

**Michael James McPhaden**

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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, TAO 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**

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”), given to the TAO project for  
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  
Editor's Citation for Excellence in Refereeing, *Journal of Geophysical Research*, 1995  
NOAA/OAR Outstanding Publication Award, 1999, 2000, 2002, 2004  
NOAA/PMEL Outstanding Publication Award, 1989–1993, 1995, 1997, 1998, 2007  
Who's Who in Science and Engineering  
Who's Who in the World  
Who's Who in the West  
Phi Beta Kappa

### **PROFESSIONAL SOCIETIES**

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

### **PROFESSIONAL SERVICE ACTIVITIES**

President-elect, American Geophysical Union, 2008–present  
Member, RAPID-WATCH Program Advisory Committee, 2008–present  
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–present  
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**

Natalia Stefanova	2005–
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

Jeff Proehl, Ph.D. (Chairman)  
Mary Landsteiner, M.S. (Chairman)  
Scott Springer, M.S. (Chairman), Ph.D.  
Xuri Yu, Ph.D. (Chairman)  
Weimin Wang, Ph.D. (Chairman)  
Xuebin Zhang, Ph.D. (Chairman)  
Natalia Stefanova, Ph.D. (Chairman)  
William Kessler, Ph.D.  
David Battisti, Ph.D.  
Keith Brainard, Ph.D.  
Joanna Meunch, Ph.D.  
Chuanli Jiang, Ph.D.

Naval Postgraduate School  
Rusty Brainard, Ph.D.

University of Paris - VI  
Christophe Menkes, Ph.D.  
Lucia Bunge, Ph.D.

University of Toulouse - III  
Sophie Cravatte, Ph.D.  
Takeshi Izumo, Ph.D.  
Christelle Bosc, Ph.D.

University of Maryland  
Gregory Foltz, Ph.D.

## **POSTDOC SUPPORT AND SUPERVISION**

Xuebin Zhang	2008
Regina Rodrigues	2005–2007
Greg Foltz	2003–2006
Dongxiao Zhang	1999–2001
Weimin Wang	2000
Xuri Yu	1999
Chris Meinen	1998–2000
Kenong Bi	1995–1996
Meghan Cronin	1993–1995
Janet Sprintall	1992–1993
Eric Johnson	1990–1992

## **OCEANOGRAPHIC RESEARCH CRUISES**

- 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., R. Lumpkin, M.J. McPhaden, F. Hernandez, P. Nobre, E. Campos, L. Yu, S. Planton, A. Busalacchi, A.D. Moura, J. Servain, and J. Trotte, 2008: The PIRATA Program: History, Accomplishments, and Future Directions. *Bull. Amer. Meteor. Soc.*, 89, 1111-1125.
- Cravatte, SE., T. Delcroix, D. Zhang, M.J. McPhaden, and J. Leloup, 2008: Observed freshening of the warming western tropical Pacific and extension of the Warm/Fresh Pool in recent decades. *Clim. Dyn.*, submitted.
- Foltz, G.R., and M.J. McPhaden, 2008: Impact of barrier layer thickness on SST in the central tropical North Atlantic. *J. Climate*, accepted.
- Foltz, G.R., and M.J. McPhaden, 2008: Impact of Saharan dust on tropical North Atlantic SST. *J. Climate*, in press.
- Foltz, G.R., and M.J. McPhaden, 2008: Trends in Saharan dust and tropical Atlantic climate during 1980-2006. *Geophys. Res. Lett.*, accepted.
- Foltz, G.R. and M.J. McPhaden, 2008: Seasonal mixed layer salinity balance of the tropical North Atlantic Ocean. *J. Geophys. Res.* 113, C02013, doi:10.1029/2007JC004178.

- Lee, T. and M.J. McPhaden, 2008: Decadal phase change in large-scale sea level and winds in the Indo-Pacific region at the end of the 20th century. *Geophys. Res. Lett.*, *35*, L01605, doi:10.1029/2007GL032419.
- McPhaden, M.J., 2008: Evolution of the 2006-07 El Niño: The Role of Intraseasonal to Interannual Time Scale Dynamics. *Adv. Geosci.*, *14*, 219-230.
- McPhaden, M.J., M.F. Cronin, and D.C. McClurg, 2008: Meridional structure of the surface mixed layer temperature balance on seasonal time scales in the eastern tropical Pacific. *J. Climate*, *21*, 3240-3260.
- McPhaden, M.J., G. Meyers, K. Ando, Y. Masumoto, V.S.N. Murty, M. Ravichandran, F. Syamsudin, J. Vialard, L. Yu, and W. Yu, 2008: RAMA: The Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction. *Bull. Am. Meteorol. Soc.*, accepted.
- Vialard, J., J.P. Duvel, M. McPhaden, P. Bouruet-Aubertot, B. Ward, E. Key, D. Bourras, R. Weller, P. Minnett, A. Weill, C. Cassou, L. Eymard, T. Fristedt, C. Basdevant, Y. Dandoneau, O. Duteil, T. Izumo, C. de Boyer Montégut, S. Masson, and F. Marsac, 2008: Cirene: Air-sea interactions in the Seychelles-Chagos thermocline ridge region. *Bull. Am. Meteorol. Soc.*, submitted.
- Vialard, J., G. Foltz, M.J. McPhaden, J.P. Duvel and C. de Boyer Montégut, 2008: Strong Indian Ocean sea surface temperature signals associated with the Madden-Julian oscillation in late 2007 and early 2008. *Geophys. Res. Lett.*, submitted.
- Zhang, X. and M.J. McPhaden, 2008: Eastern equatorial Pacific forcing of ENSO sea surface temperature anomalies. *J. Climate*, accepted.
- Cheng, W., M.J. McPhaden, D. Zhang, and E.J. Metzger, 2007: Recent changes in the Pacific subtropical cells inferred from an eddy resolving ocean circulation model. *J. Phys. Oceanogr.*, *37*, 1340-1356.
- Delcroix, T., S. Cravatte, and M.J. McPhaden, 2007: Decadal variations and trends in tropical Pacific sea surface salinity since 1970. *J. Geophys. Res.*, *112*(C3), C03012, doi:10.1029/2006JC003801.
- Yoneyama, K., et al, 2007: MISMO field experiment in the tropical Indian Ocean. *Bull. Am. Meteor. Soc.*, submitted.
- Behrenfeld, M.J., K. Worthington, R.M. Sherrell, F.P. Chavez, P. Strutton, M.J. McPhaden, and D.M. Shea, 2006: Controls on tropical Pacific Ocean productivity revealed through nutrient stress diagnostics. *Nature*, *442*, 1025-1028.
- Bennett, A.F., B.S. Chua, H.-E. Ngodock, D.E. Harrison, and M.J. McPhaden, 2006: Generalized inversion of the Gent-Cane model of the Tropical Pacific with Tropical Atmosphere-Ocean (TAO) data. *J. Mar. Res.*, *64*, 1-42.
- Cronin, M.F., C. Fairall, and M.J. McPhaden, 2006: An assessment of buoy derived and numerical weather prediction surface heat fluxes in the tropical Pacific. *J. Geophys. Res.*, *111*, C06038, doi:10.1029/2005JC003324.

- Feely, R.A., T. Takahashi, R. Wanninkhof, M.J. McPhaden, C.E. Cosca, S.C. Sutherland and M.-E. Carr, 2006: Decadal Variability of the Air-Sea CO<sub>2</sub> Fluxes in the Equatorial Pacific Ocean. *J. Geophys. Res.*, *111.*, C08S90, doi:10.1029/2005JC003129.
- Foltz, G.R. and M.J. McPhaden, 2006: Unusually warm sea surface temperatures in the tropical North Atlantic during 2005. *Geophys. Res. Lett.*, *33*, L19703, doi:10.1029/2006GL027394.
- Foltz, G.R. and M.J. McPhaden, 2006: The role of oceanic heat advection in the evolution of tropical North and South Atlantic SST anomalies. *J. Climate*, *19*, 6122-6138.
- Maes, C., K. Ando, T. Delcroix, W.S. Kessler, M.J. McPhaden, and D. Roemmich, 2006: Observed correlation of surface salinity, temperature and barrier layer at the eastern edge of the western Pacific warm pool. *Geophys. Res. Lett.*, *33*, L06601, doi:10.1029/2005GL024772.
- McPhaden, M.J., S.E. Zebiak, and M.H. Glantz, 2006: ENSO as an integrating concept in Earth science. *Science*, *314*, 1740-1745.
- McPhaden, M.J., X. Zhang, H.H. Hendon, and M.C. Wheeler, 2006: Large Scale Dynamics and MJO Forcing of ENSO Variability. *Geophys. Res. Lett.*, *33*(16), L16702, doi:10.1029/2006GL026786.
- Rodrigues, R.R., M.J. McPhaden, and D. Zhang, 2006: Decadal variability of the shallow overturning cells in the Pacific and Atlantic Oceans. *J. Phys. Oceanogr.*, (submitted).
- Schein, K.A. et al, 2006: The state of the climate 2005. *Bull. Am. Meteorol. Soc.*, *87*, S1-S102.
- Zhang, D., and M.J. McPhaden, 2006: Decadal variability of the shallow Pacific meridional overturning circulation: relation to tropical sea surface temperatures in observations and climate change models. *Ocean Modelling*, *15*, 250-273.
- Zhang, X. and M.J. McPhaden, 2006: Wind stress variations and interannual sea surface temperature anomalies in the eastern equatorial Pacific. *J. Climate*, *19*, 226-241.
- Capotondi, A., M.A. Alexander, C. Deser, and M.J. McPhaden, 2005: Anatomy and Decadal Evolution of the Pacific Subtropical-Tropical Cells (STCs). *J. Climate*, *18*, 3739-3758.
- Delcroix, T., M.J. McPhaden, A. Dessier, and Y. Gouriou, 2005: Time and space scales for sea surface salinity in the tropical oceans. *Deep-Sea Res.*, *52*, 787-813.
- Foltz, G.R. and M.J. McPhaden, 2005: Mixed layer heat balance on intraseasonal time scales in the northwestern tropical Atlantic Ocean. *J. Climate*, *18*, 4168-4184.
- Grodsky, S.A., J.A. Carton, C. Provost, J. Servain, J. A. Lorenzetti, and M.J. McPhaden, 2005: Tropical instability waves at 0°N, 23°W in the Atlantic: A case study using Pilot Research Moored Array in the Tropical Atlantic (PIRATA) mooring data. *J. Geophys. Res.*, *110*, C08010, doi:10.1029/2005JC002941.
- Levinson, D.H. et al, 2005: State of the Climate in 2004. *Bull. Am. Meteor. Soc.*, *86*(6), S1-S86.
- Cai, W. M.J. McPhaden, and M.A. Collier, 2004: Multidecadal fluctuations in the relationship between equatorial Pacific heat content anomalies and ENSO amplitude. *Geophys. Res. Lett.*, *31*, L01201, doi:10.1029/2003GL018714.
- Foltz, G.R., S.A. Grodsky, J.A. Carton, and M.J. McPhaden, 2004: Seasonal salt budget of the northwestern tropical Atlantic Ocean along 38°W. *J. Geophys. Res.*, *109*(C3), C03052, doi:10.1029/2003JC002111.

- Foltz, G.R. and M.J. McPhaden, 2004: 30-70 day oscillations in the tropical Atlantic. *Geophys. Res. Lett.*, *31*, L15205, doi:10.1029/2004GL020023.
- McPhaden, M.J., 2004: Evolution of the 2002–03 El Niño. *Bull. Am. Meteor. Soc.*, *85*, 677–695.
- McPhaden, M.J. and D. Zhang, 2004: Pacific Ocean circulation rebounds. *Geophys. Res. Lett.*, *31*, L18301, doi:10.1029/2004GL020727.
- Rajeevan, M. and M.J. McPhaden, 2004: Tropical Pacific upper ocean heat content variations and Indian summer monsoon rainfall. *Geophys. Res. Lett.*, *31*, L18203, doi:10.1029/2004GL020631.
- Serra, Y. and M.J. McPhaden, 2004: In situ observations of the diurnal variability in rainfall over the tropical Atlantic and Pacific Oceans. *J. Climate*, *17*, 3496–3509.
- Cosca, C.E., R.A. Feely, R. Wanninkhof, J. Boutin, J. Etcheto, and M.J. McPhaden, 2003: Seasonal and interannual variations of fCO<sub>2</sub>-SST relationships for the central and eastern equatorial Pacific. *J. Geophys. Res.*, *108*(C8), 3278, doi:10.1029/2000JC000677.
- Foltz, G.R., S.A. Grodsky, J.A. Carton, and M.J. McPhaden, 2003: Seasonal mixed layer heat budget of the tropical Atlantic Ocean. *J. Geophys. Res.*, *108*(C5), 3146, doi:10.1029/2002JC001584.
- McPhaden, M.J., 2003: Tropical Pacific Ocean heat content variations and ENSO persistence barriers. *Geophys. Res. Lett.*, *30*(9), 1480, doi:10.1029/2003GL016872.
- Scavia, D., M.P. Sissenwine, H.L. Dantzler, M.J. McPhaden, P.F. Moersdorf, 2003: NOAA's ocean observing programs. *Oceanography*, *16*, 61–67.
- Serra, Y.L. and M.J. McPhaden, 2003: Multiple time space comparisons of ATLAS buoy rain gauge measurements to TRMM satellite precipitation measurements. *J. Appl. Meteorol.*, *42*, 1045–1059.
- Zhang, D., M.J. McPhaden, and W.E. Johns, 2003: Observational evidence for flow between the subtropical and tropical Atlantic: The Atlantic subtropical cells. *J. Phys. Oceanogr.*, *33*, 1783–1797.
- Cronin, M.F. and M.J. McPhaden, 2002: Barrier layer formation during westerly wind bursts. *J. Geophys. Res.*, *107*(C12), 8020, doi:10.1029/2001JC001171.
- Cronin, M.F., N. Bond, C. Fairall, J. Hare, M.J. McPhaden, and R.A. Weller, 2002: Enhanced Oceanic and Atmospheric Monitoring for the Eastern Pacific. *Eos Trans. AGU*, *83*, 205.
- Delcroix, T. and M.J. McPhaden, 2002: Interannual sea surface salinity and temperature changes in the western Pacific warm pool during 1992–2000. *J. Geophys. Res.*, *107*(C12), 8002, doi:10.1029/2001JC000862.
- Feely, R.A., J. Boutin, C.E. Cosca, Y. Dandonneau, J. Etcheto, H.Y. Inoue, M. Ishii, C.L. Quéré, D. Mackey, M.J. McPhaden, N. Metzl, A. Poisson, and R. Wanninkhof, 2002: Seasonal and interannual variability of CO<sub>2</sub> in the equatorial Pacific. *Deep-Sea Res.*, *49*, 2443–2469.
- Kutsuwada, K. and M.J. McPhaden, 2002: Intraseasonal variations in the upper equatorial Pacific Ocean prior to and during the 1997–98 El Niño. *J. Phys. Oceanogr.*, *32*, 1133–1149.

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- Maes, C., M.J. McPhaden, and D. Behringer, 2002: Signatures of salinity variability in tropical Pacific Ocean dynamic height anomalies. *J. Geophys. Res.*, *107*(C12), 8012, doi:10.1029/2000JC000737.
- McPhaden, M.J., 2002: Mixed layer temperature balance on intraseasonal time scales in the equatorial Pacific Ocean. *J. Climate*, *15*(18), 2632–2647.
- McPhaden, M.J. and D. Zhang, 2002: Slowdown of the meridional overturning circulation in the upper Pacific Ocean. *Nature*, *415*, 603–608.
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- Thum, N., S.K. Esbensen, D.B. Chelton, and M.J. McPhaden, 2002: Air-sea heat exchange along the Northern Sea surface temperature front in the eastern tropical Pacific. *J. Climate*, *15*(23), 3361–3378.
- Chelton, D.B., S.K. Esbensen, M.G. Schlax, N. Thum, M.H. Freilich, F.J. Wentz, C.L. Gentemann, M.J. McPhaden, and P.S. Schopf, 2001: Observations of coupling between surface wind stress and sea surface temperature in the eastern tropical Pacific. *J. Climate*, *14*, 1479–1498.
- Dickinson, S., K.A. Kelly, M.J. Caruso, and M.J. McPhaden, 2001: A note on comparisons between TAO buoy and NASA scatterometer wind vectors. *J. Atmos. Oceanic Technol.*, *18*, 799–806.
- Godfrey, J.S., G.C. Johnson, M.J. McPhaden, G. Reverdin, and S. Wijffels, 2001: The Tropical Ocean Circulation. In: *Ocean Circulation and Climate - Observing and Modelling the Global Ocean*, G. Siedler, J. Church, and W.J. Gould, eds., *Academic Press*, 215–246.
- Johnson, G.C., M.J. McPhaden, and E. Firing, 2001: Equatorial Pacific Ocean horizontal velocity, divergence, and upwelling. *J. Phys. Oceanogr.*, *31*, 839–849.
- Kelly, K.A., S. Dickinson, M.J. McPhaden, and G.C. Johnson, 2001: Ocean currents evident in satellite wind data. *Geophys. Res. Lett.*, *28*, 2469–2472.
- McPhaden, M.J., T. Delcroix, K. Hanawa, Y. Kuroda, G. Meyers, J. Picaut, and M. Swenson, 2001: The El Niño/Southern Oscillation (ENSO) Observing System. In: *Observing the Ocean in the 21st Century*. Australian Bureau of Meteorology, Melbourne, Australia, 231–246.
- Meinen, C.S. and M.J. McPhaden, 2001: Interannual variability in warm water volume transports in the equatorial Pacific during 1993–1999. *J. Phys. Oceanogr.*, *31*, 1324–1345.
- Meinen, C.S., M.J. McPhaden, and G.C. Johnson, 2001: Vertical velocities and transports in the equatorial Pacific during 1993–1999. *J. Phys. Oceanogr.*, *31*, 3230–3248.
- Nowlin, Jr., M. Briscoe, W.D., N. Smith, M.J. McPhaden, D. Roemmich, P. Chapman, and J.F. Grassle, 2001: Evolution of a sustained ocean observing system. *Bull. Am. Meteorol. Soc.*, *82*, 1368–1376.
- Serra, Y.L., P.A'Hearn, H.P. Freitag, and M.J. McPhaden, 2001: ATLAS self-siphoning rain gauge error estimates. *J. Atmos. Oceanic Technol.*, *18*, 1989–2002.



- Turk, D., M.J. McPhaden, M.R. Lewis, and A.J. Busalacchi, 2001: Remotely-sensed biological production in the Tropical Pacific during 1992–1999. *Science*, 293, 471–474.
- Vialard, J., C. Menkes, J.-P. Boulanger, P. Delecluse, E. Guilyardi, M.J. McPhaden, and G. Madec, 2001: A model study of oceanic mechanisms affecting equatorial Pacific sea surface temperature during the 1997–98 El Niño. *J. Phys. Oceanogr.*, 31, 1649–1675.
- Wang, W. and M. J. McPhaden, 2001: Surface layer heat balance in the equatorial Pacific Ocean during the 1997–98 El Niño and the 1998–99 La Niña. *J. Climate*, 14, 3393–3407.
- Wang, W. and M.J. McPhaden, 2001: What is the mean seasonal cycle of surface heat flux in the equatorial Pacific?. *J. Geophys. Res.*, 106, 837–857.
- Bennett, A.F., B.S. Chua, D.E. Harrison, and M.J. McPhaden, 2000: Generalized inversion of Tropical Atmosphere-Ocean (TAO) data and a coupled model of the tropical Pacific, II: La Niña, error statistics, and array assessment. *J. Climate*, 13, 2770–2785.
- Cronin, M.F., M.J. McPhaden, and R.H. Weisberg, 2000: Wind forced reversing currents in the western equatorial Pacific. *J. Phys. Oceanogr.*, 30, 657–676.
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- Meinen, C.S. and M.J. McPhaden, 2000: Observations of warm water volume changes in the equatorial Pacific and their relationship to El Niño and La Niña. *J. Climate*, 13, 3551–3559.
- Nystuen, J.A., M.J. McPhaden, and H.P. Freitag, 2000: Surface measurements of precipitation from an ocean mooring: The underwater acoustic log from the South China Sea. *J. Appl. Meteorol.*, 39, 2182–2197.
- Wang, W. and M.J. McPhaden, 2000: The surface layer heat balance in the equatorial Pacific Ocean. Part II: Interannual variability. *J. Phys. Oceanogr.*, 30, 2989–3008.
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