



## Improved understanding of weather and climate events through data rescue

**Why this is important:** Development of high-quality observational data sets of environmental variables for the UK and the rest of the globe is key to understanding how weather and climate is changing in different parts of the world and how these changes vary by region and geography. Vast amounts of historical weather observations exist which remain in their original hand-written paper format, hindering their use. Digitising these and incorporating them into existing datasets will improve temporal and spatial dataset coverage and allow users to better plan, manage and put climate events, episodes and impacts into a longer temporal perspective.



**What the UKCR programme is doing:** A new citizen science data rescue campaign was run using the [WeatherRescue.org](https://www.weatherrescue.org) platform by the University of Reading. Thousands of volunteers helped transcribe and digitise around 0.5 million sub-daily or daily observations for locations around the British Isles and NW Europe recorded in the [Met Office Daily Weather Reports \(DWRs\)](#) from March 1861 until April 1875. The quality control of this data is now underway and once completed all data will be made openly available. A data rescue campaign from another project had previously digitised 1.8 million mean sea level pressure, temperature and rainfall observations from 72 stations across Great Britain, Ireland and western Europe taken between 1900-1910. Under the UKCR programme, this data has now been quality controlled and made available to the Met Office and the wider international community, which has helped fill the many observational gaps for this time period in the dataset helping scientists to better understand UK weather extremes and significantly improve rainfall reconstructions.

**Results so far:** These newly digitised observations have been used to better understand extreme UK weather in 1903 by comparing with the [20th Century Reanalysis dataset \(20CRv3\)](#). The UK experienced a severe windstorm in February 1903, and October 1903 is the wettest month in the England and Wales Precipitation record (in excess of 300 mm across some regions). A test simulation of the 20<sup>th</sup> Century Reanalysis (20CR) has been run for an 18-month period over 1902 and 1903 including the newly digitised pressure observations. This was compared to the published version (20CRv3) with regards to the change in ensemble spread and representation of high impact weather events. Results are positive with reductions in ensemble spread of up to 20% for 1903 over data sparse regions and therefore better representing the high impact weather events of February and October 1903, thus illustrating an important benefit of the extra records.

The addition of the new observations into the [HadUK-Grid dataset](#) for 27 October 1903 improves its estimated rainfall significantly, especially over Wales and Scotland resulting in a closer match with the test simulation of the 20CR. This highlights that HadUK-Grid could be significantly improved with the inclusion of further newly digitised historical observations. Hundreds of millions of additional UK historical pressure, rainfall and temperature observations back to the 1700s exist and await digitisation through future campaigns, and so significant opportunities are available.

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**What is next?** The weather rescue project will continue to recover even more data from across the UK and Europe. Visualisations and video pieces will be developed to demonstrate the enhanced ability to resolve and characterise past weather and climate events and phenomena and how they will feed into weather and climate services and applications.

**Reference:** Craig, P. M., Hawkins, E. (2020) Digitizing observations from the Met Office Daily Weather Reports for 1900–1910 using citizen scientist volunteers, *Geoscience Data Journal*, <https://doi.org/10.1002/gdj3.93>