PROCEEDINGS OF SCIENCE

The Dieci e Lode project: recovery of meteorological observations relating to the former Italian colonies

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Abstract

Italy has played a crucial role in the history of meteorology, contributing to the development of observational methods, from key pioneering meteorological instruments to establishing the first international observation network, the so-called “Medici Network”. As a result, an extensive collection of valuable meteorological data has been preserved in Italian archives over the past three centuries. Despite previous efforts to safeguard and digitize a portion of this heritage, a significant amount of data remains available only in paper format. This makes it vulnerable to deterioration over time, posing a risk of losing irreplaceable scientific

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information essential for meteorological and climate-related research, including climate change assessments.

Among records yet to be recovered, a particularly important subset includes meteorological data collected in regions once governed by Italy between the late 19th and early 20th centuries, such as Eritrea, Somalia, Ethiopia, Libya, the Dodecanese Islands, Albania, Dalmatia, and Istria. Within this context has been established the *Dieci e Lode* project, a collaborative initiative bringing together researchers from various institutions under the auspices of the Italian Association of Atmospheric Sciences and Meteorology (AISAM). Funded by the Italian Ministry of Culture, this project seeks to conduct an extensive search for historical meteorological data from these areas during the specified periods.

During this research, the primary source is the National Meteorological Archive of the Council for Research in Agricultural Economy (CREA) in Rome, specifically the Historical Central Library of Italian Meteorology. The initiative includes a large-scale photographic scanning effort, aimed at making images of the data sheets and volumes freely accessible online. In total, approximately 40,000 pages are expected to be digitized.

By making these records available, the project will significantly enhance the understanding of historical climate patterns in these regions, many of which currently lack extensive meteorological collections. In addition, these data are particularly valuable for modern meteorological offices operating in those areas, helping them place contemporary weather observations in a broader historical context, thereby improving the study of climate change.

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1. Introduction

Italy has played a highly significant role in the emergence and development of modern meteorology, particularly as the birthplace of several fundamental meteorological instruments, including Galileo's thermometer and Torricelli's barometer. Furthermore, what can be considered the first international observational system (the Medici Network), associated with the Accademia del Cimento, was established in Italy. Due to this unique historical role, the country holds an extensive and exceptionally valuable heritage of ancient meteorological data (Camuffo and Bertolin, 2012).

Efforts to recover this vast observational record have been ongoing for a long time (Cottone, 1939; Bossolasco, 1945), and in recent decades, a significant portion of this data has been digitised. However, despite these initiatives, a substantial fraction remains available only in paper format, which is deteriorating over time. This degradation poses a serious risk of losing irreplaceable data and information essential for scientific research in meteorology and climate change studies. Among the records yet to be recovered, those from regions of central and northern Africa that were formerly governed by Italy are of particular importance.

The objective of this project is to recover meteorological measurements from these former Italian territories that were under Italian control and still hold valuable data in need of preservation. By ensuring free access to these newly recovered datasets, the project aims to fill critical gaps in climate reconstructions of the past century. This attempt will significantly enhance the accuracy of historical atmospheric pattern reconstructions in regions that have proven to be crucial in the context of recent climate change.

Moreover, the project will explore the potential for citizen science initiatives to assist in extracting numerical data from the digitized records. This aligns with other AISAM-led programmes, such as the Cli-DaRe@School project, which engages numerous Italian schools and hundreds of students in climatological research. A feasibility study will also be conducted to evaluate how the latest Optical Character Recognition (OCR) technology can support these data extraction activities.

2. Area of study

Among the many datasets yet to be recovered, a particularly significant portion consists of meteorological observations collected in territories that were under Italian control, including Eritrea, Somalia, Ethiopia, Libya, the Dodecanese, Albania, Dalmatia, and Istria, starting from the 19th century and until the first half of the 20th century. Remarkably, as early as the late 1800s, the Royal Central Meteorological Office was already publishing data and reports concerning Eritrea, Somalia, Tripolitania, and Cyrenaica.

In this context, the present project aims to conduct a comprehensive survey of the available meteorological data and information for these regions (Figure 1).

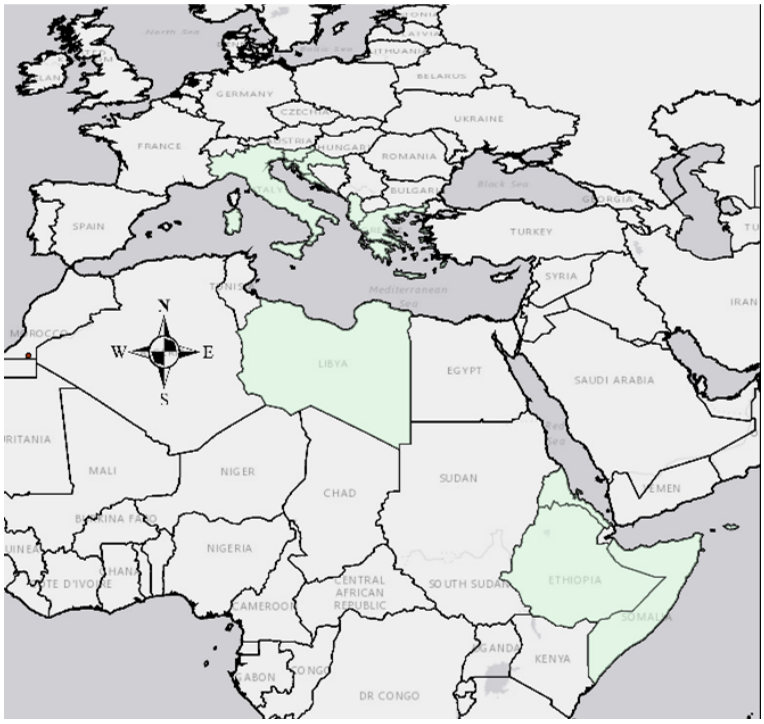

Figure 1: Countries under Italian control between the late 19th and early 20th centuries.

3.Materials and methods

The archive of meteorological observations from territories under Italian control between the late 19th and early 20th centuries is stored in the National Meteorological Archive of CREA (Council for Research in Agricultural and the Analysis of Agricultural Economy) which will serve as the primary source (Figure 2). Many volumes containing important information, including data tables and analyses, are preserved in the Library of the Collegio Romano. However, access to these materials is limited, as they are not easily or immediately available to researchers or other potential users. Moreover, these historical volumes are subjected to deterioration over time, restricting their handling to expert personnel.

To address these challenges, AISAM aims to undertake a large-scale digitization project that will serve two primary objectives: first, to preserve this invaluable meteorological heritage, and second, to make it accessible for consultation, analysis, and study from anywhere in the world. The scanned records will provide a significant dataset for regions that remain poorly covered by modern monitoring networks. This initiative will enable researchers and the general public to conveniently access online data, facilitating climate studies and contributing to a better understanding of past climate conditions and ongoing climate change.

These historical records are also highly relevant for meteorological offices currently operating in these territories, as they provide a long-term reference for placing present-day meteorological observations in context. This is particularly valuable for assessing climate change and its impact on critical resources.

Once the most relevant datasets and documents have been identified, photographic scanning will be carried out to create a publicly accessible online archive of data sheets and volumes.

Approximately 40,000 pages are expected to be scanned. This digitization effort will be accompanied by detailed indexing, ensuring efficient retrieval of specific data and relevant information.

Beyond scans, the project will reconstruct the historical context in which these meteorological observations were conducted in Italy's former colonies. This effort will highlight the role played by key institutions, as well as the contributions of scientists and personnel responsible for collecting and processing the data. The scanned material will be supplemented with comprehensive contextual descriptions, making it accessible to a non-specialist audience.

Additionally, the project will explore the implementation of Citizen Science initiatives to facilitate the extraction of numerical data from the digitized records for climatological research. This approach builds on existing AISAM activities, particularly the Cli-DaRe@School project (Manara et al., 2025), which involves numerous Italian schools and hundreds of students in climate research.

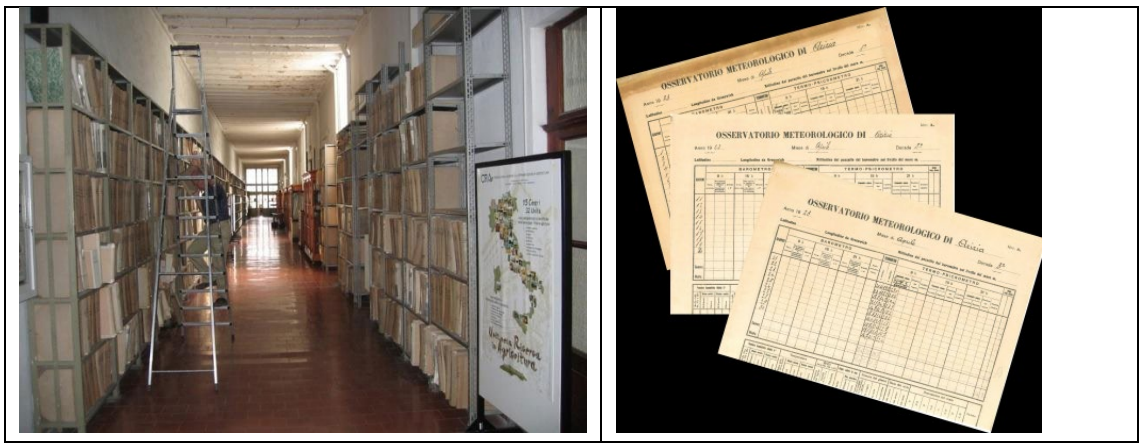

Figure 2: Historical archives of climatic data (left panel) at the Collegio Romano headquarters, later moved to CREA, and some examples of observation sheets collected at the Aziza station (right panel).

4.Dissemination of results

The proposed project is endorsed by the institutions to which the AISAM Project Team members (listed above) belong, including CREA, the University of Trento, Politecnico di Milano, the University of Milan, CNR-IBE in Rome, and CNR-ISAC in Bologna. These are high-level public entities and research institutions that, both nationally and internationally, attest to the professionalism and expertise of the Project Team members.

The project's goal, digitizing meteorological and climatological data from territories that were once under Italian control, addresses a critical gap in regions that currently lack extensive monitoring networks and well-structured climate data archives. The absence of such records hinders the ability to track the long-term evolution of meteorological variables and climate change impacts. Recognizing this, AISAM is committed to fostering collaborative relationships with both national institutions, such as ItaliaMeteo, the national Meteorological Service of

Italian Air Force (Aeronautica Militare), universities, and other research organizations, and international meteorological services of the countries whose territories were historically under Italian administration. By establishing these partnerships, the project aims to provide an open access to climate data of significant scientific and historical value, ensuring that these critical records, which would otherwise remain confined to paper archives, become widely available to the scientific community and beyond for reconstructing past climate conditions.

5.Conclusions

The digitization of climatological data from former Italian colonies represents a significant advancement in understanding past climate conditions in regions that still lack a dense monitoring network for tracking meteorological phenomena. Making these data available and accessible through international databases will enable their full utilization, contributing to a more comprehensive understanding of climate change in the areas covered by the project. The project's scientific and cultural impact will extend to a diverse range of users, including students, university researchers, research institutions, businesses, and meteorological services in the nations that were once under Italian administration.

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