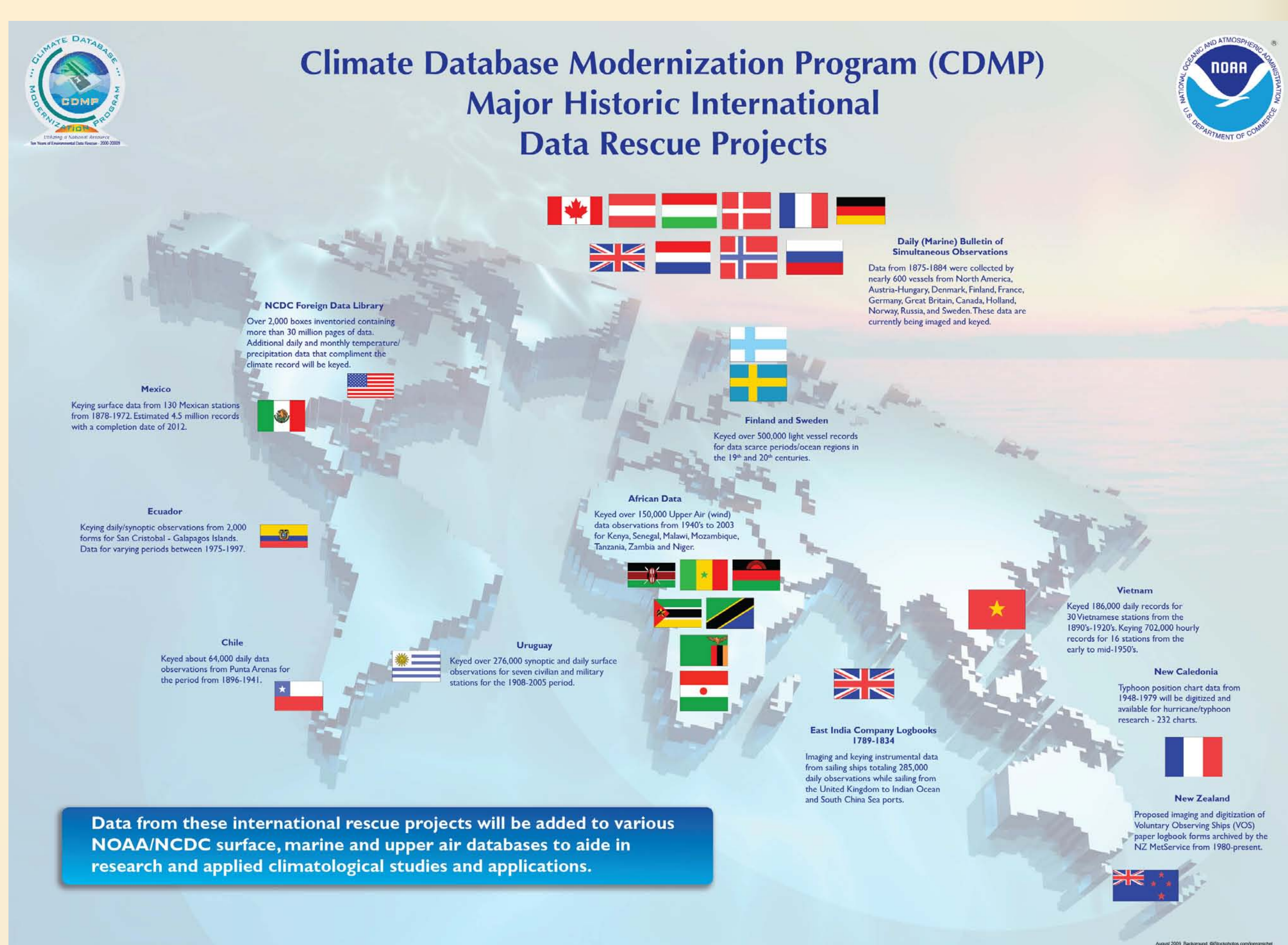


Advancing the Use of Historical Environmental Data through the Climate Database Modernization Program

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NOAA's Climate Database Modernization Program (CDMP) has been rescuing environmental data for more than ten years. During that time, information located on fragile media has been imaged and preserved, and historical data has been digitized to provide access to more than 55 million imaged records previously difficult to obtain or fully unavailable to the public. CDMP rescues many types of data, including ocean, terrestrial, and upper air. By digitizing national and international ship logbooks, global observations over the oceans are being made available to the International Comprehensive Ocean-Atmosphere Dataset (ICOADS) to enhance the spatial and temporal coverage of the most extensive surface marine meteorological archive in the world. Marine rescue efforts are not limited strictly to surface meteorological observations and also include projects related to sub-surface ocean observations, as well as biological and marine ecosystems information. CDMP coordinates with the RECOVERY of Logbooks And International Marine data (RECLAIM) project to locate, document and prioritize the rescue of new sources of data and metadata for future projects with the goal of increasing awareness and understanding of historical observing practices as well as augmenting data coverage in sparsely observed areas. Over the past decade, CDMP has also digitized large amounts of terrestrial data from data sparse areas around the globe. These data are essential to the International Surface Temperatures Initiative, a renewed effort at creating a comprehensive international data holding of all land meteorological data to address gaps including inadequate temporal and spatial coverage. By working with private and public sector partners towards a mission to make data available for science, CDMP is advancing understanding of the earth's physical environment and preserving the past for generations to come.



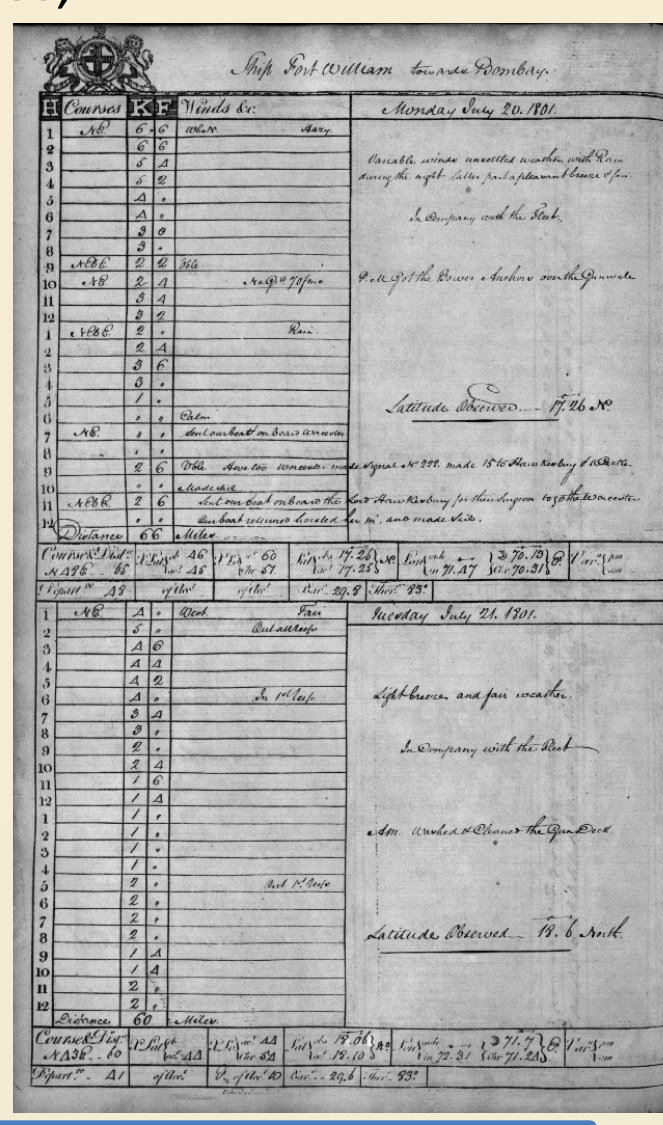
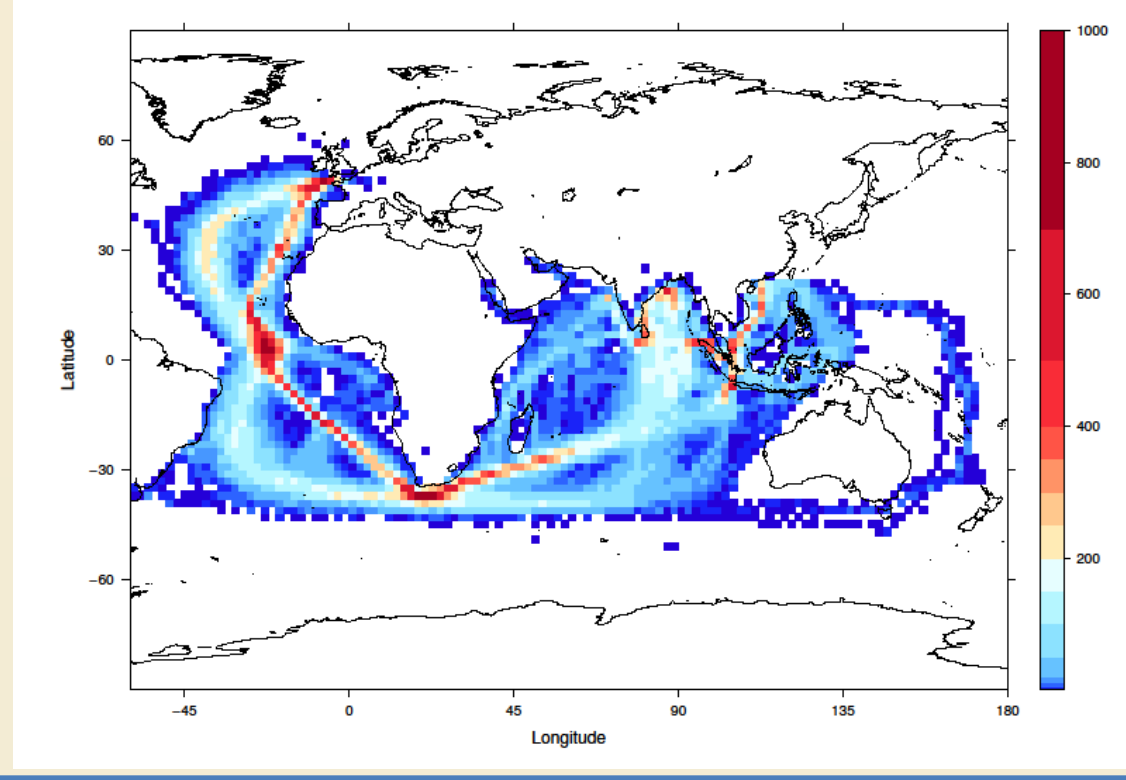
Numerous international projects within CDMP. Digitized data from these projects have been incorporated into various terrestrial & marine surface and upper air databases.

MARINE

English East India Company Logbooks

- Period of Record: 1789-1834
- 893 logbooks digitized with instrumental data (pressure and air temperatures, few SSTs) in the Atlantic and Indian Oceans, with a small sample in the SW Pacific
- 273K total observations will be blended into a future ICOADS release
- Digitization complete and observations are now available at NCDC

Spatial density of EEIC observations



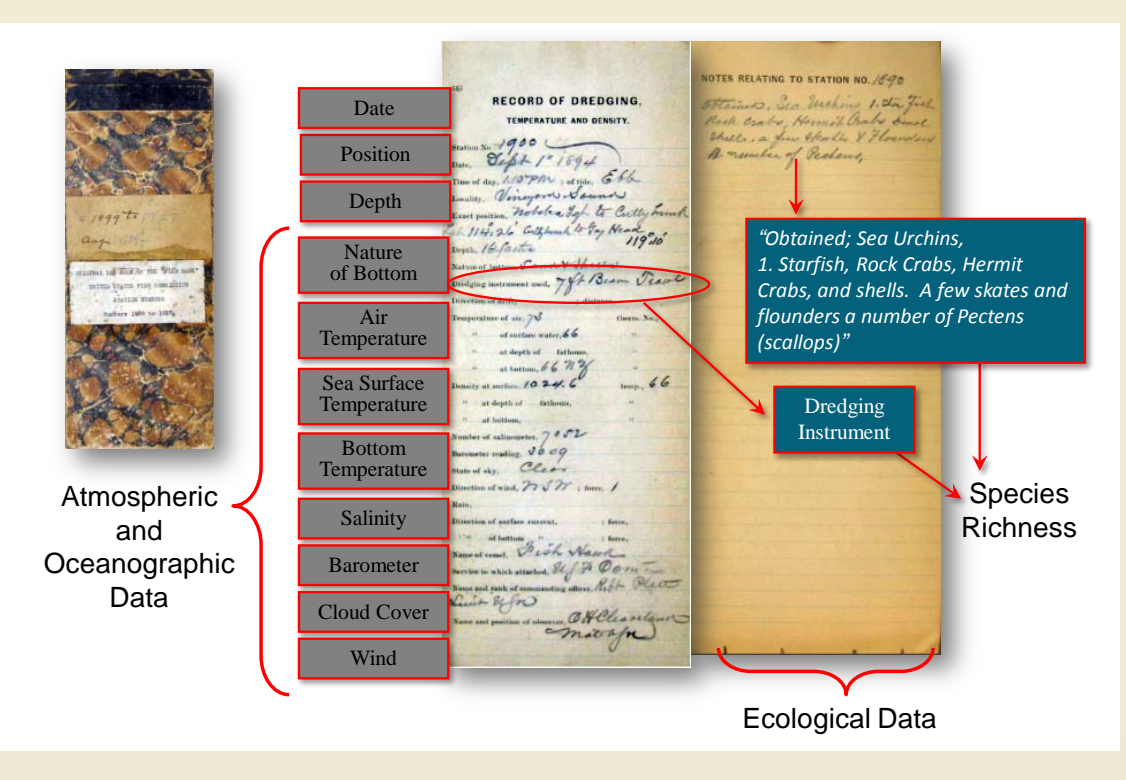
San Cristobal Island Surface Observations, Galapagos Islands, Ecuador

REGISTRO MENSUAL DE TEMPERATURAS	REGISTRO MENSUAL DE VENTOS	REGISTRO MENSUAL DE NEBLINAS
1891	1892	1893
1894	1895	1896
1897	1898	1899
1900	1901	1902
1903	1904	1905
1906	1907	1908
1909	1910	1911
1912	1913	1914
1915	1916	1917
1918	1919	1920
1921	1922	1923
1924	1925	1926
1927	1928	1929
1930	1931	1932
1933	1934	1935
1936	1937	1938
1939	1940	1941
1942	1943	1944
1945	1946	1947
1948	1949	1950
1951	1952	1953
1954	1955	1956
1957	1958	1959
1960	1961	1962
1963	1964	1965
1966	1967	1968
1969	1970	1971
1972	1973	1974
1975	1976	1977
1978	1979	1980
1981	1982	1983
1984	1985	1986
1987	1988	1989
1990	1991	1992
1993	1994	1995
1996	1997	1998
1999	2000	2001
2002	2003	2004
2005	2006	2007
2008	2009	2010
2011	2012	2013
2014	2015	2016
2017	2018	2019
2020	2021	2022

Surface observations have been taken at Puerto Baquerizo Moreno (.9°S, 89.6°W) on Isla San Cristobal in Ecuador's Galapagos Islands since 1967. There are no stations within 1,000 km which regularly report surface data for this period. This station is located in the heart of the East Pacific Cold Tongue.

US Fish Commission Logbooks

- Period of Record: 1877-1948
- First US Research Vessels
- All logbooks archived at Smithsonian Institute have been imaged
- contain meteorological, oceanographic, and eco/biological data
- Additional Fish Commission and US Navy logbooks held at the US National Archives and Records Administration (NARA)



US Hourly Surface Observations

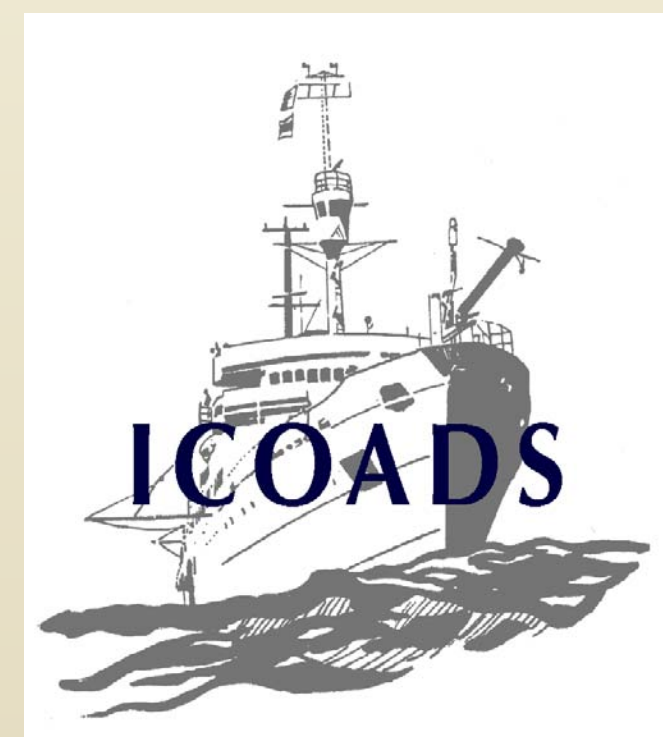
- Period of Record: 1891-1981
- **410 Million** observations digitized!!
- Will be merged into NCDC Integrated Surface Daily (ISD) and other datasets. Currently awaiting metadata processing to accompany station data.



National Weather Service in Lander, WY 1906 (Courtesy of <http://www.crh.noaa.gov/nw/7n-history>)



Weather instruments on the roof of the Wold-Chamberlain Field Administration Building around 1945 (Courtesy of the Minnesota Historical Society, Photograph Collection). Photo: Ms. Lucille Sjostrom checking temperature and dew point sensors in the white shelter and the rain gage at far right while planes are taking off.



RECOVERY of Logbooks And International Marine data project (RECLAIM) and the International Comprehensive Ocean-Atmosphere Dataset (ICOADS)

CDMP has provided support to assist RECLAIM and ICOADS in efforts to document and prioritize new global sources of historical marine data. Support has also been given to locate and image important metadata and national/international historical observing practices. In recent years, more than 4.59 million observations* have been digitized by CDMP and provided to ICOADS for blending. Additional sources (~1.69M reports) have been digitized and await translation to the International Maritime Meteorological Archive (IMMA) format for blending into future releases: English East India Company 1789-1834 (273K reports); German Maury Collection 1845-67 (544K reports); Swedish Lightvessels 1860-64, 1879-1922 (198K reports); Finnish Lightvessels 1900-16, 1919-57 (250K reports); US Lightships Collection 1916-82 (430K reports).

* Sources include UK Royal Navy WW2 logbooks, US and Canadian VOS delayed mode observations, US Marine Meteorological Journals

Time Period, Frequency, and Parameters

The time period of coverage ranges from the 1830s through the 1970s with most data from the period prior to 1960. Each series typically includes observations for a number of meteorological and other geophysical parameters. These may include daily and monthly observations, as well as monthly and annual means, for:

- surface temperature
- precipitation
- atmospheric pressure
- wind speed and direction
- soil temperature
- radiation
- sunshine
- cloudiness
- upper air measurements
- geomagnetism

TABLE showing the Amount of RAINFALL at different Stations in Mauritius, during the year 1865

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Port Louis	1.2	1.1	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	19.8
...
Total	...	...	...	...	...	...	...	...	...	...	...	...	...

NOAA Central Library Foreign Data

CDMP imaged NOAA Central Library's collection of climate data from over 75 countries and former colonies. These data are suitable for a volunteer keying project. After digitization, these data will be incorporated into NOAA's GHCN daily and monthly, IGRA upper air and ISD surface databases.

- Period of Record: 1830's-1970's
- 315GB of data representing 5022 individual volumes
- Some data already digitized by International Met. Groups/Agencies
- Image Access: http://docs.lib.noaa.gov/rescue/data_rescue_home.html

The Foreign Data Library (FDL)

The best index we have for our "vast unknown" of foreign data:

Country	Year	Volume	ISD	IGRA	ISD
Canada	1875-1984	1,000	100	100	100
Denmark	1875-1984	1,000	100	100	100
Finland	1875-1984	1,000	100	100	100
France	1875-1984	1,000	100	100	100
Germany	1875-1984	1,000	100	100	100
Japan	1875-1984	1,000	100	100	100
Kenya	1940-2003	1,000	100	100	100
Malawi	1940-2003	1,000	100	100	100
Mozambique	1940-2003	1,000	100	100	100
Niger	1940-2003	1,000	100	100	100
Senegal	1940-2003	1,000	100	100	100
Tanzania	1940-2003	1,000	100	100	100
Zambia	1940-2003	1,000	100	100	100
Zimbabwe	1940-2003	1,000	100	100	100
China	1895-1941	1,000	100	100	100
Uruguay	1900-2002	1,000	100	100	100
East India Company	1789-1834	1,000	100	100	100
New Zealand	1980-present	1,000	100	100	100
Total	1,000	1,000	1,000	1,000	1,000

2071 boxes of data in the FDL.

CDMP multi-year project to inventory data suitable for keying in GHCN daily and monthly, IGRA upper air and ISD surface

Web interface inventory will be developed after inventory is complete