

Agency for Environmental Prevention and Protection of Veneto Region

PIECEWISE AND STRUCCHANGE: TEST OF TWO METHODS OF CHANGE POINT ANALYSIS IN AGROCLIMATOLOGY

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Introduction

In the last decades the perception to live a peculiar climatic phase has increased; this justify the importance of quantitative methods useful to describe the characters of this phase. The temporal variability of historical datasets is frequently analyzed as a continuous process, described by linear interpolation methods. Nevertheless an important aspect of the evolution of climate is represented by abrupt changes with different phases separated by breakpoints as shown for example by Sneyers, Palmieri and Siani (1993) and Lockwood (2001). Each breakpoint splits the time-series in homogeneous sub-series whose trends must be analysed separately.

Some methods for discontinuity analysis are discussed in this work. A specific advantage of the discontinuity analyses is to focus on the climatic and non-climatic origin of the breakpoints (e.g. changes in the circulation pattern behaviour at different scales, changes in land use, changes in the instruments and observation methods).

Methods and materials

An homogeneous archive for the 1956-2004 period was obtained from the analysis of daily data of precipitation and air temperature (source: National Hydro graphic Service, Meteorological Centre of Teolo). These data were analysed by means of some different statistical methods as the simple linear regression, the mobile average, the piecewise linear (Tom and Miranda, 2004) and flat-steps (Bai and Perron, 2003) discontinuity methods.



Conclusions

The adoption of different methods for trend and discontinuity analysis can give complementary information useful in order to analyze the behavior of the time series which can be subdivided in climatic and non climatic ones.

The flat-steps approach can be particularly interesting for agro-climatic purposes, because it permits to identify the reference period for climatic normal which are the basis for a lot of evaluations about climatic change and adaptation of agricultural systems.

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