

RECLAIM

REcovery of Logbooks And International Marine data

Clive Wilkinson (CDMP/NCDC & CRU, University of East Anglia, Norwich, UK), Scott Woodruff (NOAA Earth System Research Laboratory, Boulder Colorado, USA), Eric Freeman (Sourcecraft/CDMP/NCDC), Philip Brohan (Met Office Hadley Centre for Climate Change, Exeter UK), Frits B. Koek (KNMI, P.O. Box 201, 3730 AE De Bilt, the Netherlands), Dennis Wheeler (University of Sunderland, SR1 3PZ, UK)

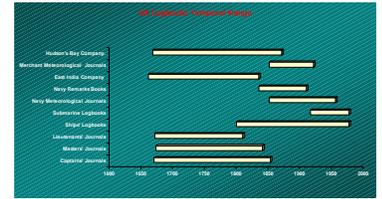
The RECLAIM Project, is: "A cooperative international project to image historical ship logbooks and related marine data and metadata, and digitize the meteorological and oceanographic observations for merger into the International Comprehensive Ocean-Atmosphere Data Set (ICOADS) and for utilization for climate research." RECLAIM builds on the results and knowledge gained during the European Union-funded Climatological Database for the World's Oceans (CLIWOC) 1750-1854 project (completed in 2003), which focused on ship logbooks containing "semi-instrumental" and "non-instrumental" (e.g., wind force and wind direction) observations from Dutch, Spanish, French and UK archives. Vast numbers of undigitized historical ship logbooks exist in UK archives, and smaller, but still significant, amounts exist in Dutch, French, German, and other European, US, and international archives.

One significant accomplishment emerging from the RECLAIM project was the imaging in 2006 by KNMI of Dutch logbooks from the 19th century, which are planned for future digitization by NOAA's Climate Database Modernization Program (CDMP). Another major accomplishment was a jointly funded UK and CDMP effort to image and digitize selected UK Royal Navy (RN) Ship's Logs around the data sparse World War II period (1938-47). The completed WWII project preserved 268K images from 302 logbooks and produced 1.5M digitized observations. The data are now available as an Auxiliary data set of ICOADS in IMMA format and are being blended into ICOADS in 2008 as part of Release 2.5. Further planned RECLAIM tasks include the imaging and digitization of approximately 1K English East India Company (EIC) logbooks recording instrumental data in the period 1790-1834, RN logbooks selected around the WWI period (1914-23) and 19th century Arctic whaling logbooks.

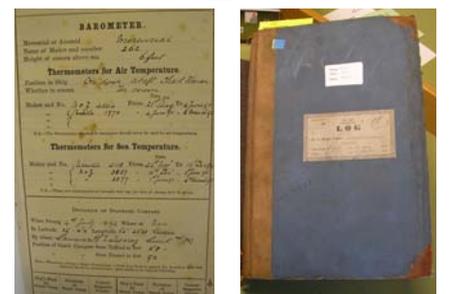
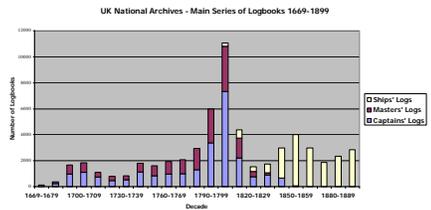
The RECLAIM website (<http://icoads.noaa.gov/reclaim/>) presently provides researchers with data on RN shipping movements between 1800 and 1947, the movements of EIC vessels from 1790 to 1834, and the activities of Arctic exploration vessels and whalers through a set of logbook and movement directories. The associated archive references are also provided. There is also information on UK archives, the format and content of logbooks, and information on digitized logbooks. Several original UK and US documents are reproduced. They include UK Marine Data Bank series manuals and a list of RN WWII Meteorological Logs held by the UK Met Office. US documents include marine card deck reference manuals and instructions for US Marine Meteorological Journals (1878-94). The data and information available is regularly updated and amended. Future developments will include: metadata on vessels and meteorological instruments, additional sets of manuals and instructions, and relevant literature from 19th century scientific journals.



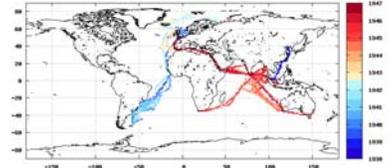
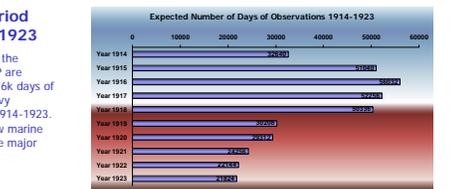
The US National Archives and Records Administration (NARA) and National Climatic Data Center (NCDC) both hold wide ranges of merchant and military logbooks (or meteorological forms), with lines on the above figure indicating their temporal ranges (red=undigitized, yellow=digitized but not yet blended, green=blended into ICOADS). Caveats: Delayed-mode ship data have not yet been blended into ICOADS after 1997 (thus both green lines should actually be colored yellow starting in 1997). Also, some US logbook data for a period starting around 1995 may still be undigitized.



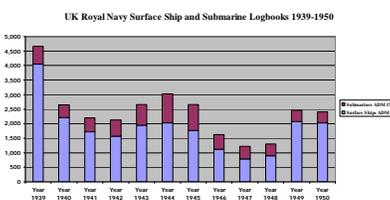
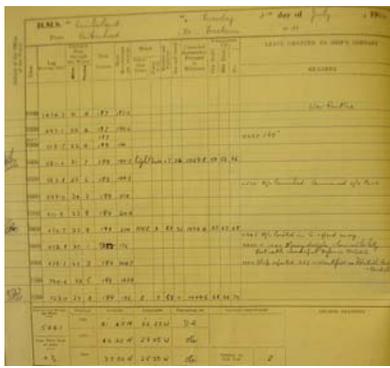
UK archives hold a wide range of logbook types from personal journals to deck logs and dedicated meteorological registers. The National Archives is the chief repository of naval logbooks while the British Library holds logbooks kept by officers of the East India Company



Typical instrument metadata HMS Tourmaline 1895 Logbook cover HMS Amphion 1856



HMS Cumberland Movements 1938-1947 Logbook cover Logbook page 2nd July 1940

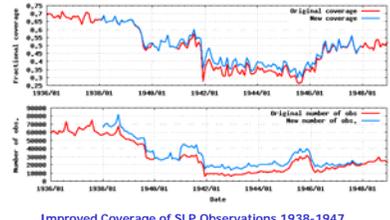


WWII Period Logbook Digitization

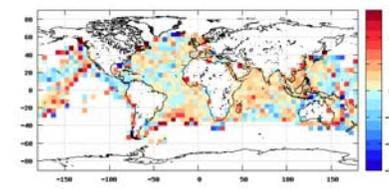
In 2007, The UK Met Office, National Archives and CDMP digitized 10k Royal Navy logbooks 1938-1947. HMS Cumberland (above) was one of many vessels providing continuous coverage of the period across most of the globe. This produced a significant improvement in the number of observations made available during the period of WW2 in particular observations made in the southern hemisphere. Although observations came chiefly from larger vessels such as aircraft carriers, battleships and cruisers; armed merchant cruisers and submarines also provided many valuable meteorological and SST observations.

Analysis of New Data from WWII Period

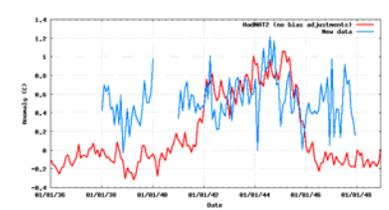
Existing observations show large changes during the WWII period that are not wholly climatic in character. Night Marine Air Temperatures (NAT) shows a temporary increase attributed to measurements being made indoors, as lights could not be shown on deck; Sea Surface Temperature (SST) shows an increasing trend attributed to a transition from bucket to engine room intake (ERI) measurements, and a step reduction in 1946. The new observations shed new light on both variables: the NAT does not show a change over the period, but is systematically different from the existing observations; the SST also shows the increase attributed to the bucket to ERI change, but not the step reduction in 1945, which may be an artefact caused by the change from UK to US ships in the existing observations."



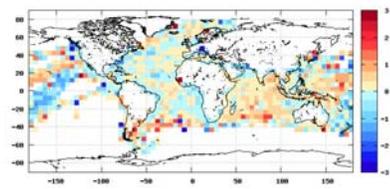
Improved Coverage of SLP Observations 1938-1947



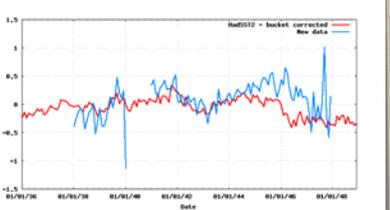
Mean Differences New Data and HadNAT2



Global Mean from HadNAT2 and new Observations



Mean Differences New Data and HadSST2



Global Mean from HadSST2 and the new Observations

Extended WWI Period Digitization 1914-1923

In 2008, the UK Met Office, the National Archives and CDMP are planning to digitize up to 376k days of observations from Royal Navy logbooks from the period 1914-1923. This project will provide new marine observations covering all the major oceans.



The track of the Swedish East Indiaman *Gotha Leijon* 1750-51 is typical (red out - blue home). In 2006, RECLAIM assisted with the imaging of 19thC Dutch logbooks. (example below). In 2008, RECLAIM and partners, arranged the imaging of over 1,000 English East India Company logbooks covering the years 1790-1834 at the British Library. Many of these recorded pressure and air temperature data. In 2007 the Swedish East Indiaman *Gothaborg* sailed to China, in part following the routes used in past centuries. *Gothaborg* is a typical example of this type of vessel and is also a Voluntary Observing Ship (VOS). Data were reported through regular JCOMM channels.

