

RAINFALL REVIEW OF THE STATE OF PARANA, BRAZIL

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SUMMARY

Situated in the southern region of Brazil, Paraná state occupies an area of 199,323.9 km², bordered to the north and northeast by the State of São Paulo, on the east by the Atlantic Ocean, to the south by the state of Santa Catarina, to the southwest by Argentina, to the west by Paraguay, and northwest by the State of Mato Grosso do Sul. The relief of its territory is characterized by lowland frequency on the coastal area, where predominates the alluvial plains and plateaus, and the existence of mountains of crystalline rock formations, such as Serra do Mar. In the inland, the landscape is divided into three distinct types of plateaus in the central and west regions.

The first plateau, where the city of Curitiba is located, the state capital, formations of crystalline rocks can be observed. In the second one predominates the sedimentary rocks, sandstones and limestones, and the third plateau, where there are almost 135,000 km² of the total area of the State, are observed geological formations that make up the basalt soils derived from volcanic rock and clay soils of sedimentary rocks.

A total of 53% of the total area of the state is located 600 meters above the sea level and its highest peak is the Paraná, 1.992m high. The state is crossed by the Tropic of Capricorn, which sets the southern limit of tropical crops. As a result of different topographic and geological features, the climate in the state of Parana has three distinct types, each corresponding to wet weather, presenting milder in the north and temperate in the south, where winters can be rigorous.

Parana is the fifth in economic importance among all Brazilian states. The different physical characteristics and climate of the state favor the existence of diversified agricultural activities and its degree of economic development allows the use of advanced agricultural techniques that result in higher productivity rates in the country. In 1994 the average rates of productivity in the main state of the crops (soybean, corn, beans, cotton, coffee and wheat) increased by 12.9%, due to the development of modern production systems, such as soybeans and wheat, grown on turnover system, generating two annual crops in the same area. Noteworthy is Paraná production of potatoes, sugar cane, cassava and rice. In recent years the fruit development programs has been deployed in various regions of the state.

In the northern region of Parana, the establishment of citrus orchards has allowed the industrial production of orange juice, while the apple production in many regions obtains an average yield of 30,000 tons per year. The cultivation of tropical fruits in the coastal region is generating good results, with rates of production and quality competitive on a large scale. The state has one of the largest cattle herds in the country with 8,606,629 head of cattle, and also the expressive creations of pigs (3780172) and poultry (85,713,370). The milk production of the state represents about 10% of national production. The State of Paraná, with climate dynamics of cold winter, stratiform rainfall and incoming frontal systems, remarkably intense, mainly between May and July.

There is possibility of hoarfrost, which causes damage to agricultural production in this region. Also during this period is the occurrence of air locks (Indian summer) that inhibits the rain in this area, occurring strong atmospheric stability.

During summer (December-March) rainfall is predominantly convective, occurring a supply of moisture from the northern region of Brazil, associated with the entry of frontal systems that force warm moist air to raise generating cumulus-nimbus clouds, with the occurrence of severe thunderstorms and possibly hail precipitation. The presence of moisture convergence zone, areas of the South Atlantic Convergence and Convective Complexes of Meso-scale, mainly from September to March, are marked in the central

part of Brazil, reaching this state, depending on their orientation, causing increased rainfall over the area or, in some cases, inhibiting them.

The interannual variability (El Niño - oscillation periods also explains the wettest or driest in this state, because of the occurrence of the El Niño. Climatological rains above average in virtually every state in the South hand, when La Niña event occurs, unless it rains this region, often causing drought in much of the state. As the State of Paraná is primarily agricultural, producing grain (mainly wheat and soybeans) suffers a lot from this interannual variability. The 1982/83 El Niño was the most intense in the southern region, with rainfall exceeding 4000 mm, compared to the climatological average. In 1985 severe drought occurred in the same area, hit the state with negative anomalies, i.e., below the climatological average.

This study aims to accomplish an analysis of the rain in Parana state, based on data obtained from the National Water Agency (ANA), and analyze the period from 1976 to 2010. These data were primarily based on the free software, with climatological subroutine designed by Guijarro (2002). After homogenization of the data, several statistical analyses were performed, in addition to some indices to study the variability of rain in that state. The calculations showed clearly the anomalies of rainfall variability from year to year, been used as reference the climatological average. It is possible to observe temporal and special variability in the studied area.

EL TEMA QUE SE TRATA ES: Sistemas de Información Geográfica, Meteorológica y Climatológica.

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