

Identification of sensitive regions to climate change and anticipation of climate events in Brazil

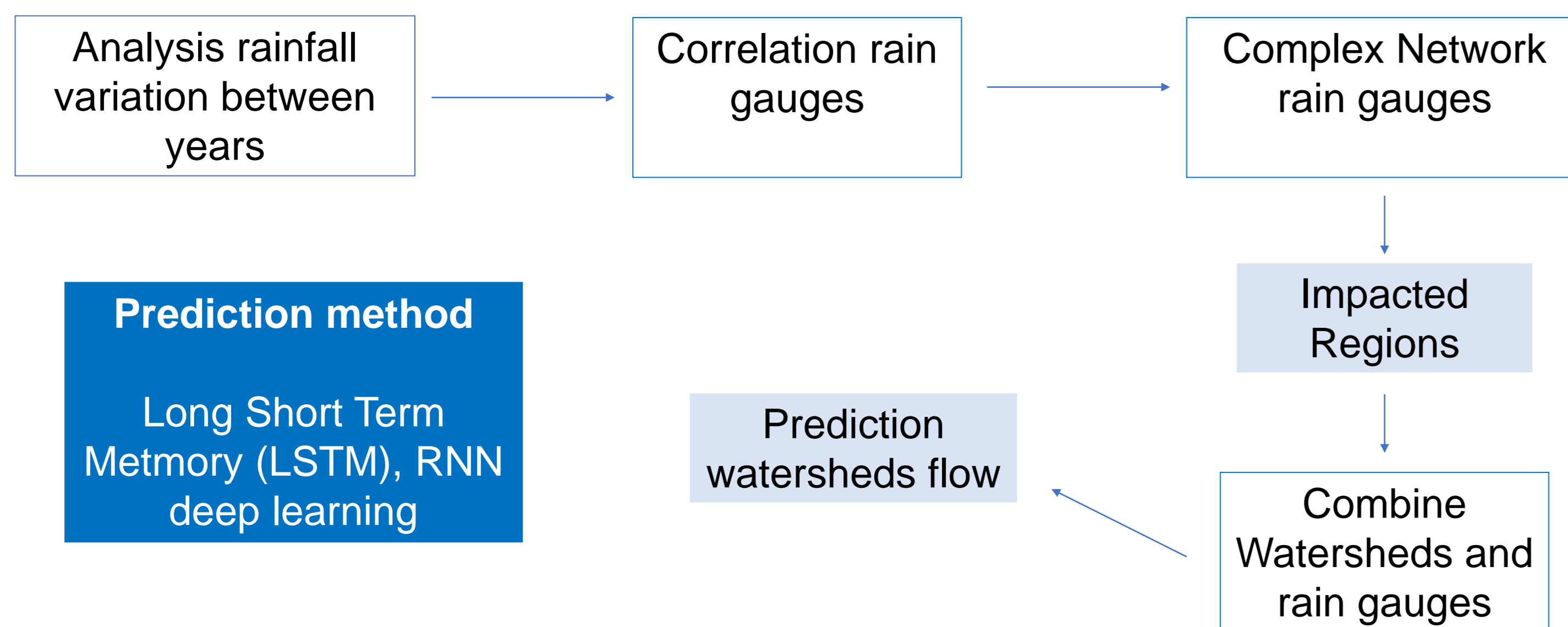


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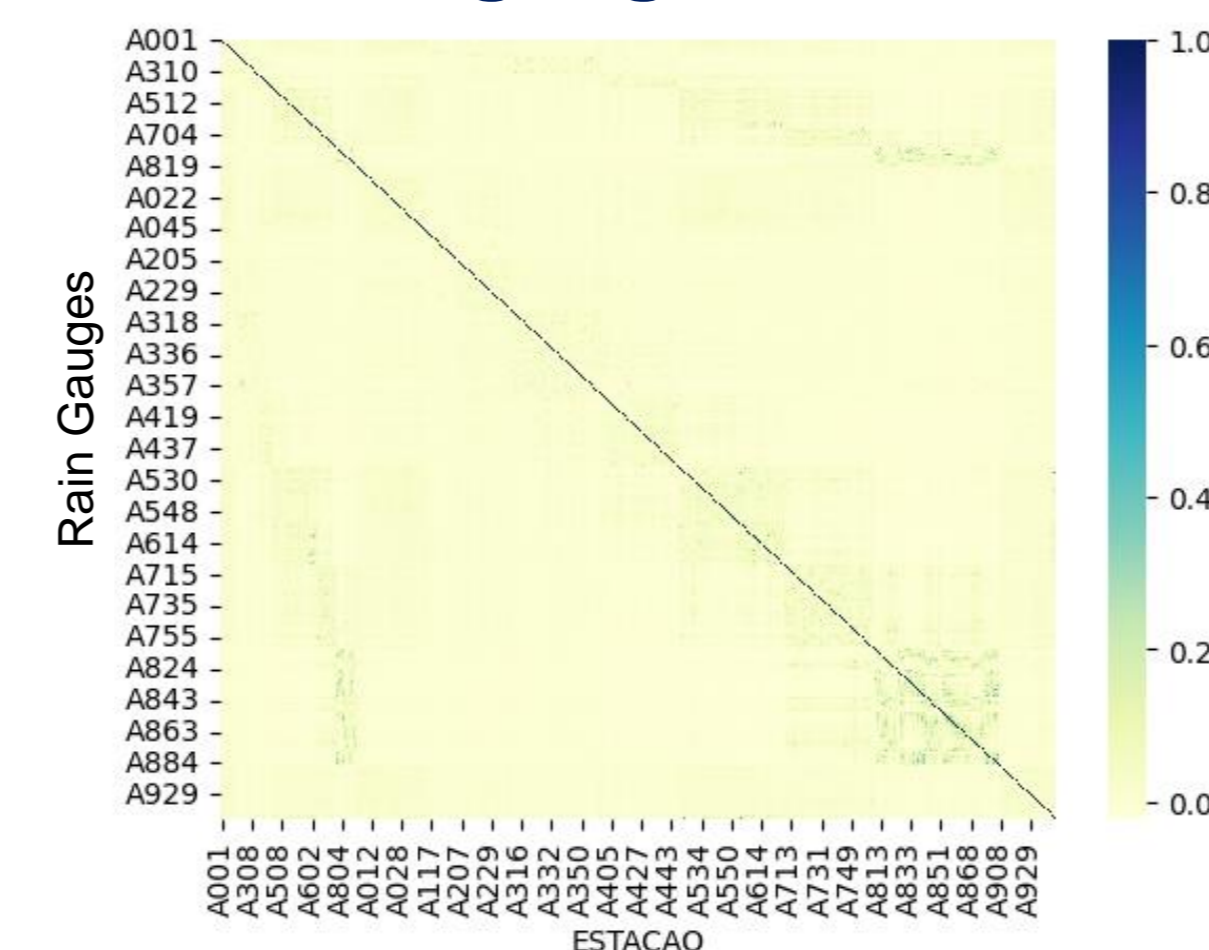
Introduction: In Brazil, the water system is essential for the electrical system and agribusiness. Understanding climate changes and predicting long-term hydrometeorological phenomena is vital for developing and maintaining these sectors in the country.

GOAL: identify possible climate changes in Brazil and predict future hydrometeorological phenomena.

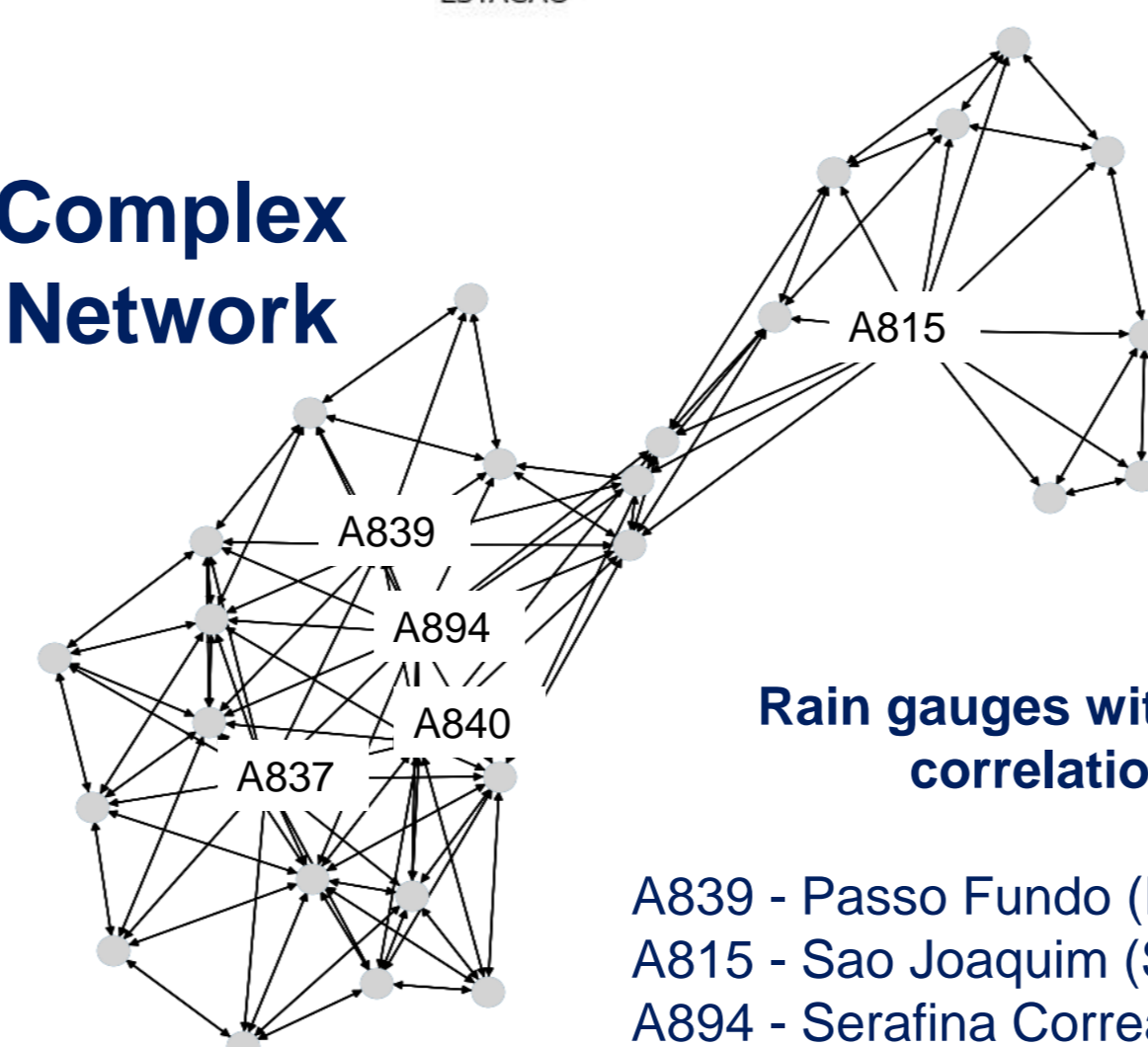
Method



Correlation between rain gauges



Complex Network



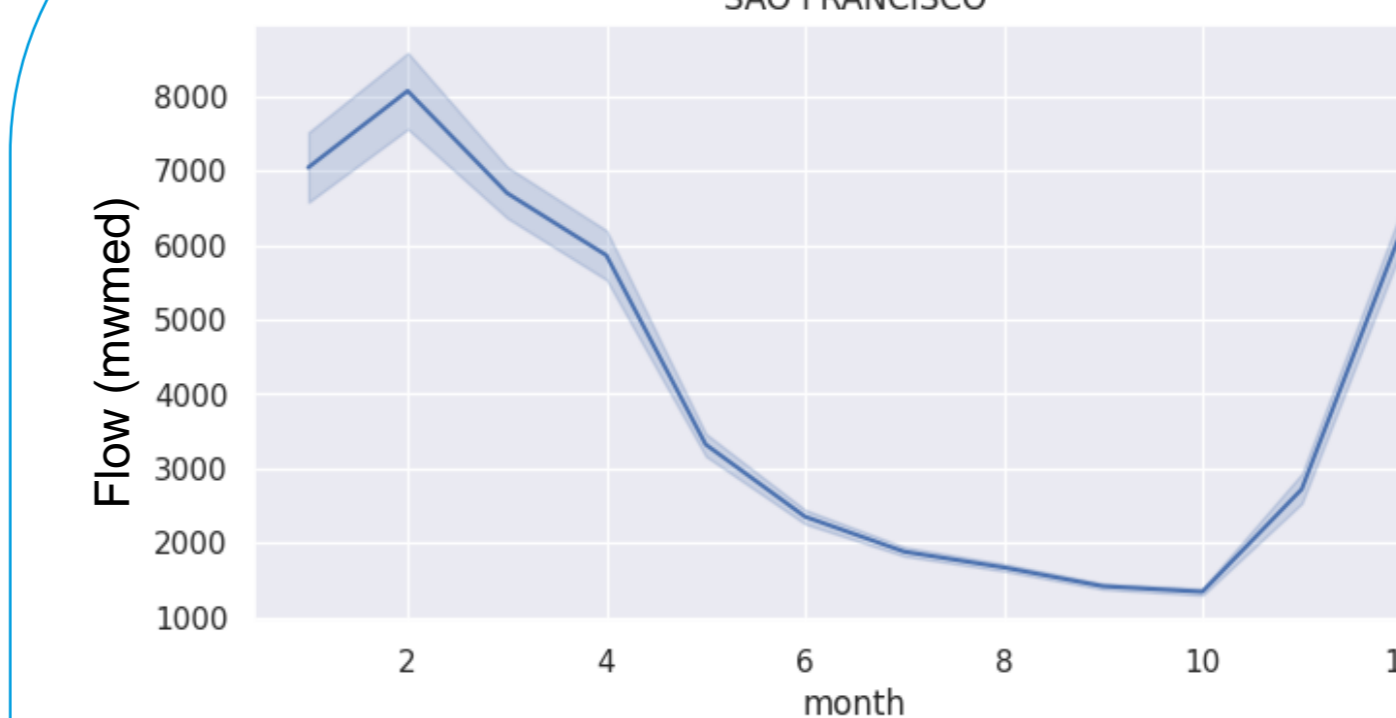
- A839 - Passo Fundo (RS)
- A815 - Sao Joaquim (SC)
- A894 - Serafina Correa (RS)
- A840 - BENTO GONCALVES (RS)
- A837 - SOLEDADE (RS)

High variation in rainfall intensity over the years and months



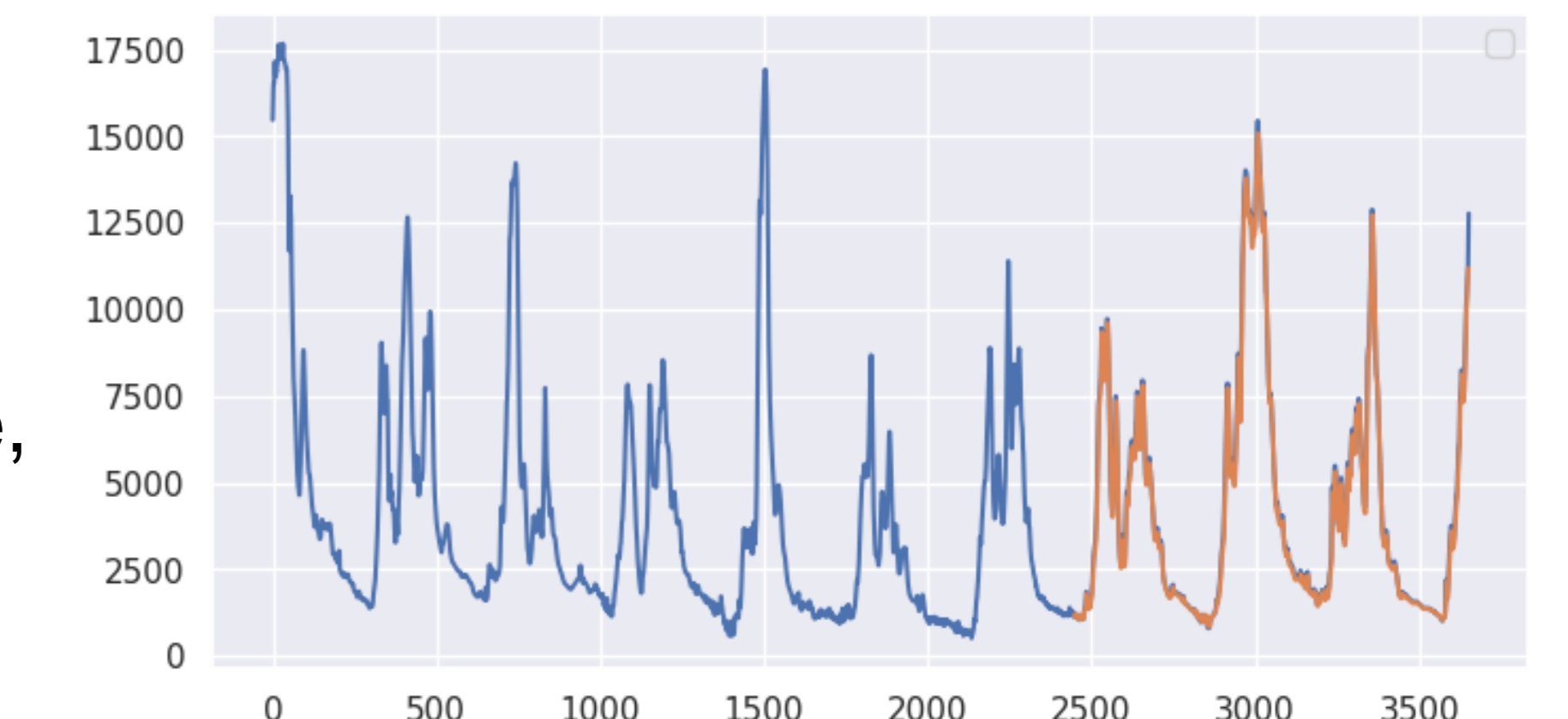
Results

Prediction Sao Francisco watershed



High variation between the months and greater variation and intensity in the first months

Prediction flow of the next time step



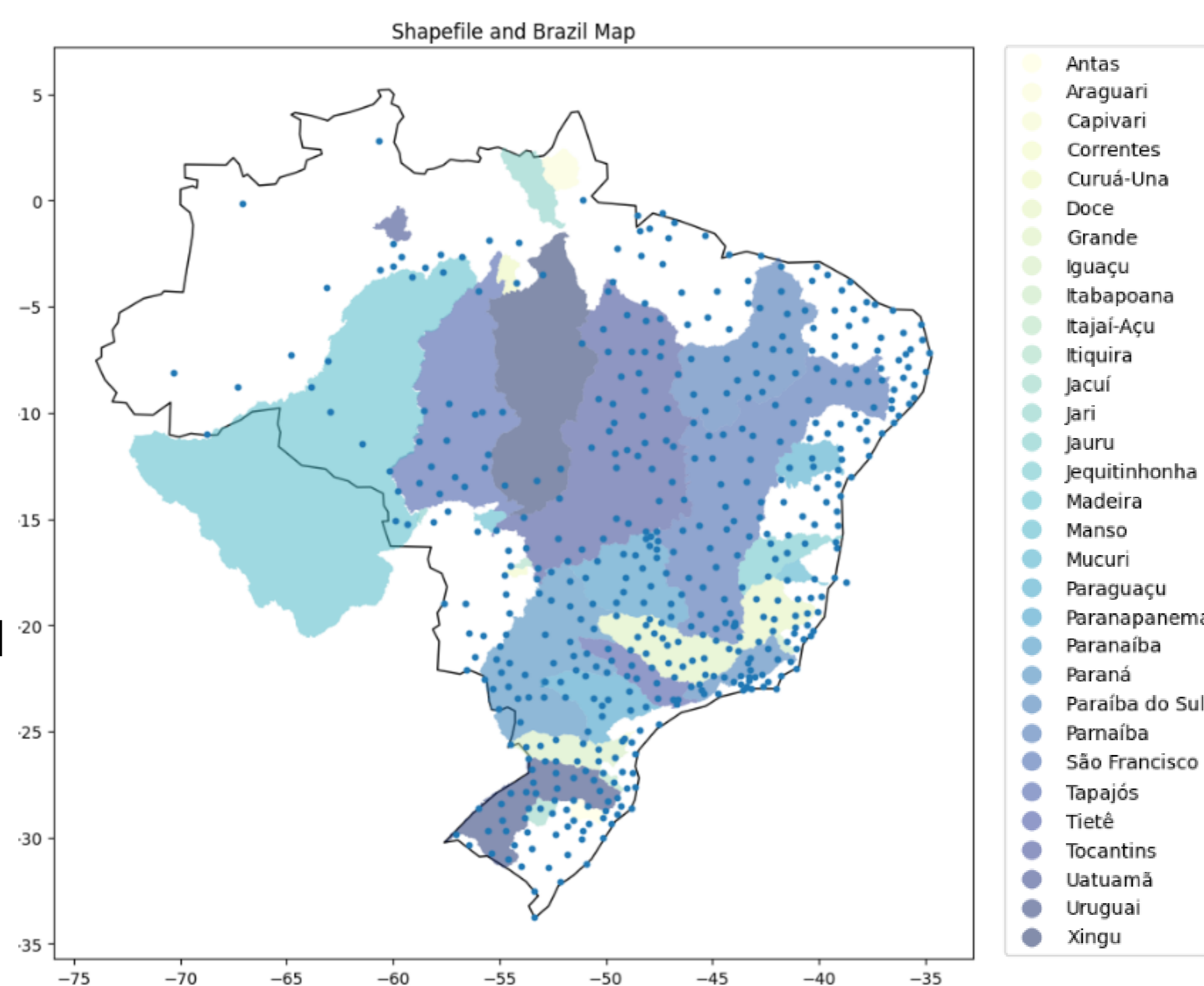
Satisfactory performance, 4% MAPE
 243 RMSE

Data and Region

Data:

- 494 Rain Gauges (2000 – 2022, hourly data)
- Watersheds (2012 – 2022, daily data)

Rain gauges data are from INMET and watersheds SIN data are from ONS Brazil.



Conclusion and Perspectives

Based on the presented results, the importance of the hydrological connection of different regions can be seen. There is a high variation in rainfall intensity over the years, mainly in Santa Catarina and Rio Grande do Sul regions. Through the LSTM method, it is possible to verify the satisfactory performance of anticipating the flow in the São Francisco basin.

As a **perspective** of this work, it is important to combine the information from the rain gauges with the flow history to predict the flow of the main river basins in Brazil and anticipate possible changes in the hydrometeorological system.

