

## **Totalmente Online - 14 a 19 de novembro de 2020**

**GT: Estudos e Modelagem do Tempo e Clima**

### **NON-LINEAR WEATHER TIME SERIES EXPLAIN WHY THE DROUGHT PERIOD LENGTH 2011 AT COAST NORTH NEB AND SEMI-ARID REGION NEB ARE DIFFERENT?**

Natanael Vieira de Sousa<sup>1\*</sup>, Jose A. Marengo<sup>2</sup>, Elbert E. N. Macau<sup>3</sup>, Yong Zou<sup>4</sup>

#### **ABSTRACT**

The NEB region has rainy season depending on teleconnections such as NINO/NINA, Madden-Julian Oscillation and others weather systems (e.g. ITCZ). These weather factors are forced by sea temperature surface, sea level pressure, long wave radiation, relativity humidity and others variables. The goal of this work is development of time series analysis techniques with spatial distribution based on the complex networks formalism with applications for understanding episodes of droughts period length (DPL) in Coast North-Northeast Brazil (NEB) and semi-arid region NEB at 2011. Data: The study period is since 01/01/2011 until 12/31/2011. Time series rainfall daily was obtained by GPCP data base 0.5 degree resolution nat average área as box 2S-9S, 45W-30W. To SST [0.25 d.r.] and SLP [2.5 d.r.]. were applied at average NINO 3.4 region 5N-5S, 120-170W. Tropical North Atlantic SST averaged over the domain 6-22N and 80-15W, to South Atlantic SST average 25S-2N and 35W-10E. Relativity Humidity [2.5 d.r.] area between 40-20W, 15S-1S. Long Wave Radiation anomaly Hovmoller diagram [1 d.r.] 5N-5S , 20E-120W, in 20-70 days. Methods: First to SPL and after other variables: get the differrentiated series  $\Delta SPL = SPL(t+1) - SPL(t)$ ; SPL will be in phase increase is  $\Delta SPL$  is positive, in contrast SPL will be in phase decrease if  $\Delta SPL$  is negative, i.e., increase (or decrease) trends in sea level pressure averaged over a one-month M window time. To quantify the changes in spatial difference will use  $r(m,d)$ ,  $r(d)$  season metric (ave: Feb., Mar., Apr., May.), were used too  $r(m,s)$  to drought period. As conclusions of this research, the authors wait to get the triggers to DPL based in metorological explications about teleconnections and ITCZ (cause and effect) at rainy season in study regions: Coast NNEB and a central point at semi-arid region (Quixeramobim-CE, 5.29S and 39.40S ).

**Keywords:** Complexnet, Drought period length, Northeast Brazil, Rainy season, Teleconnections.

\*natanaelfisico@gmail.com

---

<sup>1</sup> PhD candidate at Weather Forecast Center and Climate Studies, Cachoeira Paulista - SP, CEP: 12630-000, Brazil .

<sup>2</sup> Full Professor at Weather Forecast Center and Climate Studies, Cachoeira Paulista - SP, CEP: 12630-000, Brazil .

<sup>3</sup> Full Professor at Sao Paulo Federal University, Sao Jose dos Campos- SP, CEP: 12.247-016, Brazil .

<sup>4</sup> Full Professor at East China Federal University, Shanghai, China.