

Maria Antonietta Capotondi

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EDUCATION:

- B.S.: 1981, Department of Physics, University of Pisa, Pisa , Italy
- PhD: 1993, Department of Physical Oceanography, MIT-WHOI Joint Program, Cambridge, MA, Thesis advisors: Paola Malanotte-Rizzoli, William R. Holland

PROFESSIONAL EXPERIENCE:

- 3/16–present: Research Scientist III, NOAA/ESRL/PSD and University of Colorado/CIRES, Boulder, CO
- 10/98-3/16: Research Scientist II, NOAA/ESRL/PSD and University of Colorado, CIRES, Boulder, CO
- 5/96–10/98: Research Associate, PAOS, University of Colorado, Boulder, CO (50%)
- 5/96–10/98: Visiting Scientist, CGD, NCAR, Boulder, CO (50%)
- 5/95–5/96: Visiting Scientist, CGD, NCAR, Boulder, CO
- 4/93–4/95: Postdoctoral Research. Scientist, ASP, NCAR, Boulder, CO (Advisor: Dr. William Holland)
- 4/90–4/92: Graduate Res. Assistant, ASP, NCAR, Boulder, CO
- 9/87–2/93: Graduate Res. Assistant, MIT, Cambridge, MA
- 5/85–5/86: Postdoctoral Fellow, IBM, Kingston, NY
- 1/83–8/87: Physical Oceanographer, Company Snamprogetti, Fano, Italy

PROFESSIONAL SERVICE ACTIVITIES:

- Co-Lead, NOAA MAPP Marine Prediction Task Force, October 2017 – present.
- Co-Chair, Joint PICES-CLIVAR Working Group on “Climate and Ecosystem Predictability”, July 2017 – present.
- Member, CLIVAR Pacific Region Panel, January 2016 – present.
- Co-Convener, Open session on Ocean Circulation, European Geophysical Union general Assembly 2018, Vienna, Austria.
- Co-Convener, “El Niño Southern Oscillation (ENSO) Diversity, Predictability, and Impacts”, Ocean Sciences Meeting 2018, Portland OR.
- Co-Convener, Open session on Ocean Circulation, European Geophysical Union general Assembly 2017, Vienna, Austria.

- Co-Convener, “ENSO dynamics, observations, and Predictability, AGU Fall Meeting 2016, San Francisco, CA.
- January 2016 – present. Member of CLIVAR Pacific Research Panel.
- Co-Convener, Open session on Ocean Circulation, European Geophysical Union general Assembly 2016, Vienna, Austria.
- Convener, session on “El Niño Southern Oscillation (ENSO) diversity in a changing climate”, Ocean Sciences meeting 2016, New Orleans, LA.
- Guest Editor, Climate Dynamics Special Collection on ENSO Diversity, October 1, 2015-March 31, 2016
- Member, US CLIVAR Phenomena, Observations and Synthesis Panel, 2010-2015
- Co-Chair, US CLIVAR ENSO Diversity Working Group 2012-2016
- Member, NCAR-Atmospheric Model Working Group Panel for the evaluation of the Community Atmospheric Model (CAM) component, 2014-2015
- Organizer, US CLIVAR workshop on ENSO Diversity, February 6-8, 2013 Boulder, CO
- Convener, Session on “The El Niño/Southern Oscillation continuum”, AGU Fall Meeting 2012
- Reviewer, Journal of Climate, Journal of Geophysical Research (Oceans), Geophysical Research Letters, Journal of Physical Oceanography, Nature Climate Change, Nature Communications, Scientific Reports
- Proposal Panel Reviewer, NSF Physical Oceanography, DOE, NOAA, NASA

GRANTS AWARDED

“Understanding and Quantifying the Predictability of Marine Ecosystem Drivers in the California Current System”, NOAA-CPO, 7/1/2017-6/30/2020 (*lead-PI: Dr. A. J. Miller, co-PIs: Drs. E. Di Lorenzo, A. Capotondi, and A. Subramanian*), \$170,000/year.

“Precursors and dynamics of ENSO events from 25 years of climate-quality satellite ocean observations”, NASA Physical Oceanography, 3/6/2015 -3/5/2018 (*Principal Investigator*)

“Collaborative research: Climate Variability and change in the U.S. GLOBEC regions as simulated by the IPCC climate models: Ecosystem implications”, NSF, 7/1/2008-6/30/2010 (*Principal Investigator*)

“Tropical Pacific decadal variability and its impacts on the atmosphere in climate models”, NSF Climate Dynamics, 6/1/2009-5/31/2011 (*Principal Investigator*)

“Decade-long droughts in the western U.S. and their connection with tropical Pacific decadal variability”, NOAA Climate and Global Change Program [Drought in Coupled Models (DRICOMP) program], 5/2007 (3 months support) (*Principal Investigator*)

“Collaborative research: Dynamics of ocean climate changes in the Gulf of Alaska”, NSF Physical Oceanography, 3/1/2005-2/29/2008 (*Principal Investigator*)

“Mechanisms of decadal variability in the tropical Pacific”, NOAA Climate and Global Change Program, starting date: 1/20/2001 (*Principal Investigator*)

STUDENT COMMITTEES

Samantha Stevenson, University of Colorado, Boulder, CO, PhD

Shayne McGregor, Macquarie University, New South Wales, Australia
PhD

Kobi Mosquera, University of Toulouse, Toulouse, France (PhD 2012)

Pamela Grothe, Georgia Institute of Technology, Atlanta, GA (PhD 2017)

Danielle Lemmon, University of Colorado, Boulder, CO (Graduate Student)

Aude Carreric, University of Toulouse, Toulouse, France (Current graduate student)

PEER-REVIEWED PUBLICATIONS:

Timmermann, A., S.-I. An, J.-S. Kug, F.-F. Jin, W. Cai, **A. Capotondi**, et al., 2018: El Niño-Southern Oscillation Complexity, *Nature*, in press.

Turi, G., M. Alexander, N. S. Lovenduski, **A. Capotondi**, J. Scott, C. Stock, J. Dunne, J. John, and M. Jacox, 2018: Response of O₂ and pH to ENSO in the California Current System in a high resolution global climate model. *Ocean Sci.*, 14, 69-86, [/https://doi.org/10.5194/os-14-69-2018](https://doi.org/10.5194/os-14-69-2018).

Capotondi, A. and P. Sardeshmukh, 2017: Is El Niño *really* changing? *Geophys. Res. Lett.*, **44**, doi:10.1002/2017GL074515.

Journal Highlights: “This elegantly simple analysis shows that changes in key El Niño properties observed after the late 1970s, including the variance of surface and subsurface fields and the El Niño spectral characteristics, did not occur “by chance” but were linked to significant changes in the system dynamics as represented in the dominant structures associated with the evolution of El Niño events from their initial to mature stages. “

Stevenson, S., **Capotondi, A.**, J. Fasullo, and B. Otto-Bliesner, 2017: Forced changes to twentieth-century ENSO diversity in a last Millennium context. *Clim. Dyn.*, DOI:10.1007/s00382-017-3573-5.

Capotondi, A., and P. D. Sardeshmukh, 2015: Optimal precursors of different types of ENSO events. *Geophys. Res. Lett.*, **42** (42), 9952-9960, doi:10.1002/2015GL066171.

- Bonfils, C., B. D. Santer, T. J. Phillips, K. Marvel, L.-Y. R. Leung, C. Doutriaux, and **A. Capotondi**, 2015: Relative contributions of mean-state shifts and ENSO-driven variability to precipitation changes in a warming climate. *J. Climate*, **28**, 9997-10013, doi:10.1175/JCLI-D-15-0341.1.
- Capotondi, A.**, and co-Authors, 2015: Understanding ENSO Diversity. *Bull. Amer. Meteor. Soc.*, **96**, 921-938, doi:10.1175/BAMS-D-13-00117.1. **Hot paper** (top 0.1%) on Web of Science as of 3/13/2017.
- Capotondi, A.**, 2013: ENSO diversity in the NCAR CCSM4 climate model. *J. Geophys. Res. Oceans*, **118**, 4755-4770, doi:10.1002/jgrc.20335.
- Capotondi, A.**, M. A. Alexander, N. A. Bond, E. N. Curchitser, and J. D. Scott, 2012: Enhanced upper ocean stratification with climate change in the CMIP3 models. *J. Geophys. Res.*, **117**, C04031, doi:10.1029/2011JC007409.
- Hare, J.A., J.P. Manderson, J.A. Nye, M.A. Alexander, P.J. Auster, D.L. Borggaard, **A. Capotondi**, K.B. Damon-Randall, E. Heupel, I. Mateo, L. O'Brien, D.E. Richardson, C.A. Stock, and S.T. Biegel, 2012: Cusk (*Brosme brosme*) and climate change: assessing the threat to a candidate marine fish species under the US Endangered Species Act. *ICES J. of Marine Science*, 69(10), 1753-1768.
- Deser, C., A. S. Phillips, R. A. Tomas, Y. Okumura, M. A. Alexander, **A. Capotondi**, J. D. Scott, Y. -O. Kwon, and M. Ohba, 2012. ENSO and Pacific Decadal Variability in Community Climate System Model Version 4. *J. Climate*, **25**, 2622-2651.
- Capotondi, A.**, and M. A. Alexander, 2010: Relationship between precipitation in the Great Plains of the United States and global SSTs: Insights from the IPCC-AR4 models, *J. Climate*, **23**, 2941-2958.
- Capotondi, A.**, 2010: ENSO ocean dynamics: Simulation by coupled general circulation models. In "Climate Dynamics: Why does climate vary?", AGU monograph Series, D.-Z. Sun and F. Bryan Editors, pp. 105-122.
- Penland, C., D.-Z. Sun, and **A. Capotondi**, 2010: A brief introduction to El Niño and La Niña. In "Climate Dynamics: Why does climate vary?", AGU monograph Series, D.-Z. Sun and F. Bryan Editors, pp. 53-64.
- Capotondi, A.**, V. Combes, A. A. Alexander, E. Di Lorenzo, and A. J. Miller, 2009: Low-frequency variability in the Gulf of Alaska from coarse and eddy-permitting ocean models, *J. Geophys. Res.*, **114**, C01017, doi:10.1029.
- Guilyardi, E., A. Wittenberg, A. Fedorov, M. Collins, C. Wang, **A. Capotondi**, G. J. van Oldenborgh, and T. Stockdale, 2009: Understanding El Niño in ocean-atmosphere general circulation models: Progress and challenges. *Bull. Amer. Met. Soc.*, **90**, 325-340.

- Capotondi, A.**, 2008: Can the mean structure of the tropical pycnocline affect ENSO period in coupled climate models? *Ocean Modelling*, **20**, 157-169.
- Alexander, M., **A. Capotondi**, A. Miller, F. Chai, R. Brodeur and C. Deser, 2008: Decadal variability in the Northeast Pacific in a physical-ecosystem model: The role of mixed layer depth and trophic interactions. *J. Geophys. Res., - Oceans*, **113**, C02017, doi:10.1029/2007JC004359
- Trites, A., A. J. Miller, H. D. G. Mascner, M. A. Alexander, S. J. Bograd, J. A. Calder, **A. Capotondi**, K. O. Koyle, E. Di Lorenzo, B. P. Finney, L. Fritz, E. J. Greg, C. E. Grosch, S. R. Hare, G. L. Hunt, J. Jahncke, N. B. Kachel, H.-J. Kim, and C. Ladd, 2007: Bottom-up forcing and the decline of the steller sea lions in Alaska: Assessing the ocean-climate hypothesis. *Fisheries Oceanography*, **16**, 46-67.
- Capotondi, A.**, A. Wittenberg, and S. Masina, 2006: Spatial and temporal structure of tropical Pacific interannual variability in 20th century climate simulations. *Ocean Modeling*, **15**, 274-298.
- Alexander, M. A., J. Yin, G. Branstator, **A. Capotondi**, C. Cassou, R. Cullather, Y.-O. Kwon, J. Norris, J. Scott, and I. Wainer, 2006: Extratropical Atmosphere-Ocean variability in CCSM3. *J. Climate*, **19**, 2496-2525.
- Deser, C., **A. Capotondi**, R. Saravanan, and A. Phillips, 2006: Tropical Pacific and Atlantic climate variability in CCSM3. *J. Climate*, **19**, 2451-2481.
- Capotondi, A.**, M. A. Alexander, C. Deser, and M. McPhaden, 2005a: Anatomy and decadal evolution of the Pacific Subtropical-Tropical Cells (STCs). *J. Climate*, **18**, 3739-3758.
- Capotondi, A.**, M. A. Alexander, C. Deser, and A. J. Miller, 2005b: Low-frequency pycnocline variability in the northeast Pacific. *J. Phys. Oceanogr.*, **35**, 1403-1420.
- Miller, A. J., E. Di Lorenzo, D. J. Neilson, H.-J. Kim, **A. Capotondi**, M. A. Alexander, S. J. Bograd, F. B. Schwing, R. Mendelsohn, K. Hedstrom, and D. L. Musgrave, 2005c: Interdecadal changes in mesoscale eddy variance in the Gulf of Alaska circulation: Possible implications for the steller sea lion decline. *Atmosphere-Ocean*, **43**, 231-240.
- Capotondi, A.**, M.A. Alexander, and C. Deser, 2003: Why are there Rossby wave maxima in the Pacific at 10°S and 13°N? *J. Phys. Oceanogr.*, **33**, 1549-1563.
- Capotondi, A.**, and M. A. Alexander, 2001: Rossby waves in the tropical North Pacific and their role in decadal thermocline variability. *J. Phys. Oceanogr.*, **31**, 3496-3515.
- Capotondi, A.**, 2000: Oceanic wave dynamics and interdecadal variability in a climate system model. *J. Geophys. Res.*, **105**, 1017-1036.

Capotondi, A., and W. R. Holland, 1997: Decadal variability in an idealized ocean model and its sensitivity to surface boundary conditions. *J. Phys. Oceanogr.*, **27**, 1072-1093.

Capotondi, A., and R. Saravanan, 1996: Sensitivity of the thermohaline circulation to surface buoyancy forcing in a two-dimensional ocean model. *J. Phys. Oceanogr.*, **26**, 1039-1058.

Capotondi, A., P. Malanotte Rizzoli, and W. R. Holland, 1995a: Assimilation of altimeter data into a quasi-geostrophic model of the Gulf Stream System. Part I: Dynamical considerations. *J. Phys. Oceanogr.*, **25**, 1130-1152.

Capotondi, A., W.R. Holland, and P. Malanotte Rizzoli, 1995b: Assimilation of altimeter data into a quasi-geostrophic model of the Gulf Stream System. Part II: Assimilation results. *J. Phys. Oceanogr.*, **25**, 1153-1173.

Holland, W.R., **A. Capotondi**, and M. M. Holland, 1995c: Advances in ocean modeling for climate-change research. *Reviews of Geophysics*, **33**, 1411-1424.

Chassignet, E., W. R. Holland, and **A. Capotondi**, 1992: Impact of the altimeter orbit on the reproduction of oceanic rings – application to a regional model of the Gulf Stream. *Oceanologica Acta*, **15**, 479-490.

Signell, R. P., R. C. Beardsley, H. C. Graber, and **A. Capotondi**, 1990: Effect of wave-current interaction on wind-driven circulation in narrow, shallow embayments. *J. Geophys. Res.*, **95**, 9671-9678.

Capotondi, A., V. Sonnad, and S. Chin, 1989: Parallel solution of the shallow-water equations using an explicit finite-difference algorithm. *Computer Physics Communications*, **52**, 195-205.

Clementi, E., D. Logan, V. Sonnad, Z. Christidis, and **A. Capotondi**, 1986: Solving engineering problems with a loosely coupled array of processors. *Computers in mechanical engineering*, **5**, 42-47.

INVITED ARTICLES (soft-reviewed)

Capotondi, A., K. B. Karnauskas, A. Miller, and A. Subramanian, 2017: ENSO diversity and its implications for US West Coast marine ecosystems. *US CLIVAR Variations*, **15**(1), 16-21.

Capotondi, A., Y.-G. Ham, A. T. Wittenberg, and J.-S. Kug, 2015: Climate model biases and El Niño Southern Oscillation (ENSO) simulation. *US CLIVAR Variations*, **13**(1), 21-25.

Capotondi, A., 2015: Atmospheric Science: Extreme La Niña events to increase. *Nature Climate Change*, **5** (2), 100-101. Note: News and Views, based on Cai, W., et al., *Nature Climate Change*, **5** (2), 132-137.

Capotondi, A., and A. Wittenberg, 2013: ENSO diversity in climate models. U.S. CLIVAR *Variations*, **11**, 10-14.

Capotondi, A., E. Guilyardi, and B. Kirtman, 2013: Challenges in understanding and modeling ENSO. *PAGES News*, **21**, 58-59.

PRESENTATIONS (2015)

“Understanding ENSO Diversity”, American Meteorological Society Annual Meeting, Phoenix, AZ, January 2015.

“Assessing systemic changes in ENSO”, CLIVAR workshop “ENSO in a changing climate”, Paris, July 2015.

“The ENSO Diversity working group (2012-2015)”, webinar presentation, July 2015, Invited.

“Precursors of ENSO Diversity”, US CLIVAR Summit, Tucson, AZ, August 2015. Invited.

“The role of oceanic processes in Tropical Pacific Decadal Variability”, National Academy of Sciences workshop on “Frontiers in decadal climate variability”, Woods Hole, MA, September 2-3, 2015. Invited.

“Optimal precursors of different types of ENSO events”, International Conference of Southern Hemisphere Meteorology and Oceanography, Santiago, Chile, October 2015

“ENSO diversity”, CLIVAR Pacific Panel meeting, Santiago, Chile, October 2015. Invited.

“Assessing systemic changes in ENSO (How long a dataset is needed?)”, 8th Atmospheric Reconstructions over the Earth (ACRE) workshop, Santiago, Chile, October 2015, Invited.

