Marine data sets from the United Kingdom

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Overview

- Data sources, quality control and gridding
- Data sets
- New digitised data
- Undigitised data

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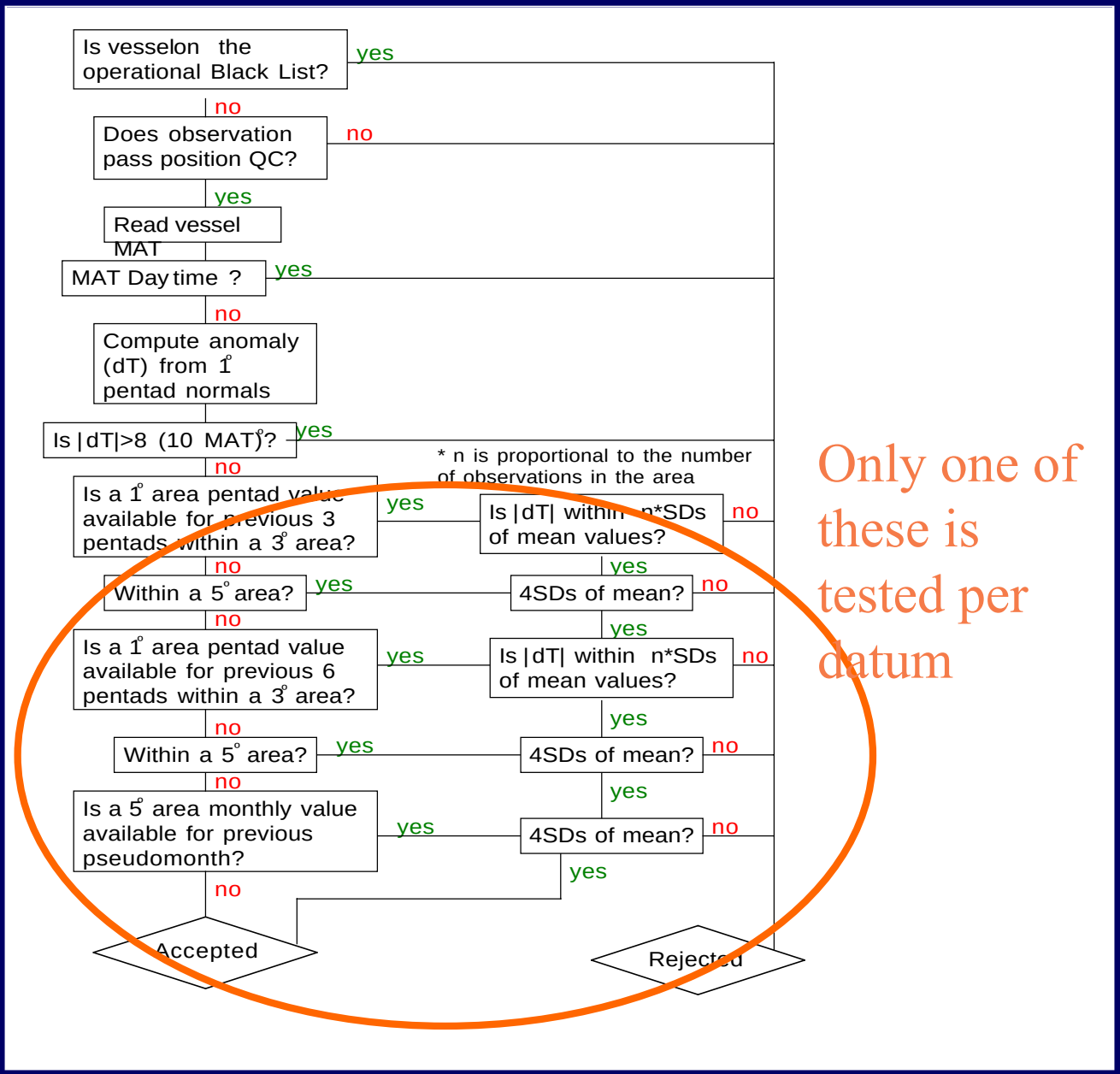
Met Office Marine Databank

- Is historical data from digitised logbooks.
- “Representative” database.
  - One observation per degree square/observation time.
- Data includes (where known) ship call sign.

Quality Control of Marine Observations.



Only one of these is tested per datum

Gridding

- Grid all data for a 1^{o} by 1^{o} pentad by
  - Computing daily anomalies.
  - Rejecting all data that failed QC.
  - "Winsorising" (setting all values outside $1^{st}/4^{th}$ quartile to $1^{st}/4^{th}$ quartile values)
  - Taking mean of all values.
- Compute 5^{o} by 5^{o} monthly mean anomalies by
  - Computing anomalies from all 1^{o} by 1^{o} pentads
  - "Winsorising" the pentad anomalies.
  - Taking the mean.

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Gridded marine data sets

- HadMAT
  - Marine air temperature (for night) 1856 to present
  - Corrected for changes in platform height and other heterogeneities.
  - Updated in near real time.
- HadSST
  - Sea surface temperature 1870 to present.
  - Corrected for change from buckets to engine intakes.
  - Variance corrected.
  - Updated in near real time.
- (HadCRUT)
  - HadSST blended with **land** temperature data set from UEA.
- HadISST
  - Globally complete SST and Ice 1870 to present
  - Constructed from HadSST (and other data sources)
- HadSLP
  - Sea Level Pressure over both ocean and land
  - 1870 to 1998.

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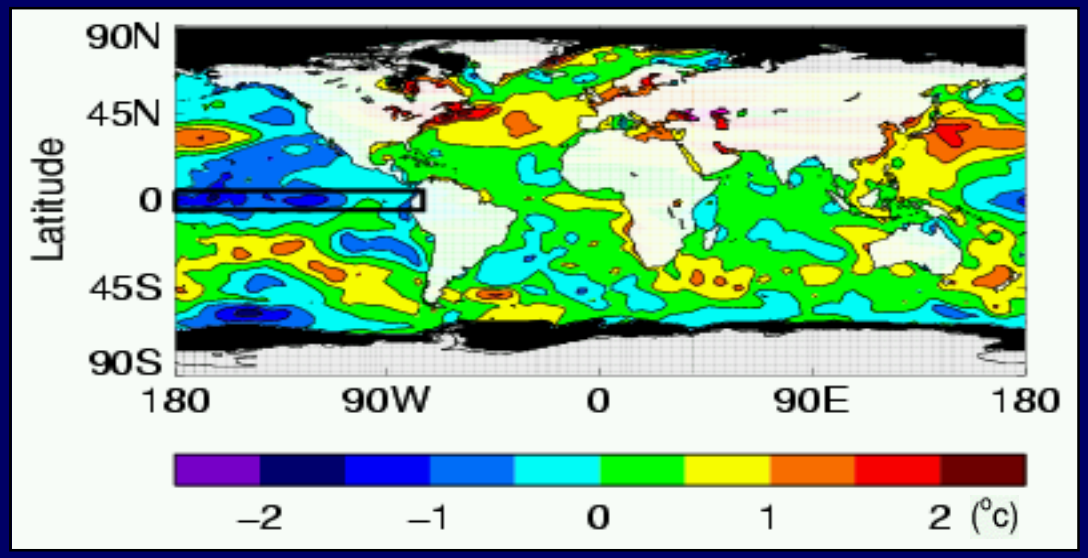
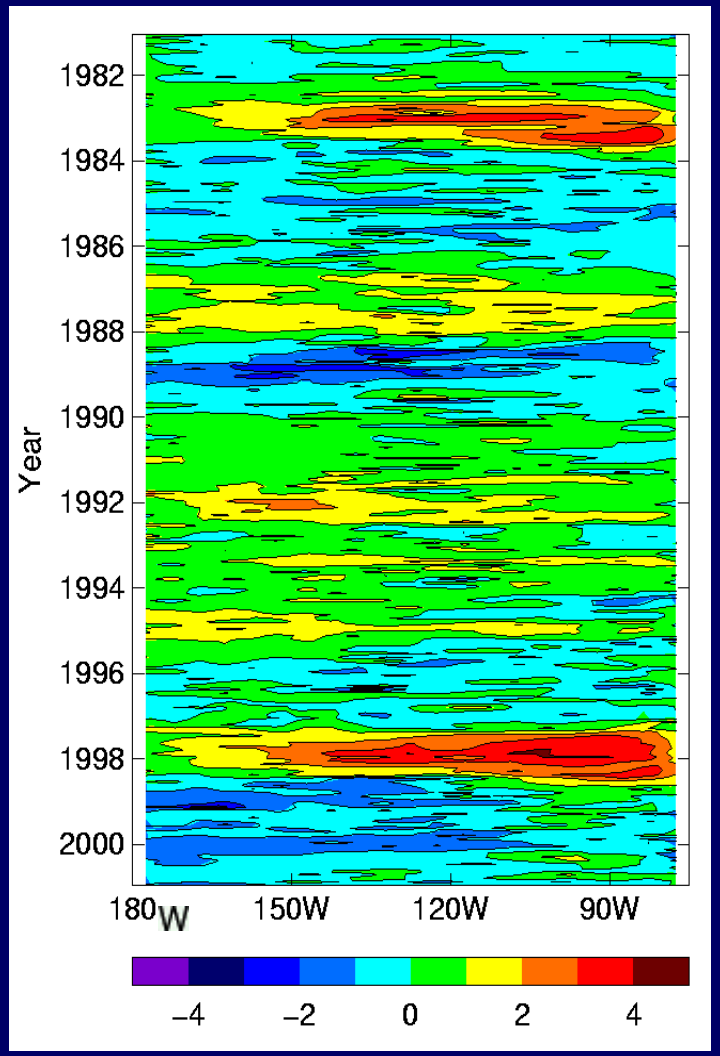
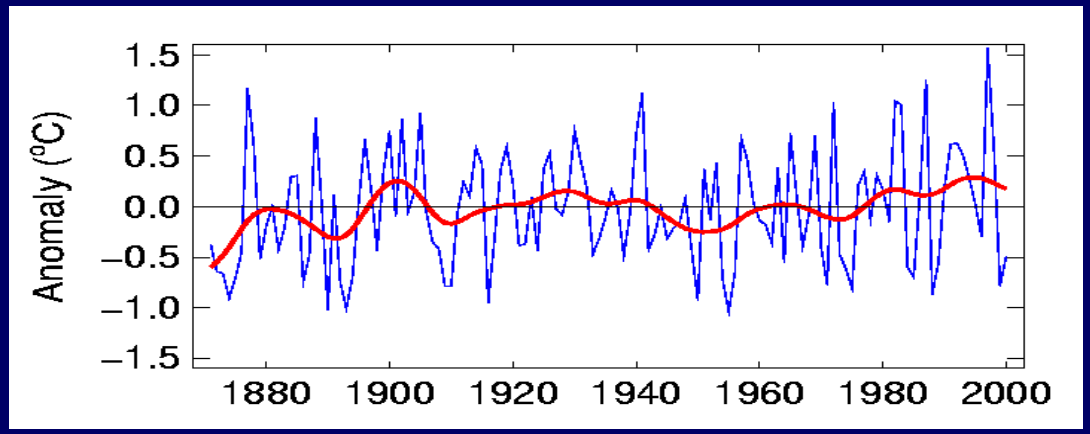
Sea Surface Temperature (SST) Anomaly 1999



Monthly Tropical Pacific SST Anomalies, 1981-Dec 2000



Tropical Pacific SST Anomalies, 1871-2000



Warming trend in sea surface temperatures in El Niño region

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New digitised data for 1935-1939

- About 450K records
- Needs QC (some locations in error)
- Each voyage has associated meta-data.
  - Barometer height
  - Ship name (439 different ships) and type
  - Start and end of voyage.
  - Captains name!

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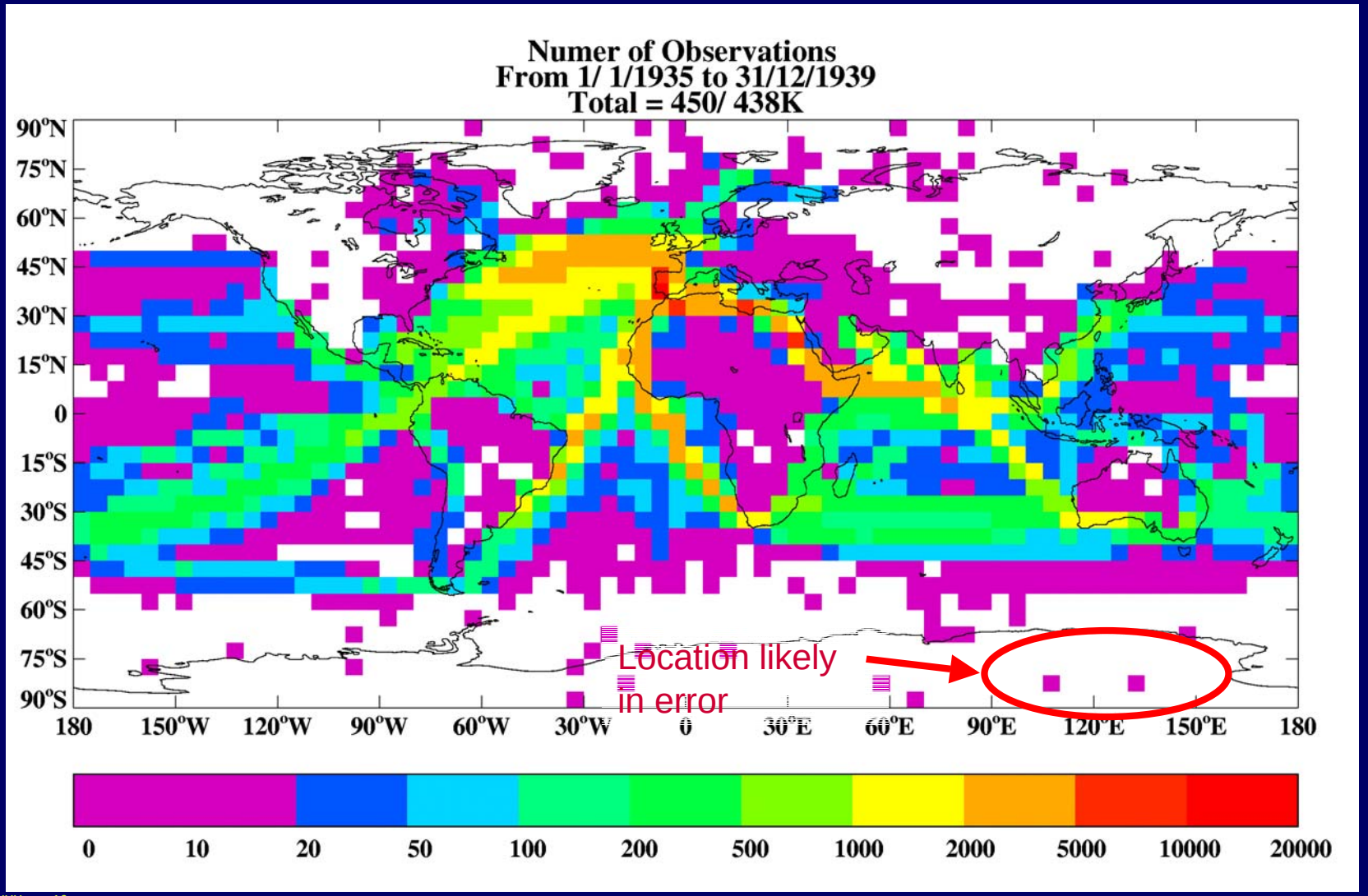
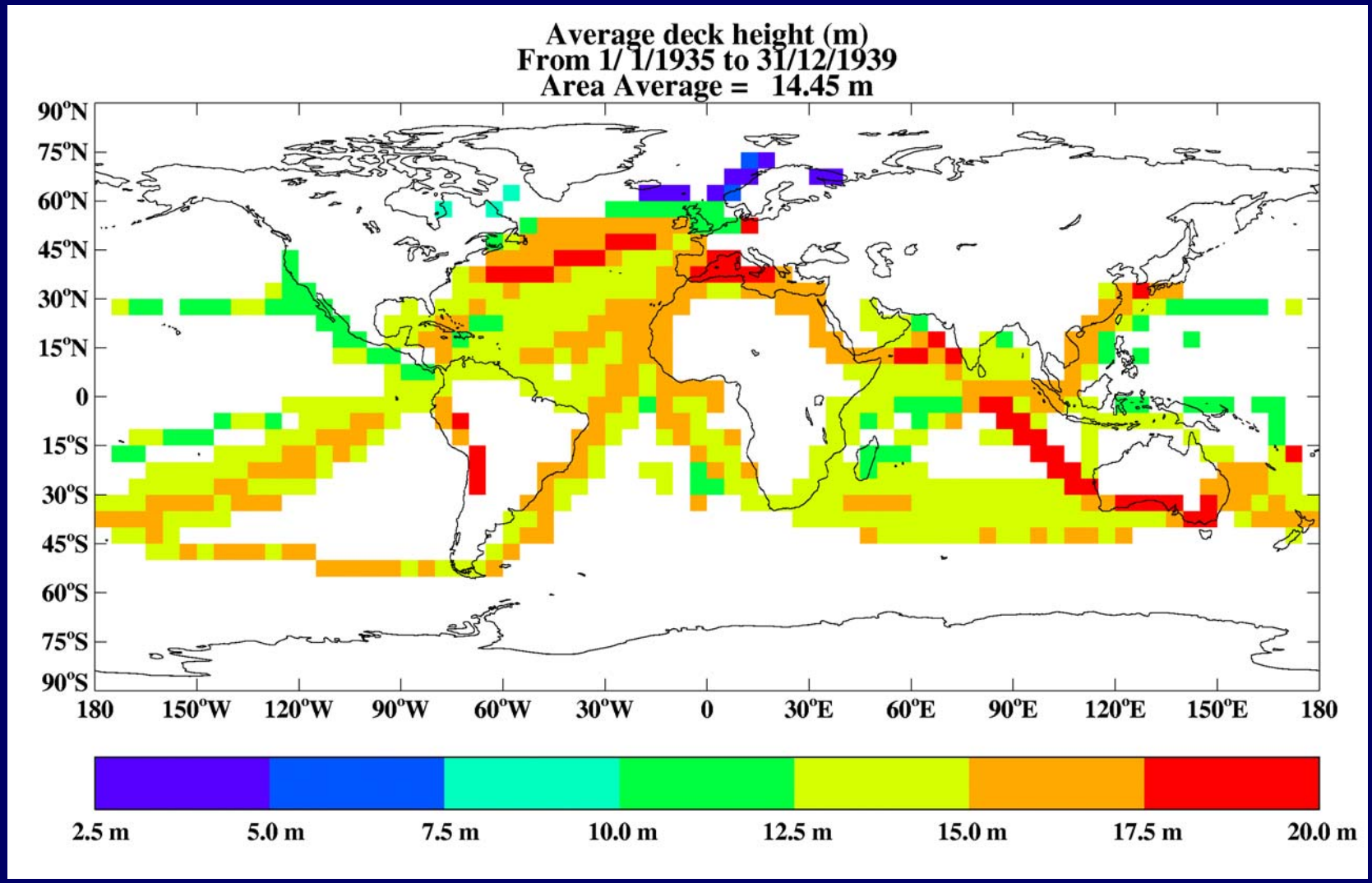
450K Individual Records

- Each Record:
  - Date/time
  - Position
  - Ship course/speed
  - Wind speed/direction
  - Air and Sea Temperature
  - Pressure
  - Weather (past and present)
  - Wave state

Number of Observations per 5° X 5° square



Average Deck Height



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Undigitised marine observations for 1851-1900 in UK national archives

Meteorological logbooks: 2M observations
Warship deck logs: 6M observations

These are conservative estimates

Geographical distribution (%:

North Atlantic	South Atlantic	Mediterranean	North Indian Ocean	South Indian Ocean	North Pacific	South Pacific
40	12	15	6	13	2	12

Ships' locations need to be interpolated between recorded noon positions.

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Undigitised marine observations for 1911-1920 in UK national archives

Large warship deck logs: 5.7M observations
Small warship deck logs: 2M observations

Geographical distribution (%:

North Atlantic	South Atlantic	Mediterranean	North Indian Ocean	South Indian Ocean	North Pacific	South Pacific
45	7	25	8	5	7	3

Ships' locations need to be interpolated between recorded noon positions.

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Plans

- Regenerate HadMAT, HadSST, HadISST and HadSLP from:
  - COADS/MDB blend
  - Newly digitised data.
- Consider sub-surface analysis (and use ARGO)
  - Temperature
  - Salinity
- Develop plan for digitisation of records
  - No immediate resources available for digitisation.

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