TEMPERATURE TRENDS OVER SOUTH AMERICA - 1979 TO 2017

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INTRODUCTION

In this work, the objective is to evaluate the temperature trends over South America and adjacent sea (ASSEA; 90ºW a 20ºW e 60ºS a 10ºN; Fig. 1). The analysis included the tropical/Northern (TSA; 90ºW-20ºW and 20ºS to 10ºN) and subtropical/southern of the ASSEA area (SSA; 90ºW to 20ºW and 60ºS to 20ºS). To compare the climate change over ASSEA with global changes, the temperature tendency over the entire planet is shown too. The subperiods 1979 to 2005 and 2006 to 2017 are also analyzed. The air temperature 2 meters above the surface of the NCEP/Department of Energy (DOE) reanalysis was used (https://www.esrl.noaa.gov/psd/data/gridded/reanalysis/).

METODOLOGY

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The air temperature 2 meters above the surface provided by the NCEP/Department of Energy (DOE) reanalysis was used (https://www.esrl.noaa.gov/psd/data/gridded/reanalysis/). The resolution of the NCEP/DOE reanalysis is T62L28, with nearly 2.5º latitude × 2.5ºlongitude and the simulations were initiated in 1979, which is also when environmental satellite data began to be produced on a large scale (Kanamitsu et al. 2002, *Bull AMS*). The average of the monthly values was considered to determine the annual temperature.

Trend signs are examined by the Mann–Kendall test and trend signs and magnitudes for Sen's slope estimator (Sen, 1968, *J. Amer. Stat. Assoc.)*. The normally or not of the datasets not was tested, once again that Mann–Kendall and Sen´s tests can be used for any distribution.

RESULTS

The Mann–Kendall and Sen tests indicate same trend in all regions and period. The temperature trend between **1979-2017** for the **GLOBE, ASSEA, TSA** and **SSA** were: **0.19***, 0.01^{-}, 0.08*, -0.06* ºC/decade**; between **1979-2005: 0.16***, -0.08^{+}, 0.04^{-}, -0.12***ºC/decade** and between **2006-2017: 0.25^{+}, 0.24^{+}, 0.21^{+}, 0.18^{+} ºC/decade**, respectively.

DISCUSSION

It was observed that the trends of increasing temperature were higher in recent years, however with lower statistical significance in most regions. The trend of temperature increase in recent years was more pronounced in South America and its sub-regions, mainly on the SSA region, which over the globe. The difference between the average temperature of the two subperiods is 0.37ºC, 0.09ºC, 0.21ºC and -0.04ºC for the globe, ASSEA, TSA and SSA, respectively. For the globe and the TSA region this mean difference is statistically significant (99% confidence).

***0.001 level of significance; ** 0.01 level of significance; * 0.05 level of significance; $^{+}$ 0.1 level of significance; - > 0.1 level of significance

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