



## **Active and Break periods in South American Monsoon System and their relation with wet and dry rainy season**

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In the South American continent, as well as in Asia and Oceania, there are occurrence of break and active periods during the rainy season. The highlight characteristics of these periods relates to an amount of accumulated rainfall, in other words, the rainy season with more activity periods is related to higher accumulated rainfall, however within the break periods the amount of accumulated rainfall are below the average. To analyze these periods the precipitation data analysis with spatial resolution  $1^\circ$  latitude X  $1^\circ$  longitude, from Earth System Research Laboratory/National Oceanic and Atmospheric Administration (ESRL/NOAA) was used. Summers were selected (December to February) from 1989 to 2011 on the central region of South America ( $10^\circ$ -  $20^\circ$ S and  $50^\circ$ -  $60^\circ$ W) and an adaptation of monsoon rainfall index (MPI) was applied. The new criterion set up that cases will be classified as active (break) when the MPI is at least (most) half a standard deviation above (below) average climatological pentadal precipitation data, with persistence of this pattern for at least two consecutive pentads. The results showed that during the 22 analysed summers 31 active periods have occurred, with appreciable increasing trend in the number of cases per year, but maintaining the average duration around 4 pentads. Moreover, for the break periods 32 cases were identified, with no expressive increase or reduction tendency of the numbers of events, but with some tendency of shorter duration cases. It was also noted that from the 22 evaluated summers, 7 of them were anomalously wet, being the active period the mostlasting, and 11 summers anomalously dry, with the presence of higher duration break periods. In only 2 cases the total of the annual duration of break periods exceeded active periods, although the precipitation anomalies were positives, representing rainy years. Furthermore, 2 cases of active and break periods with the same duration during the year were observed, one of them the precipitation is around the average, whilst the other was characterized as an anomalously wet year. Other observed characteristic is that there is more expressive number of active (15 cases) and break (13 cases) periods lasting 2 pentads than longer duration cases. For example, only 2 break periods with 7 pentads duration have occurred. From these preliminary results it is concluded that, although the total number of break and active events was practically the same, there are some striking differences which induce to interpret that the anomalously rainy (dry) summers are related to the presence of active (break) periods more lasting than break (active) periods. It was also noted that during the 22 analyzed years there is a tendency of the active periods becoming more frequent and lasting about the average, whilst for the break periods there is an indication that the cases will become shorter and will maintain the average annual frequency.