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USE OF TWO "STATE OF THE ART" REMOTE SENSING BASED DATA OF EVAPORATION TO STUDY ANOMALIES IN MOISTURE SOURCES AND SINKS ASSOCIATED TO THE TWO SEVERE AMAZONIA DROUGHTS IN 2005 AND 2010

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ABSTRACT:

The Amazonia has suffered from two very severe droughts in recent years, 2005 and 2010 being the 2010 drought even more intense that the 2005 one. The effects of these droughts over the Amazon rainforests could be devastating in the sense of these forests act as a natural buffer to man-made carbon emissions. Furthermore, these droughts impinged widespread socio-economic impacts, particularly in Water resources, ecosystems and Agriculture. Most meteorological analyses of these droughts has focused on anomalous boundary conditions such as those observed in oceanic sea surface temperature (SST). This approach is based on the accepted premise that strong SST changes in Tropical Atlantic can result in anomalous atmospheric circulation, favouring periods with low atmospheric instability. However, to the best of our knowledge there are no works focused on the anomalous transport of moisture to this region, neither the subsequent anomalies of moisture transport from it.
In this analysis, we start by identifying the main drought area for the 2005 and 2010 Amazonia droughts, allowing then to establish a comparison with the climatological sources of moisture for this region and the main sinks from it. Afterwards, we used a Lagrangian approach to estimate the contribution of the anomalous transport of moisture to the affected areas (both in position and intensity of the sources), as well as, the effect of the dryness of the region on its main moisture sinks. The identification of moisture sources and sinks as well as its changes in position was achieved with a well-known methodology which relies on the Lagrangian particle dispersion model FLEXPART, using about 2 million particles over a 34 year period (1980-2013), computed using ERA-interim reanalysis. Finally, changes in intensity of sources and sinks are stablished with two "state of the art" products of ocean and terrestrial evaporation, respectively OAFLUX and GLEAM.

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