

# Progress On A New Met Office Temperature and Salinity Dataset with Incorporated Uncertainties

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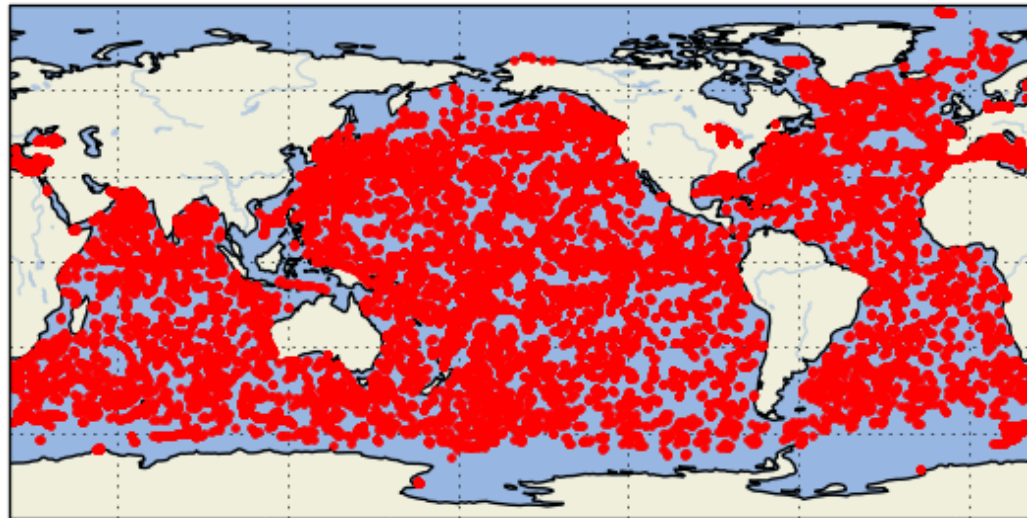
# Overview

- EN4 – subsurface temperature and salinity dataset.
- HadIOD - surface and subsurface temperature and subsurface salinity dataset.
- A new ensemble surface and subsurface temperature and salinity dataset.
- Future work.
- Conclusions.

# EN4

- EN4 is the current Met Office subsurface temperature and salinity dataset.
- Documented in Good et al., 2013.
- Freely available for research purposes from [www.metoffice.gov.uk/hadobs/en4](http://www.metoffice.gov.uk/hadobs/en4)
- Updated monthly.

07/2016  
28939 profiles



# EN4

- Quality controlled profiles.
- Objective analyses on a 1 x 1 degree grid with uncertainties.
- 1900 – present day.
- Full reprocessing approx. once a year with data from WOD, GTSP, Argo and ASBO.
- Levitus 2009 and Gouretski 2010 XBT corrections applied.

# HadIOD

- HadIOD = Hadley Centre Integrated Ocean Database.
- Surface and subsurface temperatures.
- Subsurface salinities.
- Documented in Atkinson et al., 2014.
- Release date: late 2016/ early 2017.
- Updated monthly and covers 1900 – 2016.
- Data drawn from ICOADS 2.5.1 and EN4.2.0.
- All values have quality flags and a unique identifier.
- Where possible bias adjustments and uncertainty estimates are also given (at minimum an estimate of random measurement uncertainty is provided).

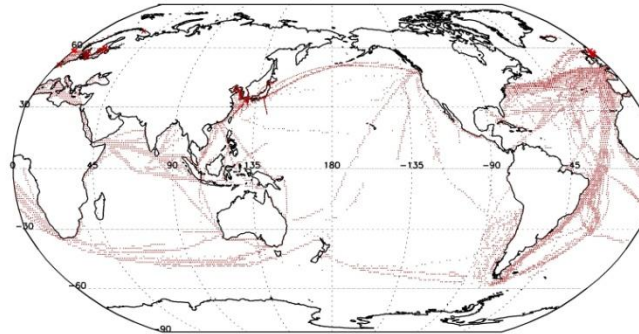




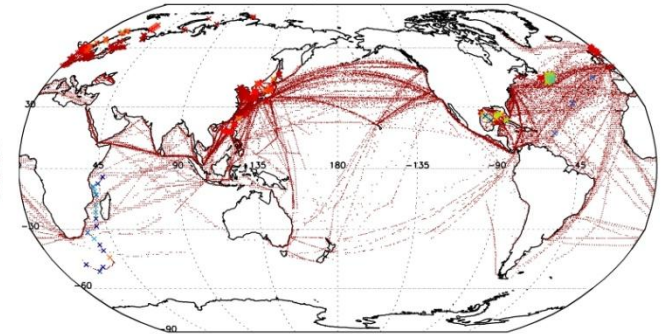
Met Office  
Hadley Centre

# HadIOD

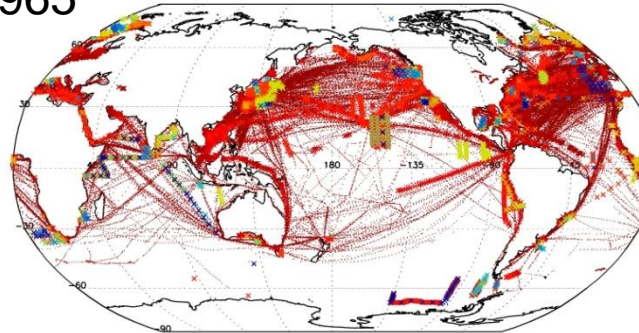
April 1905



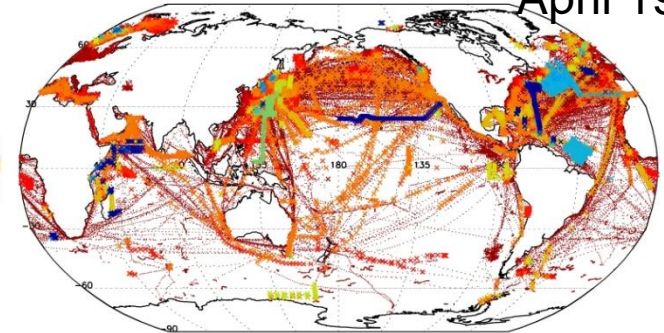
April 1935



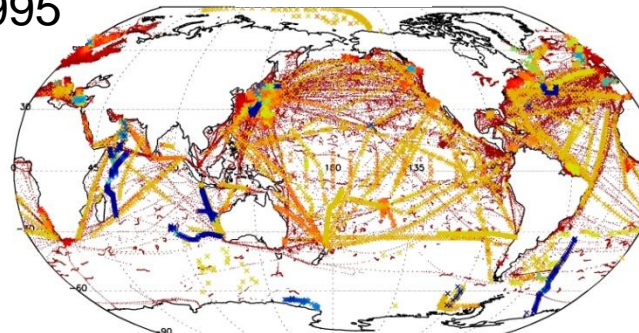
April 1965



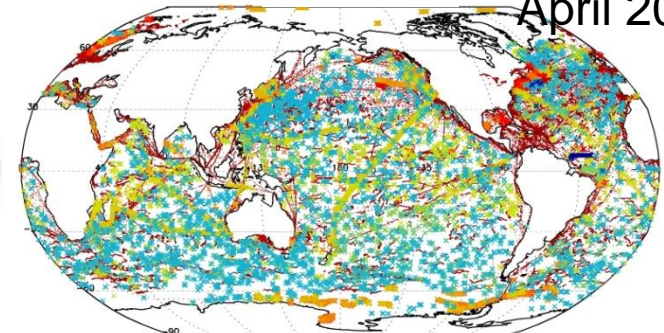
April 1985



April 1995



April 2010



Atkinson et al.,  
2014

# A New Ensemble

- Uncertainties will be explored using an ensemble of datasets.
- This ensemble will use both surface and sub-surface data and hopes to include:
  - Different mapping methods.
  - Different XBT bias correction schemes.
  - Different climatologies.
  - Different quality control methods.
  - Different OHC calculation methods.

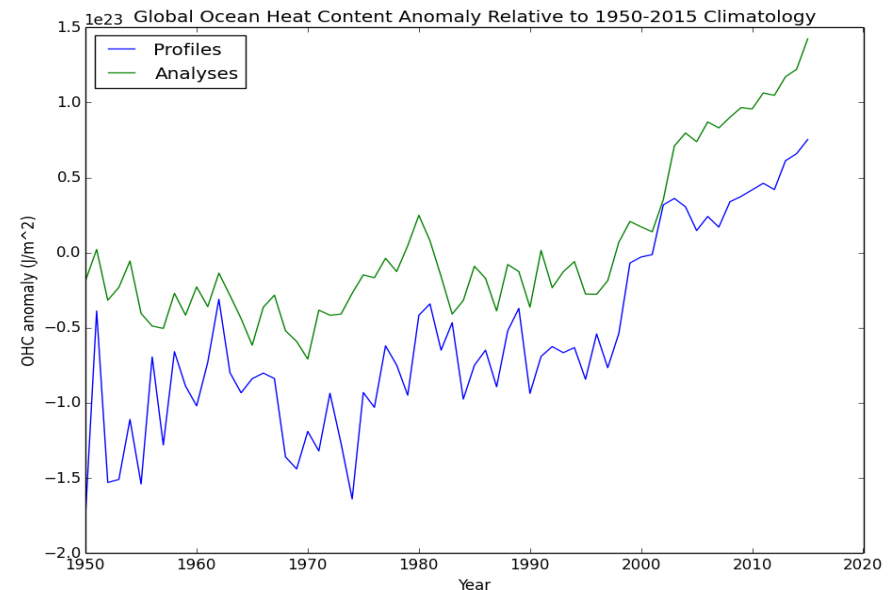
# Content of the new ensemble

- Surface and subsurface data.
- 1950 – 2016.
- 5 different XBT bias correction schemes:
  - Levitus 2009,
  - Gouretski 2010,
  - Gouretski 2012,
  - Cowley 2013,
  - Cheng 2014.
- 3 different climatologies:
  - 1981 – 2010,
  - Argo,
  - Long term (1950-2015).
- OHC and a salinity measure.



# Ocean Heat Content (OHC)

- A concise way of showing changes in ocean heat.
- Two methods of calculation to be investigated:
  - Existing Met Office method: Using profiles,
  - Updated Met Office method: Using analyses.
- Look at OHC down to 2000m.
- Yearly series and anomaly maps.



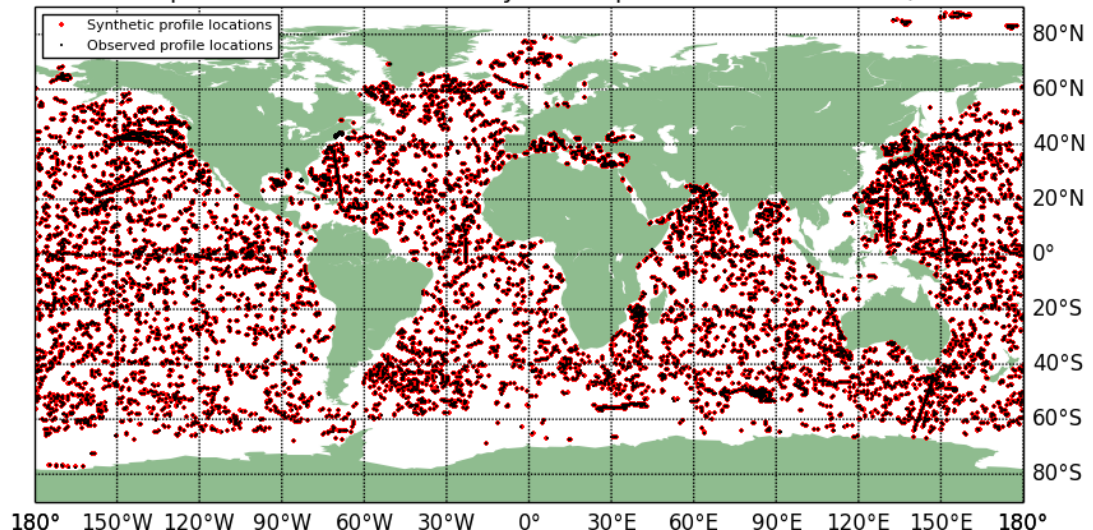
# Salinity

- Need a salinity measure that can also be looked at as an ensemble.
- Have looked through the BAMS State of the Climate Report and the most recent IPCC report.
- Possibilities that have arisen are:
  - Contrast between high and low salinity regions,
  - Salinity anomaly from climatology,
  - Global integrated salinity and freshwater content.
- Thoughts and suggestions welcome!

# Future Work

- Not everything will be included in this iteration of the ensemble, future ideas include exploration of:
  - Mapping methods and the validity of our current analysis uncertainty estimates,
  - QC strategies,
  - Incorporation of more instrument uncertainty.
- Incorporation of ensemble ideas into EN4.

Comparison of observed and synthetic profile locations - 2015/12



# Conclusions

- Outline of ocean heat content and salinity analysis put forward.
- This will lead to:
  - 15 datasets for the ensemble,
  - 3 salinity ensemble estimates,
  - 30 OHC ensemble estimates.
- Suggestions on how to increase the ensemble size especially for salinity as well as suggestions for useful salinity metrics to explore would be gratefully received.

# References

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