# MedCLIVAR: Mediterranean Climate variability.
# Meteorological Database Over The Mediterranean Sea Through Old Royal Navy Logbooks

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## Introduction and Methodology:

Ship's logbooks have proved to be one of the most effective sources in our endeavours to reconstruct the maritime climate back. Several thousands Royal Navy Logbooks, surviving the rigours of life at sea, have come to the present day. Most are found in the UK repositories such as The National Archives (Figure 1) at Kew (TNA).

The principal objective is to analyse the scientific potential of logbook climatic data and produce a database of daily weather observations for the Mediterranean Sea between 1675 and 1850. The new database significantly improves our knowledge of the circulation variability in the Mediterranean during 1675-1850 and the possibility of comparing past wind variability with instrumental records. So, logbooks weather information has been digitized into a database to identify weather patterns and extremes.


**Figure 1:** The National Archives, TNA, at Kew (UK)

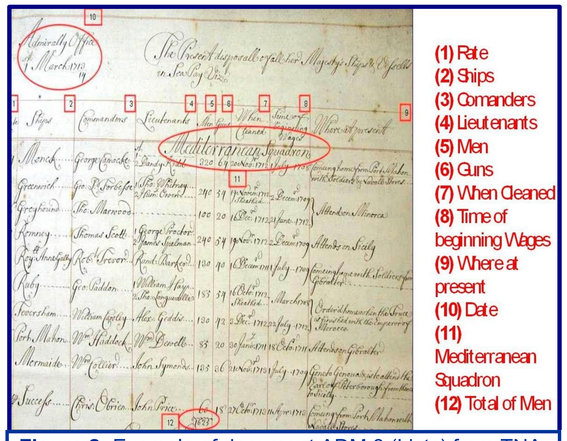


**Figure 2:** Example of document ADM 8 (Lists) from TNA.

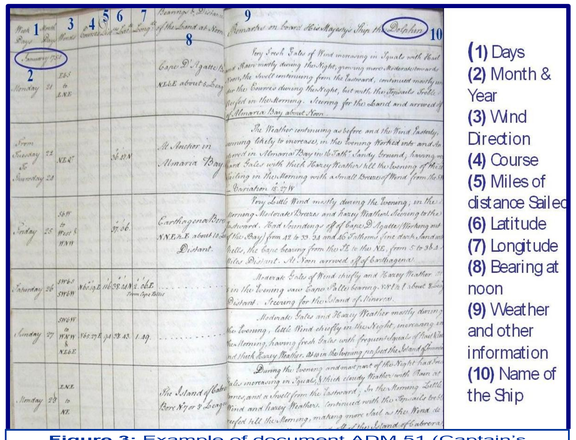


**Figure 3:** Example of document ADM 51 (Captain's Logbooks) from TNA.

To build the database it has been necessary to localize at TNA which vessels were sailing the Mediterranean Sea between 1673 and 1850. We consulted documents at TNA where Royal Navy officers keep a record of vessels' location. These records are catalogued at TNA as ADM 8 (Figure 2) and are classified annually. The ADM 8 documents indicate, in a monthly basis, the number of ships in the area and the main information for these ships.

Once the monthly list of vessels sailing the Mediterranean was known, we selected at least one or two ships per month, and we searched the Captain's logbooks of the selected ships. The documents that contain these logbooks are catalogued at TNA as ADM 51 (Figure 3) , and their reference at TNA can be found in the ADM 51 glossary. The needed documents were ordered to TNA and it was possible to take pictures of each one of these logbooks. The next step is to digitize the daily logbooks, making use of the extensive set of pictures, to construct the database from 1675 to 1850.

All meteorologically relevant data (Figure 4) at noon were extracted from each logbook's page. For our purposes, the main contents of the database are wind direction and wind force information.

To translate the original force information to Beaufort's Scale the CLIWOC MULTILINGUAL METEOROLOGICAL DICTIONARY(*) has been used. This dictionary was built to translate the early observers ancient vocabulary of the early observers into expressions directly comparable with the present-day Beaufort Scale.

*(*) CLIWOC Multilingual Meteorological Dictionary, HISKLIM 5 (KNMI publ 205) 49 pp, KNMI, De Bilt, 2003.*

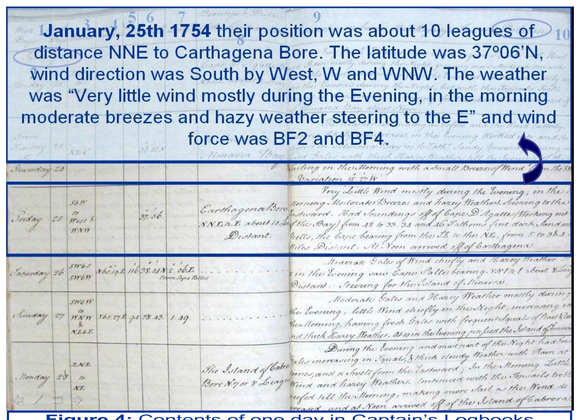


**Figure 4:** Contents of one day in Captain's Logbooks (January, 25th 1754).

## Results:

Data digitized for this database (Figures 5 and 6) includes information about 82 ships from 313 documents from TNA with logbooks covering the period 1673-1850. We have 21,000 images of these logbooks for the complete period. Today, the database already includes around 35,435 records (55% of the total) and we continue working to transcribe the remaining data. The period 1725-1820 has been fully transcribed and is ready for analysis. It is still necessary to digitize the remaining data.

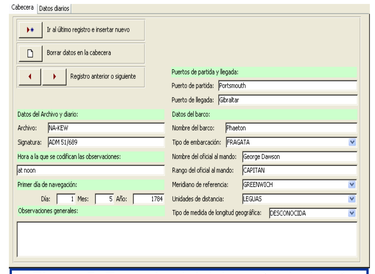


**Figure 5:** Example of database (mainsheet)

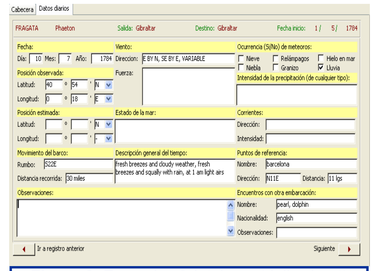


**Figure 6:** Example of database (daily sheet)

| | |
|---|---|
| Total | 16803 |
| Data with Landmark | 9757 (58%) |
| Data with Landmark+Bearing | 4662 (27,8%) |
| Complete data | 1003 (6%) |

**Table 1:** Corrections of ship's position (1735-1780)

Data from ship's position sometimes need a correction (Table 1). These corrections are possible classified in three groups depending if the logbooks contains data with:

**1) Landmark (reference point):** we will search the position (latitude-longitude) of this Landmark.

**2) Landmark+Bearing (reference point with direction and distance to that point):** we will calculate the position

**3)Landmark+Latitude+ Longitude:** we will have a complete data and no need any correction.

**With this database it will be possible:**

- To provide a better understanding of the nature of climatic change over the Mediterranean for the 1675-1850 (period without instrumental data)
- To prepare future analysis of extreme weather events.
- To improve the current Sea Level Pressure reconstructions over the Mediterranean.

## Acknowledgments:

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