

About the variations of thunderstorms days over the city of Belém, located near the equator, in the last 50 years

A.B. Sales*, O. Pinto Jr., I.R.C.A. Pinto

National Institute of Space Research – INPE
S.J. Campos, São Paulo, 12227-010, Brazil
anderson.sales@dge.inpe.br

ABSTRACT: Belém is the capital of the state of Pará, in the North region of Brazil. It is located at 1°27'S 48°30' W, near to the equator. The thunderstorm activity in this region receives direct influence of global climatological parameters like ENSO (El Niño Southern Oscillation) and Tropical Atlantic Dipole. It may be also influenced by variations in solar activity, large scale volcanic eruptions, anthropogenic activity (Greenhouse Gases GHG), PDO (Pacific Decadal Oscillation), QBO (Quasi-biennial oscillation), average global air temperature (from Climatic Research Unit), and local air temperature. To find the relative influence of these parameters on atmospheric electrical activity in Belém, thunderstorm days (TD), also called keraunic level, records were used. The TD observations began in the 1950s and continued until nowadays allowing a robust statistical multivariate regression of the keraunic level in the city with respect to these parameters. Preliminary results show a positive trend of TD over the period that is correlated mainly with anthropogenic activity, followed by temperature of the city, ENSO and average global temperature. The monthly average TD presents its maximum in autumn and minimum in spring, while the air temperature of the city has a monthly maximum average in spring and minimum in summer. It was also found a strong (weak) trend to observe high TD in summer (winter) in La Niña events as compared to El Niño events.

* Correspondence to:

Anderson Barreira Sales, Centro de Ciência do Sistema Terrestre Division, National Institute of Space Research (INPE), S.J. Campos, SP, 12227-010, Brazil. Email: anderson.sales@dge.inpe.br