Sources of Historic Meteorological and Oceanographic Data for the North-West Pacific and Sea Areas of China and South-East Asia

C. Wilkinson

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*British logbooks in UK archives, 17th–19th centuries – a survey of the range, selection and suitability of British logbooks and related documents for climatic research.*

*British logbooks in UK archives, 20th century – a survey of the range, selection and suitability of British logbooks and related documents for climatic research.*

*Historical Meteorological and Oceanographic Data for the Maritime and Coastal Areas of Chile and the Southern Pacific.*

*Sources of Historic Sea-Ice Observations for the Southern Hemisphere.*

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*Sources of Historic Meteorological and Oceanographic Data for the North-West Pacific and Sea Areas of China and South-East Asia.*
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The author gratefully acknowledges the assistance provided by individuals and organizations in compiling this report and the inventory of sources of historic marine observations. Particular thanks to

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UK Hydrographic Office, Taunton: Glyn Hughes

NOAA/CIRES, Boulder Colorado: Scott Woodruff

University of California, San Diego (UCSD): Mark Hanna
Introduction

The sea areas around China, SE Asia and the north-west Pacific can provide many historic weather observations as far back as the 17th century. Instrumental observations of air pressure and temperature and sea temperature can be found as early as the late eighteenth century and up to the present day. This report will provide an overview of the range and variety of historic instrumental observations to be found in archives for this part of the globe, indicating what observations are presently available for scientific analysis, and what further observations can be found to augment those currently in use. The report accompanies an inventory of sources of observations. This inventory is updated as new sources are discovered and as known archives and sources are investigated and documented, imaged, keyed and processed.

The geographical area covered by this report extends from the Arctic regions to the Equator and from 90º east longitude to 180º. The sea areas include parts of the Indian Ocean and Bay of Bengal, the Andaman Sea and Malacca Strait, the South China Sea, East China Sea, Sea of Japan, the Sea of Okhotsk, and all of the north-west Pacific Ocean. This is the primary area of concentration, but areas contiguous to this focus are not ignored. The chief source of observations are ships’ logbooks, and these will include vessels passing through the area under study as well as travelling within it. Although this report will eventually encompass vessels and archives of many different nations, the main focus in this first version will be archives and vessels of the United Kingdom, with passing mention to those of the United States.

Historical Background

The earliest European trade with China was through the Portuguese from 1517. The Dutch had several unsuccessful attempts to enter the trade with China before the 18th century, while the English East India Company established trading posts in 1672. Meanwhile Spanish trade between Mexico and the Philippines was established in 1565, continuing on an annual basis until 1815. Logbooks from vessels at this early period are still extant but few in number and weather observations are almost all non-instrumental. Instrumental observations, mostly barometric pressure and air temperature can be found from the 1790s onwards in the logbooks or journals of vessels of the English East India Company, trading with the port of Whampoa. These particular observations 1790-1835, have already been imaged, keyed, processed and ingested into version 2.5 of the International Comprehensive Ocean-Atmosphere Data Set (ICOADS). http://icoads.noaa.gov/

Determining what relevant historic data is available in archives requires an understanding of the shipping routes. Sailing ship tracks in and towards SE Asia, China and the north-west Pacific were almost exclusively via the Indian Ocean, the major exception being the Spanish Manila Galleon trade between Acapulco and the Philippines. Sailing vessels approaching China from the Pacific were confined to ships of exploration, though under exceptional circumstances English East India Company ships were known to sail around Australia and approach China from the south-east most notably in 1804. Vessel movements in the early
instrumental period were seasonal, governed both by the state of the monsoon, and the evolving understanding of the monsoon winds and the mapping of the wind system. Depending on the time of year, most of the outward trade to China would, after rounding the Cape of Good Hope, either take a route through the Mozambique Channel, and then north of the equator to the Malacca Strait, or traverse westward from the Cape at least as far as the meridian of Amsterdam Island before heading north towards Malacca and the South China Sea. The return route from China, commencing in December with the NE Monsoon, traversed the South China Sea before passing through the Sunda Strait into the Indian Ocean. A video depicting the routes of the English East India Company ships to India and China (1798-1834) can be found at https://vimeo.com/43884291.

The introduction of steam powered vessels had a marked effect on shipping routes and the seasonality of voyages. Whereas sailing ships routes would conform to routes dictated by the wind circulation and the state of the monsoon, powered vessels were placed under no such restrictions. The illustrations below depict sea level pressure (SLP) coverage maps from ICOADS release 2.5. The tracks on the coverage map for 1860-1869 are mostly sailing vessels, those for 1930-1939, exclusively powered vessels. With powered vessels the shipping routes and therefore observational coverage is highly concentrated along narrow bands (yellow and red), whereas other sections of the ocean show a much lower concentration of observations (blues). This is an artefact of the data content of ICOADS but is likely to be typical nevertheless. Therefore, in endeavouring to locate new sources of data, particular attention has been paid to vessels operating along unusual routes, (meaning unusual for ICOADS), for example Australia to China or Hawaii to China and Japan, as well as the common trade routes.

ICOADS Release 2.5. SLP Coverage Maps 1860-1869 and 1930-1939

The 20th century also saw entirely different routes being taken to China and Japan from Britain and Europe. After the opening of the Panama Canal, and commonly from the 1920s onwards, some merchant shipping bound to the Far East would call first at US east coast ports before transiting the Panama Canal calling at San Pedro or some other port on the west coast of the US and then crossing the Pacific to Japan and China, returning to Britain via Suez. This pattern is shown by the logbooks and met-forms preserved in the UK National Meteorological Archive, but this pattern may equally reflect a data collection policy rather than any significant change in world shipping routes. Nevertheless, the knowledge that an
archive contains data for particular areas of the ocean at particular periods of time permits a targeted data recovery strategy aimed at reducing geographic and temporal gaps in the historic observational record.

Observing Platforms and Corresponding Documentary Data Sources

1. Naval Vessels

All naval vessels have logbooks and journals associated with them. It was a legal requirement for a ship’s logbook or an officer’s journal to be completed, and therefore almost all of these in the case of the British Royal Navy have been archived and are accessible to the public. The same is applicable to the United States. As well as a ship’s log or officer’s journal, vessels of the Royal Navy and the United States Navy also produced a ‘Remark Book’. This differed from the logbook in that it contained further observations usually of a hydrographic nature, rather than the daily routine documented in the logbook. It was not a legal requirement to keep a remark book, and not all vessels submitted one to the naval authorities. By the end of the 19th century, these remark books had become a detailed record of meteorological and oceanographic observations.

British naval vessels in Chinese and SE Asian waters were usually smaller vessels, especially sloops, frigates and gunboats and rarely the larger cruiser and battleship, except in times of war. During the second half of the 19th century and later, vessels were based at Hong Kong or Singapore, once assigned to that station. The station was variously referred to as East Indies, China and East Indies, and from 1863, China. As well as vessels assigned to the China Station, naval vessels on an expedition of exploration, especially if this involved a circumnavigation, would sometimes pass through Asian waters. In addition there were vessels undertaking hydrographic surveys, and this latter category of vessel covers both the 19th and 20th centuries. Observations from these naval ships are reliable as many of the officers, especially those involved in exploration and hydrographic surveys, had an interest in science and these vessels carried a range of barometers and thermometers (both air and sea). Interest in scientific observation had been formalized by the publication in 1851, of the Manual of Scientific Enquiry under the authority of the British Admiralty.

Before the 1840s, naval officers’ and ships’ logbooks and journals did not have specific sections or columns for recording barometric pressures and temperatures. Nevertheless, many vessels recorded this information. From the 1840s onwards, pre-printed naval logbooks, have columns for recording at least pressure and temperature, and these observations were usually made on a sub-daily basis, often every 4 hours, or one set of observations per watch. Sea temperature observations can also be found but not in significant number until the 1870s and the introduction of steam powered vessels where observations of sea temperature were needed to regulate the cooling of the engines. By the 1890s and often earlier, it was usual to record details of the meteorological instruments used, their type and position. It should also be noted that up until the early 20th century, the wind directions recorded in naval logs are magnetic unless it specifically states on the log page that the direction is true. An example logbook page from HMS Tourmaline in 1895 is illustrated below.
Details of Instruments:  HMS *Toumaline*, 1895.  National Archives, ADM 53/16302

<table>
<thead>
<tr>
<th>Date</th>
<th>Maker and No.</th>
<th>From</th>
<th>To</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 April</td>
<td>Assella 2118</td>
<td>24th</td>
<td>15 Dec</td>
<td>- 20° 20' E. 6° 30' N.</td>
</tr>
<tr>
<td>15 Dec</td>
<td>Assella 2118</td>
<td></td>
<td></td>
<td>20° 20' E. 6° 30' N.</td>
</tr>
<tr>
<td>16 Dec</td>
<td>H. 03</td>
<td></td>
<td></td>
<td>20° 20' E. 6° 30' N.</td>
</tr>
<tr>
<td>17 Dec</td>
<td>1807</td>
<td></td>
<td></td>
<td>20° 20' E. 6° 30' N.</td>
</tr>
</tbody>
</table>

N.B.—When new instruments are brought into use, the date of change is to be given.
As well as the standard naval logbook found in the British National Archives and illustrated above, many naval vessels including those in Asian waters completed a dedicated meteorological log, that was submitted to the meteorological department of the Board of Trade, which later became the UK Met Office. These logbooks are of an entirely different character and are kept at the National Meteorological Archive in Exeter. As the same logbook format was used for merchant shipping, this type of logbook is discussed in more detail below, under merchant vessels.

![Logbook Image]

**National Meteorological Archive, Met Log 13113, HMS Waterwitch 1908.**

Observations from naval vessels are not confined to ships’ logbooks. The UK Hydrographic Office, Taunton has a large collection of ships’ remark books, a supplement to the logbook recording hydrographic data and usually meteorology. These remark books are to be transferred from Taunton to the National Archives in Kew. As of 2016, most of the remark books are still stored at Taunton. An example is illustrated below.

Other documents found on some naval vessels appear to be non-standard, issued neither by the Admiralty, nor by the met services, and are of a strictly ‘local’ nature. One such document is the ‘China Form 6 - Report of Typhoon Encountered’. The example illustrated is from HMS Cicala at Canton in 1929. The form allowed for hourly observations of pressure and other parameters and it is possible that these were some of the original documents from which typhoon reports were compiled. The example illustrated below was found amongst the ‘China Station Report of Proceedings’ for 1929, at the UK National Archives. Other sets of these forms may be amongst the other China station volumes at the...
National Archives, although a search of some of the Chinese meteorological observatories is more likely to produce results as these forms were of local importance.

UK Hydrographic Office, Remark Book, HMS Ariel 1876

Report of Typhoon Encountered, HMS Cicala Aug. 1929, National Archives, ADM 116/2694, China Station Proceedings 1929
Useful meteorological data can also be found in documents whose title or function would not suggest that they contained such data. One of these is ‘Report of data relating to the temperature and salinity of seawater’. Like the typhoon report above this is a non-standard, local issue, pre-printed form as it clearly states (Commander in Chief, China, no 39/K 102 of 18th December 1922). The example below illustrates data collected by HMS Bluebell, in May 1925 in the North Pacific. As well as observing the sea temperature at various depths, the form also records, barometric pressure, air temperature and weather. Other examples of this type of document for other vessels must exist, but have not yet been located.

![Report of data relating to the temperature and salinity of seawater](image)


<table>
<thead>
<tr>
<th>Depth</th>
<th>Temperature (not corrected)</th>
<th>Whether sample obtained?</th>
</tr>
</thead>
<tbody>
<tr>
<td>200-metres</td>
<td>13.0°C</td>
<td>y0.</td>
</tr>
<tr>
<td>150</td>
<td>17.4°C</td>
<td>y0.</td>
</tr>
<tr>
<td>100</td>
<td>20.3°C</td>
<td>y0.</td>
</tr>
<tr>
<td>75</td>
<td>27.0°C</td>
<td>y0.</td>
</tr>
<tr>
<td>50</td>
<td>28.0°C</td>
<td>y0.</td>
</tr>
<tr>
<td>30</td>
<td>28.8°C</td>
<td>y0.</td>
</tr>
<tr>
<td>20</td>
<td>28.9°C</td>
<td>y0.</td>
</tr>
<tr>
<td>10</td>
<td>29.0°C</td>
<td>y0.</td>
</tr>
<tr>
<td>5</td>
<td>29.4°C</td>
<td>y0.</td>
</tr>
</tbody>
</table>

2. Merchant Vessels –
A. Meteorological Logs

Unlike the naval services, very few merchant shipping logbooks are to be found in national archives. Some shipping company records are to be found in public archives, others are still in the hands of the original companies or their successors, or in private hands. It is likely that many of these valuable documents have been disposed of but this is by no means certain. Fortunately a substantial number of dedicated meteorological logbooks completed on both merchant and some naval vessels have survived and are archived with various national met services such as the UK National Meteorological Archive, and Deutscher Wetterdienst. The extent to which US holdings of merchant meteorological logs are still available is uncertain at the time of writing (2016). The descriptions below refer only to the logbooks held by the UK National Meteorological Archive, Exeter.

The original format of these meteorological logbooks arose from the 1853 Brussels Conference and it is notable that within the different national met archives there is a consistent logbook format used, as the conference established a uniform method for making observations at sea. The format changed over time, with the inclusion of additional reporting parameters. This can be seen by comparing the log image of HMS Waterwitch in 1908 (above) and the merchant ship Hong Kong in 1871, illustrated below. The difference in format is generic and nothing to do with differences between naval and merchant services.
This type of logbook was in use from the 1850s, and in a revised but very similar form up until 1939. It was superseded after WWII by a much smaller logbook format, the Form 911. Each double page contained four day’s worth of data, observed at four-hourly intervals. A noon position, both observed and by ‘dead reckoning’, was recorded. Other data would include currents, sea temperature, magnetic variation, wind direction and wind force, barometric pressure and attached thermometer, wet and dry bulb temperatures, cloud cover, weather, sea state and other remarks as required. Metadata on the type and position of the instruments was provided, either on each page at the head of a column, or on a page at the front of the logbook.

Each logbook also contained, at the front, a ‘Form for testing Logs’. This form was completed, once the logbook was submitted to the Meteorological Department. It is a very rudimentary form of quality control, often listing additional metadata and remarks on how the observations were made and how competently the logbook was completed. For instance there are notes on whether the pressures recorded in the logbook decrease and then increase on entering and leaving the equatorial doldrums and whether the wet and dry bulb thermometers exhibit a diurnal range. Near the bottom of the form there is a section for remarks, with the question ‘are any interesting facts given?’ It is here that extreme events, such as typhoons, ice, etc, as well as atmospheric phenomena such as aurora, are noted making it possible to find such events easily without perusing every logbook page. Many of the earlier logbooks also contain a separate sheet with notes on corrections to the instrumental observations.

Many of the logbooks are annotated. It is clear that groups of data have been extracted for particular purposes. This is noted at the front of the logbook. All of the data extractions are 19th century, with the possible exception of sea temperatures which may have been extracted in 1965. Although dates are given for the extraction the year is abbreviated making it uncertain which century the extraction was made. More recent 20th century data extractions may not have been marked in each individual logbook. Nevertheless, it is surmised that most of the data to be found in these logbooks in the China and SE Asia region is not in digital form. Other forms of annotation can also be found in some of the later logs, usually in pencil. These annotations were inserted by wireless or radio operators to encode the observations for transmission. Such coding will usually be found in logbooks containing separate records of radio messages or synchronized weather observations.

Met Form 121 and 121a

The met Form 121 ‘Ship’s Meteorological Report’ was introduced in the early 1920s, re-issued as Form 121a, and was in use until about 1925, when it was re-designated as Form 911. Instructions for making observations were given in the Marine Observer’s Handbook. The Forms 121a are archived at the National Meteorological Archive Exeter. There are about 9,000 of these documents, of which 967 are now documented as covering the NW Pacific and SE Asian waters.
An example of a Form 121a is illustrated below. Observations are made at 8am and 8pm only. There are no noon observations on the Form 121a.

Nat. Meteorological Archive, Met Form 121a, *Glenluc*, Yokohama to Vladivostok, Jan/Feb 1922

The ship’s position is given at both hours of observation, but with no indication if it is an observed or estimated position. Current direction and speed is observed in the past 24 hours based on noon observations and presumably derived from estimates based on observed and dead reckoning positions. Other parameters are wind direction and force, *uncorrected*
barometric pressure with attached thermometer, air and sea temperature (but no wet or dry bulb observations), clouds, weather, visibility and general remarks relating to precipitation, sea swell etc. There is a special section at the bottom of the form for reporting ice. The ice remarks from the Glenluce, illustrated above, state:

22 Jan – The Tsugaru Strait was entirely free from ice, a strong easterly wind prevailed.

On 24th, field ice (2in. to 9in. in thickness) in Peter the Great Bay. Field ice was encountered as soon as the 100 fathom contour line was crossed, no broken channels were found and passage had to be forced.

Feb 11th, Pack ice encountered from leaving Vladivostok ........

The Form 121a has minimal metadata concerning instruments. Below the section on ice remarks, there is a place for stating details of the barometer that includes whether it reads too high or low, and the height of the instrument above sea level.

**Met Form 911 and Met Log 911**

The early Form 911s (c. 1923 onwards) were essentially the same as the Form 121a with observations at 8am and 8pm. By the late 1920s, these met forms had been revised to include both uncorrected barometric pressure and true pressure at sea level. A further revision included a note on barometric tendency, and in this revision, observations were made at 0000, 0600, 1200 and 1800 hours Greenwich Mean Time (GMT). Note that the time of observation was not local or ship time and that the met form is ‘Synchronized Weather Observations over all Oceans’, all based on GMT.

The collection of hard-bound meteorological logbooks and Form 911 ceases about 1939/1940 and recommences with a new version of the Form 911 in 1947, titled ‘Selected Ship’s Synoptic Weather Record (Fair Logbook)’. This is a paper bound logbook with one week to a double page view, and sufficient pages to record ten weeks of data. The first page of the logbook states that it ‘is for use of all ‘Selected Ships’ belonging to countries in the British Commonwealth’ by agreement at a conference of empire meteorologists in London in 1946. These logbooks were therefore issued to vessels recruited by the London Meteorological Office as part of a scheme of voluntary observing ships.

The range of data in the new Form 911s expanded. Observations are at 0000, 0600, 1200 and 1800 hours GMT. Wind directions are observed as true and recorded as degrees, not compass points. Wind force is by Beaufort Scale. Both uncorrected and corrected barometric pressures are recorded with attached thermometer and the height of the cistern above sea level is noted. A barograph reading is included indicating barometric tendency and the amount of change in the preceding three hours. Air, wet bulb and sea temperatures are recorded, weather according to Beaufort notation, types of cloud at different levels, including total cloud cover and estimates of cloud-base, direction and amount of sea swell, and general remarks. There is a separate set of pages for recording sea surface current observations and a set of inserted sheets (Form 911a) containing ‘Selected Ships’ Coded Messages’
The example of a 911 Form is illustrated below, the MV Priam, contains a noteworthy annotation stating that the excessive vibration associated with a motor ship, produces poor results on the barograph and that this could be improved by some means of suspension. This is useful information when quality control of digitized data is undertaken.

Nat. Meteorological Archive, Met Log 911, no. 994, MV Priam, Jun/Jul 1948. Left facing page
**Printed Documentary Sources**

The following is a table of printed sources of marine meteorological data for SE Asian and Chinese waters. At this time, the list is not comprehensive, but contains many rare and unusual items.
<table>
<thead>
<tr>
<th>Archive</th>
<th>Author</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google</td>
<td>Abel, Clarke</td>
<td>Narrative of a Journey in the Interior of China and of a Voyage to</td>
<td>(67-8) Short table of obs in the Yellow Sea 23-27 July 1816 with air temperature, pressure, SST and sub-surface temps. (344-7) Observations on the taking of sea temperatures by various individuals. Met Journal kept on board HMS Alceste 14-28 July 1816 from Hong Kong to Pe-tche-lee via the Yellow Sea. Sub-daily pressure, air temperature and hygrometer observations and winds. A further met journal recording the same observations on a journey into the interior of China 8 Sep-24 Nov 1816. Position is not recorded in this latter journal, however a tabulated itinerary is provided pp. 397-402.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>from and from that Country in the years 1816 and 1817, (London 1818)</td>
<td></td>
</tr>
<tr>
<td>Admiralty Library, Portsmouth</td>
<td>Algue, Jose</td>
<td>Cyclones of the Far East</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Manila, 1904)</td>
<td></td>
</tr>
<tr>
<td>National Maritime Museum</td>
<td>Austen</td>
<td>The Hastings and Sphynx</td>
<td></td>
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<tr>
<td></td>
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<td>Hurricane of September 30 and October 1 in the China Sea, Nautical</td>
<td></td>
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<td>Magazine 1852</td>
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<td>National Maritime Museum</td>
<td>Calbeck, John</td>
<td>Typhoon in the China Sea.</td>
<td>Meteorological register kept on board the EIC ship Duchess of Athol, 10 Dec 1824-5 Apr 1825 on a voyage from China to England. Sub-daily pressure and temperature 8am, noon, 4pm, 8pm. Adie sympiesometer used and compared with Troughton marine barometer. Note that the logbook for this vessel does not record instrumental data. The observations were apparently made by a passenger.</td>
</tr>
<tr>
<td>National Maritime Museum</td>
<td>Collinson</td>
<td>Typhoon in the China Sea.</td>
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<td>Nautical Magazine (1841)</td>
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<td>Google</td>
<td>Coombs, J. Monckton</td>
<td>Theory of the Atmospheric Tides (Met journal of EICS ship Duchess of</td>
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<tr>
<td></td>
<td></td>
<td>of Athol), Asiatic Journal (1827)</td>
<td></td>
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<tr>
<td>Admiralty Library, Portsmouth</td>
<td>Froc, Louis</td>
<td>The Typhoons of September 9th and 29th, 1897, Shanghai Met. Soc. 5th</td>
<td>Copy noted as being in the library of the Bombay Geographical Society in 1846</td>
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<tr>
<td></td>
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<td>and 6th Annual Reports 1898</td>
<td></td>
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<tr>
<td></td>
<td>Guthrie, R. D.</td>
<td>Abstract Logs of Peninsular and Oriental Steam Navigation Steamers</td>
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<td></td>
<td></td>
<td>on the Bombay and China Line</td>
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<td>National Maritime Museum</td>
<td>Hay, John</td>
<td>Typhoon of July 1842 in the Canton River, Nautical Magazine 1843</td>
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<tr>
<td>Admiralty Library, Portsmouth</td>
<td>Knipping, E.</td>
<td>The Great Taifun of August 1880 (Yokohama, 1881)</td>
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<td>Knipping, E.</td>
<td>Der Grosse Oktober Teifun, 1880 (Berlin 1881)</td>
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<td>Normalorter fur die Taifune in den chinesischen und japanischen Meeren des Jahres 1881, (Berlin, 1882)</td>
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<td>Admiralty Library, Portsmouth</td>
<td>Nicolson, F</td>
<td>Remarks on the Gales which occurred on the Coast of China in September 1857, Shanghai 1857.</td>
<td></td>
</tr>
<tr>
<td>Piddington, Henry</td>
<td></td>
<td>Storms of the China Sea from 1842 to 1847 ans some of the North Pacific from 1797, <em>Journal of the Asiatic Society of Bengal</em> (1849)</td>
<td></td>
</tr>
<tr>
<td>Redfield, William</td>
<td></td>
<td>Additional Facts relating to the <em>Raleigh’s</em> Typhoon of August 5th and 6th 1835, in the China Seas, American Journal of Science (1839)</td>
<td></td>
</tr>
<tr>
<td>Redfield, William</td>
<td></td>
<td>Observations in relation to the Cyclones of the western Pacific</td>
<td>Text contains many pressure observations</td>
</tr>
<tr>
<td>Revertegat, M. J.</td>
<td></td>
<td>Notice Meteorologique sur les Mers Comprises entre la Chine et le Japon, Paris 1879</td>
<td></td>
</tr>
</tbody>
</table>
The Archives

1. United Kingdom

British Library

The British Library (BL) is located in Central London, www.bl.uk. The marine department of the India Office Records contains the journals or logbooks of vessels trading under the English East India Company. The records are archived under L/MAR/B. Several hundred of these logbooks are associated with ships trading with China, through the port of Whampoa. From about 1790 onwards, many of these vessels carried barometers and thermometers making regular instrumental noon observations, with descriptive weather observations at other times of the day. From about 1790 until 1835, all those vessels making daily pressure observations (those sailing to China and elsewhere) have been imaged and digitized, the data now part of ICOADS release 2.5.

In addition there are a further ten ships’ journals 1811-1834 catalogued under IOR/Mss/Eur. There are also four logbooks from vessels of the Indian Navy in Chinese waters (1841-1844) catalogued under L/MAR/B. Neither of these additional sets have been imaged or digitized, and have not been examined for instrumental observations, though it is likely that instrumental observations are present.

Cambridge University Library

The University of Cambridge holds the archive of Jardine Matheson, one of the largest British shipping companies to operate in the Far East. Permission from Jardine Matheson is required to view the material. Only ten logbooks are to be found in the archive, most for the Indo-China Steam Navigation Company in the 1890s and operating between ports on the China coast, Singapore, Saigon and Manila. None of these logbooks (as of 2016) are imaged or digitized.

Hydrographic Office

The United Kingdom Hydrographic Office (UKHO) is situated in Taunton in the county of Devon, www.gov.uk/the-ukho-archive. The UKHO holds over 10,000 ‘remark books’ kept on board ships of the Royal Navy from the 1760s to 1909. Typically these records contain pressure and temperature observations from about the 1820s onwards. There are 732 remark books relevant to vessels stationed in Chinese and SE Asian waters between c.1840 and 1909. In addition to the remark books, there are sets of other relevant data, listed below.

Original document Series (OD)

<table>
<thead>
<tr>
<th>Reference</th>
<th>Date</th>
<th>Document Description</th>
<th>Data type</th>
</tr>
</thead>
<tbody>
<tr>
<td>OD161</td>
<td>1856</td>
<td>Yangtze, Tungshi, Tides and Meteorology</td>
<td>Not examined</td>
</tr>
<tr>
<td>OD452</td>
<td>1891-3</td>
<td>China Sea Soundings and Temperature, Egeria and Penguin</td>
<td>Air temperature data</td>
</tr>
</tbody>
</table>
There are about a dozen further survey data books for vessels in Chinese waters that have not been examined. Most survey books however record only daily mean temperature, along with bearings and triangulations.

**National Archives – Kew**

The UK National Archives (TNA) is located at Kew, to the west of central London, [www.nationalarchives.gov.uk](http://www.nationalarchives.gov.uk). The archive holds the main archive of the British Royal Navy and includes officers’ journals and ships’ logbooks, in ADM 51, captains’ journals, ADM 52, masters’ journals (navigating officer), ADM 53, ships’ logbooks, ADM 54, miscellaneous logbooks and ADM 55, logs of vessels of exploration. In addition there are other sets of records that contain within them, documents with meteorological and oceanographic data. ADM 55 has been imaged, and the images can be accessed through the British Atmospheric Data Centre (BADC), [www.badc.nerc.ac.uk](http://www.badc.nerc.ac.uk). For the period 1800-1920, the archive holds over 1,000 logbooks of vessels in Chinese and SE Asian waters. To date (2016) about 600 sets logbook sets have been identified, representing about 1500-2000 individual logbooks. Those logbooks in ADM 53 covering the period of the two world wars (1914-1918 & 1939-1945) have already been imaged and digitized. Data extracted from WWII Royal Navy logbooks is already part of ICOADS, data from WWI will be added to the next ICOADS release.

Apart from journals and logbooks there are other important sources of data, often buried within sets of other documents connected with the management and proceedings of naval vessels on the China Station. These are the ‘Reports of Proceedings’ of the China station, and of individual vessels. The China Form 6 typhoon report (HMS *Cicala*), and the sea temperature report (HMS *Bluebell*) illustrated before are typical examples to be found amongst these collections. Therefore, the reports of proceedings require further examination, and the following document sets are just a few promising examples.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADM 1/8642/130</td>
<td>1923</td>
<td>Letter of Proceedings, Hong Kong. Report in connection with the typhoon and its consequences</td>
</tr>
<tr>
<td>ADM 1/8758/194</td>
<td>1931-2</td>
<td>Reports of the West River Gunboats, China Station</td>
</tr>
<tr>
<td>ADM 1/9561</td>
<td>1937-8</td>
<td>Hong Kong, Report of Proceedings</td>
</tr>
<tr>
<td>ADM 1/9568</td>
<td>1938</td>
<td>China Station, West River Flotilla, Movements and Reports of Proceedings</td>
</tr>
<tr>
<td>ADM 1/19373</td>
<td>Jan 1946</td>
<td>Report of Proceedings, Shanghai</td>
</tr>
</tbody>
</table>
National Maritime Museum

The National Maritime Museum is at Greenwich to the south-east of London, www.rmg.co.uk. The Museum holds substantial collections of logbooks and journals kept on board both naval and merchant vessels. Of the naval logs relevant to Chinese and SE Asian waters, there are eleven ships’ logs, four lieutenants’ logs, one captain’s log and one meteorological log, presently identified. Some are manuscript logs and others are on microfilm.

Merchant shipping logs are more numerous and are found under the references LOG/C and LOG/M. Section LOG/C has 40 logbooks of merchant vessels in Chinese and SE Asian waters from 1814 to 1901. Most of these logs are for voyages in the first half of the 19th century. LOG/M is yet to be examined. In addition there is the Lubbock Collection, reference LUB. Basil Lubbock wrote extensively on the merchant shipping (under sail) of the 19th and early 20th centuries and his papers contain at least eight abstract logs, five from the 1870s and three from the Cutty Sark in the 1880s. This collection has not yet been examined and more relevant material will probably be found. Two other items of interest are TIZ/64/2, Meteorological Observations, Hong Kong, Sept. 1872, and MSS/73/036, manuscript narrative with logbook extracts from the vessel Claverdon in an encounter with a storm in the North Pacific in 1902. Further examination of the Museum’s relevant holdings is still required.

National Meteorological Archive

The UK National Meteorological Archive (NMA) is located within the Devon Record Office, Exeter, a short distance from the Met Office, www.metoffice.gov.uk/learning/library/archive. The NMA hold 380 dedicated meteorological logbooks (called weather books in the 19th century) for naval vessels operating in Chinese and SE Asian waters. These range in date from the 1850s to the 1940s. There are a few manuscript logbooks before 1850. The collection of naval logs includes one from the Australian Navy light cruiser, HMAS Brisbane in 1935 on a voyage from Fremantle to Aden via Singapore. Some of the more unusual items include three sets of met logs (3263, 3350 & 3499) for the Princess Charlotte, (1873-1874) stationed in Hong Kong Harbour as a floating barracks. There is also a met log (4012) for the Victor Emmanuel in 1876, a hospital ship also in Hong Kong Harbour. In addition to this, there are some related items such as (967) a set of bound ‘Land Forms’ containing observations by a RN surgeon at Bangkok in 1858, (1387) pressure observations at Canton in 1860, (11170 & 11390), self-recoding barograph curves, HMS Terrible (1901) and HMS Pique (1903).

The bulk of the NMA marine archive is made up of meteorological logs from merchant shipping from the mid 1850s to the present day. There are several different formats of marine logbook, the large bound meteorological logbook, called a weather book, the single sheet met Form 121a and early Form 911, and the soft-bound logbook also designated Form 911. These are all described in an earlier section above.

The hardbound logbooks covering Chinese and SE Asian waters date from 1854 to 1940. There are 2056 individual logs. These are bound into volumes usually containing 3-4 logs.
but not all of the logs in a single volume will cover the same geographical area. The met form 121 and 121a begin in 1920 and run to 1925. And there are c.1050 relevant met forms covering Chinese, SE Asian waters and the NW Pacific. Of the early Met Form 911 (1920-1939), c.3400 relevant items have been documented. Of the paper-bound Met Log 911 (1946 -1950), there are 224 examples documented. In summary, the National Meteorological Archive hold nearly 400 naval logbooks and nearly 10,000 merchant shipping logbooks and met forms covering the seas of the NW Pacific, China, Japan and SE Asia.

Merseyside Maritime Museum – Liverpool

The Merseyside Maritime Museum is situated at the Albert Dock, Liverpool, www.liverpoolmuseums.org.uk . The Museum archive holds the records of several shipping companies amongst which can be found the archive of the Blue Funnel Line and the archive of Thomas and John Brocklebank. The Blue Funnel Line was one of the dominant shipping companies in Asia. The Museum hold a collection of ‘Voyage Books’ 1897-1902, which should give details of shipping movements. There are also ‘Engineer’s Records from 1888 to 1949. It is not clear what these documents are, but if they include ‘engine room logs’, these may contain sea temperature observations taken through a sensor at the injector. Additionally there are ‘Port Log Books’ for the period 1960-1975. There is also a set of ‘Ship Journals’ for the period 1866-1974. Enquiries have established that these journals are not navigational logbooks but akin to the Official Logbook, which deals with crew and domestic matters.

The Brocklebank archive contains a number of items that will help determine those ships and logs relevant to Chinese and SE Asian waters. These include ‘Notebooks of Ship Movements 1907-1932’, ‘Notebooks of Voyage Details 1931-1950’, Historical Notes of Voyage Details 1770-1901, and ‘Sailings to China 1829-1911. In addition, there are sets of ‘Radio Logs of Ships 1944-1945’ and ‘Confidential Logs 1941-1945’. It should be determined what these logs contain. If they contain weather observations or reports, this will be a significant find as there are no UK merchant shipping meteorological logbooks in the UK National Meteorological Archive for the WWII period.

2. United States of America

The Maury Collection (US and German)

This collection will contain the logs and abstract logs of vessels trading with China and Japan. Further investigation is required.

National Archives and Records Administration (NARA)

The National Archives and Records Administration is located in Washington DC. www.archives.gov A number of publications on American merchant shipping, most notably Carl Cutler, Greyhounds of the Sea (1930) suggest that NARA holds a collection of ship’s logbooks associated with many of the famous American clipper ships. These may now be in the hands of other institutions such as the Peabody Essex Museum, or housed elsewhere. However the facts should be determined in order to locate the relevant logbooks and marine data.
Peabody Essex Museum

The Peabody Essex Museum is situated in East India Square, Salem Massachusetts. [www.pem.org](http://www.pem.org). The archive of the Museum holds an extensive collection of ships logbooks and journals back to the early 19th century. A preliminary search indicates that several hundred logbooks in this collection are associated with vessels sailing to China, Japan and the Philippines. A detailed inventory is required.

San Francisco Maritime National Historical Park

The Archive of the San Francisco Maritime Historical Park is located in Building E, Fort Mason, San Francisco. [www.nps.gov/safr/learn/historyculture/researchvisit.htm](http://www.nps.gov/safr/learn/historyculture/researchvisit.htm) The Archive holds the logbooks of the Dollar Line and American Presidents Line, trading on routes between the west coast of the United States and China and Japan. Specific routes and vessels can be found at [www.timetableimages.com/maritime/images/apl.htm](http://www.timetableimages.com/maritime/images/apl.htm). The collection covers the years 1925 to 1944 and includes deck logs, port logs, engineer’s logs, bridge logs (war time), and chief officers logs. A detailed inventory is required.

University of California San Diego (UCSD)

The Special Collections at UCSD have an active on-going collection policy regarding ships’ logbooks and journals for the Pacific region. The existing collection of logs is small but growing, and contains a number of documents of relevance. A brief, preliminary examination of the archive has indicated that the collection includes the log of the *Peruvian* 1868-1870, voyaging between Hong Kong, Manila, Adelaide and Japan, recording daily pressure observations. Other items include the *Salamis* 1869-1870, in Chinese and Japanese waters, and HM Govt. Vessel *Leven* also in Chinese waters 1870-1873. Further investigation is required.

Small collections of relevant logbooks have also been identified at the Independence Seaport Museum, Philadelphia, and the New York Historical Society and Museum.

3. Other Archives

National Archives of Australia

Eleven individual vessels of the Royal Australia Navy have been identified as operating in or near SE Asian waters 1913-1941. This represents about 100 or so individual logbooks. Relevant merchant shipping logbooks in Australian archives still require investigation, but it is expected that many will be found.

University of Lisbon

A handful of logbooks have been found at the University of Lisbon (1860s and 1870s). More are likely to be found.
**Deutsche Wetterdienst (DWD)**

The German Weather Service hold several thousand meteorological logbooks from both sail and steam vessels sailing across the globe. It is equivalent to the UK’s National Meteorological Archive, with logbooks of much the same format and type. Forty-two merchant vessels have been positively identified as operating in Far Eastern waters and have been matched to logbooks held by DWD. There will be many more held by this archive, and more work is required. DWD have an active and ongoing programme of imaging and digitization.

**Vestfold Archive, Sandfjord Norway**

A solitary logbook for the tanker Thorsholm, in Far East waters in 1938, was discovered on an unrelated visit to this archive. It was imaged, and the images are held both by the Archive and the Met Office Hadley Centre. The Archive holds many uncatalogued company records, and more logbooks may be found, especially the Wilhelmsen Line operating out of Tønsberg, Norway from 1865 to present day, and to China and Japan from 1914.

**Additional Sources of Logbooks**

Naval logbooks can usually be found in a national archive, naval museum or with a naval service and many are still extant. Merchant shipping deck or navigation logbooks should be more numerous that naval logbooks, but are much more difficult to locate. There are many ‘official logbooks’ amongst merchant shipping archives but these are exclusively concerned with personnel issues and NOT with navigation or meteorology. Surprisingly, the most abundant collections of merchant shipping logbooks are dedicated meteorological logs or met forms archived with various national meteorological services. It is assumed however that many thousands of logs have been disposed of by the shipping companies if they have not been donated to museums or regional archives. In the hope that this assumption is unsafe, a list of companies trading with China and SE Asia is given here. The list below is not exhaustive, and is based largely on information to be found in The Shiplist, [www.theshipslist.com/ships/lines/index.htm](http://www.theshipslist.com/ships/lines/index.htm). Selective information on specific vessels, sailing routes and sailing schedules associated with the shipping companies below can be obtained through [www.timetableimages.com](http://www.timetableimages.com). Bringing this information together, helps to identify those vessels that would have made observations in Chinese and SE Asian waters, and aid the search for the corresponding logbooks. Further investigation of potential archives of logbooks associated with these shipping companies is required.

**American & Oriental Line** – New York to Straits Settlements, Hong Kong, Philippines, China & Japan.

**American President Line**

West coast of North America to China and Japan. A large collection of logbooks has been identified at San Francisco Maritime National Historical Park.

**Austasia Line Ltd.**, Singapore, 1952-1993
**Australian Oriental Line** 1912-1961 – route: Melbourne, Sydney, Brisbane, Townsville, Cairns, Thursday Island, Manila, Hong Kong

**Ben Line / William Thomson & Co.** – routes: 1859-1992 UK East Coast and North European ports to East Indies and Far East

**Blue Anchor Line** - London - Australia - China - London (sail)

**Blue Funnel Line**

<table>
<thead>
<tr>
<th>Years</th>
<th>Route</th>
</tr>
</thead>
<tbody>
<tr>
<td>1865-1869</td>
<td>Liverpool - Mauritius - Penang - Singapore - Hong Kong - Shanghai.</td>
</tr>
<tr>
<td>1869-1980</td>
<td>Liverpool - Suez - Penang - Singapore - Hong Kong - Shanghai - Japan.</td>
</tr>
<tr>
<td>1880-1899</td>
<td>Singapore - Belawan Deli / Singapore - Penang and intermediate ports</td>
</tr>
<tr>
<td>1902-1984</td>
<td>China - Vancouver - Seattle - North Pacific Coast ports - San Diego</td>
</tr>
</tbody>
</table>

A large collection of logbooks was identified at the Merseyside Maritime Museum, Liverpool, but these proved to have no weather related data in them.

**Blue Star Line** –

1911-1930 UK - Hong Kong - Shanghai - Japan.

**Brocklebank Line**

<table>
<thead>
<tr>
<th>Years</th>
<th>Route</th>
</tr>
</thead>
<tbody>
<tr>
<td>1905-1914</td>
<td>Antwerp - Suez - Singapore - Shanghai - Kobe - Yokohama.</td>
</tr>
</tbody>
</table>

**Canadian Pacific Line**

1891-1979 - Vancouver - (Hawaii) - Yokohama - Shanghai - (Manila) - Hong Kong

**China Coast Steam Navigation Co. (Jardine Matheson)**

1873-1890s - China – Japan

**China Trans-Pacific Steamship Co.**

1874 – Hong Kong, San Francisco

**Compagnie des Services Maritimes Imperiales**

1865 - Saigon - Hong Kong - Shanghai - Yokohama

**Compagnie des Messageries Maritimes**
1866-1914 - Saigon - Manila

**Compagnie Nationale de Navigation**

1879-1904 – Marseilles- French Indo-China

**Dollar Line**

From 1902 - Trans-Pacific routes between Yokohama, the Philippines and the west coast of the United States. A large collection of logbooks has been identified at San Francisco Maritime National Historical Park.

**Eastern & Australasian Mail Steamship Co.**

1873-1919 - four weekly mail and passenger service from Sydney to Brisbane, Batavia, Singapore and Hong Kong.

**Ellerman and Bucknall Steamship Co.**

1915 - UK - Marseilles - Suez - Malaya - Singapore - Philippines - Hong Kong - Shanghai - Japan.
1915 - Manchester - Liverpool - Panama Canal - Los Angeles - Dutch East Indies - Philippines - China - Japan - Dairen.

**Glen Line**

1871-1907 - (Glasgow) - London - (Hamburg) - Penang - Singapore - China – London.
1907-193 - London - (Continent) - Genoa - (Mediterranean ports) - Penang - Singapore - (Manila) - Hong Kong - Shanghai – Japan
1935-1978 - Middlesbrough - Immingham - Hamburg - Rotterdam - Antwerp - London - (Marseilles) - (Genoa) - Port Said - Penang - Singapore - Hong Kong - Manila - (Chinese ports) - Shanghai - (Japanese ports) - Kobe - Vladivostok or Shanghai - Dairen.

**Great Northern Steamship Co.**

1900-1918 - Seattle-Yokohama-Kobe-Nagasaki-Shanghai-Manila-Hong Kong

**Inch Steamship Company Ltd.** , Hong Kong 1947-1966

**Indo-China Steam Navigation Co.**

1881- 1946 - coastal services and to Singapore, Calcutta and Vladivostok. Hong Kong to Manila from 1885.

**Jardine Matherson & Co.**

**Java China Japan Lijn** 1902-1947
Jenkins & Co. Ltd.

(Sail) 1861-1872 London - Cape of Good Hope - China.
(Sail) 1872-1888 London - China – Japan
(Steam) 1872-1910 London - Suez - Colombo - Singapore - Hong Kong - Nagasaki - Yokohama - Kobe.

Koninklijke Java China Paketvaart Lijnen 1947-1977, Amsterdam

Koninklijke Paketvaart Maatschappij 1888-1967

Routes covering South Africa, Australia, Indonesia and SE Asia.

Mitsui Bussan Kaisha Mitsui Steamship Co. Ltd (Tokyo)

1876-1964

Moller & Co. (Shanghai) – Hong Kong from 1953

1882-1981 - China Coast, East Russia, Japan, Philippines, Indonesia and Far East.

Nippon Yusen Kaisha K.K.

1885 to present

Northern Pacific SS Co.

1890s - Tacoma - Japan - Shanghai - Hong Kong

Oriental African Line

Hong Kong, Bangkok, Singapore to Mauritius, Delagoa Bay, Durban, East London, Port Elizabeth, Mossel Bay, Cape Town.

Oriental Steamship Company, Yokohama Toyo Kisen Kaisha (TKK)

1899-1926
Hong Kong-Amoy-Shanghai-Nagasaki-Kobe-Yokohama-Honolulu-San Francisco
Yokohama-Iquique-Valparaiso
Osaka Shosen K.K.

1884 to present (as Mitsui O.S.K. Line since 1964)
Routes from Japan to China, USA and Australia

Rickmers Line

1848 – 1987 - East Asia, Vladivostok from 1909. (NB. Several Rickmers’ vessels submitted meteorological logbooks to Deutscher Wetterdienst - DWD)

Russian Volunteer (Mercantile) Fleet

1878-1945 - Odessa - Nagasaki - Shanghai - Vladivostok.

Shire Line


Silver Line 1908-1985

From 1930s, Pacific ports, Straits and Dutch East Indies

Swedish East Asia Company (SEAC) 1907-1979

White Star Line

1875-1883 – San Francisco, Yokohama, Hong Kong

Wilhelmsen Line (Tønsberg, Norway) 1865 to present day

From 1914, Straits, China and Japan

Yangtze Steam Navigation Co.

Part of Indo-China Steam Navigation Co (above)

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1 Royal Navy logbooks are subject to a thirty year restriction. Presently 2015, the National Archives at Kew hold logbooks up to 1987, with a further, small number after this data to 1998.

2 These dates are determined from information in the Met Office Entry books. For example the earliest 121a archive numbers are for met forms in 1920s. There are examples in the archive much earlier than the 1920s, for instance, a met form (121 or 911) for the Istra (Jun-Jul 1914). The date ranges stated are therefore only a general guide.
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