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An Exploratory Climate Time Series Analysis in Mercedes, Argentina

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Abstract

The Corrientes Province grasslands constitute a major alternative for Pampas' meat production. Besides, Mercedes Department represents the major livestock production region of this Province. Several works have shown that climate can influence the net primary production. Therefore, on a climate change scenario, to know the climate trends is a key when looking for adaptive responses by grassland/livestock production systems.

In this work, climate linear trends of observational data at Mercedes Experimental Station were analyzed. Our study considered a 29-year period (1981–2009) divided in periods of 10 years, in relation to the long term normal (1961–1990). Due to lack data, potential evapotranspiration (ETP) was calculated only for the 1994–2009 series, according to Thornthwaite, Turc and Hargreaves methods. The resulting trends indicated fluctuations in mean temperature considering the long term. However, if short time series of 10 years are considered, the first time period saw an increase of 0.3°C, followed by a decrease of 0.4°C during the next 10 year period and finally an increase of 0.5°C mean temperature in the last decade. Monthly mean temperature showed a similar trend. The observed climate data revealed slight decreases in the annual precipitation when the long term time series was considered (especially in spring and summer), but a decrease higher than 100 mm during the last 10 years period, which was also characterised by a decrease in the number of rainfall days “El Niño” events were frequent during the first and the second time series, while in the last one, only two light events occurred. ETP analysis showed a small increase independent of the considered calculation method ($r^2=0.36$; $r^2=0.05$ and $r^2=0.11$), especially in spring and summer 2001–2009 period. This work presents a more realistic appraisal of climate variations in Mercedes, Corrientes–Argentina, as a first step for future research considerations on adaptation strategies.

Keywords: Adaptive responses, climate change, evapotranspiration, grassland ecosystems, Province of Corrientes