Geophysical Research Abstracts,
Vol. 10, EGU2008-A-00668, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-00668
EGU General Assembly 2008

INTERACTION BETWEEN THE INDICES OF LARGE-SCALE CIRCULATION PATTERNS AND TERMO-PLUVIOMETRIC SERIES IN PIEDMONT AND THE CLIMATE VARIABILITY.

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The temperatures and precipitations are among the most important meteorological parameters, because of their strong impact both on natural ecosystems and human society. The temperatures assume a homogeneous distribution in the territory because they are more influenced by the latitude and the elevation. The precipitations are characterized by a high spatial and temporal variability, they are generally determined by a large number of climatic factors (orography, exposure, distance from the sea). One of the most important forcing elements is orography, which interacts strongly with the large scale flow, contributing to the determination of the precipitation field structure. The Piedmont, situated on both sides of the 45˚ parallel, a midway between the equator and the north pole, is a very interesting region because it is situated in a transition zone between the Atlantic Ocean, the Mediterranean Sea and the European Continent. The Region is protected by their influence to the west and north from the Alps while to the southeast from the Ligurian Appenines.

For this work, we have selected the meteorological stations, belonging to the ex-National Hydrographic Mareographic Service, now ARPA (Regional Agency for the

Environmental Protection) Piedmont, that have continuously measured the daily temperatures and the daily precipitations from 1951 to 2006.

The long series of precipitations and temperatures are analysed using the principal component analysis (PCA) method (Jolliffe, 2002). EOF analysis was used to spatially summarise the rainfall data and to enable clarification of the role of the dominant circulation regimes affecting the Region. The study considers the various seasonal periods and shows the relationship between the structures of the seasonal camps of the precipitations and temperatures with two different patterns, the North Atlantic Oscillation (NAO) (Hurrell, 1995) and the European Blocking (EB) (Tibaldi, 1990).

In all series and on different time scale (monthly, seasonal and year) we have calculated the trends using the Mann-Kendall test to evaluate the consistency of the results.

For analysing thoroughly the climatic variations in Piedmont we have calculated the seasonal and annual anomalies in the maximum minimum temperatures series and in the precipitations series. This study has showed the variations in the series and has identified the period in which they are manifesting. In the both variables we have also individuated an increasing shifts in the trends, particularly in the last period.

Thanks to this work, we have studied and comprehended the climate variability in Piedmont and we have estimated the correlations with the indices of large scale circulation patterns contributing to predict the regional climate changes.