ASSESSING THE VARIABILITY OF LONG-TERM MEXICAN INSTRUMENTAL RECORDS AND THE ENSO MODULATING FORCE.

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ABSTRACT

Undisputable evidence of climate change is accumulating from direct observations. Unfortunately, for some unanalysed regions of the world, the data coverage is still sparse (IPCC, 2007). This study aims to assess the changing patterns of precipitation and temperature across Mexico and the direct influence of El Niño-Southern Oscillation.

A network of 175 stations with precipitation and 52 with temperature of monthly data were built for the Principal Component Analysis (PCA) and the ENSO modulation assessments. A set of 35 stations with daily data for weather extremes analyses was also developed. Oblique-rotated solutions have been applied to the monthly datasets to regionalise groups of stations that are varying coherently. Extreme indices are calculated using the RClimDex in the daily time-series of rainfall and temperature. Finally, linear (Kendall's tau-b) and lag correlations have been applied to establish relationships between three different ENSO indices, the precipitation regional averages (resulting from PCA) and also with the weather extreme indices.

A clear latitudinal transition is observed when the annual and rainy (May-Oct) seasons of regional precipitation averages and extreme rainfall indices are correlated with the ENSO indices: wetter conditions are observed north of the tropic of cancer and below normal precipitation is dominant in the southern part of the country. Meanwhile, a national climatic picture of wetter conditions is observed when the standardised versions of the

dry (Nov-Apr) season of the regional precipitation averages and the extreme precipitation indices are correlated with the ENSO indices; precipitation responds mainly close to the peak of El Niño-like conditions. Warmer temperatures are observed when the extreme temperature indices are correlated with the ENSO indices. Nevertheless, the most significant results are seen in the minimum temperatures, although timing of response to the ENSO modulation is not as clear as in the case of precipitation.