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Temperature trend over Italy from 1961 to 2004

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With 10 Figures

Received June 24, 2005; revised March 24, 2006; accepted November 13, 2006
Published online February 28, 2007 © Springer-Verlag 2007

Summary

In order to evaluate the temperature trend over Italy, minimum and maximum daily temperatures reported by SYREP messages from 49 meteorological stations of the national air force weather service from 1961 to 2004 have been collected, controlled and used to calculate the annual series of mean temperature anomalies over Italy, with respect to the 30-years climatological period 1961–1990. Monthly temperature series were homogenized in order to eliminate the effects of non-climatic factors. Then, three trend models (linear, piecewise and sloped steps) were applied and the trends of mean temperature and average minimum and maximum temperature, together with their confidence intervals, were estimated. The results indicate a negative trend for the period 1961–1981, a more pronounced positive trend from 1981 to 2004, and an increase of the average daily temperature range for the whole period.

1. Introduction

The evaluation of long term mean temperature trend averaged over large geographical or political area requires the availability of quality-controlled time series from a consistent number of spatially well distributed meteorological stations. In Italy, several national and regional institutions are responsible for the operation of meteorological networks for different purposes, but it is difficult to identify a reference source of data matching all the following requirements:

length, completeness, quality and regular updating of the time series, density and geographical distribution of the stations, which should represent the different topographical and climatological characteristics of the national territory.

Mean and daily minimum and maximum temperature trends over Italy during the last 130–150 years have been investigated by several studies (Maugeri and Nanni, 1998; Brunetti et al., 2000a, b) making use of monthly average data of the historic network of the Ufficio Centrale di Ecologia Agraria. In the framework of the recent development at the Italian environmental agency (APAT) of a national computerized system for the collection, elaboration and diffusion of climatological data (denominated SCIA, see the web site www.scia.sinanet.apat.it), synoptic data of the Air Force Ufficio Generale per la Meteorologia (UGM) have been processed and quality-checked in order to derive ten-daily, monthly and yearly values of the most important statistical indicators of climatic variables such as temperature, precipitation, relative humidity, cloud cover, atmospheric pressure and wind. The synoptic stations are distributed over all the Italian regions, and, although many of them are located within civil or military airports, they probably provide the most suitable set of data for deriving synthetic indicators of temperature trend over Italy in the last decades. The indicators we have considered for