

CURRICULUM VITAE

Antonio J. Busalacchi Jr.
May, 2017

Address: University Corporation for Atmospheric Research, 3375 Mitchell Lane, Boulder, Colorado 80307

Education: Florida State University, B.S., Physics (Magna Cum Laude), 1977; M.S., Oceanography, 1980; Ph.D., Oceanography, 1982

Professional Experience

President, University Corporation for Atmospheric Research, 2016-present
Glenn L. Martin, Professor, 2016-present
Chair, University of Maryland Council on the Environment, 2011-present
Director, Earth System Science Interdisciplinary Center, University of Maryland, College Park, 2000-2016
Professor, Department of Atmospheric and Oceanic Science, University of Maryland, College Park, 2000-2016
Affiliate Professor, Department of Geology, University of Maryland, College Park, 2000-2016
Affiliate Professor, Maryland Institute for Applied Environmental Health, School of Public Health, 2009-
Director, Cooperative Institute for Climate Studies (CICS) 2002-2006
Chief, Goddard Laboratory for Hydrospheric Processes, Greenbelt, MD, 1991-2000
Associate Chief for Research, Goddard Laboratory for Hydrospheric Processes, 1990-1991
Head, Oceans and Ice Branch, Goddard Laboratory for Hydrospheric Processes, 1988-1990
Oceanographer, Oceans and Ice Branch, Goddard Laboratory for Oceans, Lab. Atmospheric Sciences, 1982-1988
Adjunct Professor of Oceanography, University of Rhode Island, 1994-
Associate Professor Adjoint, University of Colorado, Dept of Aerospace Engineering Sciences, Boulder, 1987-1990
Graduate Research Assistant, Mesoscale Air-Sea Interaction Group, Florida State University, 1977-1982

Honorary and

Professional Societies:

American Geophysical Union
American Meteorology Society
The Oceanography Society
Phi Beta Kappa
Phi Kappa Phi
Pi Mu Epsilon
Sigma Xi

Citations and Awards:

Grumman Aerospace Engineering Award, 1974
Sigma Xi J. R. Fisher Award, Florida State University, 1982
NASA/Goddard Special Achievement Award for Superior Accomplishment, 1987
NASA/Goddard Special Service Award, 1989, 1990
NASA/Goddard Performance Award, 1989, 1990
Arthur S. Flemming Award, as one of five outstanding young scientists in the Federal Government, 1991
NASA/Goddard Special Act Group Award, 1990
Florida State University, "Grad Made Good" Alumnus of the Year Award, 1995
H. Burr Steinbach Visiting Scholar, Woods Hole Oceanographic Institution, 1997
NASA/Goddard Excellence in Outreach Award, 1999
Presidential Rank Meritorious Executive Award, 1999
NOAA/OAR Outstanding Scientific Paper Award, 2000
Fellow, American Meteorological Society, 2005
Walter Orr Roberts Interdisciplinary Science Lecturer, AMS, 2006
Fellow, American Geophysical Union, 2009
Fellow, American Association for the Advancement of Science, 2011
Member, National Academy of Engineering, 2016

National Academies of Sciences, Engineering and Medicine Service (formerly NRC)

Co-Chair, Decadal Survey for Earth Science and Applications from Space, 2015-2016
Member, Intelligence Science and Technology Experts Group (ISTEG), 2015-
Chair, Board on Atmospheric Sciences and Climate, 2009-2014, Member 2008-2014, Member Ex-Officio 2003-2008
Member, Standing Committee of Earth Science and Applications from Space, 2012-2016
Member, Committee on Assessing the Impacts of Climate Change on Social and Political Stresses, 2011-2012
Co-Chair, Committee on National Security Implications of Climate Change on US Naval Forces, 2009-2011

Member, Committee for the Assessment of NASA's Earth Science Program, 2011-2012
Chair, Committee on Earth Science and Application: Ensuring the Climate Measurements from NPOESS and GOES-R, 2007-2008
Member, IOM/NRC Committee on the Effect of Climate Change on Indoor Air Quality and Public Health, 2010-
Member, Committee on the Assessment of Impediments to Interagency Cooperation on Space and Earth Science Missions, 2009-2011
Member, Committee on America's Climate Choices: Panel on Advancing the Science of Climate Change, 2009-2010
Chair, Climate Research Committee, 2003- 2008, Member, 2001 – 2008
Member, Committee for the Review of the NASA Science Mission Directorate Science Plan, 2006
Lifetime National Associate of the National Academies, 2003
Member, Committee on Extending the Effective Lifetimes of Earth Observing Research Missions, 2004-2005
Member, Committee to Review the NASA Earth Science Enterprise Strategic Plan, 2003
Member, Committee on Earth Studies, 2002-2005, 2008-2012
Member, Panel on Climate Change Feedbacks, 2001-2002
Member, Panel on a Review of "A Plan for a New Science Initiative on the Global Water Cycle", 2001
Member, Panel on Near-Term Development of Operational Ocean Observations, 1991 - 1993
Member, Tropical Ocean Global Atmosphere (TOGA) Advisory Panel, 1989 - 1996

Relevant Professional and Service Activities

Director, Guild of Sommeliers Education Foundation, Board of Directors, 2017-
Member, Maryland Commission on Climate Change Scientific and Technical Work Group, 2015-2016
Member, AGU Ocean Sciences Fellows Committee, 2015-present
Trustee, University Corporation for Atmospheric Sciences (UCAR) Board of Trustees, 2014-2016
Chair, Section W Committee on Atmospheric and Hydrospheric Sciences, American Association for the Advancement of Science (AAAS), 2014; Chair Elect 2013
Chair, Joint Scientific Committee, World Climate Research Programme, 2008-2014, Member, 2007-2014
Member, American Meteorological Society (AMS) Fellows Committee, 2013-2016
Member, FSU Graduate School Advancement Council, 2013-2016
Member, Interdisciplinary Selection Committee, World Cultural Council, Albert Einstein World Award of Science, 2010-present
Vice-Chair, DOE Climate Change Science Program Research Product Development Advisory Committee, 2007-2008, Member, 2006-2007
Member, Universities Space Research Association (USRA) Earth Science Council, 2009-2014
Chair, NOAA Climate Working Group, 2006-2012, Member, 2003-2012
Chair, NOAA Climate Test Bed Science Advisory Board, 2004-2014
Member, NCAR/TIMES Advisory Panel, 2005-2008
Member, NOAA/NCEP Ocean Modeling Review Panel, 2004
Associate Editor, Journal of Physical Oceanography, 2004-
Elected Officer/Member-at-Large, Section Committee on Atmospheric and Hydrospheric Sciences, American Association for the Advancement of Science, 2004-2008
Member, Pacific Northwest National Laboratory Fundamental Science Directorate Review Committee, 2004-
Member, Los Alamos National Laboratory Earth and Environmental Sciences Division Review Committee, 2003-2008
Member, Joint Center for Satellite Data Assimilation Scientific Steering Group, 2002-2008
Member, American Institute for Physics, Committee on Media and Government Relations, 2006-2008
Member, American Institute for Physics, Advisory and Liaison Committee for Public Policy, 2003-2005
Member, AGU Council on Public Affairs, 2002-2007
Co-Chair, IAPSO Session Decadal-Centennial Climate Variability of the Ocean-Atmosphere System, 2005
Co-Chair, AMS Crosscutting Symposium on Forecasting the Weather and Climate of the Atmosphere and Ocean, 2004
Co-Sponsor and organizer with Norwegian Embassy "Transatlantic Research Conference on Climate Change and New Energy Technology" October 7, 2003
Co-Chair, AMS Special Session on State of the Science: The Role of the Carbon Cycle in the Earth System, 2003
Member, NCAR/ESIG Review Panel, 2001
Co-Chair, CLIVAR International Science Steering Group, 2000-2006, Member 1997-2006
Member, NCEP Advisory Panel, 1999-
Chairman, Hayes Center Review Panel, 1998
Chairman, International Pacific Research Center Scientific Advisory Panel, 1997-

Chairman, IRI Working Group on Modelling and Prediction, 1998-1999
Member, CLIVAR Atlantic Ocean Sector Panel, 2000-2004
Member, IRI Advisory Panel, 1998-1999
Editor, Journal of Climate, 1997-1999
Member, NASA Earth System Science and Applications Advisory Committee (ESSAAC), 1997-1998
Member, Variability of the American Monsoon System (VAMOS) Panel, 1998-
Member, NOAA Council on Long-Term Climate Monitoring, 1998-2003
Co-Chair, Union Special Session on The 1997-98 El Nino: Observations and Predictions, Fall AGU, 1998
Chairman, Oceans Section AGU Western Pacific Geophysics Meeting, Taiwan, August 1998
Scientific Organizing Committee, International Conference on Satellites, Oceans and Society, Lisbon, August, 1998
Scientific Organizing Committee, Pacific Ocean Remote Sensing Conference, 1998-
Chairman, American Astronautical Society Goddard Symposium, March, 1998
Member, JIMAR Scientific Review Panel, 1997
Member, NOAA ENSO Systems Council, 1996-1998
Member, NSF IAI Scientific Review Panel, 1996
Member, International Pacific Research Center (IPRC) Science Feasibility Working Group, 1996-1997
Member, Pilot Research Array in the Tropical Atlantic (PIRATA) SWG, 1996-
Member, NCAR/ESIG Review Panel, 1996
Member, SIO/LDEO Consortium Review Panel, 1996
Co-Chairman, Special Session Western Pacific Geophysics Meeting, Indo-Pacific Ocean Modelling, 1996
Member, Center for Ocean Land Atmosphere Advisory Panel (COLA), 1995-1997
Member, Executive Board, Joint Center for Earth System Technology, U. of Maryland Baltimore County, 1995-2000,
Chairman, 1996-1998
Chairman, Executive Board, Joint Center for Observational System Science, Scripps Institution of Oceanography, 1996-2000
Session Co-Chair for Organizational Issues and Follow-on Activities, International Forum on Forecasting El Nino:
Launching an International Research Institute, 1995
Member, Tropical Atmosphere Ocean (TAO) Array Implementation Panel, 1995-2000
Member, NOAA Long-Term Ocean Observations Review Panel, 1993
Chairman, Workshop on In-Situ and Satellite Measurements in Support of Short-Term Climate Prediction, Venice, Italy,
May, 1993
Chairman, NASA HPCP NRA Earth Science Selection Panel, 1992
Chairman, Special Session Fall AGU, TOGA Program on Seasonal to Interannual Prediction, TPOP, 1991, Co-Chairman,
1993
Co-Investigator, NASA SeaWifs Ocean Color Mission, 1993 -2000
Member, International Research Institute for Climate Prediction (IRICP) Task Group, 1992
Member, U.S. Senior Executive Service (SES), 1991-2000
Co-Investigator, NASA Tropical Rainfall Measurement Mission (TRMM) 1991 - 1993, 1997-1999
Chairman, SeaWifs Ocean Color Data Source Evaluation Board, 1990-1991
Member, NOAA Climate and Global Change Program Surface and Upper Ocean Observation Project Science Team, 1990-
1995
Member, Steering Committee for USRA/GSFC Graduate Student Summer Program in Earth Sciences, 1990 - 2000
Member, TOGA Coupled Ocean-Atmosphere Response Experiment (COARE) Science Working Group, 1989 - 1993
Member, NASA EOS Project Science Office, 1989 - 1992
Member, Organizing Committee for Western Pacific International Meeting and Workshop on TOGA-COARE, Noumea,
New Caledonia, May 24-30, 1989
Member, WOCE Data Management Working Group, 1988-1993
Co-Investigator, NASA Ocean Topography Experiment (TOPEX) Science Definition Team, 1987-96, Principal Investigator,
1996-
Member, NSF Division of Ocean Sciences Summer and Winter Review Panels, 1987
Member, NOAA Office of Climate and Atmospheric Research Review Panel, 1986
Member, Space and Earth Sciences Computing Requirements Committee, 1986
Co-Investigator, NASA Scatterometer (NSCAT) Project, 1986 -
NASA/Goddard RTOP Manager for Physical Oceanography, 1985 - 1988
NASA representative, NCAR Advisory Panel on Scientific Computing, 1985 - 1990
Associate Editor, Journal of Geophysical Research-Oceans, 1985 -1999
Member, NASA Space and Earth Sciences Computer Users Committee, 1985-88; Co-Chairman, 1987-88

Member, Equatorial Theoretical Panel (sponsored by NSF) 1977

Reviewer; *Annales Geophysicae*, *Geophysical Research Letters*, *Journal of Geophysical Research*, *Journal of Marine Research*, *Journal of Physical Oceanography*, *Monthly Weather Review*, *NASA*, *NOAA*, *NSF*, *Oceanologica Acta*, *Journal of Climate*

Public Testimony:

U.S. Senate, Committee on Appropriations, Subcommittee on Commerce, Justice, Science and Related Agencies, Chairman, Senator Shelby, *National Water Hazards & Vulnerabilities: Improved Forecasting for Response & Mitigation*, April 4, 2017

U.S. House of Representatives, Committee on Science, Space and Technology, Subcommittee on Environment, Chairman, Representative Bridenstine, *Private Sector Weather Forecasting: Assessing Products and Technologies*, June 8, 2016

U.S. House of Representatives, Committee on Science, Space and Technology, Subcommittee on Space and Subcommittee on Environment, Chairmen, Representatives Babin and Bridenstine, *Exploring Commercial Opportunities to Maximize Earth Science Investments*, November 17, 2015

U.S. House of Representatives, Commerce, Justice, Science Subcommittee, Appropriations Committee, Chairman, Representative Frank Wolf, *Testimony of the Association of Public and Land-Grant Universities, Board on Oceans, Atmosphere and Climate on the FY12 Budgets for NSF, NOAA, and NASA*, March 11, 2011

U.S. House of Representatives, Commerce, Justice, Science Subcommittee, Appropriations Committee, Chairman, Representative Alan Mollohan, *The Role of Space-Based Ocean Observations in Support of Climate Understanding and Prediction*, March 18, 2009

U.S. Senate, Committee on Commerce, Science, and Transportation, Chairman, Senator Daniel Inouye; *U.S Weather and Environmental Satellites: Ready for the 21ST Century?*, July 11, 2007

State of Maryland Senate, Committee on Education, Health, and Environmental Affairs; *State of Climate Science*, February 20, 2007

U.S. Senate, Committee on Commerce, Science, and Transportation, Chairman, Senator John McCain; *Climate Change Science*, October 1, 2003

Refereed Publications:

- 1980 Busalacchi, A. J., and J. J. O'Brien: The seasonal variability in a model of the tropical Pacific. *J. Phys. Oceanogr.*, **10**, 1929-1951.
- 1981 O'Brien, J. J., A. J. Busalacchi, J. Kindle: Ocean models of El Nino, Chapter 7 in *Resource Management and Environmental Uncertainty*. Edited by M. Glantz and J. D. Thompson, Wiley-Interscience, 159-212.
- 1981 E. E. Hoffman, A. J. Busalacchi, J. J. O'Brien: Wind generation of the Costa Rica Dome, *Science*, **214**(4520), 552-554.
- 1981 Busalacchi, A. J., and J. J. O'Brien: Interannual variability of the equatorial Pacific in the 1960s. *J. Geophys. Res.*, **86**, 10901-10907.
- 1983 Busalacchi, A. J., K. Takeuchi, and J. J. O'Brien: On the interannual wind-driven response of the tropical Pacific Ocean. In *Hydrodynamics of the equatorial ocean*. Edited by J. C. J. Nihoul, Elsevier, 155-195.
- 1983 Busalacchi, A. J., K. Takeuchi, and J. J. O'Brien: Interannual variability of the equatorial Pacific-revisited. *J. Geophys. Res.*, **88**, 7551-7562.
- 1983 Busalacchi, A. J. and J. Picaut: Seasonal variability from a model of the tropical Atlantic. *J. Phys. Oceanogr.*, **13**, 1564-1588.
- 1984 Picaut, J., J. Servain, A. J. Busalacchi, and M. Seva: Interannual variability versus seasonal variability in the tropical Atlantic. *Geophys. Res. Lett.*, **11**, 787-790.
- 1985 Busalacchi, A. J., and M. A. Cane: Hindcasts of sea level variations during the 1982-83 El Nino. *J. Phys. Oceanogr.*, **15**, 213-221.
- 1985 Servain, J., J. Picaut, and A. J. Busalacchi: Interannual and seasonal variability of the tropical Atlantic Ocean depicted by sixteen years of sea-surface temperature and wind stress, Chapter 16 in *Coupled Ocean-Atmosphere Models*. Edited by J. C. J. Nihoul, Elsevier.

- 1987 Atlas, R., A. J. Busalacchi, M. Ghil, S. Bloom, and E. Kalnay: Global surface wind and flux fields from assimilation of SEASAT data. *J. Geophys. Res.*, 92, 6477-6487.
- 1988 Busalacchi, A. J., and M. A. Cane: The effect of varying stratification on low frequency equatorial motions. *J. Phys. Oceanogr.*, 18, 801-812.
- 1988 McPhaden, M., A. J. Busalacchi, J. Picaut, and G. Raymond: A model study of potential sampling errors due to scatter around XBT transects in the tropical Pacific. *J. Geophys. Res.*, 93, 8119-8130.
- 1988 McPhaden, M. J., A. J. Busalacchi, and J. Picaut: Observations and wind-forced model simulations of the seasonal cycle in tropical Pacific sea surface topography. *J. Geophys. Res.*, 93, 8131-8146.
- 1989 Busalacchi, A. J., and F. Blanc: On the role of closed and open boundaries in a model of the tropical Atlantic Ocean. *J. Phys. Oceanogr.*, 19, 831-840.
- 1990 Picaut, J., A. J. Busalacchi, M. J. McPhaden, and B. Camusat: Validation of the geostrophic method for estimating zonal currents at the equator from GEOSAT altimeter data. *J. Geophys. Res.*, 95, 3015-3024.
- 1990 Zimelman, D. F., and A. J. Busalacchi: The wet tropospheric range correction: Product intercomparisons and simulated effect for tropical Pacific altimeter retrievals. *J. Geophys. Res.*, 95, 2899-2922.
- 1990 Busalacchi, A. J., M. J. McPhaden, J. Picaut, and S. Springer: Sensitivity of wind-driven tropical Pacific Ocean simulations on seasonal and interannual time scales. *J. Marine Systems*, 1, 119-154.
- 1990 Springer, S. R., M. J. McPhaden, and A. J. Busalacchi: Oceanic heat content variability in the tropical Pacific during the 1982-1983 El Nino. *J. Geophys. Res.*, 95, 22089-22101.
- 1993 Lau, K. M., and A. J. Busalacchi: El Nino Southern Oscillation, In Global Change Atlas, Eds. R. Gurney, J. Foster and C. Parkinson, Cambridge University Press, 281-294.
- 1993 Busalacchi, A. J., R. M. Atlas, and E. C. Hackert: Comparison of SSM/I vector wind stress with model-derived and subjective products for the tropical Pacific. *J. Geophys. Res.*, 98, 6961-6977.
- 1994 Busalacchi, A. J., M. J. McPhaden, and J. Picaut: Variability in equatorial Pacific sea surface topography during the verification phase of the TOPEX/Poseidon mission. *J. Geophys. Res.*, 99, 24,725-24,738.
- 1994 Chen, D., L. M. Rothstein, and A. J. Busalacchi: A hybrid vertical mixing scheme and its application to tropical ocean models. *J. Phys. Oceanogr.*, 24, 2156-2179.
- 1994 Chen, D., A. J. Busalacchi, and L. M. Rothstein: The roles of vertical mixing, solar radiation, and wind stress in model simulation of the sea surface temperature seasonal cycle in the tropical Pacific Ocean. *J. Geophys. Res.*, 99, 20,345-20,359.
- 1995 Acker, J. G., and A. Busalacchi: Workshop on Satellite and In Situ Observations for Climate Prediction. *Bull. Amer. Meteor. Soc.*, 76, 241-249.
- 1995 Miller, R. N., A. J. Busalacchi, and E. C. Hackert: Sea surface topography fields of the tropical Pacific from data assimilation. *J. Geophys. Res.*, 100, 13,389-13,425.
- 1995 Katz, E. J., A. J. Busalacchi, M. Bushnell, L. Gourdeau, M. McPhaden, and J. Picaut: A comparison of coincidental time series of the ocean surface height by satellite altimeter, mooring, and inverted echo sounder. *J. Geophys. Res.*, 100, 25101-15108.
- 1995 Picaut, J., A. J. Busalacchi, M. J. McPhaden, L. Gourdeau, F. I. Gonzalez, and E. C. Hackert: Open-ocean validation of TOPEX/Poseidon sea level in the western equatorial Pacific. *J. Geophys. Res.*, 100, 25109 - 25127.
- 1995 Chen, D., S. E. Zebiak, A. J. Busalacchi, and M. A. Cane.: An improved procedure for El Nino forecasting: Implications for predictability. *Science*, 269, 1699-1702.
- 1996 Busalacchi, A. J.: Data assimilation in support of tropical ocean circulation studies. In: Modern Approaches to Data Assimilation in Ocean Modeling, P. Malonotte-Rizzoli, Ed., Elsevier, p. 235-270.
- 1996 Murtugudde, R., R. Seager, and A. J. Busalacchi: Simulation of tropical oceans with an ocean GCM coupled to an atmospheric mixed layer model. *J. Clim.*, 9, 1795-1815.
- 1996 Cane, M. A., A. Kaplan, R. N. Miller, B. Tang, E. C. Hackert, and A. Busalacchi: Mapping tropical Pacific sea level: data assimilation via a reduced state space Kalman filter. *J. Geophys. Res.*, 101, 22,599-22617.
- 1996 Menkes, C., J.-P. Boulanger, and A. J. Busalacchi: Evaluation of TOPEX and basin-wide TOGA TAO sea surface topographies and derived geostrophic currents. *J. Geophys. Res.*, 101, 25087 - 25099.
- 1997 Busalacchi, A. J.: Oceanic observations. Special Issue on Assimilation of Observations in Meteorology Oceanography, *J. Meteor. Soc. Japan*, 75, 131-154.
- 1997 Chen, D., S. E. Zebiak, M. A. Cane, and A. Busalacchi: On the initialization and predictability of a coupled ENSO forecast model. *Mon. Wea. Rev.*, 125, 773-788.
- 1997 Kalnay, E., D. Anderson, A. F. Bennett, A. J. Busalacchi, S. E. Cohn, P. Courtier, J. Derber, A. C. Lorenc, D. Parrish, J. Purser, N. Sato, and T. Schlatter: Data Assimilation in the ocean and in the atmosphere: What should we do next?, *J. Meteor. Soc. Japan*, 75, 489-496.
- 1997 Miller, R. N., A. J. Busalacchi, and E. C. Hackert: Applications of data assimilation to analyses of the ocean on large

- scales. Special Issue on Assimilation of Observations in Meteorology and Oceanography, *J. Meteor. Soc. Japan*, 75, 445-462.
- 1998 Hackert, E. C., R. N. Miller, and A. J. Busalacchi: An optimized design for a moored instrument array in the tropical Atlantic Ocean. *J. Geophys. Res.*, 103, 7491-7509.
- 1998 McPhaden, M. J., A. J. Busalacchi, R. Cheney, J.-R. Donguy, K. S. Gage, D. Halpern, M. Ji, P. Julian, G. Meyers, G. T. Mitchum, P. P. Niiler, J. Picaut, R. W. Reynolds, N. Smith, and K. Takeuchi: The Tropical Ocean-Global Atmosphere Observing System: A Decade of Progress. *J. Geophys. Res.*, 103, 14,169-14,240.
- 1998 Murtugudde, R., and A. J. Busalacchi: Salinity Effects in a Tropical Ocean Model. *J. Geophys. Res.*, 103, 3283-3300.
- 1998 Murtugudde, R., A. J. Busalacchi, and J. Beauchamp: Seasonal-to-Interannual Effects of the Indonesian Throughflow on the Tropical Indo-Pacific Basin. *J. Geophys. Res.*, 103, 21,425-21,441.
- 1998 Rothstein, L. M., R.-H. Zhang, A. J. Busalacchi, and D. Chen: A numerical simulation of the mean water pathways in the subtropical and tropical Pacific Ocean. *J. Phys. Oceanogr.*, 28, 322-343.
- 1998 Servain, J., A. J. Busalacchi, M. J. McPhaden, A. D. Moura, G. Reverdin, M. Vianna, and S. E. Zebiak: A Pilot Research Moored Array in the Tropical Atlantic (PIRATA). *Bull. Am. Meteor. Soc.*, 79, 2019-2031.
- 1998 Stockdale, T., A. J. Busalacchi, D. E. Harrison, and R. Seager: Oceanic Modeling of ENSO, *J. Geophys. Res.*, 103, 14,325-14,355.
- 1998 Zhang, R.-H., L. M. Rothstein, and A. J. Busalacchi: Origin of Upper-Ocean Warming and El Nino Change on Decadal Scales in the Tropical Pacific Ocean. *Nature*, 391, 879-882.
- 1999 Murtugudde, R., and A. J. Busalacchi: Interannual Variability of the Dynamics and Thermodynamics of the Tropical Indian Ocean, *J. Clim.*, 12, 2300-2326.
- 1999 Murtugudde, R., S. Signorini, J. R. Christian, A. J. Busalacchi, and C. R. McClain: Ocean Color Variability of the Tropical Indo-Pacific Basin Observed by SeaWiFS During 1997-98, *J. Geophys. Res.*, 104, 18,351-18,366.
- 1999 Signorini, S. R., R. G. Murtugudde, C. R. McClain, J. R. Christian, J. Picaut, and A. J. Busalacchi: Biological and Physical Signatures in the Tropical and Sub-tropical Atlantic, *J. Geophys. Res.*, 104, 18,367-18,382.
- 1999 Verron, J., L. Gourdeau, D. T. Pham, R. Murtugudde, and A. J. Busalacchi : An Extended Kalman Filter to Assimilate Satellite Altimeter Data into a Non-linear Numerical Model of the Tropical Pacific Ocean: Method and Validation, *J. Geophys. Res.*, 104, 5441-5458.
- 1999 Zhang, R.-H., and A. J. Busalacchi: A Possible Link between Off-equatorial Warm Anomalies Propagating along the NECC Path and the Onset of the 1997-98 El Nino. *Geophys. Res. Lett.*, 26, 2873-2876.
- 1999 Zhang, R.-H., L. M. Rothstein, A. J. Busalacchi, and X.-Z. Liang: On the Onset of the 1991-92 El Nino Event in the Tropical Pacific Ocean: The NECC Subsurface Pathway, *Geophys. Res. Lett.*, 26, 847-850.
- 1999 Zhang, R.-H., L. M. Rothstein, and A. J. Busalacchi: Interannual and Decadal Variability of the Subsurface Thermal Structure in the Pacific Ocean: 1961-1990, *Clim. Dynam.*, 15, 703-717.
- 2000 Gourdeau, L., J. Verron, T. Delcroix, A. J. Busalacchi, and R. Murtugudde: Assimilation of TOPEX/Poseidon altimetric data in a primitive equation model of the tropical Pacific Ocean during the 1992-1996 ENSO period. *J. Geophys. Res.*, 105, 8473-8488.
- 2000 Murtugudde, R., J. P. McCreary Jr., and A. J. Busalacchi: Oceanic processes associated with anomalous events in the Indian Ocean with relevance to 1997-1998. *J. Geophys. Res.*, 105, 3295-3306.
- 2001 Ballabrera, J., A. J. Busalacchi, and R. Murtugudde: Application of a reduced order Kalman filter to assimilate sea level, sea surface temperature, and wind stress into a coupled atmosphere-ocean model: Impact on the prediction of El Nino. *J. Clim.*, 14, 1720-1737.
- 2001 Hackert, E., A. Busalacchi, and R. Murtugudde: A wind comparison study using an ocean general circulation model for the 1997-98 El Nino. *J. Geophys. Res.*, 106, 2345-2362.
- 2001 Lazar, A., R. Murtugudde, and A.J. Busalacchi: A model study of temperature anomaly propagation from the subtropics to the tropics within the south Atlantic thermocline. *Geophys. Res. Lett.*, 28, 1271-1274.
- 2001 Murtugudde, R. G., J. Ballabrera-Poy, J. Beauchamp, A. J. Busalacchi: Relationship between zonal and meridional modes in the tropical Atlantic. *Geophys. Res. Letters*, 28, 4463-4466.
- 2001 Picaut, J., and A. J. Busalacchi: Tropical Ocean Variability Inferred by Satellite Altimetry. In: Radar Altimetry, L. Fu and A. Cazenave, Eds., Academic Press, 217-236.
- 2001 Turk, D., M. J. McPhaden, A. J. Busalacchi, and M. R. Lewis: Remotely sensed biological production in the tropical Pacific during 1992-1999. *Science*, 293, 471-474.
- 2002 Ballabrera-Poy, J., R. Murtugudde, and A. J. Busalacchi: On the potential impact of sea surface salinity observations on ENSO predictions. *J. Geophys. Res.*, 107 (C12), 8007, doi:10.1029/2001JC000834, SRF 8-1 to SRF 8-11.
- 2002 Christian, J., M. Verschell, R. Murtugudde, A. J. Busalacchi, and C. R. McClain: Biogeochemical modeling of the tropical Pacific Ocean I: Seasonal and interannual variability. *Deep Sea Res.*, 49, 509-543.

- 2002 Christian, J., M. Verschell, R. Murtugudde, A. J. Busalacchi, and C. R. McClain: Biogeochemical modeling of the tropical Pacific Ocean II: Iron biogeochemistry. *Deep Sea Res.*, 49, 545-565.
- 2002 Inui T., A. Lazar, P. Malanotte-Rizzoli, and A. J. Busalacchi: Wind stress effect on subsurface pathways from the subtropical to tropical Atlantic. *J. Phys. Oceanogr.*, 2257-2276.
- 2002 Lazar, A., T. Inui, A.J. Busalacchi, P. Malanotte-Rizzoli, L. Wang, and R. Murtugudde: Seasonality of the ventilation of the tropical Atlantic thermocline. *J. Geophys. Res.*, 107(C8), 3104, doi:10.1029/2000JC000667.
- 2002 Murtugudde, R., J. Beauchamp, and A. Busalacchi: Effects of penetrative radiation on the upper tropical ocean circulation, *J. Clim.*, 470-486.
- 2002 Picaut, J., E. Hackert, A. Busalacchi, R. Murtugudde, and G. Lagerloef: Mechanisms of the 1997-1998 El Niño-La Niña, as inferred from space-based observations. *J. Geophys. Res.*, 107(C5), 3037, doi:10.1029/2001JC000850, 5-1 to 5-18.
- 2003 Ballabrera-Poy, J., R. G. Murtugudde, J. R. Christian, and A. J. Busalacchi: Signal-to-noise ratios of observed monthly tropical ocean color. *Geophys. Res. Letters.*, 30, 1645, doi:10.1029/2003GL0116995.
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