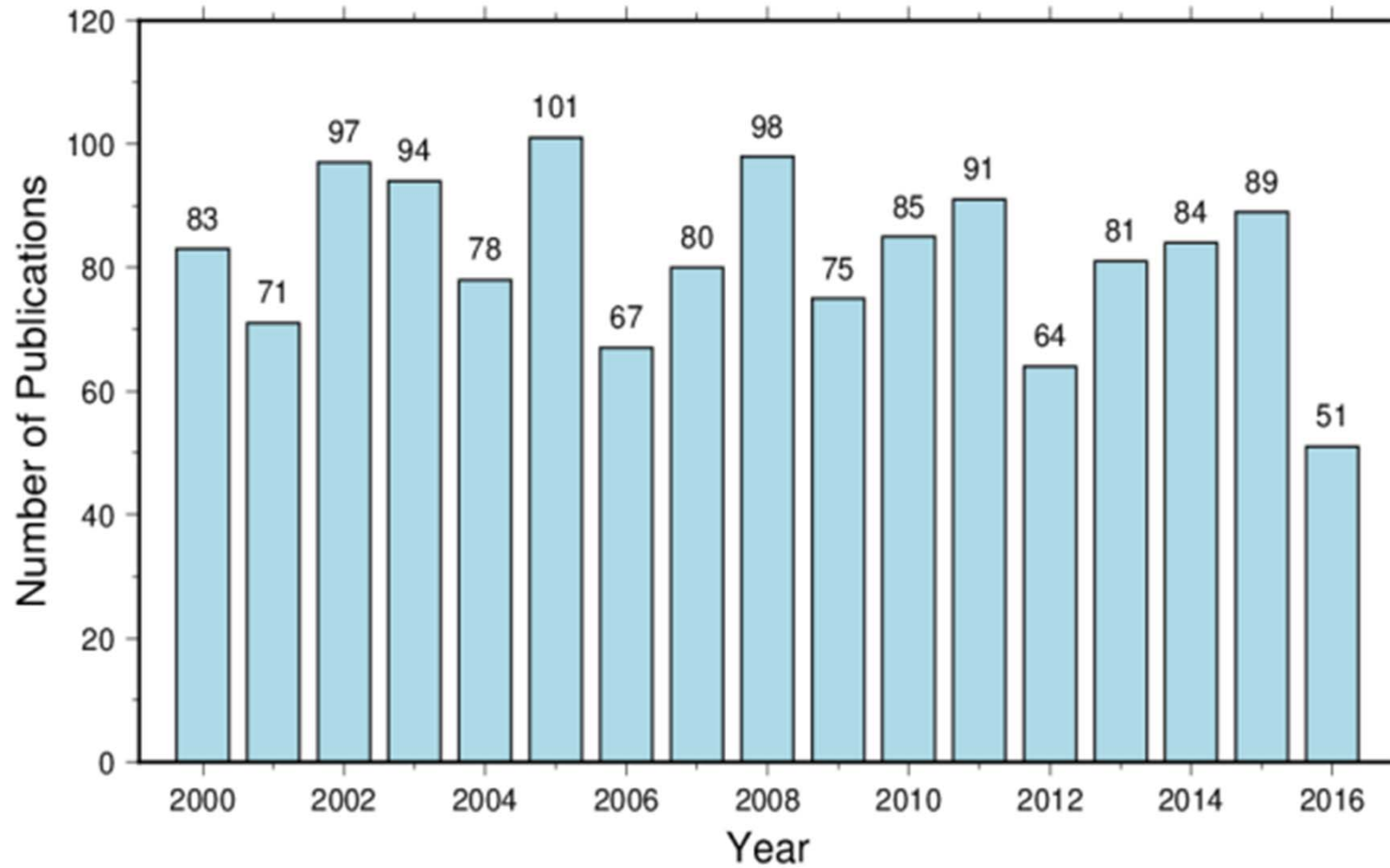


XBT Science Review Manuscript

By the XBT Science Community

**5th XBT Science Workshop
Tokyo, Japan
October 2016**

XBT Bibliographic Entries Since 2000



- Not counting those who use temperature climatologies

Justification (why to write this manuscript?)

To inform the scientific community, program managers, scientific and operational panels with updates on the main uses of XBT observations and key results.

Also: Inform the XBT community, as we are from various backgrounds: logistics, data management, operational oceanography, science, etc.

Previous XBT review manuscripts

OceanObs09: Goni G.J., D. Roemmich, R. Molinari, G. Meyers, C. Sun, **T. Boyer**, **M. Baringer**, **V. Gouretski**, P. DiNezio, **F. Reseghetti**, **G. Vissa**, S. Swart, R. Keeley, S. Garzoli, **T. Rossby**, C. Maes, and G. Reverdin, 2010: The Ship Of Opportunity Program. In Proceedings of the "OceanObs'09: Sustained Ocean Observations and Information for Society" Conference (Vol. 2), Venice, Italy, 21-25 September 2009, Hall, J., Harrison D.E. and Stammer, D., Eds., ESA Publication WPP-306.

Recent review manuscripts of other observational platforms

Surface drifters: Centurioni, L., A. Horanyi, C. Cardinali, E. Charpentier, and R. Lumpkin, 2016: **A global ocean observing system for measuring sea level atmospheric pressure: Effects and impacts on numerical weather prediction.** *Bull. Am. Meteorol. Soc.*, (doi:10.1175/BAMSD1500080.1).

Argo profiling floats: Riser, S.C., H.J. Freeland, D. Roemmich, S. Wijffels, A. Troisi, M. Belbeoch, D. Gilbert, J. Xu, S. Pouliquen, A. Thresher, P.-Y. Le Traon, G. Maze, B. Klein, M. Ravichandran, F. Grant, P.-M. Poulain, T. Suga, B. Lim, A. Sterl, P. Sutton, K.-A. Mork, P.J. Veèlez-BelchÃ, I. Ansorge, B. King, J. Turton, M. Baringer, and S.R. Jayne, 2016: **Fifteen years of observations with the global Argo array.** *Nat. Clim. Change* , 6(2):145-153, (doi:10.1038/nclimate2872).

1) A short review of the (an updated?) XBT network.



What could/should the manuscript include ?

2) A SHORT review of the current main uses of XBT data:

- **Monitoring and assessments of Meridional Heat Transport and Meridional Overturning Circulation**
- **Monitoring and assessments of the variability of key ocean currents (surface and subsurface)**
- **Contribute with (a large amount of) temperature profile data for: ocean heat content (advances on FRE), model data initialization, etc**
- **...**

What could/should the manuscript include ?

3) A short review uniqueness of XBT data:

- Provides unique record of temperature along REPEAT transects;
- XBT deployments started 49 years ago (50 YEARS IN 2017);
- XBT transect observations may resolve MESOSCALE FEATURES;
- XBT deployments can be carried out together with other observational platforms, e.g. TSG, pCO₂, CPR, (OLEANDER PROJECT)
- XBTs COMPLEMENT OBSERVATIONS OF OTHER PLATFORMS (Argo, altimetry, ...)
- Why use XBTs when we now have Argo profiling float observations (not obvious to everybody)

What needs to be highlighted in this manuscript ?

4) CONCRETE SCIENTIFIC RESULTS

- What we have learned by monitoring a suite of currents for 20+ years
 - Volume transport variability
 - Change in location
- What we have learned by monitoring MOC/MHT for 15+ years
 - First, and still in place, monitoring of MOC in South Atlantic
- How improved XBT profiles have impacted science results and understanding
 - Reduced errors during years when XBTs were most profile observations
 - Updated ocean heat content time series using different FREs: Sippican, Hanawa, Cheng, etc



1 Sverdrup (Sv) = $10^6 \text{m}^3 \text{s}^{-1}$

What needs to be highlighted in this manuscript ?

5) COMPELLING RESULTS

We are monitoring temperature variability along fixed transects, ocean currents, MOC/MHT for tens of years and we have analyzed their variability, and we now understand some of their variability.....

SO WHAT ?

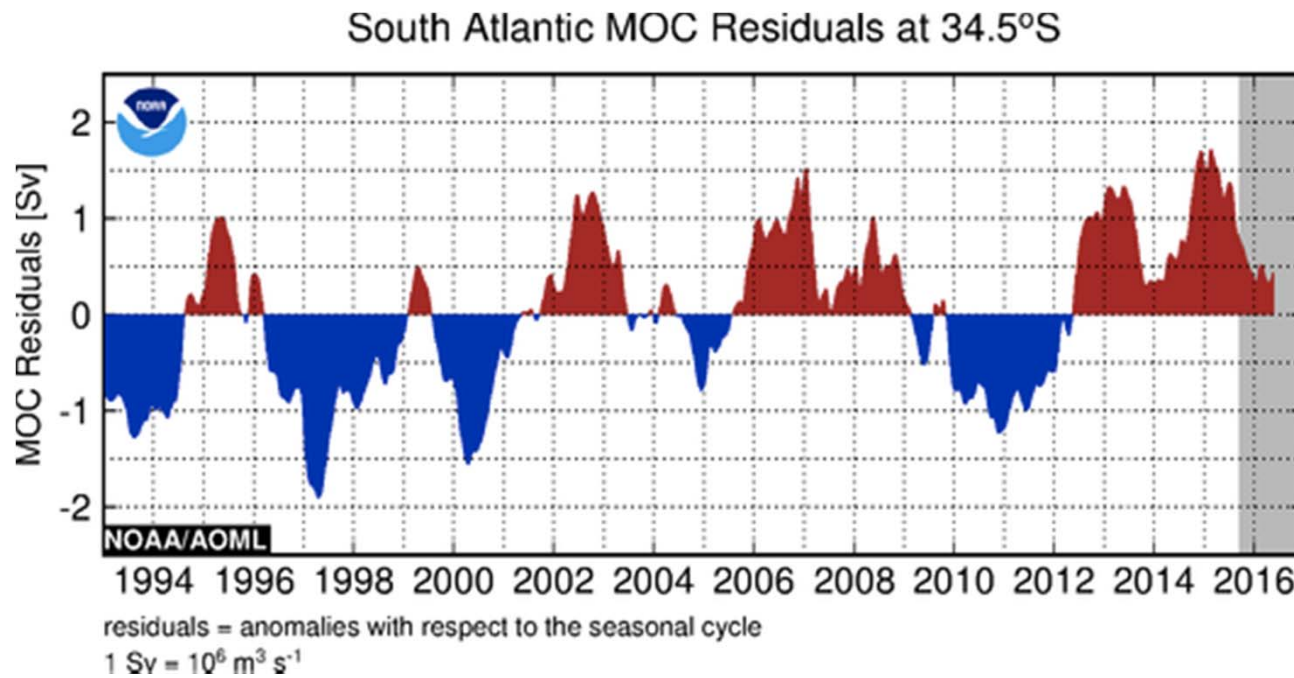
Who cares about our results ?

Why other scientists should care ?

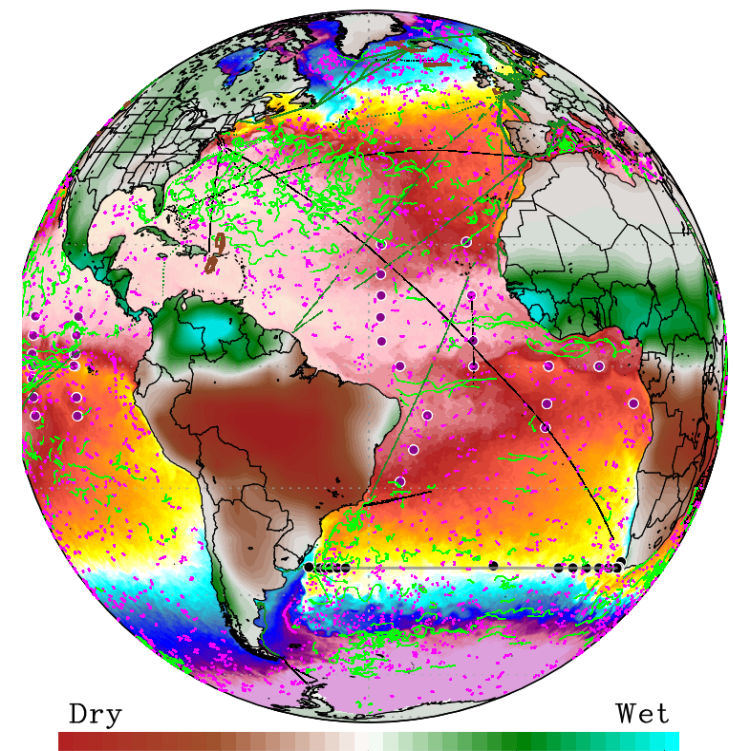
Why our program managers should keep paying to maintain the XBT network ?

Can we relate the changes we observe with extreme weather, climate, ecosystems, ...?

What needs to be highlighted in this manuscript ?



Lopez, H., S. Dong, S.-K. Lee, and G. Goni, 2016: The role of the South Atlantic Meridional Overturning Circulation variability on modulating interhemispheric atmospheric circulation and monsoons. *J. Clim.*, 29(5):1831 - 1851, (doi:10.1175/JCLI-D-15-0491.1).



Who can/should participate ?

6) Requesting contributions on:

- **Summary: Logistics and data management; International effort, cross-panel interactions, technology**
- **Concrete and compelling: analysis, science, operational uses**
- **Our vision about the future of the network**
- **Several to many authors. Everybody with relevant input is invited to contribute. If you are contributing with results and significant input in the writing then you are welcome to join as a co-author.**
- **Current versions with language contributions from: G. Goni, F. Bringas, S. Dong, M. Goes, H. Lopez, F. Reseghetti...**

Contributions

Manuscript draft now in Google Doc:

<https://docs.google.com/a/noaa.gov/document/d/1Gf6OTe9NuOf3kNXDQXFJ8xB0x1jIAxp3pYPn7DI05FE/edit?usp=sharing>

You may need to obtain permission from me to access this file.

Currently shared with 29 people

Please let me know if you would like to participate and you are currently not in the distribution list.

Timeline

First draft submitted to potential participants on September 16, 2016

Receive contributions until December 2, 2016; then Gustavo will prepare a good draft

Gustavo will send a new draft by December 31, 2016

Submission before February 1, 2017

Journal: Progress in Oceanography, BAMS, ?

What is Next

NOAA XBT Science Review in early February 2017

SOT Meeting to be held in the UK, April 27-31, 2017

Thank you

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