



## Rescue of Ukrainian early historical climatological data

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Modern climate applications and climate services are seeing the need for more data and information (including its historical part) on climate variability at high temporal and spatial resolution. Therefore, daily or even sub-daily meteorological data are required increasingly to fill this gap and provide the basis for climate research, extreme events analysis and impact studies.

The main objective of our work is to present information on results of data rescue (DARE) activity conducted recently in the Ukrainian Hydrometeorological Institute (UHMI, Kyiv, Ukraine) in close collaboration with several national and international partners. Our DARE activity was concentrated mainly on the original sub-daily, pre-1850 meteorological observations conducted at eight meteorological stations located in the territory of modern Ukraine, namely Kyiv, Kharkiv, Poltava, Kamyanets-Podilsky, Lugansk, Dnipro, Kherson and Odesa. These eight stations are the only ones, whose pre-1850 data have been found in an archive of the Central Geophysical Observatory (CGO), an observation institution of the Ukrainian Weather Service.

The data are contained in 38 special hard copy books. Before digitization, the book pages were photocopied to create a database of the images of all the paper sources. Its two copy versions are now stored at the UHMI and CGO, respectively. After the creation of the images database, the data were digitized manually by the authors. In total 291 103 values were digitized. These include 165 980 air temperature records (~57% of the total), 124 376 atmospheric pressure measurements (~42.7%) and 747 precipitation totals (~0.3%).

Quality control of the digitized data was conducted, including intercomparisons between the stations as well as comparisons with monthly temperature data that were digitized previously from other sources. The quality control procedures revealed a fairly good agreement among the

rescued time series on the monthly time scale as well as a good accordance with the monthly data from other sources. However, several periods at some stations should be used with caution, due to relatively large discrepancies revealed. The rescued digital dataset can be used for different meteorological and climatological purposes, including the analysis of extreme events for the pre-1850 period in comparison with today's climate, regional climatological studies, etc. The dataset is an important supplement to existing digitized archives of meteorological measurements that were performed in the first half of the 19th century.