EMS Annual Meeting Abstracts
Vol. 9, EMS2012-115, 2012
12th EMS / 9th ECAC

Daily minimum and maximum temperature probability density functions estimation with an empirical method

C. Lussana
ARPA Lombardia, U.O. Meteoclimatologia, Milan, Italy (c.lussana@arpalombardia.it)

The presented work focuses on the investigation of daily minimum and maximum temperature probability density functions (pdfs) with the intent of both characterizing a region and detecting extreme values.

In the southern ridge of the Alps, Lombardy contains several climatic areas. The Lombardy's meteorological network, managed by the weather service and composed of 250 automated weather stations, is suited to sample the mesoscale and can provide an high-resolution description of the atmospheric state near the surface.

The empirical pdfs estimation has been derived using several years of hourly averaged temperature gridded analysis available at the weather service. In fact, the mesoscale network, in its actual design, is rather recent (after the year 2000) and an effort must be made to identify the time period whit a constant stations distribution or the elaboration can be influenced by the unsettled distribution.

The spatial interpolation is based on an implementation of Optimal Interpolation (OI) using only air temperature observations. Apart from the stations distribution, the geographical information used are a digital elevation model and the land use.

The OI is also applied operationally at the weather service providing daily minimum and maximum temperature analysis. The correspondent empirical pdfs are consistent with the operational OI results, because both the interpolation method and the grid parameters are identical, then for each grid point it is possible to straightforwardly deliver to the users the observed temperatures probability of occurrence in a concise way, such as: extremely cold/hot, unusual cold/hot.