

The Influence of Large-Scale Circulation on Fire Outbreaks in the Amazon Region

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The combination of alterations in land use cover and severe droughts may dramatically increase fire outbreaks. Tropical convection in the Amazon Basin is regulated mainly by large-scale atmospheric systems such as the Walker circulation. Many of the documented drought episodes in the Amazon occurred during intense El Niño events such as those recorded in 1926, 1983, 1997-1998, and 2010. However, not all El Niño events are related to drought in the Amazon. Recent studies have also pointed out the importance of the tropical Atlantic Ocean in the modulation of the Amazonian climate, as observed during the drought episodes in 2005 and 2010. This work investigates the fire outbreak tendency in the Amazon region, and the influence of large-scale circulation on these events. Data from the Fire Program of the Center for Weather Forecasting and Climate Studies (CPTEC/INPE) show a substantial increase in the number of fire outbreaks in the last few years, especially during 2016. However, in the 2017 year a sharp drop in fire outbreaks reaching levels similar to the years prior to 2016 is being noted, already showing a reduction of 54% in relation to the preceding 2016 year. The 2015-2016 period was marked by one of the strongest El Niño in history. This was reflected in the increase of the number of fire outbreaks due to the increase of the drought and temperature elevation period. On the other hand, the 2017 year is being characterized by a condition of neutrality in relation to the El Niño-Southern Oscillation (ENSO) phenomena, and have overall presented positive sea surface temperature (SST) anomalies in the tropical Atlantic. Variations of these systems and their relation to fire outbreaks is demonstrated.

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