



On the atmospheric circulation patterns over Colombia, South America: a comparison between reanalyses

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We present a map-pattern climatology with focus on Colombia, South America. Meridional and zonal wind and specific humidity fields at the 850 and 500hPa levels derived from the NCEP/NCAR and ERA-40 reanalyses (both available at 2.5° resolution) were classified jointly into few patterns using the SOM technique. Each day during two trimesters for the 1958-2000 period is categorized by a map-type. The analysis of the patterns is based in some qualitative and quantitative properties of the time series corresponding to each pattern.

The analysis of atmospheric patterns at the 850hPa and 500hPa levels show important differences between the two reanalyses. In particular, patterns representing one reanalysis do not represent atmospheric states of the other reanalysis, which means that both datasets produce atmospheric states in disjoint regions of the corresponding data space. Detailed analysis of the time series of patterns show particular features of each pattern.

From the computation of the frequencies of occurrence of each pattern for each year of the period 1958-2000 we found some kind of trends, so further analyses were performed for the subperiods 1958-1978 and 1980-2000 separately. The persistence and recurrence of the patterns representing extreme conditions of the three fields are analyzed. The relative frequencies of the patterns during the warm and cold phases of ENSO are also analyzed. Furthermore, a trend towards more days with moister atmospheres at the end of the 20th century is identified in both reanalyses. However, we found some ERA-40 patterns with both very high frequency and very high persistence in the period 1958-1978. These patterns could be related with an error in ERA-40 reanalysis over Colombia.