



## The CRA-CMA historical weather Archive

M. C. Beltrano, L. Iafrate, and L. Perini

Consiglio per la ricerca e la sperimentazione in agricoltura - Unità di ricerca per la climatologia e la meteorologia applicate all'agricoltura, CRA-CMA, ROME, Italy (mariacarmen.beltrano@entecra.it, +39 06 69531215)

CRA-CMA is the heir of the first Central Office for Meteorology in Italy, known as "Regio Ufficio Centrale di Meteorologia", established in 1876. The CRA-CMA Weather Archive comes from the systematic and centralized collection of meteorological data belonged to such a Central Office, recorded in the whole Italian country, in the former colonies of Northeastern Africa and in Greece and Balkan countries.

The Archive contains a wealth of information: it is composed of more than 850 meteorological data series, including the ones belonging to 40 still operating observatories. Among such series, 260 are more than thirty years old and 20 more than one hundred year old.

It consists of ten-day paper forms reporting daily or sub-daily data recorded by a large network of mechanical stations; some of these stations are still working.

The paper forms were daily filled by volunteer observers; the data concern: air temperature, humidity, pressure, wind speed and wind direction, precipitation, sun duration, radiation, evaporation and other observations such as cloud cover and cloud type, snow, and so on. It is estimated that more than six million of data constitute each observed weather element.

In the last years a huge effort of data digitalization has been performed at CMA. The digitalized records are stored, along with the current meteorological data, in the National Agrometeorological Data Base (BDAN), the CMA operative tool for collecting and managing data.

We assume that, at the present, the data entered in the BDAN are the 30% of all data present in the Archive paper. In addition to the meteorological data, the ten-day paper forms contain, in an inset called "Notes on the weather", a rich source of valuable evidence recorded by directors and observers. Here are written colorful or poetic comments about atmospheric phenomena, which are beyond the mere weather observations, as well as historical information. So cards of great scientific interest also become valuable documents from the historical and cultural standpoint. The consultation of such "Notes" makes it possible to recognize useful information about stations displacements, changes in observers, changes or malfunction of instruments, changes in observation and reporting times, changes in exposure and site characteristics, variations in height and/or ground cover, and so on. These valuable information, known as "metadata", are a very important source of notices: they allow us to reconstruct the history of each weather station, providing a key to critically analyze historical meteorological datasets, a necessary step for controls useful to validate and standardize the data themselves.

A new project of digitizing is ongoing and concerns the image scanning of the meteorological cards: the best approach to preserve their whole contents. Recently, we have bought a professional plan-scanner to start a scanning program of the meteorological cards, to create an "Images Archive", in order to make its contents more shareable and to open new relationships and collaborations.