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Education

PhD in Physical Oceanography, 1998
Institut für Meereskunde, Christian-Albrechts-Universität in Kiel, Germany
Dissertation: Die Zirkulation des Antarktischen Zwischenwassers im Südatlantik.
(Circulation of the Antarctic Intermediate Water in the South Atlantic.)

Diplom in Physical Oceanography, 1992
Institut für Meereskunde, Christian-Albrechts-Universität in Kiel, Germany
Thesis: Translations- und Stabilitätsverhalten von baroklinen Wirbeln bei großskaligen
Strömungen.
(Translation and stability of baroclinic eddies in the presence of large-scale currents.)

Vordiplom in Physical Oceanography, 1988
Institut für Meereskunde, Christian-Albrechts-Universität in Kiel, Germany

Employment

Research Oceanographer, October 2002 - present
Atlantic Oceanographic and Meteorological Laboratory, Miami, FL

Assistant Scientist, December 2000 - September 2002
Cooperative Institute for Marine and Atmospheric Studies, University of Miami, Miami, FL

Postdoctoral Associate, December 1998 - November 2000
Cooperative Institute for Marine and Atmospheric Studies University of Miami, Miami, FL

Research Associate, October 1992 - October 1998
Institut für Meereskunde, Christian-Albrechts-Universität in Kiel, Germany

Student Assistant, 1989 - 1991
Institut für Meereskunde, Christian-Albrechts-Universität in Kiel, Germany

Awards

- 2018 National Oceanic and Atmospheric Administration, Administrator Award
- 2016 Certificate of Appreciation, Atlantic Oceanographic and Meteorological Laboratory
- 2004 National Oceanic and Atmospheric Administration, Administrator Award
- 2004 Certificate of Merit, Atlantic Oceanographic and Meteorological Laboratory
- 2002 Certificate of Merit, Atlantic Oceanographic and Meteorological Laboratory

Service Experience

Member of the Atlantic Meridional Overturning Circulation (AMOC) Science Team, 2014-present

Member of the US ARGO Science and Implementation Panel, 2012-present

Co-chaired a session during the “2nd Argo science workshop”, Venice, Italy, March 13-18, 2006.

Acted as panel member during the discussion of the future of Argo at the “2nd Argo Science Workshop”, Venice, Italy, March 13-18, 2006.

Executive Member of the International Argo Data Management Team. 2001-present

Discussion Leader for trajectory data issues during the 1st Argo Data Management meeting, Brest, France, October 3-5, 2000

Funded proposals and Funding history

Transport in the upper branch of the South Atlantic Meridional Overturning Circulation, C. Schmid and G. Halliwell; 3-year proposal (8/2014 - 7/2017); funded by Climate Observations and Monitoring Program.

Continuous records of the mixed layer heat budget in the tropical Atlantic Ocean, G. Foltz, C. Schmid and R. Lumpkin; 2-year proposal (8/2014 - 7/2016); funded by Climate Observations and Monitoring Program.

Development and Demonstration of a Relocatable Ocean OSSE System: Optimizing Ocean Observations for Hurricane Forecast Improvement and Broader Applications, G. Halliwell, V. Kourafalou and R. Atlas. Collaborators: R Lumpkin, C. Schmid, G. Goni, M. Baringer, M. Goes, M. Le Hénaff and L. K. Shay. Funded by NOAA, 2013-2015.

The Argo Project - Global Observations for Understanding and Prediction of Climate Variability, D. Roemmich, S. C. Riser, W. B. Owens, A. Wong, G. .C. Johnson, S. L. Garzoli and C. Schmid. Funded by NOAA, 2011-2015.

The Argo Project: Global Ocean Observations for Understanding and Prediction of Climate Variability, D. Roemmich, S. C. Riser, W. B. Owens, A. Wong, G. .C. Johnson, R. L. Molinari and

S. L. Garzoli. Funded by NOPP, 2006-2011.

Evaluating the Ocean Observing System: Performance Measurement for Heat Storage, C. Schmid and G. Goni. Funded by NOAA 2004 - 2011.

PIRATA Northeast Extension, R. Lumpkin, C. C. Schmid Meinen, G. Foltz. Funded by NOAA since 2006.

Tropical Subtropical Interactions, S. L. Garzoli, C. Schmid, G. Goni and M. O. Baringer. Funded by NOAA in FY03.

Professional Society Membership

Member of the American Geophysical Union

Publications

Volkov, D.L., Meinen, C.S., Schmid, C., Moat, B., Lankhorst, M., Dong, S., Li, F., Johns, W., Lozier, S., Perez, R.C., Goni, G., Kersalé, M., Frajka-Williams, E., Baringer, M., Smeed, D., Rayner, D., Sanchez-Franks, A., and Send, U., 2020: Global oceans: Atlantic Meridional Overturning Circulation and associated heat transport. In *State of the Climate in 2020*, J. Blunden and T. Boyer (eds.). *Bulletin of the American Meteorological Society*, 102(8):S159-S163 (<https://doi.org/10.1175/2021BAMSStateoftheClimate>).

Johnson, G.C., Reagan, J., Lyman, J.M., Boyer, T., Schmid, C., and Locarnini, R., 2021: Global oceans: Salinity. In *State of the Climate in 2020*, J. Blunden and T. Boyer (eds.). *Bulletin of the American Meteorological Society*, 102(8):S159-S163 (<https://doi.org/10.1175/2021BAMSStateoftheClimate.1>).

Annie P. S. Wong, Susan E. Wijffels, Stephen C. Riser, Sylvie Pouliquen, Shigeki Hosoda, Dean Roemmich, John Gilson, Gregory C. Johnson, Kim Martini, David J. Murphy, Megan Scanderbeg, T. V. S. Udaya Bhaskar, Justin J. H. Buck, Frederic Merceur, Thierry Carval, Guillaume Maze, Cécile Cabanes, Xavier André, Noé Poffa, Igor Yashayaev, Paul M. Barker, Stéphanie Guinehut, Mathieu Belbéoch, Mark Ignaszewski, Molly O'Neil Baringer, Claudia Schmid, John M. Lyman, Kristene E. McTaggart, Sarah G. Purkey, Nathalie Zilberman, Matthew B. Alkire, Dana Swift, W. Brechner Owens, Steven R. Jayne, Cora Hersh, Pelle Robbins, Deb West-Mack, Frank Bahr, Sachiko Yoshida, Philip J. H. Sutton, Romain Cancoué, Christine Coatanoan, Delphine Dobbler, Andrea Garcia Juan, Jérôme Gourrion, Nicolas Kolodziejczyk, Vincent Bernard, Bernard Boulès, Hervé Claustre, Fabrizio D'Ortenzio, Serge Le Reste, Pierre-Yve Le Traon, Jean-Philippe Rannou, Carole Saout-Grit, Sabrina Speich, Virginie Thierry, Nathalie Verbrugge, Ingrid M. Angel-Benavides, Birgit Klein, Giulio Natarstefano, Pierre-Marie Poulain, Pedro Vélez-Belchí, Toshio Suga, Kentaro Ando, Naoto Iwasaka, Taiyo Kobayashi, Shuhei Masuda, Eitarou Oka, Kanao Sato, Tomoaki Nakamura, Katsunari Sato, Yasushi Takatsuki, Takashi Yoshida, Rebecca Cowley, Jenny L. Lovell, Peter R. Oke, Esmee M. van Wijk, Fiona Carse, Matthew Donnelly, W. John Gould, Katie Gowers, Brian A. King, Stephen G. Loch, Mary Mowat, Jon Turton, E. Pattabhi Rama Rao, M. Ravichandran, Howard J. Freeland, Isabelle Gaboury, Denis Gilbert, Blair J. W. Greenan, Mathieu Ouellet, Tetjana Ross, Anh Tran, Mingmei Dong, Zenghong Liu, Jianping Xu, KiRyong Kang, HyeongJun Jo, Sung-Dae Kim and Hyuk-Min Park (2020): Argo Data 1999-2019: Two Million Temperature-Salinity Profiles and Subsurface Velocity Observations From a Global Array of Profiling Floats. *Front. Mar. Sci.*, 15 September 2020, 7:700, doi:10.3389/fmars.2020.00700

G. D. McCarthy, P. J. Brown, C. N. Flagg, G. Goni, L. Houpert, C. W. Hughes, R. Hummels, M. Inall, K. Jochumsen, K. M. H. Larsen, P. Lherminier, C. S. Meinen, B. I. Moat, D. Rayner, M. Rhein, A. Roessler, C. Schmid, D. A. Smeed (2020): Sustainable observations of the AMOC: Methodology and Technology. *Reviews of Geophysics*, 34pp, doi: 10.1029/2019RG000654

Johnson, G.C., Reagan, J., Lyman, J.M., Boyer, T., Schmid, C., and Locarnini, R., 2020: Global oceans: Salinity. In *State of the Climate in 2019*, J. Blunden and D.S. Arndt (eds.). *Bulletin of the American Meteorological Society*, 101(8):S144-S149 (<https://doi.org/10.1175/BAMS-D-20-0105.1>).

Volkov, D.L., Meinen, C.S., Schmid, C., Moat, B., Lankhorst, M., Dong, S., Li, F., Johns, W., Lozier, S., Perez, R.C., Goni, G., Kersalé, M., Frajka-Williams, E., Baringer, M., Smeed, D., Rayner, D., Sanchez-Franks, A., and Send, U., 2020: Global oceans: Atlantic Meridional Overturning Circulation and associated heat transport. In *State of the Climate in 2019*, J. Blunden and D.S. Arndt (eds.). *Bulletin of the American Meteorological Society*, 101(8):S159-S163 (<https://doi.org/10.1175/BAMS-D-20-0105.1>).

G. C. Johnson, J. Reagan, J. M. Lyman, T. Boyer, Claudia Schmid, and R. Locarnini (2019): Salinity. in *State of the Climate in 2018, Global Oceans*. *Bulletin of the American Meteorological Society*. 100 (9), S77-S80, doi:10.1175/2019BAMSSStateoftheClimate.1

Dean Roemmich, Matthew H Alford, Hervé Claustre, Kenneth Johnson, Brian King, James Moum, Peter Oke, W Brechner Owens, Sylvie Pouliquen, Sarah Purkey, Megan Scanderbeg, Toshio Suga, Susan Wijffels, Nathalie Zilberman, Dorothee Bakker, Molly Baringer, Mathieu Belbeoch, Henry C Bittig, Emmanuel Boss, Paulo Calil, Fiona Carse, Thierry Carval, Fei Chai, Diarmuid Conchubhair, Fabrizio d'Ortenzio, Giorgio Dall'Olmo, Damien Desbruyeres, Katja Fennel, Ilker Fer, Raffaele Ferrari, Gael Forget, Howard Freeland, Tetsuichi Fujiki, Marion Gehlen, Blair Greenan, Robert Hallberg, Toshiyuki Hibiya, Shigeki Hosoda, Steven Jayne, Markus Jochum, Gregory C Johnson, KiRyong Kang, Nicolas Kolodziejczyk, Arne Körtzinger, Pierre-Yves Le Traon, Yueng-Djern Lenn, Guillaume Maze, Kjell Arne Mork, Tamaryn Morris, Takeyoshi Nagai, Jonathan Nash, Alberto Naveira Garabato, Are Olsen, Rama Rao Pattabhi, Satya Prakash, Stephen Riser, Catherine Schmechtig, Claudia Schmid, Emily Shroyer, Andreas Sterl, Philip Sutton, Lynne Talley, Toste Tanhua, Virginie Thierry, Sandy Thomalla, John Toole, Ariel Troisi, Thomas W Trull, Jon Turton, Pedro Joaquin Velez-Belchi, Waldemar Walczowski, Haili Wang, Rik Wanninkhof, Amy F Waterhouse, Stephanie Waterman, Andrew Watson, Cara Wilson, Annie PS Wong, Jianping Xu, Ichiro Yasuda (2019): On the future of Argo: A global, full-depth, multi-disciplinary array. *Frontiers in Marine Science*, doi:10.3389/fmars.2019.00439

Perez, R. C., G.R. Foltz, R. Lumpkin and C. Schmid, 2019: Direct measurements of upper ocean horizontal velocity and vertical shear in the tropical North Atlantic Ocean at 4°N, 23°W. *Journal of Geophysical Research-Oceans*, doi:10.1029/2019JC015064

Foltz, G.R., Brandt, P., Richter, I., Rodríguez-Fonseca, B., Hernandez, F., Dengler, M., Rodrigues, R.R., Schmidt, J.O., Yu, L., Lefevre, N., Da Cunha, L.C., McPhaden, M.J., de Araujo Filho, M.C., Karstensen, J., Hahn, J., Martin-Rey, M., Patricola, C.M., Poli, P., Zuidema, P., Hummels, R., Perez, R.C., Hatje, V., Lübbecke, J., Polo, I., Lumpkin, R., Bourlès, B., Asuquo, F.E., Lehodey, P., Conchon, A., Chang, P., Dandin, P., Schmid, C., Sutton, A.J., Giordani, H., Xue, Y., Illig, S., Losada, T., Grodsky, S., Gasparin, F., Lee, T., Mohino, E., Nobre, P., Wanninkhof, R., Keenlyside, N.S., Garçon, V., Sánchez-Gómez, E., Nnamchi, H.C., Drévillon, M., Storto, A., Remy, E., Lazar, A., Speich, S., Goes, M., Dorrington, T., Johns, W.E., Moum, J.N., Robinson, C., Perruche, C., de Souza, R.B., Gaye, A.,

Lopez-Parages, J., Monerie, P.-A., Castellanos, M., Benson, N.U., Hounkonnou, M.N., Trotte Duha, J., Laxenaire, R., and Reul, N. 2019: The tropical Atlantic observing system. *Frontiers in Marine Science*, doi:10.3389/fmars.2019.00206

Sudip Majumder, Marlos Goes, Paulo S. Polito, Rick Lumpkin, Claudia Schmid and Hosmay Lopez (2019): Propagating modes of variability and their impact on the western boundary current in the South Atlantic. *Journal of Geophysical Research: Oceans*, 124 (5), doi:10.1029/2018JC014812

Marion Kersalé, Renellys C. Perez, Sabrina Speich, Christopher S. Meinen, Tarron Lamont, Matthieu Le Hénaff, Marcel A. van den Berg, Sudip Majumder, Isabelle J. Ansorge, Shenfu Dong, Claudia Schmid, Thierry Terre and Silvia L. Garzoli (2019): Shallow and Deep Eastern Boundary Currents in the South Atlantic at 34.5°S: Mean Structure and Variability. *Journal of Geophysical Research: Oceans*, 124, 1-26, doi:10.1029/2018JC014554

G. C. Johnson, J. Reagan, J. M. Lyman, T. Boyer, Claudia Schmid, and R. Locarnini (2018): Salinity. in *State of the Climate in 2017, Global Oceans*. *Bulletin of the American Meteorological Society*. 99 (8), S77-S81, doi:10.1175/2018BAMSStateoftheClimate.1

Majumder. S. and C. Schmid (2018): A study of the variability in volume transport of the Benguela Current. *Ocean Sci.*, 14, 1-11, 2018, doi:10.5194/os-14-1-2018

Schmid, C. and Majumder, S. (2018): Transport variability of the Brazil Current from observations and a data assimilation model, *Ocean Sci.*, 14, 417-436, doi:10.5194/os-14-417-2018

Foltz, G.R., C. Schmid, and R. Lumpkin, 2018: An enhanced PIRATA dataset for tropical Atlantic ocean-atmosphere research. *Journal of Climate*, 31(4):1499-1524 (doi:10.1175/JCLI-D-16-0816.1).

G. C. Johnson, J. Reagan, J. M. Lyman, T. Boyer, Claudia Schmid, and R. Locarnini (2017): Salinity. in *State of the Climate in 2016, Global Oceans*. *Bulletin of the American Meteorological Society*, 98 (8), S69 - S71, doi:10.1175/2017BAMSStateoftheClimate.1

Majumder, S., C. Schmid, G. Halliwell, 2016: An Observations and Model Based Analysis of Meridional Transports in the South Atlantic. *Journal of Geophysical Research*, 121, doi: 10.1002/2016JC011693

Johnson, G. C., J. Reagan, J. M. Lyman, T. Boyer, C. Schmid, and R. Locarnini (2016): Salinity. in *State of the Climate in 2015, Global Oceans*. *Bulletin of the American Meteorological Society*, 97 (8), S70-S74.

Foltz, G.R., C. Schmid, and R. Lumpkin (2015): Transport of surface freshwater from the equatorial to the subtropical North Atlantic Ocean. *Journal of Physical Oceanography*, doi:10.1175/JPO-D-114-0189.1

Garzoli, S.L., S. Dong, R. Fine, C. Meinen, R.C. Perez, C. Schmid, E. van Sebille, and Q. Yao (2015): The fate of the Deep Western Boundary Current in the South Atlantic. *Deep-Sea Research, Part I.*, 103, 125-136, doi: 10.1016/j.dsr.2015.05.008.

Boyer, Tim, John Antonov, James Reagan, Claudia Schmid, Ricardo Locarnini (2015): Sub-surface

salinity. *State of the Climate in 2014, Global Oceans. Bulletin of the American Meteorological Society*, 96 (7), S74-S76 (S1-S238), doi: 10.1175/2015BAMSStateoftheClimate.1.

Tim Boyer, John Antonov, James Reagan, Claudia Schmid, Ricardo Locarnini (2014): Sub-surface salinity. *State of the Climate in 2013, Global Oceans. Bulletin of the American Meteorological Society*, 95 (7), S62-S65 (S1-S279), doi: 10.1175/2014BAMSStateoftheClimate.1.

Claudia Schmid (2014): Mean vertical and horizontal structure of the subtropical circulation in the South Atlantic from three-dimensional observed velocity fields. *Deep Sea Research I*, 91 (9), 50-71, doi: 10.1016/j.dsr.2014.04.015.

Renellys C. Perez, Verena Hormann, Rick Lumpkin, Peter Brandt, William E. Johns, Fabrice Hernandez, Claudia Schmid, Bernard Bourlès (2014): Mean meridional currents in the central and eastern equatorial Atlantic. *Clim. Dyn.*, doi: 10.1007/s00382-013-1968-5.

Gregory R. Foltz, Claudia Schmid, and Rick Lumpkin (2013): Seasonal cycle of the mixed layer heat budget in the northeastern tropical Atlantic Ocean. *Journal of Climate*, 26, 8169 - 8188, doi: 10.1175/JCLI-D-13-00037.1.

Tim Boyer, Sydney Levitus, John Antonov, James Reagan, Claudia Schmid, Ricardo Locarnini (2013): Sub-surface salinity. *State of the Climate in 2012, Global Oceans. Bulletin of the American Meteorological Society*, 94 (8), S60-S62 (S1-S238), doi: 10.1175/2013BAMSStateoftheClimate.1.

Tim Boyer, Sydney Levitus, John Antonov, James Reagan, Claudia Schmid, Ricardo Locarnini (2012): Sub-surface salinity. in: *State of the Climate in 2011, Global Oceans. Bulletin of the American Meteorological Society*, 93 (7), S72-S75 (S1-S264), doi: 10.1175/2012BAMSStateoftheClimate.1.

Igor V. Kamenkovich, Wei Cheng, Claudia Schmid and D. Harrison (2011): Effects of eddies on an ocean observing system with profiling floats: Idealized simulations of the Argo array. *Journal of Geophysical Research*, 116, C06003, doi:10.1029/2010JC006910.

Levitus, S., J. Antonov, T. Boyer, J. Reagan, C. Schmid (2011): Sub-surface salinity. in: *State of the Climate in 2010, Global Oceans*, Blunden, J., D. S. Arndt, and M. O. Baringer, Eds., *Bulletin of the American Meteorological Society*, 92, S88-S92 (S1-S218).

Peter Brandt, Verena Hormann, Arne Körtzinger, Martin Visbeck, Gerd Krahnemann, Lothar Stramma, Rick Lumpkin and Claudia Schmid (2010): Changes in the ventilation of the oxygen minimum zone of the tropical North Atlantic. *Journal of Physical Oceanography*, 40 (8), 1784-1801

Pouliquen, S. C. Schmid, A. Wong, S. Guinehut, M. Belbeoch, and Argo Data Management Team (2009): Argo Data Management. Community White Paper, OceanObs'09. In *Proceedings of OceanObs'09: Sustained Ocean Observations and Information for Society (Vol. 2)*, Venice, Italy, 21-25 September 2009, Hall, J., Harrison, D.E. and Stammer, D., Eds., ESA Publication WPP-306, doi:10.5270/OceanObs09.cwp.70

Testor, Pierre, Gary Meyers, Chari Pattiaratchi, Ralf Bachmayer, Dan Hayes, Sylvie Pouliquen,

Loic Petit de la Villeon, Thierry Carval, Alexandre Ganachaud, Lionel Gourdeau, Laurent Mortier, Hervé Claustre, Vincent Taillandier, Pascale Lherminier, Thierry Terre, Martin Visbeck, Johannes Karstensen, Gerd Krahnemann, Alberto Alvarez, Michel Rixen, Pierre-Marie Poulain, Svein Osterhus, Joaquin Tintore, Simon Ruiz, Bartolomeo Garau, David Smeed, Gwyn Griffiths, Lucas Merckelbach, Toby Sherwin, Claudia Schmid, John A. Barth, Oscar Schofield, Scott Glenn, Josh Kohut, Mary Jane Perry, Charlie Eriksen, Uwe Send, Russ Davis, Daniel Rudnick, Jeff Sherman, Clayton Jones, Douglas Webb, Craig Lee and Breck Owens (2009): Gliders as a component of future observing systems. Community White Paper, OceanObs'09. In Proceedings of OceanObs'09: Sustained Ocean Observations and Information for Society (Vol. 2), Venice, Italy, 21-25 September 2009, Hall, J., Harrison, D.E. and Stammer, D., Eds., ESA Publication WPP-306, doi:10.5270/OceanObs09.cwp.89

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Roemmich, D., G. C. Johnson, S. Riser, R. Davis, J. Gilson, W. B. Owens, S. L. Garzoli, C. Schmid and M. Ignaszewski (2009): The Argo Program: Observing the Global Oceans with Profiling Floats. *Oceanography*, 22(2), 24-33.

Johnson, Gregory C., John M. Lyman, Joshua K. Willis, Sydney Levitus, Tim Boyer, John Antonov, Claudia Schmid, and Gustavo J. Goni, 2009: Ocean Heat Content. [in "State of the Climate in 2008", Global Oceans, Peterson, T. C., and M. O. Baringer, Eds.]. *Bull. Amer. Meteor. Soc.*, 90, S1-S196.

C. Schmid, R. L. Molinari, R. Sabina, Y.-H. Daneshzadeh, X. Xia, E. Forteza and H. Yang (2007): The Real-Time Data Management System for Argo Profiling Float Observations. *Journal of Atmospheric and Oceanic Technology*, 24 (9), 1608-1628

C. Schmid (2005): Impact of combining temperature profiles from different instruments on an analysis of mixed layer properties. *Journal of Atmospheric and Oceanic Technology*, 22 (10), 1571-1587

C. Schmid, B. Bourlés and Y. Gouriou (2005): Impact of the deep equatorial jets on the zonal transport in the Atlantic. *Deep-Sea Research II*, 52 (3-4), 409-428

C. Schmid, O. Boebel, W. Zenk, J. R. E. Lutjeharms, S. L. Garzoli, P. L. Richardson, and C. Barron, 2003: Early Evolution of an Agulhas Ring. *Deep-Sea Res. II* 50(1), 141-166.

C. Schmid, Z. Garraffo, E. Johns, and S. L. Garzoli, 2003: Pathways and Variability at Intermediate Depths in the Tropical Atlantic. *Interhemispheric Water Exchange in the Atlantic Ocean, Elsevier Oceanography Series*, 68, G. J. Goni and P. Malanotte-Rizzoli, Eds. Elsevier, New York, 233-268.

Boebel, O., J. R. E. Lutjeharms, C. Schmid, W. Zenk, T. Rossby, and C. Barron, 2003: The Cape Cauldron: a regime of turbulent inter-ocean exchange. *Deep-Sea Res. II* 50(1), 57-86.

C. Schmid, R. L. Molinari, and S. Garzoli, 2001: New Observations of the Intermediate Depth Circulation in the Tropical Atlantic. *J. Mar. Res.* 59(3), 281-312.

C. Schmid, G. Siedler, and W. Zenk, 2000: Dynamics of Intermediate Water Circulation in the Sub-

tropical South Atlantic. *J. Phys. Oceanogr.* 30(12), 3191–3211.

Boebel, O., R. E. Davis, M. Ollitrault, R. G. Peterson, P. L. Richardson, C. Schmid, and W. Zenk, 1999: The intermediate depth circulation of the Western South Atlantic. *Geophys. Res. Lett.* 26(21), 3329–3332.

Boebel, O., C. Schmid, and W. Zenk, 1999: Kinematic elements of Antarctic Intermediate Water in the western South Atlantic. *New Views of the Atlantic*, W. Zenk, R. G. Peterson, and J. R. E. Lutjeharms, Eds. Deep-Sea Res. II, 46 (1-2), 355–392.

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C. Schmid, H. Schäfer, G. Podestá, and W. Zenk, 1995: The Vitória eddy and its relation to the Brazil Current. *J. Phys. Oceanogr.* 25(11), 2532–2546.

Newsletters and Proceedings

C. Schmid (2020): Recounting the Argo Program’s Two Decades of Ocean Observations. AOML Keynotes, October-December 2020

C. Schmid (2018): Argo Data Acquisition Center at AOML Surpasses One Million Profile Benchmark AOML Keynotes Vol. 22/No. 2 (March-April 2018)

C. Schmid (2013): AOML Researchers Continue Efforts to Monitor the Tropical Atlantic. AOML Keynotes Vol. 17/No. 1 (January-February 2013)

C. Schmid (2012): Short article on the float and drifter deployment cruise aboard the sailing ship Lady Amber. AOML Keynotes Vol. 16/No. 6 (November-December 2012)

C. Schmid and A. Thresher (2009): Report on the Argo Regional Center Workshop in Toulouse, France in September 2009 (Chairs: C. Schmid and A. Thresher)

C. Schmid (2009): National workshop on data analysis in Lagos, Nigeria. *Argonautics*, 11:7

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C. Schmid (2016): Modes of variability of the Brazil Current.

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- C. Schmid (2003): On the characteristics and the variability of the equatorial deep jets.
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Oral Presentations

- Claudia Schmid, Jaya Nair, Jodi Brewster, Cedrick Estelhomme (2021): 20 years of optimizations and adaptations at the US Argo DAC to accommodate evolving data formats as well as expansion of measurements and requirements. August 18, 2021 during the 11. annual NOAA Environmental Data Management Workshop session 4B, "Creative Data Solutions, part 2", on Wednesday starting at 4 -5:30 pm.
- C. Schmid (2020): AMOC variability at multiple latitudes PhOD seminar at AOML, August 26, 2020
- Claudia Schmid, Jaya Nair, Charita Atluri, Jodi Brewster, Cedrick Estelhomme (2020): Evolution of the data processing system at the US Argo Data Assembly Center. August 19, 2020 during the 10. annual NOAA Environmental Data Management Workshop session "4A: 21st Century Data Management Approaches for Unmanned Systems (3:30pm - 5:00pm)."
- C. Schmid (2019): A joint analysis of the Atlantic Meridional Overturning Circulation at 26.5°N based on two observations-based time series. Seminar (aka Informal Research Report) at AOML, August 7, 2019
- C. Schmid (2017): On the structure and variability of the Meridional Overturning Circulation in the subtropical North Atlantic. Informal Research Report at AOML, August 17, 2017
- C. Schmid (2016): Modes of variability of the Brazil Current. Informal Research Report at AOML, September 6, 2016
- C. Schmid (2015): A look at the temporal and spatial variability of the Boundary Currents in the subtropical South Atlantic. Informal Research Report at AOML, September 22, 2015
- C. Schmid (2014): Analysis of the variability of transports in the subtropical South Atlantic as estimated from Argo and altimetry. Informal Research Report at AOML, October 28, 2014

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- C. Schmid (2012): Structure and Variability of the circulation in the subtropical South Atlantic. Informal Research Report at AOML, September 14, 2012
- C. Schmid (2012): Three-dimensional geostrophic circulation in the South Atlantic Ocean. PhOD science retreat, 28-29 March 2012, Miami, Florida.
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- C. Schmid (2011): Three-dimensional circulation from Argo data, with Application to MOC. PhOD Science Retreat, 15-16 February 2011, Miami, Florida
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- C. Schmid (2010): Presentations on the developments at the South Atlantic Argo Regional Center at AOML and on the results of the Argo Regional Center Workshop. International Argo Steering Team Meeting at SIO, San Diego, CA, March 23-25, 2010.
- Schmid, C (2010): Analysis of the variability of the salinity in the eastern tropical Atlantic. TACE/PIRATA Meeting, 2-5 March 2010, Miami, Florida
- Schmid, C (2009): Presentations on the real-time data processing at the US Argo Data Assembly Center at AOML and the developments at the South Atlantic Argo Regional Center at AOML. U.S. Argo Science and Implementation Panel Meeting in Hawaii, December 15-17, 2009.
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- Christopher S. Meinen, Claudia Schmid, Gustavo Goni, Molly O. Baringer, Rick Lumpkin, and Silvia L. Garzoli: Contributions of the Global Ocean Observing System - What is the observing system telling us about the ocean and how is it helping to improve assimilating models. AMS meeting in Phoenix, 1-15 January 2009
- C. Schmid, R. Lumpkin, X. Xia (2007): Analysis of the annual cycle of the oceanic heat budget of the mixed layer in the Atlantic using different surface flux products. 24th Assembly of the International Union of Geodesy and Geophysics (IUGG) July 3-13, 2007 Perugia, Italy. (Session PS010 New Insights into the Ocean and Its Circulation from Argo and GODAE, July 10-11, 2007)
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- C. Schmid, O. Boebel and W. Zenk (1999): First Results from KAPEX: The South Atlantic Current Component. International Liège Colloquium on Ocean Hydrodynamics, Belgium, 4. May 1999
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Poster Presentations

C. Schmid, M. P. Goes, D. Smeed (2020): A joint Analysis of the Atlantic Meridional Overturning Circulation at 26.5°N using two Observations-based Time Series. Ocean Sciences Meeting, San Diego, 2/16-21/2020 (PC24A-1744)

Cyril Emmanuel Germaineaud, Marlos P Goes, Sang-Ki Lee, Denis Volkov, Ricardo M. Domingues, Claudia Schmid, Gustavo Jorge Goni and Molly O'Neil Baringer (2020): Impacts of the East Atlantic pattern on the interannual sea level variability along the U.S. eastern seaboard. Ocean Sciences Meeting, San Diego, 2/16-21/2020 (PL34A-2713)

Renellys C Perez, Gregory R Foltz, Rick Lumpkin, Claudia Schmid and Jonathan Andrew Christophersen (2020) Direct measurements of upper ocean horizontal velocity and vertical shear in the tropical North Atlantic. Ocean Sciences Meeting, San Diego, 2/16-21/2020 (PL24B-2674)

M. Goes, S. Majumder, M. Cirano, P. Polito, M. Mata, R. Lumpkin, C. Schmid, Hosmay Lopez, and G. Goni (2019): Local and remote influences on the Brazil Current transport variability 16-20 September 2019, OceanObs19, Honolulu, Hawaii

C. Germaineaud, M. Goes, C. Schmid, D. Volkov, and M. Baringer (2019): Impact of propagating sea level anomaly features in the North Atlantic on the U.S. coastal sea level; meeting with stakeholders on Sea Level Rise (where?)

Claudia Schmid and Sudip Majumder (2018): An analysis of the variability of the Atlantic Meridional Overturning Circulation at 26.5°N from a 23 year time series. International AMOC Science Meeting, July 24-27, 2018, Coconut Grove, FL, USA

Sudip Majumder, Marlos P Goes and Claudia Schmid (2018): An analysis of the interannual variability of the Brazil Current; poster, 11-16 February 2018, Ocean Sciences in Portland, Oregon.

Claudia Schmid and Sudip Majumder (2018): An Analysis of the Interannual and Spatial Variability of the Meridional Overturning Circulation in the Subtropical North Atlantic; poster, 11-16 February 2018, Ocean Sciences in Portland, Oregon.

Sudip Majumder, Claudia Schmid and George R. Halliwell (2016): On the temporal variability of Meridional Transports in the Subtropical South Atlantic. CLIVAR Open Science Conference, Charting the course for climate and ocean research, 18-25 September 2016, Qingdao, China

Sudip Majumder, Claudia Schmid and George R. Halliwell (2016): On the temporal variability of Meridional Transports in the Subtropical South Atlantic. Ocean Sciences, February 21-16, 2016, New Orleans, LA

Claudia Schmid and Sudip Majumder (2016): An Observations and Model-based Analysis of the Temporal Variability of the Brazil Current. Ocean Sciences, February 21-16, 2016, New Orleans, LA

C. Schmid, S. Majumder and G. R. Halliwell (2015); An Observation and Model Based Analysis of Meridional Transports in the South Atlantic. RAPID & US AMOC Science Team Meeting, Bristol, UK, July 21-24, 2015.

C. Schmid (2014): Variability and uncertainty of meridional transports in the South Atlantic as estimated from Argo and altimetry. US AMOC Science Team Meeting, Seattle, WA, September 9-11, 2014

Verena Hormann, Renellys C. Perez, Rick Lumpkin, Peter Brandt, William E. Johns, Fabrice Hernandez, Claudia Schmid, Bernard Boulès (2012): Structure of the equatorial Atlantic cold tongue and meridional flow. AGU meeting, San Francisco, 12/3-7/2012.

C. Schmid, S.L. Garzoli, C., V. Halliwell, Q. Yao and G. Goni: On the structure and variability of zonal and meridional transports in the subtropical South Atlantic. 4th Argo Science Workshop Venice 27-29 September 2012

C. Schmid, S.L. Garzoli, C., V. Halliwell, Q. Yao and G. Goni: Three-dimensional circulation and transports in the South Atlantic Ocean from observations. OCO Annual System Review, Climate Observations for Climate Services, in Silver Spring, MD, June 25-27, 2012

R. Lumpkin, M. Baringer, C. Schmid, G. Goni and S. Garzoli: Observations for Climate: Evaluating the Global Ocean Observing System. WCRP Open Science Conference, 24-28 October 2011, Denver CO. USA

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Chunzai Wang, Sang-Ki Lee, George R. Halliwell, Gustavo J. Goni, David B. Enfield¹, Rick Lump-

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G. Goni, R. Lumpkin, M. Baringer, S.L. Garzoli, S. Dong, D. Enfield, G. Halliwell, E. Johns, C. Meinen, R. Molinari, R. Perez, C. C. Schmid Thacker, C. Wang and R. Wanninkhof (2010): The In-Situ Global Ocean Observing System for Climate. OCO 7th Annual System Review, Climate Observations for Climate Services, in Silver Spring, MD, October 27-29, 2010

C. Schmid and S. L. Garzoli (2010): Antarctic Intermediate Water in the Atlantic Ocean spreading and variability OCO 7th Annual System Review, Climate Observations for Climate Services, in Silver Spring, MD, October 27-29, 2010

C. Schmid, V. Halliwell and S. L. Garzoli (2010): Post-Delayed Mode QC Analysis in the South Atlantic Argo Region (SAARC). OCO 7th Annual System Review, Climate Observations for Climate Services, in Silver Spring, MD, October 27-29, 2010

Peter Brandt, Verena Hormann, Arne Körtzinger, Martin Visbeck, Gerd Krahlmann, Lothar Stramma, Rick Lumpkin and Claudia Schmid (2010): Changes in the ventilation of the oxygen minimum zone of the tropical North Atlantic. Ocean Sciences Meeting, 22-26 February 2010, Portland, Oregon

C. Schmid and S. Garzoli (2009): Spreading and properties of the Antarctic Intermediate Water in the Atlantic. Third Argo Science Workshop in Hangzhou, China in 25-27 March 2009.

C. Schmid, G. Goni, R. Lumpkin (2009): Preliminary estimates of the time-variant heat budget in the tropical Atlantic Ocean Third Argo Science Workshop in Hangzhou, China in 25-27 March 2009.

C. Schmid, G. Goni and P. DiNezio (2008): Evaluation of the ocean observing system for heat storage. OCO annual system review of the Climate Observation Division, Silver Spring, MD, September 3-5, 2008.

C. Schmid, S. L. Garzoli and E. Forteza: Spreading of the Antarctic Intermediate Water in the Atlantic derived from Argo and other observations. OCO 5th Annual System Review in Silver Spring, MD, June 5-7, 2007

Goni, G., P. DiNezio and C. Schmid (2007): Evaluation of the Ocean Observing System for Ocean Heat Storage Studies. Ocean Surface Topography Science Team Meeting in Hobart, Australia March 12 - 15, 2007

C. Schmid, G. Goni and R. Lumpkin (2006): Preliminary estimates of the time-variant heat budget in the Tropical Atlantic. 15 years of progress in Radar altimetry Symposium and the Argo science workshop in Venice (March 13-18, 2006). NOAA's Office of Climate Observation (OCO) Annual System Review workshop May 10-12, 2006

G. Goni and C. Schmid (2006): How altimetry can complement in situ observations in the estimation of the upper ocean heat storage. 15 years of progress in Radar altimetry Symposium and the Argo

- science workshop in Venice (March 13-18, 2006). NOAA's Office of Climate Observation (OCO) Annual System Review workshop May 10-12, 2006
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- C. Schmid (2005): Variability of the heat storage rate in the Tropical Atlantic, NOAA's Office of Climate Observation (OCO) Annual System Review workshop, 25-27 April 2005.
- C. Schmid (2004): A comparison of temperature profiles from profiling floats and XBTs, NOAA's Office of Climate Observation (OCO) Annual System Review workshop, 13-15 April 2004.
- C. Schmid, S. L. Garzoli, R. Lumpkin, and Q. Yao (2004): New estimates of the heat budget in the Tropical Atlantic, first results, NOAA's Office of Climate Observation (OCO) Annual System Review workshop, 13-15 April 2004.
- C. Schmid, R. Sabina, Y-H. C. Daneshzadeh, E. Forteza and X. Xia (2004): US ARGO Data Assembly Center, NOAA's Office of Climate Observation (OCO) Annual System Review workshop, 13-15 April 2004.
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- Molinari, R. L., S. L. Garzoli, C. Schmid, R. Sabina, Y-H. C. Daneshzadeh, D. Bitterman, E. Forteza and Xiangdong Xia (2003): US ARGO Data Assembly Center, CIMAS review, 20-21 February 2003
- C. Schmid, R. L. Molinari and S. L. Garzoli (2003): On the temporal variability of the intermediate depth flow in the tropical Atlantic. Lagrangian Analysis and Prediction of Coastal and Ocean Dynamics (LAPCOD), 15.December 2002, Key Largo, Florida & CIMAS review, 20-21 February 2003.
- C. Schmid, R. L. Molinari and S. L. Garzoli (2001): On the temporal variability of the intermediate depth flow in the tropical Atlantic. CLIVAR, Paris, 3.-7. September 2001. International Association for the Physical Sciences of the Oceans (IAPSO) of the International Union of Geodesy and Geophysics, Mar del Plata, 22. - 26. October 2001.
- Goni, G., M. Baringer, R. L. Molinari, C. Schmid, S. L. Garzoli, D. Snowden, J. Trinanes and C. Lentini (2001): Implementation of High Density XBT Line AX8. CLIVAR, Paris, 3.-7. September 2001.
- C. Schmid, S. Garzoli and B. Molinari (2000): The Intermediate Depth Circulation in the Tropical

Atlantic. AOML review, Feb. 23/24 2000

Zenk, W., C. Schmid and O. Boebel (1999): Lagrangesche Strömungsmessungen im Südatlantik. (WOCE Tagung, Alfred-Wegener Institut, Bremerhaven, 28. April 1999)

C. Schmid (1997): On the dynamics of the Antarctic Intermediate Water circulation in the subtropical South Atlantic. South Atlantic Workshop, Brest, France, 16-20 June, 1997. Abstract in: *World Ocean Circulation Experiment*, South Atlantic Workshop, Brest, France 16-20 June, 1997

Boebel, O., C. Schmid and W. Zenk (1997): The spreading of Antarctic Intermediate Water in the western South Atlantic: A Lagrangian view of advection and diffusion. South Atlantic Workshop, Brest, France, 16-20 June, 1997. Abstract in: *World Ocean Circulation Experiment*, South Atlantic Workshop, Brest, France 16-20 June, 1997, Poster 36

C. Schmid, O. Boebel and W. Zenk (1996): The Antarctic Intermediate Water in the western subtropical South Atlantic. Den Haag, XXI General Assembly of the European Geophysical Society May 6.-10. 1996. Abstract in: *Annales Geophysicae Suppl. II* to Volume 14, Part II (Hydrology, Oceans, Atmosphere & Nonlinear Geophysics), 405

Boebel, O., C. Schmid and W. Zenk (1995): On the flow of Antarctic Intermediate Water across Rio Grande Rise. International Association for the Physical Sciences of the Oceans (IAPSO) of the International Union of Geodesy and Geophysics General Assembly Honolulu, Hawaii, 5. - 12. August 1995. Abstract in: *IAPSO Proceedings*, 19, Proceedings XXI General Assembly, 112

C. Schmid, H. Schäfer, G. Podestá and W. Zenk (1995): The Vitória eddy and its relation to the Brazil Current. Symposium, The South Atlantic: Present and past circulation, Bremen, August 15.-19. 1994. Abstract in: *Berichte aus dem Fachbereich Geowissenschaften der Universität Bremen*, 25, 132

Boebel, O., C. Schmid and W. Zenk (1994): Antarctic Intermediate Water in the South Atlantic. Symposium, The South Atlantic: Present and past circulation, Bremen, August 15.-19. 1994. Abstract in: *Berichte aus dem Fachbereich Geowissenschaften der Universität Bremen*, 25, 26

Abstracts (if not listed above)

Goni, G, M. Baringer, S. L. Garzoli, R. L. Molinari, R. Lumpkin, C. Schmid, Cook, S. (2004): Sustained Observations in the Atlantic Ocean carried out by NOAA/AOML. EGS, Nice, France, 25 - 30 April 2004, *Geophysical Research Abstracts*, 6, 04575

Ollitrault, M., O. Boebel, P. Richardson, C. Schmid and W. Zenk (1998): The AAIW general circulation in the Brazil basin and equatorial Atlantic. XXIII General Assembly of the European Geophysical Society, Nice, France, 20-24 April 1998

Zenk, W., O. Boebel and C. Schmid (1996): Towards a subsurface circulation pattern of the South Atlantic inferred from deep floats. Den Haag, XXI General Assembly of the European Geophysical Society May 6.-10. 1996. Abstract in: *Annales Geophysicae Suppl. II* to Volume 14, Part II (Hydro-

Meetings and workshops

International Argo Data Management Meeting Executive Committee Bio-Argo workshop Tianjin, China	September 28-30, 2016 September 27, 2016 September 26-27, 2016
Ocean Sciences New Orleans, LA	February 21-16, 2016
International Argo Data Management Meeting Executive Committee Bermuda	November 4-6, 2015 November 3, 2015
RAPID/US AMOC International Science Meeting Bristol, U.K.	21-24 July 2015
Argo Steering Team Meeting Brest, France	March, 18-20 2015
International Argo Data Management Meeting Executive Committee Bio-Argo workshop Ottawa, Canada	November 5-7, 2014 November 4, 2014 November 3-4, 2014
US AMOC Science Team Meeting Seattle, WA	September 9-11, 2014
U.S. Argo Science and Implementation Panel Meeting Seattle, WA	July 28-30, 2014.
International Argo Data Management Meeting Executive Committee Bio-Argo workshop Hyderabad, India	November 14-16, 2012 November 12, 2012 November 12-13, 2012
PhOD Science Retreat Miami, FL	March 28-29. 2012
International Argo Data Management Meeting Executive Committee Trajectory workshop Seoul, South Korea	November 16-18, 2011 November 14, 2011 November 15, 2011
7th Annual Indonesia-U.S. Ocean and Climate Observations, Analysis, and Applications Partnership Meeting, Yogyakarta BPPT planning meeting, Jakarta	September 19-21, 2011 September 22, 2011
PhOD Science Retreat Miami, FL	February 15-16. 2011.
U.S. Argo Science and Implementation Panel Meeting Seattle, WA	December 9-10, 2010.
OCO 7th annual system review, Climate Observations for Climate Services, Silver Spring, MD	October 27-29, 2010

U.S. Argo Science and Implementation Panel Meeting Woods Hole	December 10-11, 2008.
International Argo Data Management Meeting Executive Committee Argo Regional Center Workshop Chairs: C. Schmid and J. Potemra Hawaii	October 29-31, 2008 October 27, 2008 October 28, 2008
OCO 6th annual system review of the Climate Observation Division, Silver Spring, MD	September 3-5, 2008
XBT fall rate workshop Miami, FL	March 10-12, 2008
Silver Spring, MD	
GTSP Workshop in Hobart Hobart, Australia	November 12, 2007.
International Argo Data Management Meeting Executive Committee Argo Regional Center Workshop Chairs: C. Schmid and J. Potemra Hobart, Australia	14-16 November 2007 November 12, 2007 November 13, 2007
International Argo Data Management Meeting Executive Committee Tianjin, China	October 31 - November 3, 2006 October 30, 2006
24th Assembly of the International Union of Geodesy and Geophysics (IUGG), Perugia, Italy	July 3-13, 2007
OCO 5th Annual System Review Silver Spring, MD	June 5-7, 2007
Argo Capacity Building for the Atlantic Countries of Africa Accra, Ghana	December 5-7, 2006
U.S. Argo Science and Implementation Panel Meeting AOML, Miami, FL	November 29-30, 2006
Argo Trajectory Workshop Seoul, South Korea	October 27-28, 2006
International Argo Data Management meeting, Tianjin, China Executive Committee	November 1-3, 2006 October 31, 2005
OCO Climate Observation Program, 4th Annual System Review, Silver Spring, MD	May 10-12, 2006
AMMA US workshop, Silver Spring, MD	May 4-5, 2006

“15 years of progress in Radar altimetry Symposium” and “2nd Argo science workshop”, Venice, Italy	March 13-18, 2006
International Argo Data Management meeting, Tokyo, Japan Executive Committee	November 7-10, 2005 November 6, 2005
The Development of Improved Observational Data Sets for Reanalysis: Lessons learned and Future Directions, College Park, MD	September 28-30, 2005
AMMA Process Studies and Implementation meeting Biarritz, France	September 19-23, 2005
South Atlantic Argo Regional Center workshop Cape Town, South Africa	May 12-14, 2005
OCO Climate Observation Program, 3rd Annual System Review, Silver Spring, MD	April 25-27, 2005
TACE implementation workshop, Miami, FL	February 3, 2005
U.S. CLIVAR Atlantic Science Conference, Miami, FL	January 31 - February 2, 2005
PIRATA-10 Meeting, Fortaleza, Brazil	December 14-16, 2004
AMMA/EGEE/TAV cruise planning workshop Brest, France	October 11-13, 2004
International Argo Data Management meeting, Southampton, UK Executive Committee	September 29 - October 1, 2004 September 28, 2004
CLIVAR Workshop: North Atlantic Thermohaline Circulation Variability, Kiel, Germany	September 13-16, 2004
Second Aquarius/SAC-D Science Conference, Miami, FL	April 20-22, 2004
OCO Climate Observation Program, 2nd Annual System Review, Silver Spring, MD	April 13-15, 2004
CLIVAR Ocean Observations workshop, La Jolla, CA	March 24-26, 2004
First Argo Science Workshop, Tokyo, Japan	November 12-14, 2003
International Argo Data Management meeting, Monterey, CA Executive Committee	November 4-7, 2003 November 3, 2003
Lagrangian Analysis and Prediction of Coastal and Ocean Dynamics (LAPCOD) meeting, Key Largo, FL	December 12-16, 2002
International Argo Data Management meeting, Ottawa, Canada Executive Committee	September 18-20, 2002 September 17, 2002
International Argo Data Management meeting, Brest, France Executive Committee	November 12-14, 2001 November 13, 2001

IAPSO conference: An Ocean Odyssey
Mar del Plata, Argentina

October 21-26, 2001

1st Argo Data Management meeting, Brest, France October 3-5, 2000

Research cruises

11/15 - 12/14/2015 PIRATA Northeast Extension cruise (NATO R/V Alliance), chief scientist

01/8 - 02/13/2013 PIRATA Northeast Extension cruise (R/V Ronald H. Brown, RB-13-01), chief scientist

04/26 - 05/22/2010 PIRATA Northeast Extension cruise (R/V Ronald H. Brown, RB-10-03), chief scientist

07/11 - 08/10/2009 PIRATA Northeast Extension cruise (R/V Ronald H. Brown, RB-09-04)

05/02 - 05/29/2007 PIRATA Northeast Extension cruise (R/V Ronald H. Brown, RB-07-03)

06/22 - 07/04/2006 PIRATA Northeast Extension cruise leg 2a (R/V Ronald H. Brown, RB-06-05), chief scientist

02/01 - 02/24/2002 Subtropical Cells 2 (R/V Ronald H. Brown RB-02-01)

03/05 - 03/25/2001 Subtropical Cells 1 (R/V Oceanus OC 365-4), chief scientist.

01/10 - 01/26/2000 Atlantic Circulation and Climate Experiment (ACCE, SEWARD JOHNSON 2000/1), chief scientist.

03/21 - 04/25/1997 Cape Basin Experiment (KAPEX, POLARSTERN ANT XIV/4).

11/01 - 11/19/1996 Deep water masses and planktological observations in the tropical West Pacific (SONNE 113).

10/18 - 11/21/1994 Circulation of the Antarctic Intermediate Water in the western South Atlantic (POLARSTERN ANT XII/1)

05/15 - 06/14/1994 Water Exchange through Hunter Channel, circulation of the Antarctic Intermediate Water in the western South Atlantic (METEOR 28/2).

07/20 - 08/06/1993 POSEIDON 200/9

11/18 - 12/22/1992 Brazil Current and Antarctic Intermediate Water circulation in the western South Atlantic (METEOR 22/3&4)

09/17 - 10/27/1990 Western boundary circulation in the tropical Atlantic (METEOR 14/1&2)

03/24 - 04/17/1990 Mediterranean salt lenses (POSEIDON 171/2&3)