Analysis of changes in annual precipitation patterns in Alentejo region using log-linear models

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Abstract

Climatic changes are a topic of extreme importance nowadays. With the aim of adapting agriculture in Alentejo to climate changes, this work intended to find statistically significant differences in the intra-annual and inter-annual cycles of precipitation in Alentejo, Portugal, over the last 40 years. To do so, precipitation data from each location in Alentejo were divided into four decades and grouped into contingency tables in order to fit log-linear models with two categories: year and month. ANOVA-type tables were obtained with residual deviations for the factors month, year and interaction, which allowed us to know their statistical significance in the model. Then, Backward elimination method was applied to try to reduce the parameters of the models referring to the months that were less relevant to explain the variability of precipitation. In the end, we were able to conclude that in the oldest decade there was more intra-annual variability of precipitation, which could be interpreted as trend towards smoothing out the differences in precipitation between the months of the year. Furthermore, with regard to the inter-annual variability, a cyclical behaviour emerged when comparing the 4 decades.

Keywords

Keywords: Climatic changes, Contingency tables, Backward elimination, Residual deviance.

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