

Magdalena Andres

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Research Interests

My research focus is on the upper and deep components of energetic flows in eddies and western boundary currents (WBCs). Specific problems that interest me include the influence of topography on ocean circulation, the effect of meso-scale eddies on WBC variability, the propagation of barotropic and baroclinic Rossby waves towards the basins' western boundaries, and WBC responses to atmospheric climate variability. I am expanding the scope of my research, which has largely emphasized the Kuroshio in the western North Pacific, to address problems in the North Atlantic including interactions between the shelf and open-ocean by the northeast U.S. coast, a region of marked sea level rise, and interactions between the shelf and fjords in eastern Greenland. I explore large-scale and meso-scale processes through observations and to help interpret those observations in a dynamical framework, I use idealized numerical models, laboratory experiments, and output from ocean general circulation models.

Education

1995	B.Sc.	University of Rhode Island, Chemical Engineering, with highest distinction.
2001	M.Sc.	University of Rhode Island, Oceanography (geological). Advisor: J. Schilling.
2008	Ph.D.	University of Rhode Island, Oceanography (physical). Advisor: M. Wimbush.

Positions

2015 – present	Associate Scientist w/o Tenure, Dept. of Physical Oceanography, WHOI.
2011 – 2015	Assistant Scientist, Dept. of Physical Oceanography, WHOI.
2009 – 2011	Postdoctoral Scholar, Dept. of Physical Oceanography, WHOI.
2009	Lecturer, Science and Technology Department, Bryant University; College of Continuing Education, University of Rhode Island; Science Department, Mater Ecclesiae College.
2003 – 2008	Graduate Research Assistant, Grad. School of Oceanography, Univ. of Rhode Island.
1999 – 2001	Graduate Research Assistant, Grad. School of Oceanography, Univ. of Rhode Island.
1995 – 1999	Research Engineer, MPM Corporation, Franklin, MA.

Awards and Honors

2014	Editors' Citation for Excellence in Refereeing - Geophysical Research Letters
2009 – 2011	WHOI Ocean and Climate Change Institute Postdoctoral Scholarship
2008	Webb Award
2007	University of Rhode Island Fellowship

2006	Lance A. Ricci Award
1999 – 2001	National Defense Science and Engineering Graduate Fellowship
1995	President's Award for Student Excellence in Chemical Engineering
1994	Tau Beta Pi
1994	AiChe Annual Chapter Award for Scholastic Achievement
1992	University College Scholar
1992	Phi Eta Sigma Freshman Honor Society

Refereed Publications

1. **Andres, M.**, S. Jan, T.B. Sanford, V. Mensah*, L. Centurioni, and J.W. Book, 2015. Mean Structure and variability of the Kuroshio from northeastern Taiwan to southwestern Japan, *Oceanography*. Submitted.
2. **Andres, M.**, J.M. Toole, D. Torres, W.M. Smethie Jr., T.M. Joyce, R.G. Curry, 2015. Stirring by deep cyclones and the evolution of Denmark Strait Overflow Water observed at Line W, *Deep Sea Research*. Submitted.
3. Yang, Y.J., S. Jan, M.-H. Chang, J. Wang, V. Mensah*, T.-H. Kuo, C.-J. Tsai*, C.-Y. Lee, **M. Andres**, L.R. Centurioni, Y.-H. Tseng, W.-D. Liang, and J.-W. Lai, 2015. Mean Structure and fluctuation of the Kuroshio east of Taiwan from in-situ and remote observations, *Oceanography*. Submitted.
4. Tsai, C.-J.* , **M. Andres**, S. Jan, V. Mensah*, T.B. Sanford, R.-C. Lien, and C. Lee, 2015. Fate of eddies that impinge on the Kuroshio east of Taiwan and northeast of Luzon, *Geophysical Research Letters*. In press.
5. **Andres, M.**, A. Silvano*, F. Straneo, and D.R. Watts, 2015. Icebergs and sea ice detected with inverted echo sounders, *Journal of Atmospheric and Oceanic Technology*, **32**(5), 1042-1057, doi:10.1175/JTECH-D-14-00161.1.
6. Forsyth*, J., **M. Andres**, and G.G. Gawarkiewicz, 2015. Recent accelerated warming of the continental shelf off New Jersey: Observations from the CMV Oleander XBT line, *Journal of Geophysical Research*, **120**, 2370-2384, doi:10.1002/2014JC010516.
7. **Andres, M.**, G.G. Gawarkiewicz, and J.M. Toole, 2013. Interannual sea level variability in the western North Atlantic: regional forcing and remote response. *Geophysical Research Letters*, **40**, 5915-5919, doi: 10.1002/2013GL058013.
8. **Andres, M.**, and C. Cenedese, 2013. Laboratory experiments and observations of cyclonic and anticyclonic eddies impinging on an island. *Journal of Geophysical Research Oceans*, **118**, doi:10.1002/jgrc.20081.
9. **Andres, M.**, J. Yang, and Y.-O. Kwon, 2012. Adjustment of a wind-driven two-layer system with mid-basin topography. *Journal of Marine Research*, **70**(6), 851-882.
10. Gawarkiewicz, G.G., R.E. Todd, A.J. Plueddemann, **M. Andres**, and J. P. Manning, 2012. Direct interaction between the Gulf Stream and the shelfbreak south of New England. *Scientific*

Reports, **2**(553), doi:10.1038/srep00553. *Contribution: analyzed SSH data and contributed to preparation of text and figures.*

11. **Andres, M.**, Y.-O. Kwon, and J. Yang, 2011. Observations of the Kuroshio's barotropic and baroclinic responses to basin-wide wind forcing. *Journal of Geophysical Research*, **116**, C04011, doi:10.1029/2010JC006863.
12. **Andres, M.**, J.-H. Park, M. Wimbush, X. Zhu, H. Nakamura, K. Kim, and K.-I. Chang, 2009. Manifestation of the Pacific Decadal Oscillation in the Kuroshio. *Geophysical Research Letters*, **36**, L16602, doi:10.1029/2009GL039216.
13. **Andres, M.**, J.-H. Park, M. Wimbush, X. Zhu, K.-I. Chang, and H. Ichikawa, 2008a. Study of the Kuroshio/ Ryukyu Current system based on satellite altimeter and *in situ* measurements. *Journal of Oceanography*, **64**, 937-950.
14. **Andres, M.**, M. Wimbush, J.-H. Park, K.-I. Chang, B.-H. Lim, D.R. Watts, H. Ichikawa, W. J. Teague, 2008b. Observations of Kuroshio flow variations in the East China Sea. *Journal of Geophysical Research*, **113**, C05013, doi:10.1029/2007 JC004200.
15. Park, J.-H., **M. Andres**, P.J. Martin, M. Wimbush, and D.R. Watts, 2006. Second-mode internal tides in the East China Sea deduced from historical hydrocasts and a model. *Geophysical Research Letters*, **33**(5).
16. **Andres, M.**, J. Blichert-Toft, J.-G. Schilling, 2004. Nature of the depleted upper mantle beneath the Atlantic: evidence from Hf isotopes in normal mid-ocean ridge basalts from 79°N to 55°S. *Earth and Planetary Science Letters*, **225**, 89-103.
17. **Andres, M.**, J. Blichert-Toft, and J.-G. Schilling, 2002. Hafnium isotopes in basalts from the southern Mid-Atlantic ridge from 40°S to 55°S: Discovery and Shona plume-ridge interactions and the role of recycled sediments. *Geochemistry Geophysics Geosystems*, **3**(10), 8502, doi:10.1029/2002GC 000324.

* Indicates a student involved in the research.

Other Products and Patent

Andres, M., 2014. "Image of Icebergs in Sermilik Fjord", *Nature Geosciences*, **7**(7), cover image. <http://www.nature.com/ngeo/journal/v7/n7/covers/index.html>.

Andres, M., 2008. An Observational Study of the Kuroshio in the East China Sea: Local, Regional, and Basin-wide Perspectives on a Western Boundary Current, *Ph.D. Thesis*, University of Rhode Island, pp. 136.

Andres, M., 2001. Hafnium Isotope Ratio in Mid-Ocean Ridge Basalts: a Global Survey and Focus on the Southern Mid-Atlantic Ridge (40°S to 55°S). *M. Sc. Thesis*, University of Rhode Island, pp. 96.

Andres, M., K.-I. Chang, C.-S. Hong, H. Ichikawa, D.-K. Lee, J.-H. Lee, B.-H. Lim, D.A. Mitchell, J.-H. Park, W. Teague K. Tracey, D.R. Watts, M. Wimbush, East China Sea Kuroshio 2002-2004 data report, GSO Technical Report No. 2005-02, 2005.

Pham-Van-Diep, Gerald C., and **M. Andres**, 2001. Method and apparatus for forming droplets, United States Patent, US 6,260,741 B1.

Professional Activities

Co-convenor of “Recent observations and modeling of the Kuroshio from its origin to the East China Sea” session at the *Pacific Asian Marginal Seas (PAMS) Meeting*, Naha, Japan. April 21-23, 2015.

Lead convenor organizing the Boundary Current Session for the 2013 *IAHS-IAPSO-IASPEI Joint Assembly*, Gothenburg, Sweden, July 22 – 26, 2013.

Physical Oceanography Department Seminar Coordinator, October 2011 – August 2012.

Participated in the *OOI Science Workshop*, UMass Dartmouth, MA, June 4 – 5, 2012.

Early Career Faculty Guest at the *UCAR Annual Meeting*, Boulder, CO, October 4 – 5, 2011.

Attended the *Marine Geoscience Leadership Symposium* held by the Consortium for Ocean Leadership, Washington, D.C., April 18 – 22, 2011.

Attended the *MPOWIR Pattullo Conference*, Charleston, SC, May 18 – 21, 2008.

Journal reviews: *Continental Shelf Research*, *Deep-Sea Research*, *Geophysical Research Letters*, *Journal of Geophysical Research*, *Journal of Oceanography*, *Journal of Physical Oceanography*, *Remote Sensing of Environment*, *Terrestrial Atmospheric and Ocean Sciences*.

Proposal reviews: US National Science Foundation (mail review), South African National Research Foundation (mail review), WHOI Director of Research (panel member, 2014).

WHOI committees: Physical Oceanography recruitment committee (2014 – 2015) and chair search committee (2013).

Outreach

Living Lab on the Point radio program with Heather Goldstone on WCAI, July 13, 2015: “Northeast Waters a Hotspot for Global Warming”, <http://capeandislands.org/post/northeast-waters-hotspot-global-warming> with episode also highlighted on the National Science Foundation Science360 site, <http://science360.gov/radio/episode/7701d69d-f91e-4187-8a10-58bd8d18dc13/monitoring-reveals-northeast-coastal-waters-warming-15-times-rate-past>.

Interview with the Falmouth Enterprise: “New Study Goes Deeper To Understand Ocean Warming”, Andrea F. Carter, posted online June 26, 2015, http://www.capenews.net/falmouth/news/new-study-goes-deeper-to-understand-ocean-warming/article_d88af95e-1c19-11e5-8a69-37013cc2750a.html.

Middle School guest-instructor for 5 th and 8 th grade science classes Lawn Avenue School, Jamestown, RI.	Nov. 22, 2010; Nov. 22 2011; April 30, 2012; March 6, 2013; June 12, 2013; March 6, 2014.
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Presented during student visits to WHOI: Harvard Univ. undergraduates Ursuline Academy 11 th and 12 th graders	March 22, 2012; April 3, 2014. October 9, 2014.
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Lab demonstrations for the
Prout School 10th grades.

April 14, 2014.

Cruises

August 2 – 13, 2015	<i>Adolf Jensen</i> , Sermilik Fjord, Greenland Recovered 3 PIES moorings in the fjord and on the shelf. Aided in CTD and water sampling operations.
May 1 – 12, 2014	<i>R/V Knorr</i> , North Atlantic Line W Finale, hydrography, mooring recovery, Argo float deployments.
August 19 – 26, 2013	<i>Viking Madsalex</i> , Sermilik Fjord, Greenland Deployed 3 PIES moorings in the fjord and on the shelf.
May 26 – June 4, 2013	<i>R/V Endeavor</i> , North Atlantic Line W hydrography cruise.
June 4 – 11, 2010	<i>R/V Kagoshima-maru</i> , East China Sea Recovered and redeployed IES instruments south of Okinawa, Japan.
September 13 – 23, 2006	<i>R/V Universitatis</i> , Adriatic Sea Recovered various instruments, made hydrographic measurements.
November 17 – 20, 2004	<i>R/V Kagoshima-maru</i> , East China Recovered IES instruments deployed across the Kuroshio.

Courses Taught

Introduction to Observational Physical Oceanography, MIT/WHOI Joint Program Course 12.808, Fall 2013, Fall 2014. (co-taught with Jake Gebbie).

Short Course for BP, Physical Oceanography. Instructor for BP employees visiting WHOI for an intensive course in ocean science, Sept. 12, 2011; Sept 24, 2012 and via video-link to BP sites in Houston, Sunbury, Aberdeen, and Luanda on June 12, 2014.

NF-POGO Center of Excellence at the Bermuda Institute of Ocean Sciences, Graduate Physical Oceanography Instructor for students from underdeveloped countries, Sept. 27 – Oct. 1, 2010; Aug. 22 – 26, 2011; Nov. 5 – 9, 2012.

Woods Hole Partnership in Education Program, Undergraduate Physical Oceanography Instructor for students from groups underrepresented in the sciences, June 23 – 24, 2010; June 9 – 13, 2011.

Advising

Co-advised a WHOI Guest Student supported by a Gori Fellowship, Alessandro Silvano, March – September 2014. (with Fiamma Straneo)

Co-advised a Summer Student Fellow, Jacob Forsyth, Summer 2014. (with Glen Gawarkiewicz)

Co-advised a winter-term student, Genevieve (Jay) Brett, January 2012. (with Young-Oh Kwon)

Hosted Vigan Mensah, a graduate student from the National Taiwan University, March 2012.

Presentations at Meetings and Workshops

- Andres, M.**, J. M. Toole, D. Torres and W. M. Smethie, Jr., Denmark Strait Overflow Water observed at Line W: its evolution and mixing via deep cyclones, *AMOC International Science Meeting* 21-24 July 2015, Bristol, U.K. Poster.
- Andres, M.**, Using pressure-sensor equipped inverted echo sounders (PIESs) to measure heat and ice in a Greenland fjord, *New England Glaciology Meeting*, Woods Hole, MA. April 16, 2015. Talk.
- Andres, M.**, and S. Jan, The structure and variability of the Kuroshio east of Taiwan and Luzon inferred from PIESs, *18th Pacific-Asian Marginal Seas (PAMS) Meeting*, Okinawa, Japan, 4/21/2015 – 4/23/2015. Invited Talk.
- Andres, M.**, S. Jan, V. Mensah, C.-J. Tsai, Connectivity in the Kuroshio east of Luzon and Taiwan inferred from PIESs and ADCPs, *ONR OKTV/OKMC PI Meeting*, Taipei Taiwan, January 26, 2015. Talk.
- Andres, M.**, F. Straneo, and D. Sutherland, Heat and ice in Sermilik Fjord: novel observational techniques using PIESs, *Fall American Geophysical Union Meeting*, San Francisco, CA, December 2014. Poster.
- Andres, M.**, D. Torres, J. M. Toole, and W. M. Smethie, Velocity structure along Line W based on a decade of shipboard measurements and satellite data, *U.S. AMOC Science Meeting*, Seattle, WA, September 9 – 11, 2014. Poster.
- Andres, M.**, S. Jan, and V. Mensah, On the fate and impact of mesoscale eddies in the western North Pacific: observations and laboratory experiments, *Ocean Sciences Meeting*, Honolulu, HI, February 2014. Poster.
- Andres, M.**, Interannual sea level variability from Nova Scotia to North Carolina, *MABPOM conference*, Graduate School of Oceanography, Narragansett, RI, October, 17, 2013. Talk.
- Andres, M.**, S. Jan, and V. Mensah, Kuroshio Transport East of Taiwan and the Effect of Mesoscale Eddies: Preliminary Results, *ONR OKTV/OKMC PI Meeting*, Seattle, WA, August 13, 2013 and *ONR Panel Review*, Chicago, September 16, 2013. Talks.
- Andres, M.**, and J. M. Toole, Variability on the Onshore Side of Line W: Remote or Local Forcing? *U.S. AMOC/U.K. RAPID International Science Meeting*, Baltimore, MD, July 16, 2013 and *IAHS - IAPSO - IASPEI Joint Assembly*, Gothenburg, Sweden, July 26, 2013. Poster.
- Andres, M.**, S. Jan, and V. Mensah, Kuroshio Transport East of Taiwan and the Effect of Mesoscale Eddies, *ONR OKTV/OKMC PI Meeting*, Kaohsiung Taiwan, April 2, 2012. Talk.
- Andres, M.**, Interaction of barotropic planetary Rossby waves with ocean ridges, *Ocean Sciences Meeting*, Salt Lake City, UT, February 2012. Poster.
- Andres, M.**, M. Nonaka, and H. Sasaki, Barotropic and Baroclinic Responses to Basin-Wide Wind Forcing: Insights on the Kuroshio from Observations and OFES Model Output *International Union of Geodesy and Geophysics*, Melbourne, Australia, July 2011. Talk.
- Andres, M.**, The barotropic response of the Kuroshio to wind forcing: Remote forcing of the Kuroshio in the East China Sea: observations and OFES data, *3rd OFES International Workshop held at JAMSTEC*, Yokohama, Japan, November 2010. Invited talk.

- Andres, M.**, Remote forcing of the Kuroshio in the East China Sea: transport variability at interannual to decadal time scales, *International Symposium on Boundary Current Dynamics*, Qingdao, China, May 2010. Invited talk.
- Andres, M.**, Y.-O. Kwon, and J. Yang, Local versus remote forcing of interannual to decadal variability in the Kuroshio, *Ocean Sciences Meeting*, Portland, OR. February 2010. Poster.
- Andres, M.**, J.-H. Park, M. Wimbush, X.-H. Zhu, and K.-I. Chang, Manifestation of the Pacific Decadal Oscillation in the North Pacific Western Boundary Current System, *US CLIVAR Western Boundary Current Workshop*, Phoenix, AZ, January 2009. Poster.
- Andres, M.**, J.-H. Park, M. Wimbush, and K.-I. Chang, 10-70 day variability of Kuroshio transport in the East China Sea, *Ocean Sciences Meeting*, Orlando, FL, March 2008. Poster.
- Andres, M.**, J.-H. Park, M. Wimbush, K.I. Chang, and H. Ichikawa, Observations of Kuroshio Variability in the East China Sea, *14th Annual PAMS/JECSS Meeting*, Hiroshima, Japan, May 2007. Invited talk.
- Andres, M.**, J.-H. Park, and M. Wimbush, Variation of the Kuroshio in the East China Sea, *Ocean Sciences Meeting*, Honolulu, HI, February 2006. Talk.
- Andres, M.**, J. Blichert-Toft, and J.-G. Schilling, Hf isotope compositions of MORB from the Mid-Atlantic Ridge (40°S to 55°S), *American Geophysical Union Meeting*, May, 2001. Poster.

Presentations at Seminar Series

“Line W and SYNOP: Does Deep Cyclogenesis under Gulf Stream Meanders Influence the DWBC?”

WHOI, September 15, 2015.

URI, September 18, 2015.

“Heat and Ice in a Greenland Fjord: Measurements with a Borrowed PIES”

Symposium in Honor of D. Randolph Watts, University of Rhode Island, April 10, 2015.

“Interannual temperature variability in the Middle Atlantic Bight from MV Oleander XBT data”

University of Massachusetts-Dartmouth, February 25, 2015.

WHOI, December 9, 2014.

Bermuda Institute of Ocean Sciences (Oleander Workshop), October, 17, 2014.

“Interannual seal level variability from Nova Scotia to Cape Hatteras: Is the Gulf Stream the tail or the dog?”

WHOI, October 15, 2013.

“The Kuroshio in the East China Sea: Variability at Different Temporal Scales”

National Taiwan University, Taipei, October 19, 2012.

“Interaction of barotropic flow with topography in a layered ocean”

WHOI, July 10, 2012.

University of Massachusetts-Dartmouth, May 9, 2012.

“Barotropic and Baroclinic Responses to Basin-Wide Wind Forcing: Insights on the Kuroshio from Observations and a 2-layer Model”

National Institute of Water and Atmospheric Research, New Zealand, July 4, 2011

WHOI, May 3, 2011.

Scripps Institution of Oceanography, UCSD, April 14, 2011.

University of Rhode Island/ Graduate School of Oceanography, January 28, 2011.

“Uses and Abuses of CPIES in the Kerama Gap”

WHOI Buoy Lunch, July 12, 2010.

“Observations of the Kuroshio in the East China Sea: Local, Regional, and Basin-wide Perspectives on a Western Boundary Current”

WHOI, May, 2009.

University of Massachusetts-Dartmouth, March, 2009.

Naval Research Laboratory, Stennis Space Center, January, 2009.

University of Delaware, September, 2008.

“Observations of the Kuroshio-Ryukyu Current System”

University of Rhode Island/ Graduate School of Oceanography, April 8, 2008.

“Kuroshio Observations in the East China Sea” in a Symposium in Honor of Mark Wimbush,

University of Rhode Island/ Graduate School of Oceanography, October 17, 2008.