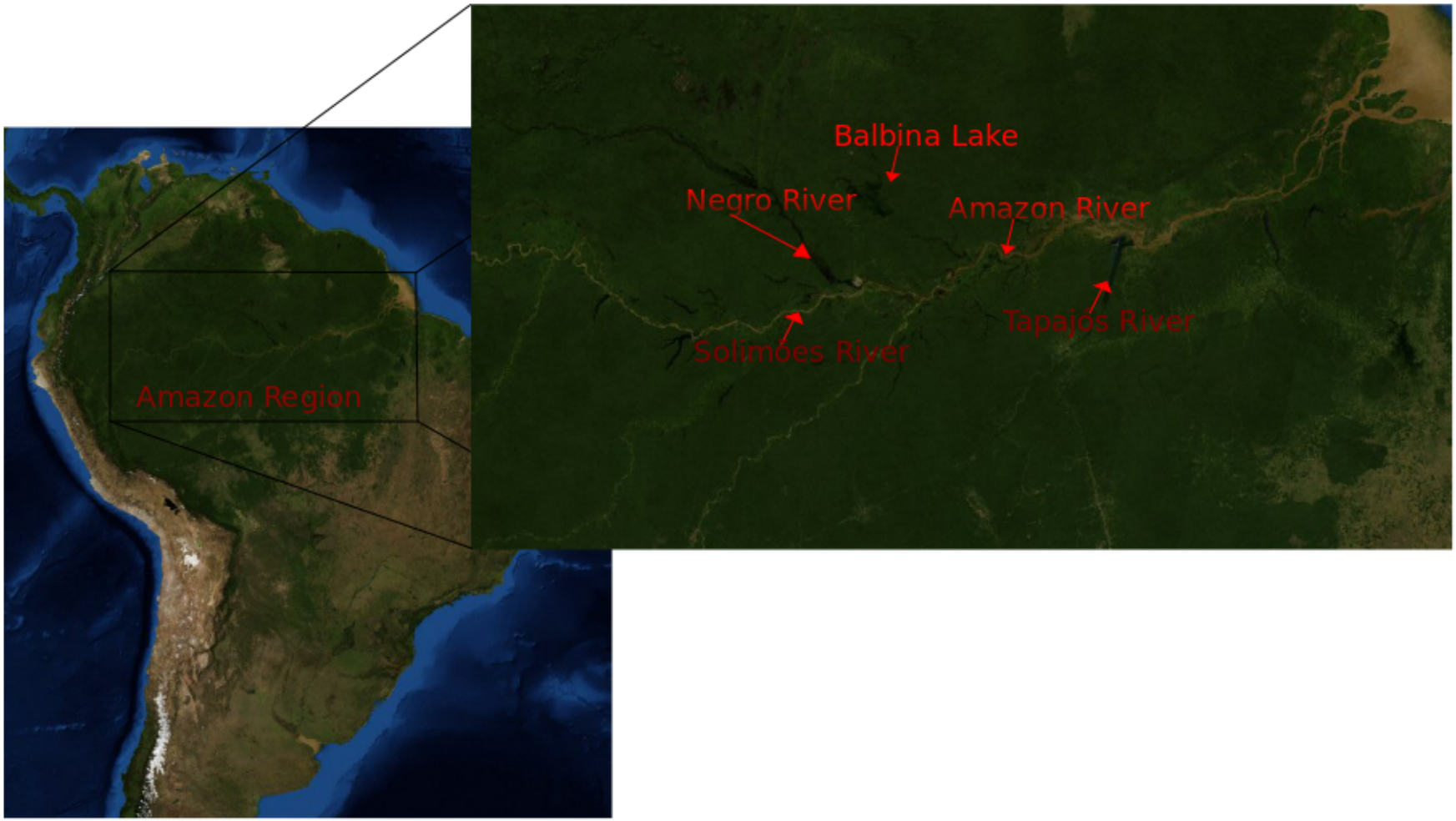
Amazon Region



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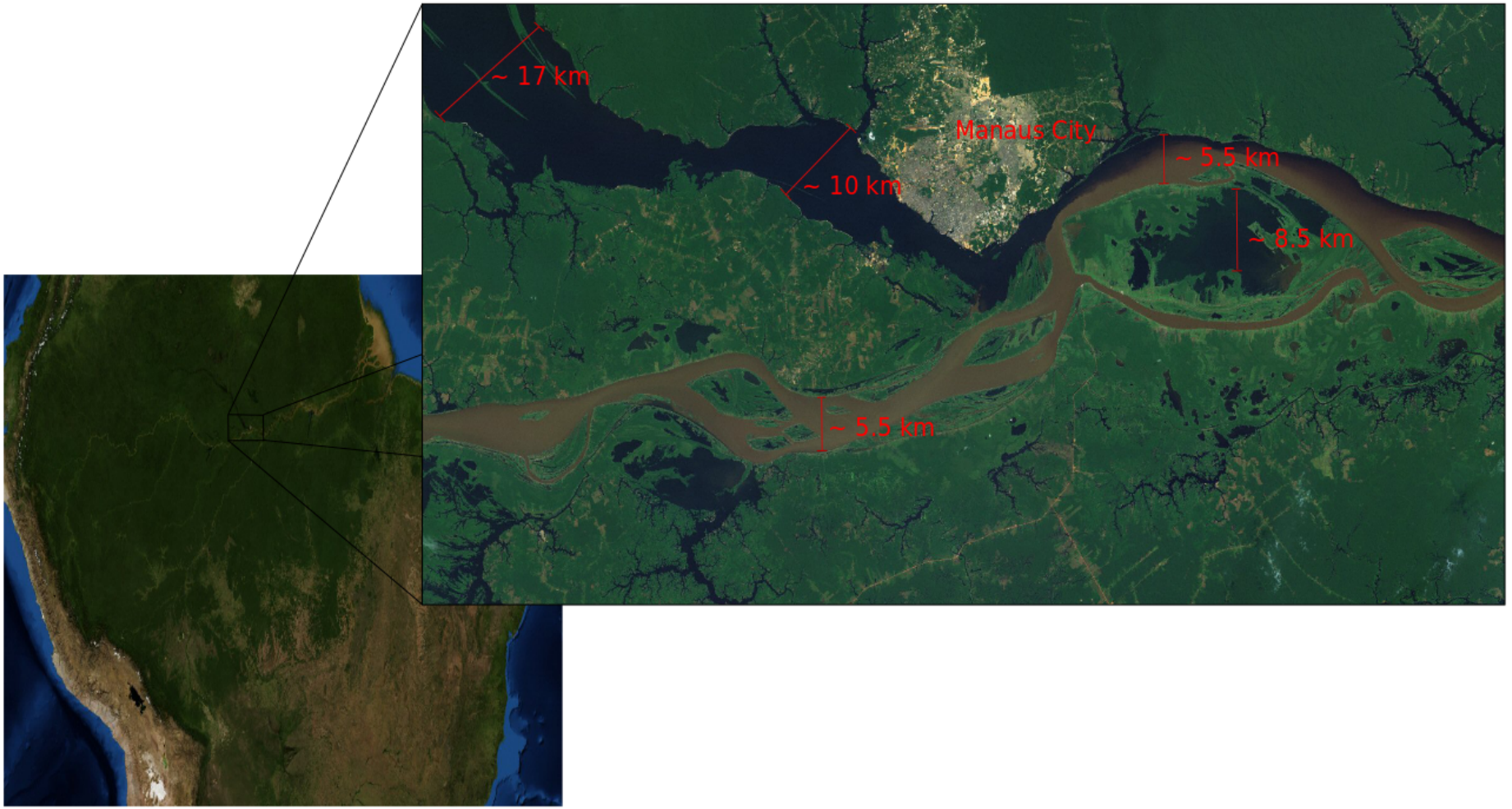
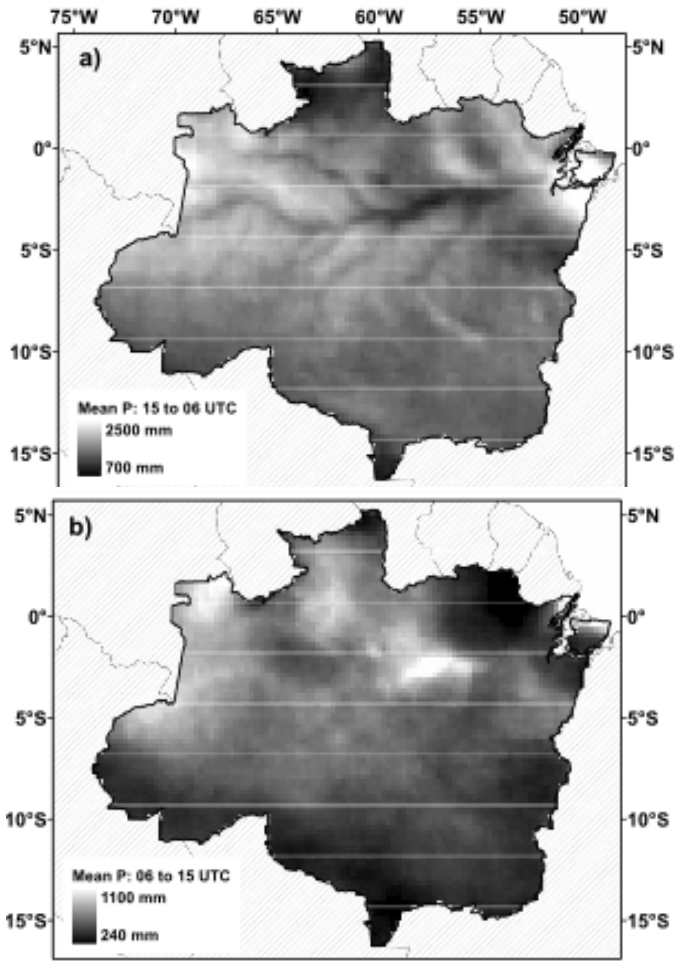


The surface heterogeneity induces a thermal contrast between land and the great rivers and consequently development of the local circulations.

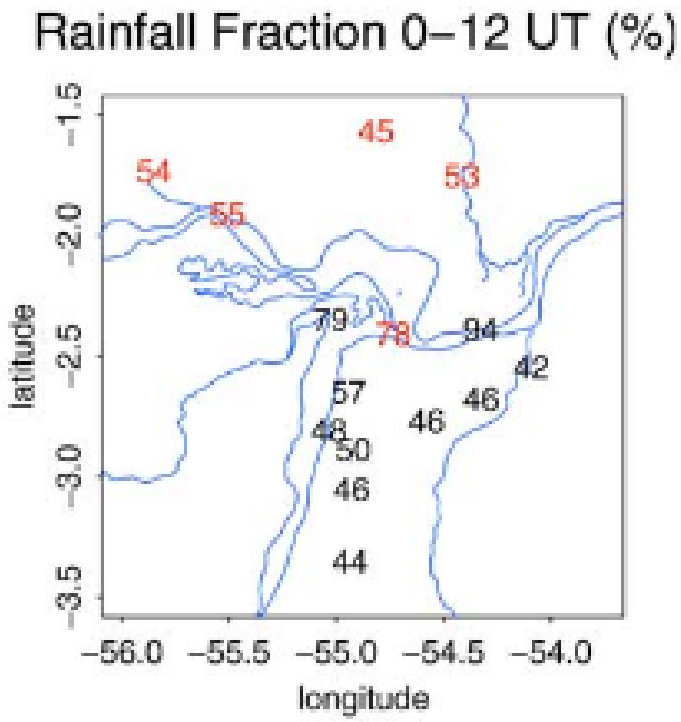
Paiva et al. (2011)

During afternoon-night period (15 to 05 UTC): Reduction of rainfall over Amazon rivers;
During night-morning period (06 to 15 UTC): Increase of rainfall over Amazon rivers.



Fitzjarrald et al. (2008)

They shown that the rainfall over Amazon River is predominantly nocturnal, specifically near the Santarém station.



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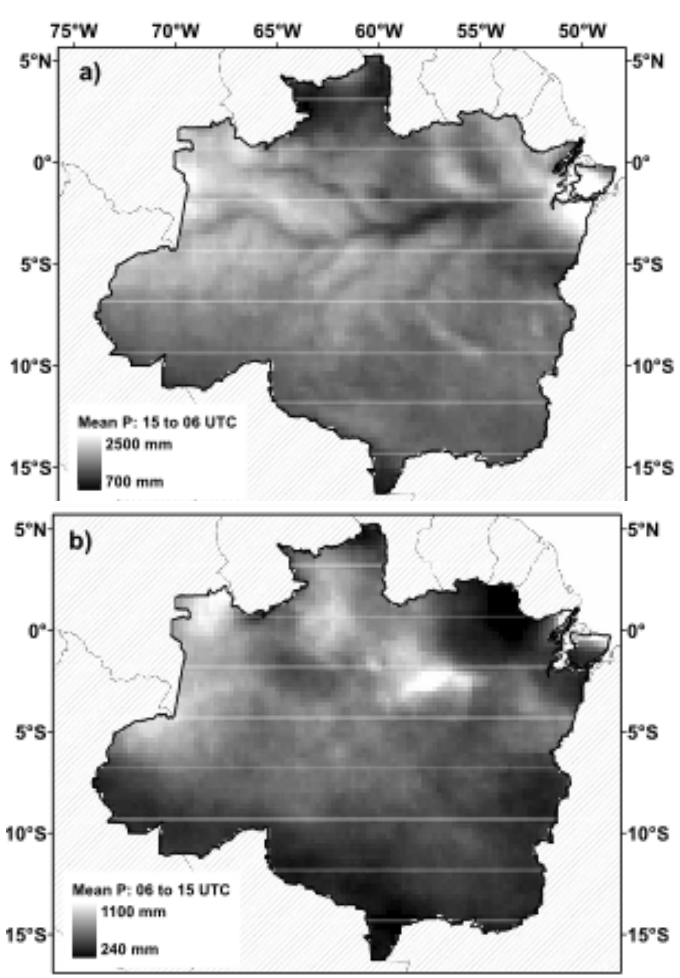

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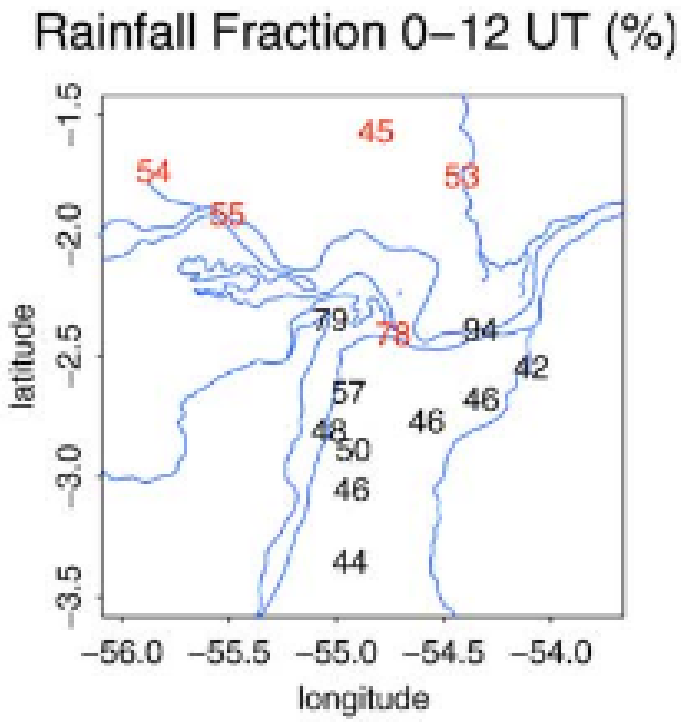


Objective

Analyze the role of the local circulations on the spatial and temporal distribution of precipitation close to the Manaus city region, where confluence of the Negro and Solimões rivers occur.

Data

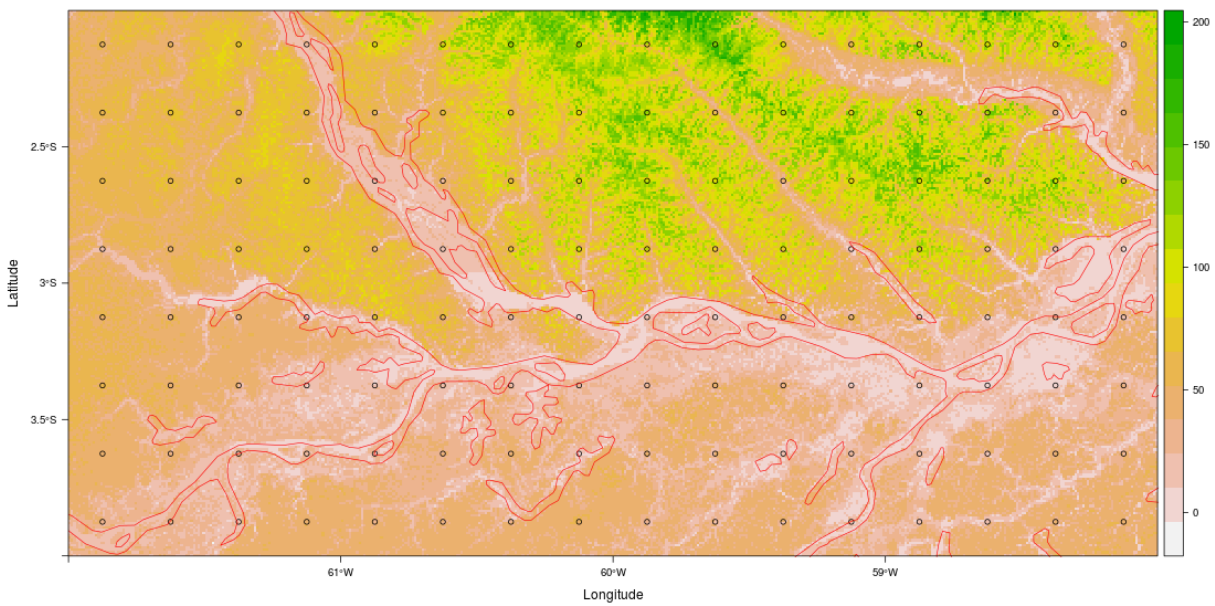
Satellite Rainfall Estimates From TRMM (Tropical Rainfall Measurement Mission)

Product TRMM_3B42: Rainfall Rate;

Data Period: January 1998 to December 2012 (15 years);

Data Frequency: 3 hours;

Grid Space: 25 X 25 km.



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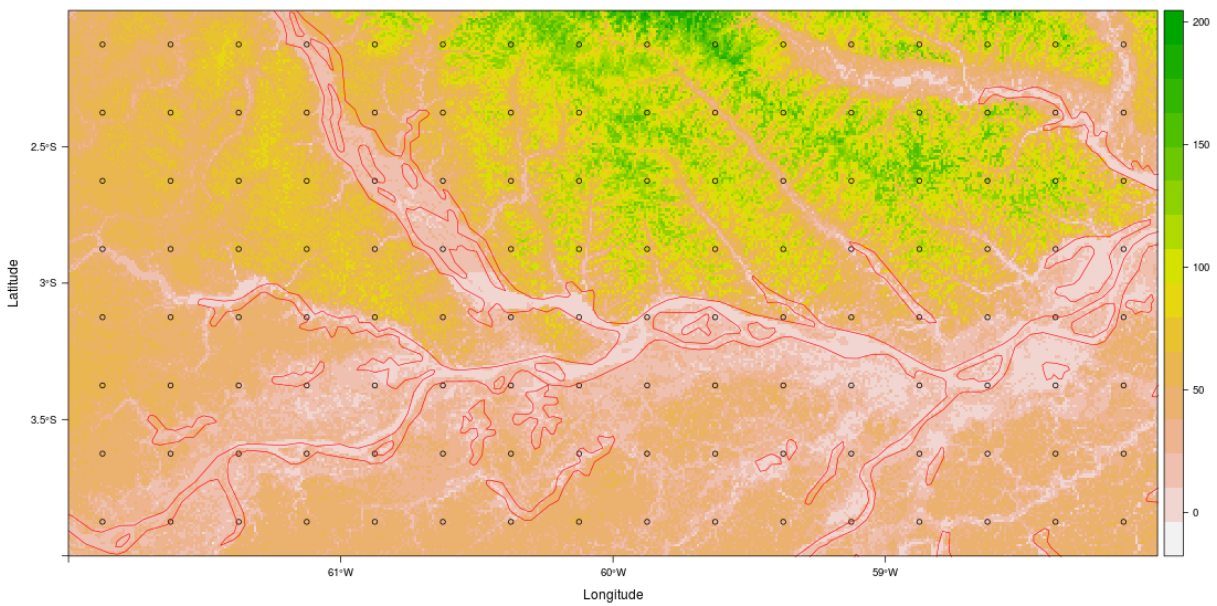
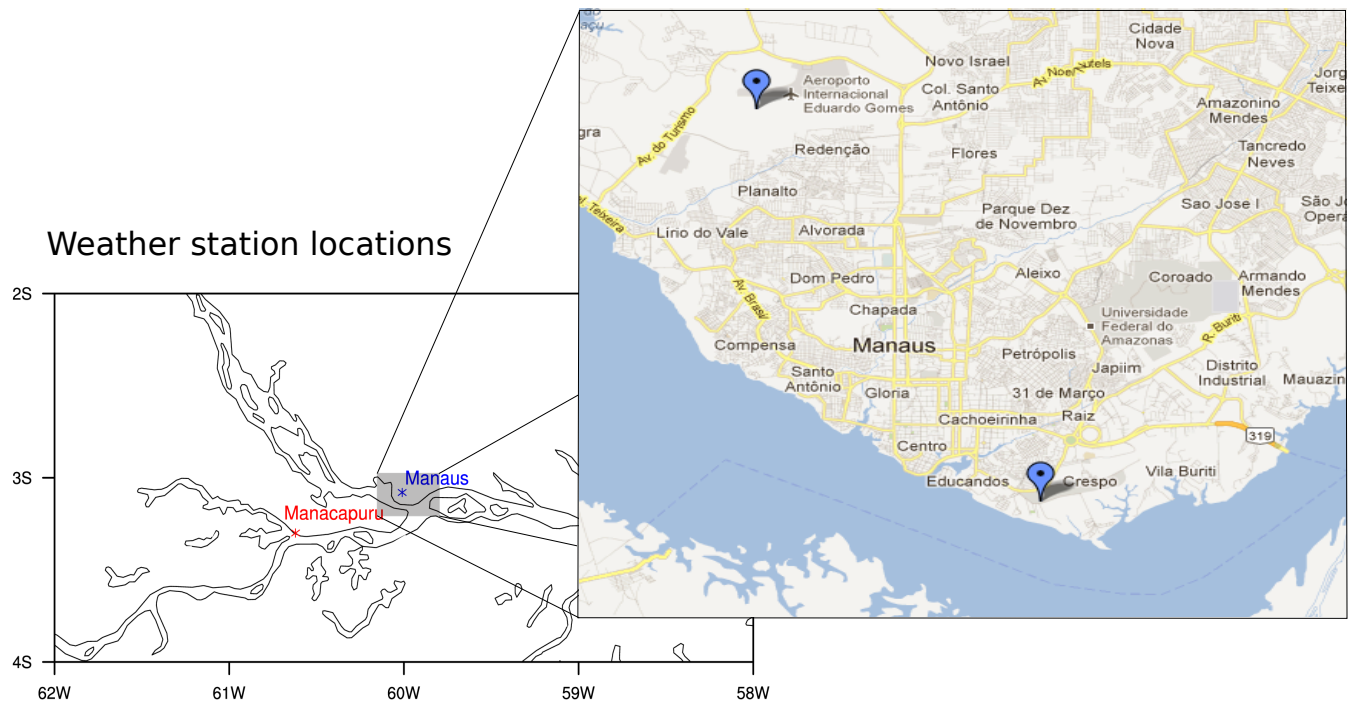


Data

i) Data Period: Eduardo Gomes 1977 - 2012 (36 years) and Ponta Pelada 1973 - 2012 (40 years);

ii) Hourly data;

iii) Dew point temperature and velocity and wind direction.



Methodology

Station data analysis

Wind Frequency in function of the wind direction information (Polar Plot);

Vapor Pressure data were used as an atmospheric moisture indicator

Precipitation data analysis

Accumulated precipitation composites (P) for 8 times every three-hours in local time;

Gradient of the Accumulated precipitation composites

$$\nabla P = \frac{\partial P}{\partial x}\hat{i} + \frac{\partial P}{\partial y}\hat{j} \tag{1}$$

Dry (June-November) and wet (December-May) Periods;

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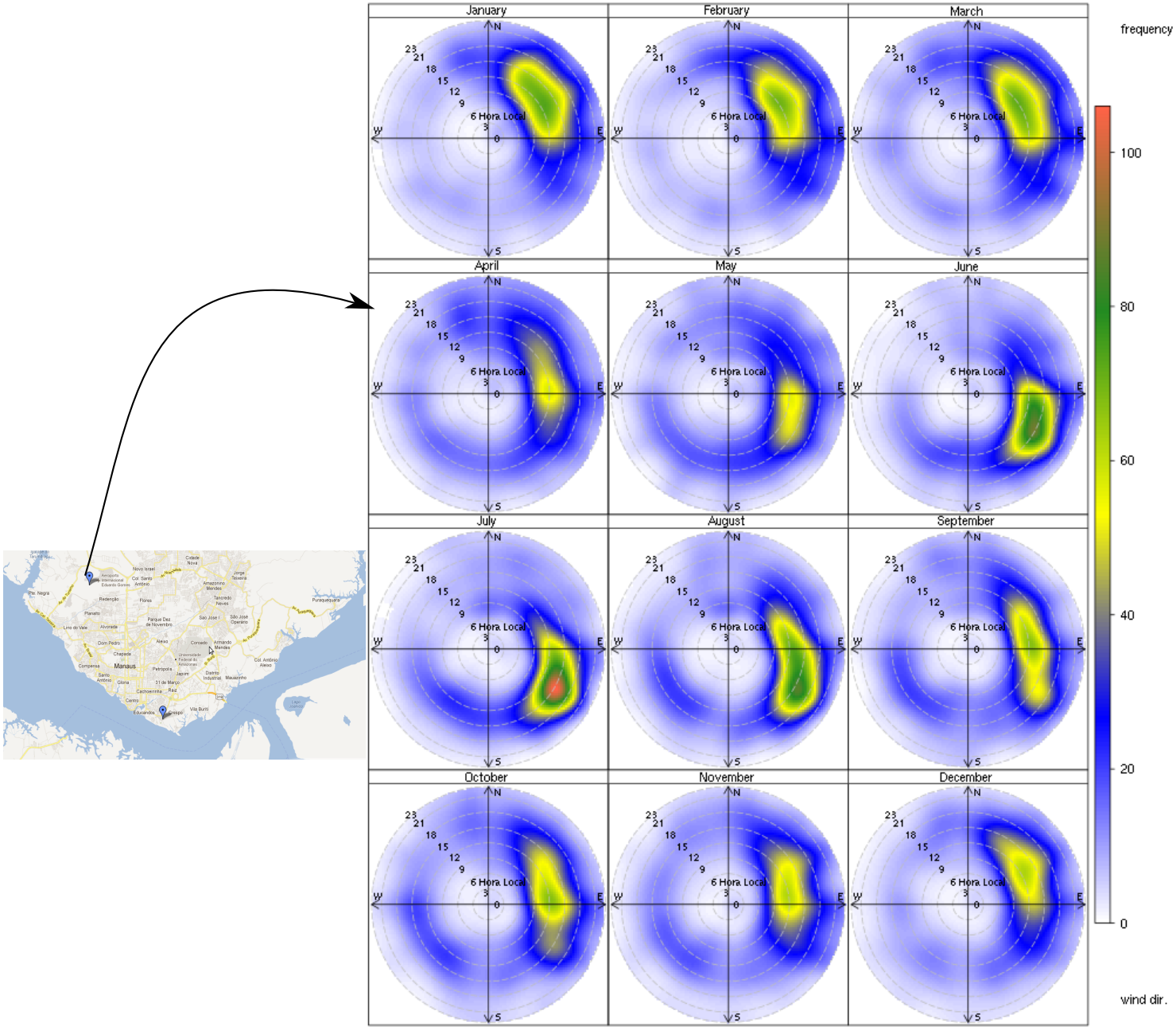
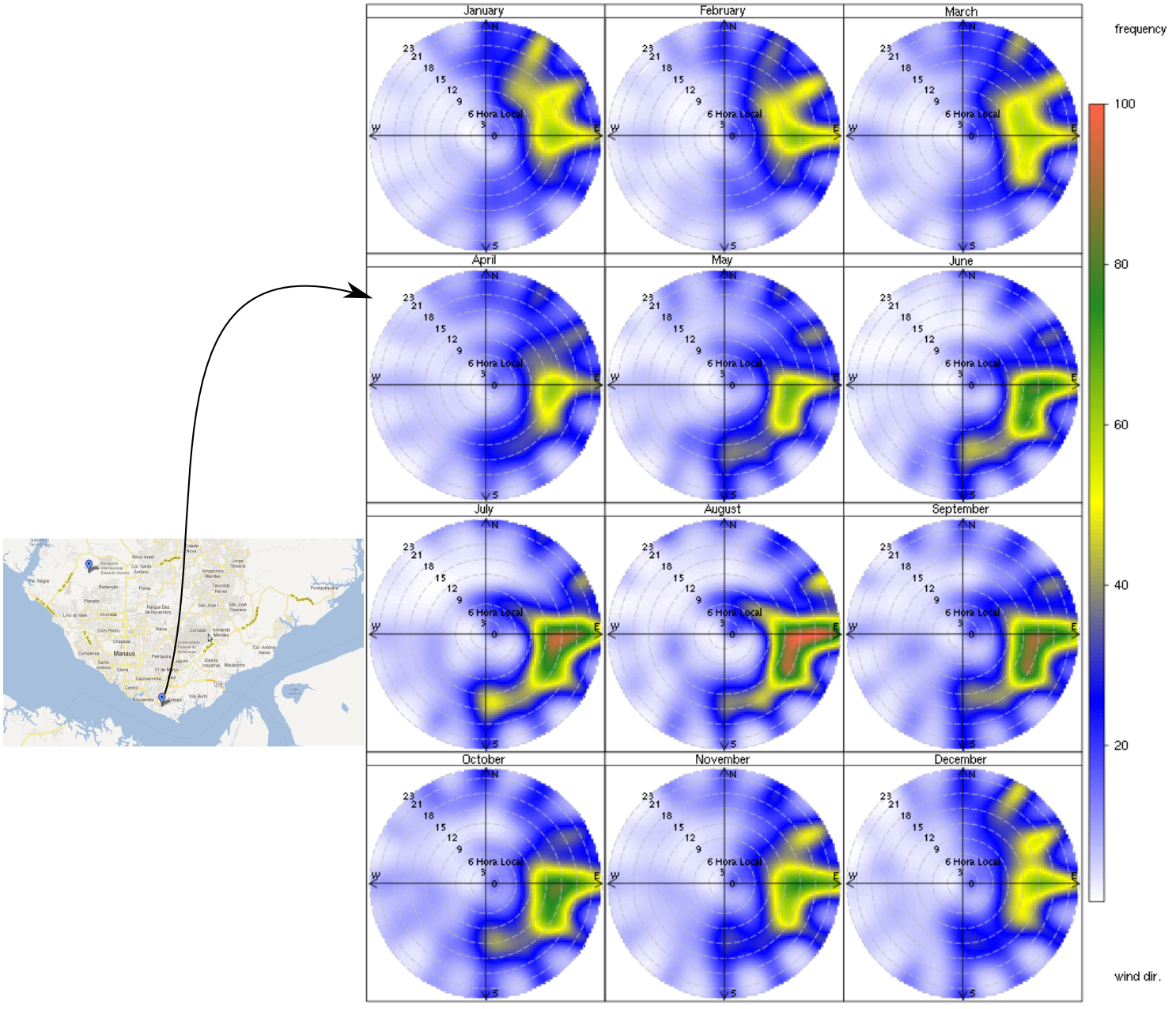
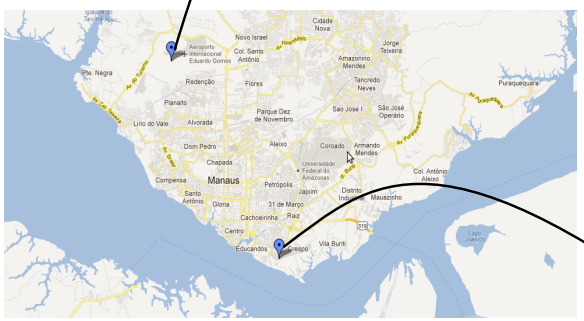
Wind Frequency of Eduardo Gomes Airport station

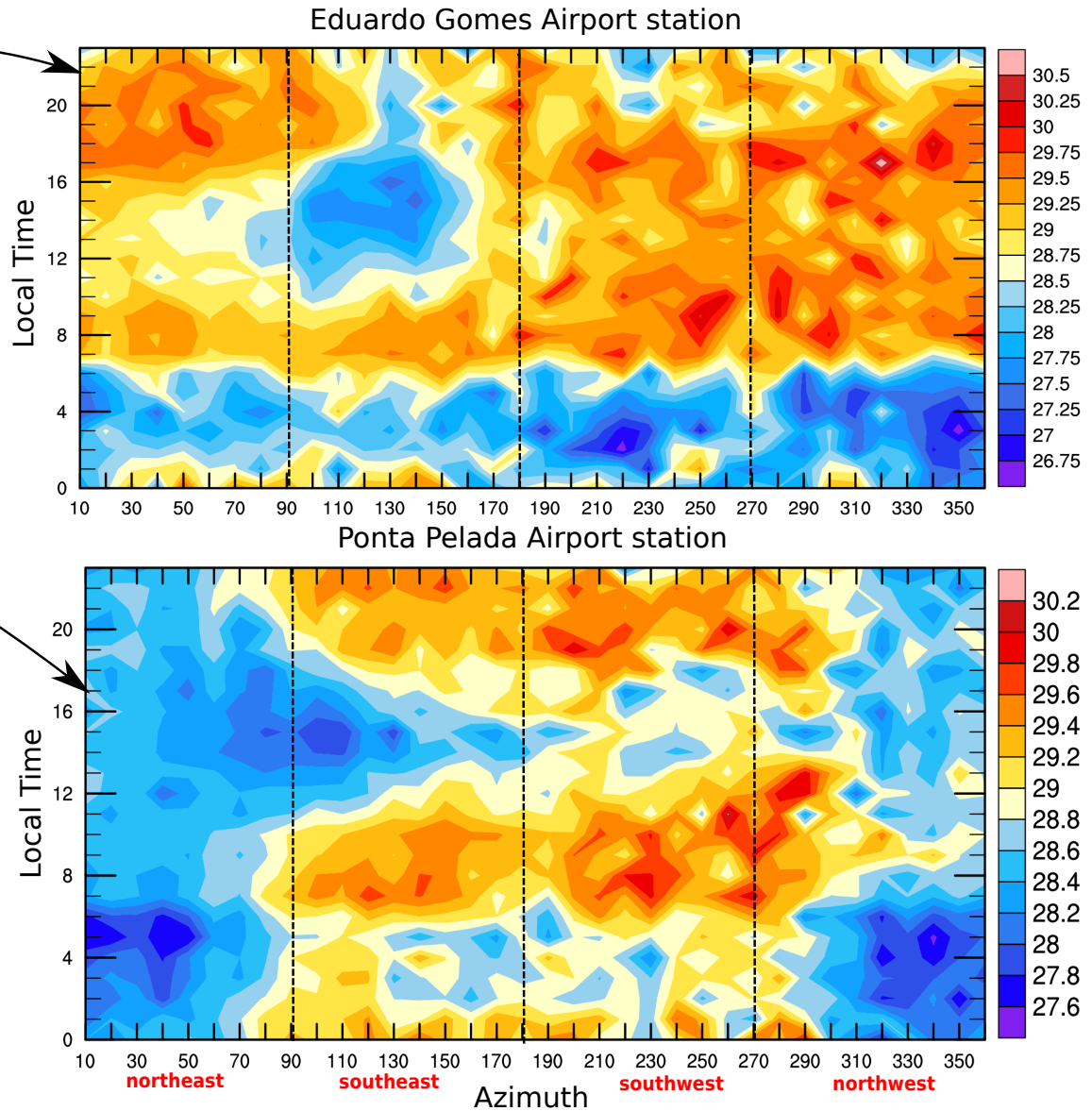


Wind Frequency of Ponta Pelada Airport station

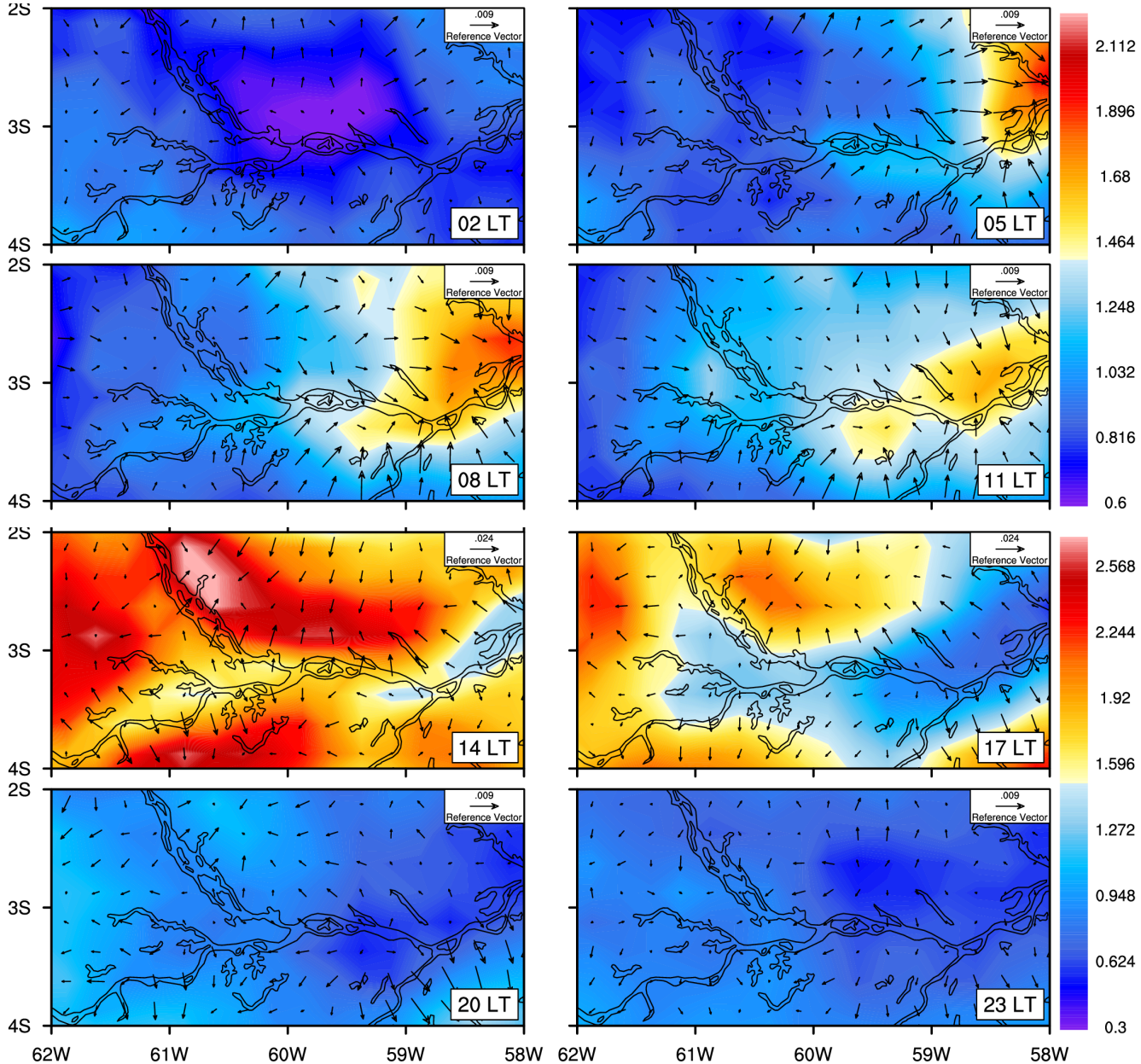


Vapor pressure (hPa)

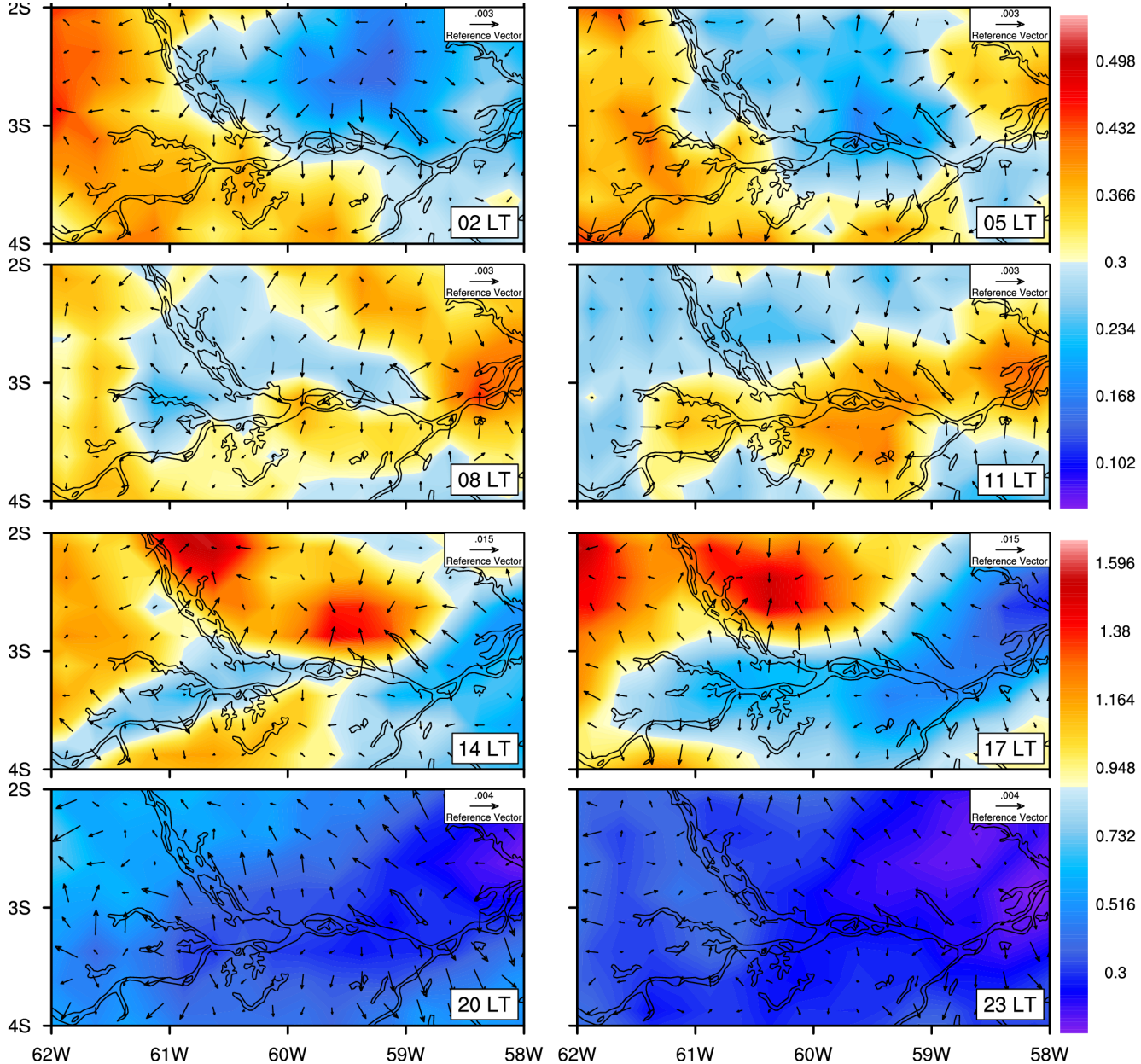




Composites and Gradients of Precipitation (wet season)



Composites and Gradients of Precipitation (dry season)



Conclusions

- In both weather stations, when the wind comes from south, are found high values of vapor pressure;
- When wind comes from southeast decreases the values of vapor pressure over the Eduardo Gomes Airport region;
- When wind comes from north decreases the values of vapor pressure over the Ponta Pelada Airport region;
- In afternoon period and early night minimum values of accumulated precipitation are observed over the rivers and maximum values over the land;
- At dawn and early morning, the accumulated maximum values are found over rivers.

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