

The international Atmospheric Circulation Reconstructions over the Earth (ACRE) initiative and the National Meteorological Library and Archive

Dr Rob Allan, International ACRE Initiative Manager, Met Office Hadley Centre, Exeter, Devon, United Kingdom

Background

The international Atmospheric Circulation Reconstructions over the Earth initiative (<http://www.met-acre.org/>) is led by a consortium of six core partners - the Met Office Hadley Centre (MOHC) in the UK; the US National Oceanic and Atmospheric Administration (NOAA) Earth System Research Laboratory (ESRL) and Cooperative Institute for Research in Environmental Sciences (CIRES) at the University of Colorado; The National Climatic Data Center (NCDC) of NOAA; the Queensland State Government in Australia and the University of Giessen in Germany plus the University of Bern in Switzerland.

ACRE aims to undertake and facilitate the recovery of instrumental terrestrial and marine global surface weather observations to underpin global weather reconstructions/reanalyses spanning the last 200-250 years (<http://reanalyses.org>) for the full range of international user needs. In order to achieve the above goals, ACRE provides an umbrella that links more than 35 projects, institutions and organisations, around the globe (http://www.met-acre.org/Home/ACRE_G2.png?attredirects=0). The initiative works closely with the international surface weather and climate observations community: particularly the International Surface Pressure Databank (ISPD) and the International Comprehensive Ocean-Atmosphere Data Set (ICOADS), the international RECLAIM (REcovery of Logbooks And International Marine data) and IEDRO (International Environmental Data Rescue Organisation) projects, and the National Climatic Data Centre (NCDC) in the US.

The vast amounts of global historical weather data being recovered, imaged, digitised and added to international terrestrial and marine data bases by this initiative, come from a wide variety of sources. These include those of National Meteorological Services and various professional, amateur and more general repositories of all types. In order to make these recovery efforts as thorough and exhaustive as possible, the initiative is keen to work closely with libraries, archives and museums around the world. One of the main repositories for global historical instrumental weather observations that ACRE is working with, is the National Meteorological Library and Archive of the Met Office at Exeter, Devon in the UK.

International ACRE endorsement

ACRE and its activities have been ratified by the World Meteorological Organisation's Commission for Climatology, extolled in the Implementation Plan for the Global

Observing System for Climate in Support of the UNFCCC (2010 Update) (<http://www.wmo.int/pages/prog/gcos/Publications/gcos-138.pdf>), and endorsed by the Joint WMO-IOC Technical Commission on Oceanography and Marine Meteorology Expert Team on Marine Climatology and by the World Climate Research Programme.

At the UNFCCC CoP16 meeting in Cancun, Mexico, the following paragraph was proposed by ACRE (via Gabriela Seiz, Meteo Swiss and the Swiss GCOS Office) and accepted as an inclusion in the Subsidiary Body for Scientific and Technological Advice (SBSTA) closing plenary conclusions on 'Research and Systematic observation':

'The SBSTA further noted the importance of historical observations as the basis for analysis and reanalysis and encouraged Parties and relevant organizations to increase their data rescue and digitization of historical observations and to establish and strengthen international coordination initiatives for these activities' (<http://unfccc.int/resource/docs/2010/sbsta/eng/l22.pdf>)

Outreach, Libraries, Archives and Museums

ACRE is engaged in extensions and outreach that are providing information, products and real inter/cross-disciplinary engagements between climate, social, economic, environmental and political sciences and the humanities worldwide.

ACRE has a Memorandum of Understanding (MoU) with the international student GLOBE Program, and will be involved with GLOBE's Student Climate Research Campaign (SCRC) starting in September 2011 (<http://globe.gov/scrc>). The initiative is also partnering with Zooniverse (<https://www.zooniverse.org/>) and the Citizen Science Alliance (<http://www.citizensciencealliance.org/>) to develop public mass data digitisation. In partnership with ACRE, the University of Oxford, the Met Office, Naval-History.Net, the UK National Maritime Museum, The National Archives in the UK, and the UK Joint Information Services Committee (JISC), the latter has led to the very successful Oldweather.org (<http://www.oldweather.org/>) pilot project to use mass citizen science digitisation on a batch of some 4,500 Royal Navy ship logbooks covering an extended World War 1 period (1914-1923), where existing observational coverage is particularly poor. It is hoped that these activities will help to engage the wider public at a time when, in some quarters, climate and climate change research findings are coming under greater scrutiny.

Led by the Centre for e-Research at King's College, London, ACRE is also part of a consortium that has a UK Arts and Humanities Research Council (AHRC) Researching Environmental Change Networks grant to run a series of expert seminars to explore research questions and sources, and methods for the effective shared use of historical weather data and to promote real inter/cross disciplinary engagements between the physical, social, economic sciences and the humanities (<http://historicweather.cerch.kcl.ac.uk/>).

As a consequence of the 2012 UK Olympics infrastructure activities, with projects such as the new Sammy Ofer wing being built at the National Maritime Museum

(NMM) at Greenwich (<http://www.rmg.co.uk/bigger>), ACRE and the NMM are working together to explore the possibilities of developing new museum displays. One thought is a focus on 18th and 19th Century expeditions and journeys of exploration, that would bring together the historical weather observations and reanalyses/reconstructions ACRE is both supporting and facilitating, with NMM and other repository holdings of relevant artefacts, objects, and material from such expeditions and explorations.

ACRE and the National Meteorological Library and Archive

In support of the above ACRE activities, and to provide new catalogue links to electronic sources of historical weather data held by it, the National Meteorological Library and Archive is scanning the weather observations identified by ACRE in numerous historical terrestrial registers and marine ship log books. The scanned images are then being sent on to the British Atmospheric Data Centre (BADc), where they are available to access on the BADc website (<http://badc.nerc.ac.uk/browse/badc/corral/images/metobs>). This material provides a set of readily accessible online images of historical weather observations that can be digitised by keying or, if in 'good' printed/tabulated form, downloaded and digitised by Optical Character Recognition (OCR) software by anyone anywhere in the world.

An integral component essential to all of the above is the potential new engagement between the Met Office, the UK Technology Strategy Board and IBM, that will support ACRE in building a web-based interface that will store, allow free access to, and enable free visualisations of, the raw weather observations, data images, metadata through to all of the variables generated by the global ACRE-facilitated weather reconstructions/reanalyses in time and space.

Thus, ACRE is working with the National Meteorological Library and Archive as an integral part of its ongoing interactions and partnerships with libraries, archives and museums around the world. Such endeavours are vital to the construction of a truly coherent and integrated web-based historical reconstruction of global instrumental weather for the full international user community. If this can be achieved, then any accumulated data or material from any discipline that has spatiotemporal characteristics can be 'layered' into such a web-based entity, to produce a sustainable and evolving 21st Century platform serving the full range of international research through to user needs.