



**TWO HUNDRED YEARS OF URBAN  
METEOROLOGY IN THE HEART OF  
FLORENCE**

Proceedings of the  
**INTERNATIONAL CONFERENCE ON URBAN CLIMATE  
AND HISTORY OF METEOROLOGY**

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*Proceedings of the International Conference On Urban Climate  
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# FOREWORD

The International Conference “Two hundred years of urban meteorology in the heart of Florence” held in Florence, Palazzo Medici Riccardi, on 25th and 26th of February 2013 was an occasion to join the scientific communities of historical climatologists along with the urban climatologists and meteorologists, in order to share methodologies and results to provide a common vision of the urban environment to allow the development of new instruments both theoretical and practical to planning our urban future. Humankind it is expected in few dozens of years to transform itself in a community of citizens in terms of persons living within the borders of cities or, better, megalopolis.

Within these borders it will be a matter of facts that the concept of citizenship could assume a high relevant value if the expectations and wellness of the populations are respected, or a badly representing the animus of the people just only allow to live inside the city without dignity.

Not only the social arrangement, or the political inclusion are issues of paramount importance in the frame to live together: the physical environment plays a crucial role in determining the conditions for the proper wellbeing perceived as a physiological optimum. This condition can be achieved bearing in mind the specific genius loci of the city itself and its development of the urban structure during the course of the years, of the centuries, along with the transformations of the land use as morphology and materials changes.

The Conference allowed to deeply exchange information in order to built a common language between scientists of different disciplines and to understand the fundamental role of the urban observatories in monitoring the changes over hundred years collecting data that represent not only a diagnosis of the past but a tool to forecast our common future.

# ANALYSIS OF 20-YEAR AIR QUALITY TRENDS IN THE CITY OF FLORENCE (ITALY)

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## Summary

*Today, about 80% of people in developed countries live in cities, while urbanization is rapidly growing in the developing countries. Due to high spatial density of human activities, cities exhibit high air pollutant concentrations, that impact human health risk across a wide range of socioeconomic and/or climatic features. In EU, and particularly in Italy, a significant percentage of urban population is exposed to pollutant concentrations above the reference levels. In this paper we report a 20-year (1993–2012) air quality analysis in the city of Florence (Italy). Concentrations of main atmospheric pollutants have been addressed: CO, NO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>, PM<sub>10</sub>, and O<sub>3</sub>. Hourly (daily for PM<sub>10</sub>) observations collected by all the stations of Florence air quality monitoring network since the beginning of its activity (i.e., 1993) have been processed. Monitoring stations falling into each area category (urban, suburban and rural) and source category (traffic, industry and background) have been considered. Trends of annual mean concentrations of all pollutants observed at both central and periferic stations have been analysed, along with occurrences of concentrations exceeding legal thresholds.*

*Meteorological parameters as wind speed and prevailing direction, air temperature, solar radiation, and stability class measured at a station located in the city centre (i.e., the Ximeniano Observatory) have been considered to depict a full description of Florence meteorological conditions. Trends of annual pollutant inventorial emission data in the province of Florence, disaggregated by SNAP category, have been also analysed and related to pollutant concentrations by means of a linear multi-regressive framework to assess the significance of their contribution to annual concentration trends.*

Keywords: urban air quality; meteorological data; emission data; linear trend analysis; Florence.

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