Geophysical Research Abstracts
Vol. 13, EGU2011-501, 2011
EGU General Assembly 2011

The long Precipitation series in Padova, Italy (1725-today)

Chiara Bertolin and Dario Camuffo
Italian National Research Council- Institute of Atmospheric Science and Climate, Padua, Italy (c.bertolin@isac.cnr.it)

The long Precipitation series in Padova, Italy (1725-today)
Dario Camuffo, Chiara Bertolin
CNR ISAC, Padova, Italy

The daily instrumental observations of precipitation in Padova, Italy, 1725-2009, is one of the longest in the world. Readings have been recovered from the original registers, corrected, validated, homogenized and transformed into modern units. An historical analysis has been performed to know instruments, location, exposure and observational methodologies. In particular, early instruments, have been carefully analysed to know their response and uncertainties e.g. Poleni's cistern rain gauge with square funnel and separate reference rod (1725-1764), Toaldo's gauge with a bottom tap and volumetric cup evaluation of precipitated water (1768-1813), like the Observatory in Paris (1779), the Musschenbroek cistern gauge with magnification and glass tube reading (1815-1837), the dome of the observatory used as huge rain collector (1838-1877), the "Palazzo" siphon gauge and recorder (1878-1913), the tipping bucket (1921-onwards) and other collectors UIRMA and Agrarian model. Simultaneous readings exist for matched combinations of instruments that are helpful for the evaluation of bias and homogenization.
The Musschenbroek gauge was inspired to the Poleni gauge, but leaved some unobserved water at the bottom of the U shaped siphon connected with the reading glass tube fixed to a wooden tablet with indication of the magnified amount of precipitated water. The external tube readings caused 0.8 mm and 1.5 mm threshold, respectively, in the observations that were corrected. If the attention is given to light and medium rain in the series, a loss of light rain is visible in the period 1830-1870, when the observers Busatta-Conti and Santini were active with unchanged location. Later, Santini passed to the dome of the Astronomical Observatory as a collector, and debris and gutters introduced a threshold to light precipitation, i.e smaller than 5mm.
Another problem was with the observational methodology, i.e. Busatta and Conti, did not performed readings immediately after every precipitation, making possible some evaporation. Another problem for the same period was the correct subdivision of precipitated water into the observing days, when the
The above drawbacks are influential for the frequency too. The plot of the yearly precipitation frequency shows a false sinusoidal oscillation with a misleading minimum in the period 1830-1870.
It was recognised that, per each month, the frequency of the precipitation intensity has a typical distribution that changes for the lowest intensities only in the above period.
Tests of homogeneity, including percentile analysis and cumulative values have been applied to make homogeneous the series.
This long precipitation series has been analyzed and shows swings as well as some cases of extreme events that will be discussed.

Acknowledgments: This work was supported by the EU, project Millennium (Contract 017008-2). Thanks are due to Dr V. Zanini and Dr L. Pigatto, INAF Astronomical Observatory, Padova for having kindly made available the original documents and to Aryan von Engelen, KNMI, Amsterdam, for his precious suggestions and help.