

## Marlos Goes

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### (a) Professional Preparations

<i>Educational Institution</i>	<i>Major</i>	<i>Degree</i>	<i>Degree Year</i>
University of Campinas, Brazil	Physics	B.Sc. /Licentiate Teacher	1999
University of Sao Paulo, Brazil	Oceanography	M.Sc.	2001
University of Reading, UK	Oceanography	Doctorate fellow	2005
University of Sao Paulo, Brazil	Oceanography	Ph.D.	2006
Penn State University, USA	Geophysics	Post-doc.	2009

### (b) Appointments

2020 – Present: **Associate Scientist**, Cooperative Institute for Marine and Atmospheric Studies, Univ. Miami. Conduct research on oceanography and climate. Supervise students and post-docs. Write and submit grants to fund research. Conduct outreach activities. Participate in scientific meetings and lead scientific publications. Advisor: Ben Kirtman (305-421-4046; bkirtman@miami.edu).

2010 – 2020: **Assistant Scientist**, Cooperative Institute for Marine and Atmospheric Studies, Univ. Miami. Conduct research on oceanography and climate. Supervise students and post-docs. Write and submit grants to fund research. Conduct outreach activities. Participate in scientific meetings and lead scientific publications. Advisor: Ben Kirtman (305-421-4046; bkirtman@miami.edu).

Dec 2009-Mar 2010: **Oceanographic Consultant**, Applied Science Associate, Rua Fidalga, 711, Sao Paulo, Brazil. 05432-070. Development of an oceanographic prediction system for the southeast Brazilian coast using ROMS numerical model. Supervisor: Gabriel Clauzet (+55 11 3095-5050).

2007-2009: **Post-doctoral fellow**, Department of Geosciences, The Pennsylvania State University. 503 Deike Building, State College, PA 16802. Grant: NSF. Activities: Numerical modeling, integrated assessment model, Bayesian statistics. Advisor: Klaus Keller (814-856-6718; kzk10@psu.edu).

2007/05-08: **Visitor Scientist**, POGO-SCOR Early Career scholarship, Dep. Atmospheric and Oceanic Science, Univ. Maryland. Observational Study of the Variability of Antarctic Intermediate Water in the Atlantic Ocean. Advisor: James Carton (301-405-5391; carton@atmos.umd.edu).

2004-2005: **Visitor Research Assistant**, CAPES scholarship, Department of Meteorology, Univ. Reading, UK. Impact of the Variability of the Thermohaline Circulation on the Upper Tropical Atlantic. Advisor: David P. Marshall (David.Marshall@physics.ox.ac.uk).

2000-2006: **Graduate Research Assistant**, Oceanographic Institute, University of Sao Paulo, Brazil. (Advisor: Ilana Wainer, wainer@usp.br).

### (c) Research Interests

- Meridional overturning circulation.
- Data analysis and uncertainty estimation.
- Large Scale Ocean circulation.
- Observational Oceanography.
- Climate variability and climate modeling.

### (d) Professional Publications

- Dong, S., Goni, G., Domingues, R., Bringas, F., **Goes, M.**, Christophersen, J., & Baringer, M., 2021: Synergy of in situ and satellite ocean observations in determining meridional heat transport in the Atlantic Ocean. *J. Geophys. Res.-Ocean*, 126, e2020JC017073. <https://doi.org/10.1029/2020JC017073>.
- Goes, M.**, G. Goni, S. Dong, T. Boyer, and M. Baringer, 2020: The complementary value of XBT and Argo observations to monitor ocean boundary currents and meridional heat and volume transports: A case study in the Atlantic Ocean. *J. Atmos. Oceanic Technol.*, 37(12), 2267-2282, <https://doi.org/10.1175/JTECH-D-20-0027.1>.
- Kim, D., S. Lee, H. Lopez, and **M. Goes**, 2020: Pacific Mean-State Control of Atlantic Multidecadal Oscillation–El Niño Relationship. *J. Climate*, 33, 4273–4291, doi: 10.1175/JCLI-D-19-0398.1.
- Goes, M.**, L. N. Murphy, and A. Clement, 2019: The stability of the AMOC during Heinrich events is not dependent on the AMOC strength in an intermediate complexity Earth System model ensemble, *Paleoceanog. and Paleoclim.*, 34, 8, 1359-1374, doi: 10.1029/2019PA003580.
- Volkov, D. L., Lee, S.-K., Domingues, R., Zhang, H., and **Goes, M.**, 2019: Interannual sea level variability along the southeastern seaboard of the United States in relation to the gyre-scale heat divergence in the North Atlantic. *Geophys. Res. Lett.*, 46, 7481-7490, doi: 10.1029/2019GL083596.
- Goes, M.**, M. Cirano, M.M. Mata, and S. Majumder, 2019: Long-term monitoring of the Brazil Current transport at 22°S from XBT and altimetry data: seasonal, interannual and extreme variability, *J. Geophys. Res.: Oceans*, 124, 6, 3645-3663, doi: 10.1029/2018JC014809.
- Majumder, S., **Goes, M.**, Polito, P. S., Lumpkin, R., Schmid, C., & Lopez, H., 2019: Propagating modes of variability and their impact on the western boundary current in the South Atlantic. *J. Geophys. Res.: Oceans*, 124, 5, 3168-3185. <https://doi.org/10.1029/2018JC014812>.
- Lee, S.-K., Lumpkin, R., Baringer, M. O., Meinen, C. S., **Goes, M.**, Dong, S., et al., 2019: Global meridional overturning circulation inferred from a data-constrained ocean & sea-ice model. *Geophys. Res. Lett.*, 46, 1521–1530. <https://doi.org/10.1029/2018GL080940>.
- Goni, G.J., J. Sprintall, F. Bringas, L. Cheng, M. Cirano, S. Dong, R. Domingues, **M. Goes** et al., 2019: More Than 50 Years of Successful Continuous Temperature Section Measurements by the Global Expendable Bathythermograph Network, Its Integrability, Societal Benefits, and Future, *Frontiers in Marine Science*, 6, doi:10.3389/fmars.2019.00452.
- Todd, R., F. P. Chavez, S. Clayton, S. Cravatte, **M. Goes**, et al., 2019: Global Perspectives on Observing Ocean Boundary Current Systems, *Frontiers in Marine Science (Oceanobs' 2019)*, 6, doi:10.3389/fmars.2019.00423.

- Goes, M.**, J. Christophersen, S. Dong, G. Goni, and M.O. Baringer, 2018: An Updated Estimate of Salinity for the Atlantic Ocean Sector Using Temperature–Salinity Relationships. *J. Atmos. Oceanic Technol.*, 35, 1771-1784, <https://doi.org/10.1175/JTECH-D-18-0029.1>
- Murphy, L. N., **Goes, M.**, and A. Clement, 2017: Role of African dust in the Atlantic meridional overturning circulation during Heinrich events, *Paleoceanography*, 32. Doi: 10.1002/2017PA003150.
- Goes M.**, E. Babcock, F. Bringas, P. Ortner, and G. Goni, 2017: The impact of improved thermistor calibration on the Expendable Bathythermograph profile data, *Journal of Oceanic and Atmospheric Technology*, 34, 1947-1961, <https://doi.org/10.1175/JTECH-D-17-0024.1>.
- Li, H., R. L. Sriver, and **M. Goes**, 2016: Modeled Sensitivity of the Northwestern Pacific upper-ocean response to tropical cyclones in a fully-coupled climate model with varying ocean grid resolution , *J. Geophys. Res. - Oceans*, 121, 586-601, doi: 10.1002/2015JC011226.
- Lima, M., M. Cirano, M. Mata, **M. Goes**, G. Goni, and M. O. Baringer, 2016: An assessment of the Brazil Current baroclinic structure and variability near 22°S in distinct Ocean Forecasting and Analysis systems, *Ocean Dynamics*, 66:893, doi:10.1007/s10236-016-0959-6.
- Goes, M.**, G. Goni, V. Hormann, R. Perez, 2013: Variability of the Atlantic off-equatorial eastward currents during 1993-2010 using a synthetic method, *J. Geophys. Res.-Oceans*, 118, 6, 3026-3045, doi: 10.1002/jgrc.20186.
- Goes, M.**, Urban, N. M., Tonkonojenkov, R., Haran, M., Schmittner, A., and Keller, K., 2010: What is the skill of ocean tracers in reducing uncertainties about ocean diapycnal mixing and projections of the Atlantic Meridional Overturning Circulation? *J. Geophys. Res.*, 115, C12006, doi: 10.1029/2010JC006407.
- Cheng, L., J. Abraham, G. Goni, T. Boyer, S. Wijffels, R. Cowley, V. Gouretski, F. Reseghetti, S. Kizu, S. Dong, F. Bringas, **M. Goes**, L. Houpert, J. Sprintall, and J. Zhu, 2016: XBT Science: Assessment of instrumental biases and errors, *Bulletin of the American Meteorological Society*, 97, 924-933, doi: <http://dx.doi.org/10.1175/BAMS-D-15-00031.1>.
- Goes, M.**, G. Goni, and S. Dong, 2015: An optimal XBT-based monitoring system for the South Atlantic meridional overturning circulation at 34°S. *J. Geophys. Res. Oceans.*, 120, 1, 161-181, doi: 10.1002/2014JC010202.
- Perez, R., M. O. Baringer, S. Dong, S. L. Garzoli, **M. Goes**, G. J. Goni, R. Lumpkin, C. S. Meinen, R. Msadek, U. Rivero, 2015: Measuring the Atlantic Meridional Overturning Circulation. *Mar. Tech. Sci.*, 49, 2, 167-177(11), <https://doi.org/10.4031/MTSJ.49.2.14>.
- Goes, M.**, M. Baringer, and G. Goni, 2015: The impact of historical biases on the XBT-derived meridional overturning circulation estimates at 34°S, *Geophys. Res. Let.*, doi:10.1002/2014GL061802.
- Goes, M.**, I. Wainer, N. Signorelli, 2014: Investigation of the causes of historical changes in the sub-surface salinity minimum of the South Atlantic, *J. Geophys. Res.-Oceans.*, 119, 9, 5654-5675.
- Goes, M.**, G. Goni, V. Hormann, R. Perez, 2013: Variability of the Atlantic off-equatorial eastward currents during 1993-2010 using a synthetic method, *J. Geophys. Res.*, 118 (6), 3026-3045, doi: 10.1002/jgrc.20186.
- Goes, M.**, G. Goni, K. Keller, 2013: Reducing biases in XBT measurements by including discrete information from pressure switches, *J. Atmos. Ocean. Tech.*, 30, 810-824, doi:10.1175/JTECH-D-12-00126.1.

- Wainer, I., **M. Goes**, L. N. Murphy, and E. Brady, 2012: Changes in the Water Mass Formation Rates in the Global Ocean for the Last Glacial Maximum, Mid-Holocene and Pre-Industrial Climates, *Paleoceanography*, Vol. 27, PA3101, doi:10.1029/2012PA002290.
- Olson, R., R. Sriver, M. Goes, N. M. Urban, H. D. Matthews, M. Haran and K. Keller, 2012: A climate sensitivity estimate using Bayesian fusion of instrumental observations and an Earth System model, *J. Geophys. Res.- Atmospheres*, 117, D4, doi:10.1029/2011JD016620.
- Goes, M.**, K. Keller, and N. Tuana, 2011: The economics (or lack thereof) of aerosol geoengineering, *Climatic Change*, 109, 3, 719-744.
- Svoboda, T., K. Keller, **M. Goes**, and N. Tuana, 2011: Sulfate Aerosol Geoengineering: The Question of Justice. *Public Affairs Quarterly*, 25, 3.
- Goes, M.**, Urban, N. M., Tonkonojekov, R., Haran, M., Schmittner, A., and Keller, K., 2010: What is the skill of ocean tracers in reducing uncertainties about ocean diapycnal mixing and projections of the Atlantic Meridional Overturning Circulation? *J. Geophys. Res.*, doi: 10.1029/2010JC006407.
- Sriver, Ryan L., **M. Goes**, M. E. Mann, and K. Keller, 2010: Climate response to tropical cyclone-induced ocean mixing in an Earth system model of intermediate complexity, *J. Geophys. Res. - Oceans*, v. 115, C10042, doi: 10.1029/2010JC006106.
- Goes, M.**, D. Marshall, and I. Wainer, 2009: Eddy formation and its importance with respect to abrupt changes in the Atlantic Meridional Overturning Circulation. *J. Physical Oceanogr.*, 39, 3021-3031, doi: 10.1175/2009JPO4004.
- Goes, M.**, I. Wainer, P. Gent, and F. O. Bryan, 2008: Changes in Subduction in the South Atlantic Ocean during the 21st Century in the CCSM3. *Geophys. Res. Lett.* 35, L06701, doi: 10.1029/2007GL032762.
- Goes, M.**, R. Molinari, I. C. A. da Silveira, and I. Wainer, 2005: Retroreflections of the North Brazil Current during February 2002. *Deep Sea Res - Part 1*, 52, 3, 647-667, doi:10.1016/j.dsr.2004.10.010.
- Goes, M.**, and I. Wainer, 2003: Equatorial currents transport changes for extreme warm and cold events in the Atlantic Ocean. *Geophys. Res. Lett.*, 30, 5, 8006, doi: 10.1029/2002GL015707.

#### (e) Other Publications

- Goes, M.**, PhD Thesis: Study of the components of the Tropical Atlantic Circulation, 2006. Grant: The São Paulo Research Foundation (FAPESP), Brazil. Advisor: Ilana Wainer (wainer@usp.br).
- Goes M.**, Master Thesis: Tropical Atlantic circulation during extreme events, 2002. Grant: Brazilian National Council for Scientific and Technological Development (CNPq). Advisor: Ilana Wainer (wainer@usp.br).
- Foltz, G. R., M. J. McPhaden, T. Lee, G. C. Johnson, and **M. Goes**, 2012: The Tropical Ocean Observing System., *U. S. IOOS Summit Community White Paper*.
- Bhat, K.S., M. Haran, and **M. Goes**, 2010: Computer model calibration with multivariate spatial output, in *"Frontiers of Statistical Decision Making and Bayesian Analysis"*, eds. M-H. Chen et al., New York: Springer-Verlag.
- Goes, M.**, D. P. Marshall, and I. Wainer, 2006: Impact of the meridional overturning circulation on the tropical Atlantic circulation, *Proceedings of 8 ICSHMO, Foz do Iguaçu, Brazil, April 24-28, 2006, INPE*, p. 1269-1272.
- Goes, M. P. A.**, C. N. Campos, A. S. Taschetto, and I. Wainer, 2003: Relação Entre o Modo Equatorial e a Tendência de Aquecimento da Bacia Atlântica Tropical. *Revista Atlântica, FURG*, 25, 1, 21-25.

Campos, C. N., **M. P. A. Goes**, A. S. Taschetto, and I. Wainer, 2001: Shift in Atlantic Ocean Warm Events: A Preliminary Study. *Subtle Signals Newsletter*, v. 1, n. 1.

Depra, P., R. Brenzikofer, **M. Goes**, and R. Barros, 1998: Fluid Mechanics analysis in volleyball services. *ISBS - Conference Proceedings Archive, 16 International Symposium on Biomechanics in Sports*.

#### **(g) Selected Talks**

Feb 9, 2021. The Atlantic Meridional Overturning Circulation from multiple observations. "Sea Secrets Lecture Series 2021 with CIMAS: From the Deepest Oceans to the Highest Clouds"

Nov 2, 2020. "The complementary value of XBT and Argo observations to monitor ocean boundary currents and meridional heat and volume transports: A case study in the Atlantic Ocean". Joint AOML-Scripps Institution of Oceanogr. Seminar via Google Meet on the use of XBT and Argo float data.

October 11, 2019: "The stability of the AMOC is not dependent on the AMOC strength in an Intermediate Complexity Earth System model ensemble". CLIVAR AMOC TT5 webinar.

October 16, 2018: "Ocean Observing systems to improve knowledge on drivers of sea level variability", Back Bay Study Knowledge Exchange: Coastal Flooding and Sea Level Rise Risk in Miami Dade County. This event was a knowledge exchange between people working on coastal flood risk in Miami-Dade County and the U.S. Army Corps of Engineers (USACE) team who will be leading a new study on reducing flood risks in the region.

#### **(f) Awards**

CIMAS Cash-in-a-Flash award under CIMAS award program for outstanding work as lead advisor for RSMAS graduate students (March, 2021).

NOAA/WPO, co-PI: "Impact of the western boundary currents on extreme precipitation: A case study in the Atlantic Ocean from along-transect measurements and high resolution model simulations". 09/01/2020-09/01/2021, \$188K.

NOAA/CPO, co-PI: "The interplay between sea level and Atlantic Meridional Overturning Circulation: Cause and effect relationships, predictability, and coastal implications. 09/01/20 - 08/31/23, \$548,762.

NOAA/CPO, PI: "The value of the global XBT transects and their integration with other observations for monitoring meridional ocean heat transport and boundary currents". 02/01/2019-02/01/2020, \$80K.

NOAA/CVP, co-PI: "The southward returning pathways of the AMOC and their impacts on global sea surface temperature", 09/01/2016 - 08/31/2018, \$399K.

NSF - Physical Oceanography, PI: "The Interannual Variability of Brazil Current", 09/01/2015 - 08/31/2018, \$488,321.

NOAA, CPO Datasets and Indicators, co-PI: "Ocean Indicators in the Tropical and South Atlantic Ocean", 1 July 2014 - 30 June 2016, \$441,515.

NOAA, CPO, co-PI: "Autonomous Marine Sampling Technology Testbed: Integrating advanced biomedical sensor technologies with advances in drop probe methodology", October 1, 2015 to September 31, 2016, \$200K.

#### **(g) Advising experience:**

- Professional Master Advisor of Mr. Vinicius Webber, (U. Miami/RSMAS), Aug 2015-Dec 2015.

- Mentor of Summer Intern Mr. Steve Marrero (Marine & Sci. Tech. Senior High), Jul-Aug, 2017.
- Post-doctoral Advisor of Dr. Sudip Majumder (U. Miami/CIMAS), Dec 2017-Aug 2018.
- Post-doctoral Advisor of Dr. Cyril Germaine (U. Miami/CIMAS), Mar 2019-June 2020.
- PhD Advisor of Mr. Ivenis Pita (U. Miami/RSMAS), June 2020-Present.
- Post-Doctoral Advisor of Dr. Soumi Chakravorty (U.Miami/CIMAS), Dec 2020-Present.

**(h) Outreach Synergistic activities**

- Presenter at the *NOAA/AOML Open House* for the local schools and general public, March 18, 2017. May 12 2017; June 9, 2019.
- Member of the XBT International Science Team.
- Member of the CLIVAR US AMOC Task Team 3: AMOC Mechanisms and Predictability
- Member of the CLIVAR US AMOC Task Team 5: Paleo AMOC.
- Member of the AOML's *Buoys and Gulls* employee organization (2012-present).
- Editor of IQuOD (International Quality-controlled Ocean Database) 6th Annual Workshop Report, Ifremer, Brest, France, 2019. Editors: Rebecca Cowley, CSIRO, Australia; Alison Macdonald, WHOI, USA; Tim Boyer, NCEI, USA; Guilherme Castelão, Scripps IO, USA; Matthew Palmer, MetOffice, UK; Steve Diggs, Scripps IO, USA; Marlos Goes, AOML, USA. [http://www.iquod.org/documents/IQuOD2019\\_Report\\_v2.0.pdf](http://www.iquod.org/documents/IQuOD2019_Report_v2.0.pdf)
- Theme editor for UCL Open Environment (<https://ucl.scienceopen.com>) – (2020-present).
- Media Interview: Oct 21, 2019 – Interview article to Folha de Sao Paulo newspaper on the Brazilian Oil Spill (<https://www1.folha.uol.com.br/ambiente/2019/10/tecnica-usada-em-desastre-aereo-ajuda-na-busca-por-origem-do-oleo-que-atinge-o-nordeste.shtml>)
- Media Interview: Oct 11, 2019 – Interview to the Jornal da Record Brazilian TV evening newscast on the Brazilian oil spill. (<https://noticias.r7.com/jr-na-tv/integras/videos/assista-a-integra-do-jornal-da-record-11102019-12102019>).