

Michael James McPhaden

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 Seattle, Washington 98115
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PROFESSIONAL EXPERIENCE

1998–present Senior Scientist
 Pacific Marine Environmental Laboratory, Seattle, Washington

1993–present Affiliate Professor, School of Oceanography, University of Washington

1992–present Director, Tropical Atmosphere Ocean (TAO) Array Project Office
 Pacific Marine Environmental Laboratory, Seattle, Washington

1992–1998 Supervisory Oceanographer GM-15, Pacific Marine Environmental Laboratory,
 Seattle, Washington

1991–1992 Oceanographer, GS-15, Pacific Marine Environmental Laboratory, Seattle, Washington

1990–present Senior Fellow, Joint Institute for the Study of the Atmosphere and Ocean,
 University of Washington

1990–1993 Affiliate Associate Professor, School of Oceanography, University of Washington

1988–1990 Affiliate Assistant Professor, School of Oceanography, University of Washington

1987–present Senior Fellow, Joint Institute for Marine and Atmospheric Research,
 University of Hawaii

1986–1991 Oceanographer GS-14, Pacific Marine Environmental Laboratory, Seattle, Washington

1984–1986 Research Assistant Professor, School of Oceanography, University of Washington

1982–1984 Visiting Research Scientist, Joint Institute for the Study of the Atmosphere and Ocean,
 University of Washington

1980–1982 Research Scientist, Oceanography Section, National Center for Atmospheric Research

EDUCATION

1980 Scripps Institution of Oceanography, Ph.D., Physical Oceanography: Dissertation title: “Models of the Equatorial Ocean Circulation”

1973 State University of New York at Buffalo, B.S., Physics, magna cum laude

HONORS AND AWARDS

Editors’ Citation for Excellence in Refereeing, *Journal of Geophysical Research-Oceans*, 1995, 2016

Sverdrup Gold Medal, American Meteorological Society, 2015

Fellow, American Geophysical Union, 2014

Priestley Lecture, Commonwealth Scientific and Industrial Research Organisation, Australia, 2012

President, American Geophysical Union, 2010 - 2012

Fridtjof Nansen Medal, European Geosciences Union, 2010

Nobel Peace Prize (shared) for contributions to Assessments of the Intergovernmental Panel on Climate Change, 2007

Fellow, American Meteorological Society, 2007

Guest Professor, Ocean University of China, 2006

Fellow, the Oceanography Society, 2005

Scientific American “Science & Technology Web Awards” for El Niño Theme Page, 2005

Presidential Rank Award for Meritorious Federal Service, 2004

Listed in Thomson ISI Highly Cited Researchers in Geosciences, 2004

Grace Hopper Government Technology Award (“Gracie Award”) for TAO Project Leadership in the Innovative Application of Information Technology, 2003

American Geophysical Union, Frontiers of Geophysics Lecturer, 2002 Western Pacific
Geophysics Meeting
American Meteorological Society, Walter Orr Roberts Lecturer, 2002
American Meteorological Society, Special Award for Completing and Maintaining the TAO Array, 1999
Public Service Award, Federal Executive Board, Seattle, 1999
American Geophysical Union, Sverdrup Lecturer, Fall 1998 Meeting
Department of Commerce, Gold Medal, 1997
NOAA/OAR Outstanding Publication Award, 1999, 2000, 2002, 2004
NOAA/PMEL Outstanding Publication Award, 1989–1993, 1995, 1997, 1998, 2007
Phi Beta Kappa

PROFESSIONAL SOCIETIES

The Oceanography Society, 1988–present
American Geophysical Union, 1979–present
The American Meteorological Society, 1978–present
The European Geosciences Union, 2005–present
Marine Technology Society/IEEE, 1990

PROFESSIONAL SERVICE ACTIVITIES

Co-convenor, ENSO Science Symposium, Hobart, Australia, January 2019
Guest Editor, Ocean Dynamics (50th anniversary Liege Colloquium edition), 2018
Co-convenor, Second workshop on the Korea-US Indian Ocean Scientific (KUDOS) Research Program,
San Diego, CA, 2018
Chair, Oceanographic Research Awards Committee, American Meteorological Society, 2019
Member, Awards Oversight Committee, American Meteorological Society, 2019
Member, Oceanographic Research Awards Committee, American Meteorological Society, 2017-2018
Member, Suomi Technology Medal Award Committee, American Meteorological Society, 2018-2019
Member, International review committee for the Tropical Atlantic Observing System, 2017–2018.
Member, Advisory Committee, Centre for Southern Hemisphere Ocean Research (CSHOR),
Hobart, Australia, 2017-present
Co-chair, Scientific Organizing Committee, Fourth International ENSO Conference,
Guayaquil, Ecuador, 2018
Co-convenor, First workshop on the Korea-US Indian Ocean Scientific (KUDOS) Research Program,
Seoul, South Korea, 2017
Member, Oceanographic Research Awards Committee, American Meteorological Society, 2017-2018
Member, The Oceanography Society Fellows Evaluation Committee, 2017-2019
Member, US IIOE-2 Scientific Steering Committee, 2016 - present
Member, AGU Bowie Medal Committee, 2015-2018
Vice-Chair, AGU Development Board, 2015-2019
Chair, AGU Ethics Committee, 2015-2019
Member, Committee on Researcher Involvement in the AMS, 2015-2017
Member, International CLIVAR ENSO Diversity Task Team, 2015-2018
Convenor, AMS Annual Meeting Special Session on ENSO, Tropical Ocean-Atmosphere Interactions, and
Global Climatic Impacts: 20 Years after TOGA, 2015
Member, RAPID-AMOC Program Advisory Committee, 2014-present
Member, Indian Ocean GOOS (IOGOOS) Steering Committee, 2014-2019
Member, Scientific Organizing Committee, Third International ENSO Conference,
Guayaquil, Ecuador, 2014
Convenor, AGU Fall Meeting Special Session on the 30th Anniversary of the 1982-1983 El Niño
Chairman, Scientific Organizing Committee, Tropical Atlantic Climate Variability Conference,
Venice, Italy, 2013
President, American Geophysical Union, 2010 - 2012 (President-elect 2008 - 2010;
Past President 2012-2014)

Member, Review Committee, University of Maryland Department of Atmospheric and Oceanic Science, 2011

Member, IUGG Nominations Committee, 2010-2011

Member, International Scientific Advisory Committee, Centro Internacional para la Investigacion del Fenomeno de El Niño (CIIFEN), 2010-present

Member, National Academy of Science Advisory Panel on National Security Implications of Climate Change for U.S. Naval Forces, 2009-2011

Member, MIT/WHOI Joint Program Review Committee, 2009

Member, RAPID-WATCH Program Advisory Committee, 2008-2014

Contributing author, IPCC Fourth Assessment Report, 2007

Convener, IUGG Symposium on Interannual to Interdecadal Climate Variability, 2007

Member, RAPID (Rapid Climate Change) Review Committee, February 2007

Member, Review Committee, Cooperative Institute for Climate and Ocean Research (CICOR), June 2005

President, Ocean Sciences Section, American Geophysical Union, 2002–2004

Member, Executive Committee, AGU Ocean Sciences Section, 2000–2008

Member, IOC/WMO Joint Commission on Oceanography and Marine Meteorology, observations Coordination Group, 2001–present

Member, International CLIVAR Global Synthesis and Observations Panel, 2004–present

Member, International CLIVAR Indian Ocean Panel, 2003–present

Member, International CLIVAR Pacific Ocean Panel, 2001–present

Chairman, Tropical Moored Buoy Implementation Panel, 2001–present

Member, International CLIVAR/OOPC OceanSITES Working Group, 2000–present

Editorial Board, Bulletin of the American Meteorological Society, 2001–present

Member, PIRATA Steering Group, 1995–present

Member, International CLIVAR Ocean Observations Panel, 2000–2003

Member, OCEANOBS99 Conference Steering Committee, 1999

Member, AMS Committee on the Interaction of the Sea and the Atmosphere, 1999–2002

Member, O-CLIVAR Steering Group, 1996–1997

Member, Nominations Committee, The Oceanography Society, 1994–1996

Chairman, Pan American Climate Studies Subcommittee on Observations, 1994 –1996

Member, Organizing Committee, Final TOGA Conference, 1994–1995

Chairman, TAO Implementation Panel, 1992–2001

Member, Ocean Observing System Development Panel, 1992–1994

Member, International TOGA Scientific Steering Group, 1992–1994

Member, National Academy of Science Advisory Panel on Near-term Development of Operational Ocean Observations, 1991 – 1993

Member, WCRP Pacific Panel, 1990 – 1994

Member, International TOGA Scientific Steering Group Ad Hoc Committee on Moored Current Measurements, 1989

Member, WOCE Moored Measurements Implementation Panel, 1988 – 1991

Member, EPOCS Council, 1987 – 1994

Convener, The ENSO Event of 1986 – 1987 Fall AGU, San Francisco, 1987

Member, US/PRC bilateral air-sea interaction planning committee, 1986 – 1992

Member, WOCE Committee on Surface Layer Observations, 1986 – 1988

Convener, Equatorial Undercurrent Centennial Conference, Fall AGU, San Francisco, 1986

Co-Convener, Second International TOGA Workshop on Thermal Sampling, Hobart, Australia, November 1986

Convener, TOGA Thermal Data Center Workshop, Monterey, California, July 1985

Consultant, CCCO Pacific, Atlantic, and Indian Ocean Panels, 1984 – 1990

Co-Chairman, Pacific Subsurface Thermal Field Monitoring Steering Group 1984 – 1987

Member, U.S. Delegation to India, Indo-U.S. bilateral on monsoon variability, Bangalore, India, 1984

Co-Convener, Pacific Subsurface Thermal Field Monitoring Workshop, Seattle, 1984

Member, TOGA Pacific Drafting Workshop, Miami, 1983

Convener, Special Ocean/Atmospheric Sciences session on El Niño 1982 – 1983, Fall AGU Meeting, San Francisco, 1983
Member, Navy/NOAA Committee on Observational Strategies for Ocean Monitoring, Miami, 1983
Consultant, FOCAL/SEQUAL Programs, 1982 – 1986
Member, Tropic Heat Experiment Executive Committee, 1981 – 1982
Consultant, CAGE Feasibility Study Committee, 1981 – 1982
Member, Equatorial Theoretical Panel, 1978 – 1984

STUDENT RESEARCH SUPPORT

Hillary Scannell	2015-2017
Guan Cong	2015-2016
Yi Wang	2011-2013
Jacob Wenegrat	2010-2015
Natalia Stephanova	2005–2008
Xuebin Zhang	2002–2007
Weimin Wang	1994–2000
Xuri Yu	1991–1999
Rusty Brainard	1991–1994
Ken Duvall	1987
Scott Springer	1986–1989
Mary Landsteiner	1985–1987
Jeff Proehl	1984–1988

STUDENT COMMITTEES

University of Washington

Shirley Leung, Ph.D., 2020 (est.)
Nan-Husn Chi, Ph.D., 2019
Hillary Scannell, M.S. (Chairman), 2018
Jacob Wenegrat, Ph.D. (Chairman), 2015
Chuanli Jiang, Ph.D., 2008
Natalia Stephanova, M.S. (Chairman), 2008
Xuebin Zhang, Ph.D. (Chairman), 2008
Weimin Wang, Ph.D. (Chairman), 2000
Xuri Yu, Ph.D. (Chairman), 1999
Keith Brainard, Ph.D., 1995
Joanna Meunch, Ph.D., 1995
Scott Springer, M.S. (Chairman), Ph.D., 1990
William Kessler, Ph.D., 1989
David Battisti, Ph.D., 1988
Mary Landsteiner, M.S. (Chairman), 1988
Jeff Proehl, Ph.D. (Co-Chairman), 1988

Naval Postgraduate School

Rusty Brainard, Ph.D., 1994

University of Paris - VI

Lucia Bunge, Ph.D., 2006
Christophe Menkes, Ph.D., 1994

University of Toulouse - III

Christelle Bosc, Ph.D., 2008
Sophie Cravatte, Ph.D., 2003
Takeshi Izumo, Ph.D., 2003

University of Maryland
Gregory Foltz, Ph.D., 2003

Utah State University
Zachary Johnson, Ph.D., 2020 (est.)

Macquarie University, New South Wales, Australia
Shayne McGregor, Ph.D., 2008

Ocean University of China, Qingdao, China
Yi Wang, Ph.D., 2014

Chinese Academy of Sciences, Qingdao
Guan Cong, Ph.D., 2017

Andhra University, Visakhapatnam, India
B. Praveen Kumar, Ph.D. (thesis examiner), 2014

Anna University, Chennai, India
Simi Mathew, Ph.D. (thesis examiner), 2019

POSTDOC SUPPORT AND SUPERVISION

Kandaga Pujiana	2017 - present
Lu Dong	2015 - 2017
Aaron Levine	2014 - present
Ebenezer Nyadjro	2012 - 2014
Joke Luebbecke	2011 - 2013
Iskhaq Iskandar	2009 - 2011
Motoki Nagura	2008 - 2010
Xuebin Zhang	2008
Regina Rodrigues	2005 - 2007
Greg Foltz	2003 - 2006
Weimin Wang	2000
Dongxiao Zhang	1999 - 2001
Daniela Turk	1999 - 2001
Xuri Yu	1999
Chris Meinen	1998 - 2000
Kenong Bi	1995 - 1996
Meghan Cronin	1993 - 1995
Janet Sprintall	1992 - 1993
Eric Johnson	1990 - 1992

VISITING FELLOW SUPPORT

Dr. Roxy Mathew Koll (NRC Fellow), Indian Institute of Tropical Meteorology, India, 2018-2019
Dr. Wahyu Pandoe (Fulbright Fellow), Agency for the Assessment and Application of Technology (BPPT), Indonesia, 2014
Dr. Kunio Kutsuwada, Tokai University, 2000-2001
Dr. Kentaro Ando, Japan Agency for Marine-Earth Science and Technology (JAMSTEC), 1994-1995
Dr. Yoshifumi Kuroda, Japan Agency for Marine-Earth Science and Technology (JAMSTEC), 1990-1991

TEACHING EXPERIENCE

Lecturer, ECCO Summer School, Friday Harbor, Washington, May 2019
Lecturer, GODAE OceanView International School: New Frontiers in Operational Oceanography, Mallorca,

Spain, October 2017
Lecturer, CLIVAR-IPRC-WCRP ENSO Summer School, Puna, Hawaii, June 2008
Guest Lecturer, University of Washington, Ocean500: Current Problems in Oceanography, 2005, 2006, 2009
Lecturer, University of Rhode Island Summer School on Equatorial Dynamics, June 1991

OCEANOGRAPHIC RESEARCH CRUISES

RV *Baruna Jaya VII*, 20 February-9 March 2017, Jakarta to Sabang, Indonesia
RV *Fridtjof Nansen*, 18-27 November 2008, Mahe, Seychelles to Pemba, Mozambique
NOAA Ship *Ka'imimoana*, 10-23 September 2006, Nuku Hiva, French Polynesia to Honolulu, Hawaii
(Chief Scientist)
NOAA Ship *Ka'imimoana*, 5-27 April 2005, San Diego, CA to Galapagos Islands, Ecuador
NOAA Ship *Ka'imimoana*, 1-23 March 2002, Honolulu, HI to Galapagos Islands, Ecuador (Chief Scientist)
NOAA Ship *Ka'imimoana*, 27 September-15 October 1997, San Diego, CA to Nuku Hiva, French Polynesia
(Chief Scientist)
RV *Le Noroit*, 2-18 February 1992, Kwajalein, Marshall Islands to Noumea, New Caledonia
RV *Le Noroit*, 26 March-4 April 1991, Kwajalein, Marshall Islands to Noumea, New Caledonia
NOAA Ship *Malcolm Baldrige*, 20 April-22 May 1990, Honolulu, HI to Rodman, Panama (Chief Scientist)
Xiangyanghong #14, 12-28 October 1987, Pohnpei, Micronesia to Republic of Nauru
NOAA Ship *Oceanographer*, 17 October-10 November 1986, Seattle, WA to Manzanillo, Mexico
(Chief Scientist)
RV *Marion Dufresne*, May-July 1983, Dakar, Senegal to La Reunion

REFEREED PUBLICATIONS

Bourlès, B.M. Araujo, M.J. McPhaden, P. Brandt, G. Foltz, R. Lumpkin, H. Giordani, F. Hernandez, N. Lefèvre, P. Nobre, E. Campos, R. Saravanan, J. Trotte-Duhà, M. Dengler, J. Hahn, R. Hummels, J. Lübbecke, M. Rouault, L. Cotrim, A. Sutton, M. Jochum, and R. Perez, 2019: PIRATA: A sustained observing system for tropical Atlantic climate research and forecasting. *Earth Space Sci.*, 6, 577-616. <https://doi.org/10.1029/2018EA000428>.

Cai, W.L. Wu, M. Lengaigne, Tim Li, S. McGregor, J.-S. Kug, J.-Y. Yu, M.F. Stuecker, A. Santoso, X. Li, Y.-G. Ham, Y. Chikamoto, B. Ng, M.J. McPhaden, Y. Du, D. Dommenges, F. Jia, J.B. Kajtar, N. Keenlyside, X. Lin, J.-J. Luo, M. Martín del Rey, Y. Ruprich-Robert, G. Wang, S.-P. Xie, Y. Yang, S.M. Kang, J.-Y. Choi, B. Gan, G.-I. Kim, C.-E. Kim, S. Kim, J.-H. Kim, P. Chang, 2019: Pan-tropical climate interactions. *Science*, 36(6430), eaav4236, DOI: 10.1126/science.aav4236.

Cyriac, A., M.J. McPhaden, H.E. Phillips, N.L. Bindoff, and M. Feng, 2019: Seasonal evolution of the surface layer heat balance in the eastern subtropical Indian Ocean. *J. Geophys. Res.*, submitted.

Davis, R.E., L.D. Talley, D. Roemmich, B. Owens, D.L. Rudnick, R. Weller, J. Toole, M.J. McPhaden, and J. Barth, 2019: 100 years of Progress in Ocean Observations. *Am Meteorol. Soc.*, in press.

Foltz, G.R., et al, 2019: The Tropical Atlantic Observing System. *Front. Mar. Sci.*, doi:10.3389/fmars.2019.00206.

Guan, C., M.J. McPhaden, F. Wang, and S. Hu, 2019: Quantifying the role of oceanic feedbacks on ENSO asymmetry. *Geophys. Res. Lett.*, 46, 2140-2148. <https://doi.org/10.1029/2018GL081332>.

Hermes, J.C., et al, 2019: A sustained ocean observing system in the Indian Ocean for climate related scientific knowledge and societal needs. *Front. Mar. Sci.*, doi: 10.3389/fmars.2019.00355.

Hu, Z.-Z., B. Huang, J. Zhu, A. Kumar, and M.J. McPhaden, 2019: On the variety of coastal El Niño Events. *Clim. Dyn.*, 52(12), 7537-7552. <https://doi.org/10.1007/s00382-018-4290-4>.

- Leung, S., L. Thompson, M.J. McPhaden, and K.A.S. Mislan, 2019: ENSO drives near-surface oxygen and vertical habitat variability in the tropical Pacific. *Environ. Res. Lett.*, 14 (6), 064020. <https://doi.org/10.1088/1748-9326/ab1c13>.
- McPhaden, M.J., A. Santoso, and W. Cai, 2019: Understanding ENSO in a Changing Climate. *Eos, Trans. Am. Geophys. Union.*, 100, <https://doi.org/10.1029/2019EO124159>.
- Pujiana, K., M.J. McPhaden, A.L. Gordon, and A.M. Napitu, 2019: Unprecedented response of Indonesian throughflow to anomalous Indo-Pacific climatic forcing in 2016. *J. Geophys. Res.*, 124, 3737-3754. <https://doi.org/10.1029/2018JC014574>.
- Puy, M., J. Vialard, M. Lengaigne, E. Guilyardi, A. Voldoire, M. Balmaseda, G. Madec, C. Menkes, and M.J. McPhaden, 2019: Influence of Westerly Wind Events stochasticity of El Niño amplitude: the case of 2014 vs. 2015. *Clim. Dyn.*, 52, 7435-7454. DOI:10.1007/s00382-017-3938-9.
- Sutton, A.J., et al., 2019: Autonomous seawater pCO₂ and pH time series from 40 surface buoys and the emergence of anthropogenic trends, *Earth Syst. Sci. Data*, 11, 421-439. <https://doi.org/10.5194/essd-11-421-2019>.
- Cai, W., G. Wang, B. Dewitte, L. Wu, A. Santoso, K. Takahashi, Y. Yang, A. Carréric and M.J. McPhaden, 2018: Increased variability of eastern Pacific El Niño under greenhouse warming. *Nature*. 564, 201-206. <https://doi.org/10.1038/s41586-018-0776-9>.
- Dong, L. and M.J. McPhaden, 2018: Unusually warm Indian Ocean sea surface temperatures help to arrest development of El Niño in 2014. *Science Reports*, 8, 2249, doi:10.1038/s41598-018-20294-4.
- Huang, K., M.J. McPhaden, W. Wang, Q. Xie, J. Chen, Y. Shu, Q. Wang, J. Li, J. Yao, D. Wang, 2018: Vertical propagation of mid-depth zonal currents associated with surface wind forcing in the equatorial Indian Ocean. *J. Geophys. Res.* <https://doi.org/10.1029/2018JC013977>.
- Levine, A.F.Z., D.M.W. Frierson, M.J. McPhaden, 2018: AMO forcing of Multidecadal Pacific ITCZ variability. *J. Climate*, 31, 5749-5764.
- McPhaden, M.J., 2018: Understanding and Predicting El Niño and the Southern Oscillation. In: Chassignet, E.P., A. Pascual, J. Tintoré, and J. Verron (Eds.). *New Frontiers in Operational Oceanography. GODAE OceanView*, 815pp, <https://doi.org/10.17125/gov2018>.
- Nagura, M. and M.J. McPhaden, 2018: The Shallow Overturning Circulation in the Indian Ocean, *J. Phys. Oceanogr.*, 48, 413-434.
- Pujiana, K. and M.J. McPhaden, 2018: Ocean's response to the convectively coupled Kelvin waves in the eastern equatorial Indian Ocean. *J. Geophys. Res.*, 123, 5727-5741. <https://doi.org/10.1029/2018JC013858>.
- Scannell, H.A. and M.J. McPhaden, 2018: Seasonal mixed layer temperature balance in the southeastern tropical Atlantic. *J. Geophys. Res.*, 123, 5557-5570. <https://doi.org/10.1029/2018JC014099>.
- Timmermann, A., et al, 2018: El Niño-Southern Oscillation Complexity. *Nature*, 559, 535-545. <https://doi.org/10.1038/s41586-018-0252-6>.
- Yeh, S.-W., W. Cai, S.-K. Min, M.J. McPhaden, D. Dommenges, B. Dewitte, M. Collins, K. Ashok, S.-I. An, B.-Y. Yim, and J.-S. Kug, 2018: ENSO atmospheric teleconnections and their response to greenhouse gas forcing. *Rev. Geophys.*, 56, 185-206. doi:10.1002/2017RG000568.

- Zhang, Y., M. Feng, Y. Du, H. Philips, N. Bindoff, and M.J. McPhaden, 2018: Strengthened Indonesian Throughflow drives decadal warming in the southern Indian Ocean. *Geophys. Res. Lett.*, *45*, 6167-6175. <https://doi.org/10.1029/2018GL078265>.
- Brainard, R.E., T. Oliver, M.J. McPhaden, A. Cohen, R. Veneers, A. Heenan, B. Vargas-Angel, R. Rotjan, S. Mangubhai, E. Flint, and S.A. Hunter, 2017: Ecological Impacts of the 2015-2016 El Niño in the Central Equatorial Pacific. *Bull. Am. Meteorol. Soc.*, *98*, S21 – S26.
- Chen, G., W. Han, Y. Li, M.J. McPhaden, J. Chen, W. Wang, and D. Wang, 2017: Strong Intraseasonal Variability of Meridional currents near 5°N in the Eastern Indian Ocean: Characteristics and Causes. *J. Phys. Oceanogr.* *47*, 979-998.
- Cuyppers, Y., P. Bouruet-Aubertot, J. Vialard, and M.J. McPhaden, 2017: Focusing of internal tides by near-inertial waves, *Geophys. Res. Lett.*, *44*, doi:10.1002/2017GL072625.
- Dong, L. and M.J. McPhaden, 2017: The effects of external forcing and internal variability on the formation of interhemispheric sea surface temperature gradient trends in the Indian Ocean. *J. Climate*, *30*, 9077-9095.
- Dong, L. and M.J. McPhaden, 2017: Why has the relationship between Indian and Pacific Ocean decadal variability changed in recent decades? *J. Climate*, *30*, 1971-1983.
- Dong, L. and M.J. McPhaden, 2017: The role of external forcing and internal variability in regulating global mean surface temperatures on decadal timescales. *Environ. Res. Lett.*, *12*, 034011. <https://doi.org/10.1088/1748-9326/aa5dd8>.
- Girishkumar, M.S., J. Joseph, V.P. Thangaprakash, P. Vijay and M.J. McPhaden, 2017: Mixed layer temperature budget for the northward propagating summer monsoon intraseasonal oscillation (MISO) in the central Bay of Bengal. *J. Geophys. Res.*, *122*, 8841-8854. <https://doi.org/10.1002/2017JC013073>.
- Khodri, M., T. Izumo, J. Vialard, C. Cassou, M. Lengaigne, J. Mignot, E. Guilyardi, N. Lebas, Y. Ruprich-Robert, A. Robock, and M.J. McPhaden, 2017. How tropical explosive volcanic eruptions trigger El Niño events by cooling tropical Africa. *Nature Comm.*, *8*, doi:10.1038/s41467-017-00755-6.
- Levine, A.F.Z., M.J. McPhaden, and D.M.W. Frierson, 2017: The impact of the AMO on multidecadal ENSO variability. *Geophys. Res. Lett.*, *44*, doi:10.1002/2017GL072524.
- Lübbecke, J.F., and M.J. McPhaden, 2017: Symmetry of the Atlantic Niño mode, *Geophys. Res. Lett.*, *44*, 965-973, doi:10.1002/2016GL071829.
- McGregor, S., A. Sen Gupta, D. Dommengat, T. Lee, M.J. McPhaden, and W.S. Kessler, 2017: Factors influencing the skill of synthesized satellite wind products in the tropical Pacific. *J. Geophys. Res. Oceans*, *122*, doi:10.1002/2016JC012340.
- Santoso, A., M.J. McPhaden, W. Cai, 2017: The defining characteristics of ENSO extremes and the strong 2015/16 El Niño. *Rev. Geophys.*, *55*, 1079-1129. <https://doi.org/10.1002/2017RG000560>.
- Wang, G., W. Cai, B. Gan, L. Wu, A. Santoso, X. Lin, Z. Chen and M. J. McPhaden, 2017: Continued increase of extreme El Niño frequency long after 1.5°C warming stabilization. *Nature Climate Change*, DOI: 10.1038/NCLIMATE3351.
- Wang, Y. and M.J. McPhaden, 2017: Seasonal Cycle of Cross-Equatorial Flow in the Central Indian Ocean.

- J. Geophys. Res.*, 122, 3817-3827, doi:10.1002/2016JC012537.
- Dong, L. and M.J. McPhaden, 2016: Interhemispheric SST gradient trends in the Indian Ocean prior to and during the recent global warming hiatus. *J. Climate*, 29, 9077-9095.
- Guan, C. and M.J. McPhaden, 2016: Ocean processes affecting the 21st century shift in ENSO SST variability. *J. Climate*, 29, 6861-6879.
- Levine, A.F.Z., F.F. Jin, M.J. McPhaden, 2016: Extreme Noise-Extreme El Niño: How State-Dependent Noise Forcing Creates El Niño-La Niña Asymmetry. *J. Climate*, 29, 5483-5499. DOI: <http://dx.doi.org/10.1175/JCLI-D-16-0091.1>
- Levine, A.F.Z. and M.J. McPhaden, 2016: How the July 2014 Easterly Wind Burst Gave the 2015-6 El Niño a Head Start. *Geophys. Res. Lett.*, 43, 6503-6510. DOI:10.1002/2016GL069204.
- Nagura, M. and M.J. McPhaden, 2016: Zonal propagation of near surface zonal currents in relation to surface wind forcing in the equatorial Indian Ocean. *J. Phys. Oceanogr.*, 46, 3623-3638.
- Sutton, A.J., C.L. Sabine, R.A. Feely, W.-J. Cai, M.F. Cronin, M.J. McPhaden, J.M. Morell, J.A. Newton, J.-H. Noh, S.R. Ólafsdóttir, J.E. Salisbury, U. Send, D.C. Vandemark, 2016: Using present-day observations to detect when anthropogenic change forces surface ocean carbonate chemistry outside pre-industrial bounds. *Biogeosci.*, 13, 5065-5083, doi:10.5194/bg-13-5065-2016.
- Wenegrat, J.O. and M.J. McPhaden, 2016: A simple analytical model of the diurnal Ekman layer. *J. Phys. Oceanogr.*, 46, 2877-2894.
- Wenegrat, J.O. and M.J. McPhaden, 2016: Wind, waves, and fronts: Frictional effects in a generalized Ekman model. *J. Phys. Oceanogr.*, 46, 371-394.
- Amaya, D.J., S.-P. Xie, A.J. Miller, and M.J. McPhaden, 2015: Seasonality of tropical Pacific decadal trends during the 21st century global warming hiatus. *J. Geophys. Res.*, 120, doi:10.1002/2015JC010906.
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