

Curriculum Vitae

Sonya Allayne Legg

Program in Atmosphere and Ocean Sciences
Princeton University
Princeton, NJ 08542
Tel: +1 609-452-6582
email: Sonya.Legg@noaa.gov
Home page: <http://www.gfdl.noaa.gov/> sal

EDUCATION

- 1989-1992 **Imperial College, University of London, UK**
Dynamical meteorology and oceanography, PhD.
Thesis title: Open-ocean deep convection: the spreading phase.
Thesis supervisor: John Marshall.
- 1986-1989 **Oxford University, Keble College, UK**
Physics, BA Honours, First Class.

POSITIONS HELD

- Sept 2004 - present **Princeton University, Princeton.**
Research Oceanographer in Program in Atmospheric and Oceanic Sciences.
- May 2001 - Sept 2006 **Woods Hole Oceanographic Institution, Woods Hole.**
Associate Scientist
Awarded tenure Jan 2005.
- June 2003 - Sept 2003 **NOAA-GFDL and Princeton University, Princeton**
Visiting Fellow
- Sept 1997 - May 2001 **Woods Hole Oceanographic Institution, Woods Hole.**
Assistant Scientist
- Feb 1997 - Sept 1997 **University of California Los Angeles, Los Angeles, USA.**
Assistant Researcher in Inst. for Geophysics and Planetary Phys.
- Feb 1995 - Feb 1997 **Universities Corporation for Atmospheric Research, Boulder, USA**
NOAA Climate and Global Change program postdoctoral fellow.
(host institution: University of California Los Angeles)
- Feb 1993 - Jan 1995 **University of Colorado, Boulder, USA.**
Postdoctoral Research Associate
in Joint Institute for Laboratory Astrophysics.
- Feb 1993 - Jan 1995 **National Center for Atmospheric Research, Boulder, USA.**
Visiting postdoctoral scientist
- Sep 1991 - Oct 1992 **Massachusetts Institute of Technology, Cambridge, USA.**
Research Fellow
- Oct 1990 - Jun 1991 **Imperial College, London, UK.**
Student laboratory teaching assistant

Jul - Sep 1989 **Ecole Polytechnique Federal de Lausanne**,
Lausanne, Switzerland. *Student assistant*

1986 - 1987 **Royal Aerospace Establishment**, Farnborough, UK.
Student Scientist

FELLOWSHIPS AND AWARDS

2003 **NOAA-GFDL/Princeton University** Visiting Fellowship

1995-1997 **National Oceanic and Atmospheric Administration**, USA,
post-doctoral fellowship in Climate and Global Change

1989-1992 **Natural Environment Research Council**, UK,
studentship.

1986-1989 **Ministry of Defense**, UK,
student sponsorship.

1986-1989 **Keble College**, Oxford University, UK,
Open Scholarship.

TEACHING EXPERIENCE

- 2007: External examiner for PhD thesis defense at University of Waterloo, Canada.
- 2007 - present: Thesis committee member for 2 students in Atmosphere and Ocean Sciences program, Princeton University.
- 2006 - present: member of Graduate Work Committee, Atmosphere and Ocean Sciences program, Princeton University.
- 2006 - present: Lecturer in Atmosphere and Ocean Sciences program, Princeton University, teaching class 572 in “Atmospheric and Oceanic Wave Dynamics”, and assisting with class GEO 425 in “Intro to physical oceanography”.
- 2001- 2004: Member of MIT-WHOI Joint program in oceanography ”Joint Committee for Physical Oceanography”, providing oversight and advisory role in graduate program.
- 2000-2004: Thesis committee member for 2 students, chairman of the defense for 2 students’ oral examinations, secondary advisor for 2 students, all in MIT-WHOI joint program in oceanography.
- 2000,2002,2003: Designed and taught new graduate course in Geophysical Turbulence, MIT/WHOI Joint Program in Oceanography.
- 1990-1991: Laboratory demonstrations for physics undergraduates, Imperial College.
- Postdoctoral advisees: James Girton (2002-2004), Ulrike Riemenschneider (2004-2007), Lucas Merckelbach (2005-present) (co-advised with David Smeed, NOC, UK)
- Summer Guest Students supervised: 2 Woods Hole undergraduate summer student fellows (1998,2002); University of Girona PhD student (2005)

MEMBERSHIP OF PROFESSIONAL SOCIETIES

American Geophysical Union
European Geophysical Society
American Physical Society

PANELS AND COMMITTEES

- MIT/WHOI Joint Committee for Physical Oceanography, 2000-2004
- NSF review panel 2001
- Universities' Corporation for Atmospheric Research member representative for WHOI 2002-2004
- Coordinating PI for NSF/NOAA funded "Gravity Current Entrainment Climate Process Team", 2003-present.
- Co-convener of scientific sessions at AGU Ocean Sciences and EGS General Assembly
- Facilitator for session on "Key Physical Processes" at CLIVAR workshop on Ocean Component of Climate Models, June 2004.
- Associate member of IAPSO/SCOR working group 121 on Ocean Mixing, 2004-2007
- Member of US CLIVAR Process Studies and Model Improvement Panel, 2005-present; co-chair of panel, 2007-present.
- Member of Graduate Work Committee, Atmosphere and Ocean Sciences program, Princeton University, 2006-present.
- Member of Atmosphere and Ocean Sciences program website committee, 2006-2007.
- Member of Review Panel for NOAA Hollings Undergraduate Scholarship Program, 2007
- Mentor for MPOWIR, 2008-present

REFEREED PUBLICATIONS

Legg S. and J. Marshall, 1993. A heton model of the spreading phase of open-ocean deep convection, *J. Phys. Oceanogr.*, **23**, 1040-1056.

Julien K., S. Legg, J. McWilliams, and J. Werne, 1996. Penetrative convection in rapidly rotating flows: Preliminary results from numerical simulation, *Dyn. Atmos. Oceans*, **24** 237-249.

Julien K., S. Legg, J. McWilliams and J. Werne, 1996. Hard-Turbulence in rotating

Rayleigh-Benard convection, *Phys. Rev. E* **53** R5557.

Julien, K., S. Legg, J. McWilliams, and J. Werne, 1996. Rapidly rotating turbulent Rayleigh-Benard convection, *J. Fluid Mech.* **322**, 243-273.

Legg S., H. Jones, and M. Visbeck, 1996. A heton perspective of baroclinic eddy transfer in localized ocean convection, *J. Phys. Oceanogr.* **26**, 2251-2266.

Legg S. and J. Marshall, 1998. The influence of the ambient circulation on the spreading of convected fluid, *J. Mar. Res.* **56**, 107-139.

Legg, S., J. Gao, and J. McWilliams, 1998. Localization of ocean deep convection by a mesoscale eddy, *J. Phys. Oceanogr.* **28** 944-970.

The LabSea Group, 1998. The Labrador Sea Deep Convection experiment, *Bull. American Met. Soc.* **79**, 2033-2058.

Julien K., S. Legg, J. McWilliams and J. Werne, 1999. Plume structure in rotating convection. Part I: balances and ensemble statistics, *J. Fluid Mech.* **391**, 151-187.

Fischer K.W., S. Legg, W. H. Munk, R.M. Shuchman, R.W. Garwood, and J.P. Palshook, 1999. Modeled radar surface signature of deep ocean convection *IEEE Transactions of geoscience and remote sensing* **37**, 2050-2067.

Legg S., and J.C. McWilliams, 2000. Temperature and salinity variability in heterogeneous ocean convection *J. Phys. Oceanogr.*, **30**, 1188-1206.

Legg S. and J. C. McWilliams, 2001. Convective modifications of a geostrophic eddy field *J. Phys. Oceanogr.*, **31**, 874-891

Legg S., K. Julien, J. McWilliams, and J. Werne, 2001. Vertical transport by convective plumes: modification by rotation, *Phys. and Chem. of the Earth*, **26**, 259-262.

Legg S. and J. McWilliams, 2002. Sampling characteristics from isobaric floats in a convective eddy field, *J. Phys. Oceanogr.*, **32**, 527-544.

Legg S. and A. J. Adcroft, 2003. Internal wave breaking on concave and convex continental slopes, *J. Phys Oceanogr.* **33**, 2224-2246.

Legg S., 2004. Internal tides generated on a corrugated continental slope. Part I: Cross-slope barotropic forcing, *J. Phys Oceanogr.* **34**, 156-173.

Legg S., 2004. Internal tides generated on a corrugated continental slope. Part II: Along-slope barotropic forcing, *J. Phys Oceanogr.* **34**, 1824-1838.

Legg S., 2004. A simple criterion to determine whether convection is localized or distributed, . *J. Phys Oceanogr.* **34**, 2843-2846.

Legg S., R.W. Hallberg and J.B. Girton, 2006. Comparison of entrainment in overflows simulated by z-coordinate, isopycnal and nonhydrostatic models, *Ocean Modelling*, **11**, 69-97.

Legg S. and K.M.H. Huijts, 2006. Preliminary simulations of internal waves and mixing generated by finite amplitude tidal flow over isolated topography, *Deep Sea Research, part II*, **53**, 140-156.

Riemenschneider U. and S. Legg, 2007. Regional Simulations of the Faroe Bank Channel Overflow in a Level Model, *Ocean Modelling*, **17**, 93-122.

Green J.A.M., J.H. Simpson, S. Legg and M.R. Palmer, 2008. Internal waves, baroclinic energy fluxes and mixing at the European shelf edge, *Continental Shelf Research*, **28**, 937-950.

Jackson L., R.W. Hallberg and Legg S., 2008. A parameterization of shear-driven turbulence for ocean climate models, *J. Phys. Oceanogr.*, **38**, 1033-1053.

Legg S., L. Jackson and R.W. Hallberg, 2008. Eddy-resolving modeling of overflows, in “*Ocean Modeling in an Eddying regime*”, eds M.W. Hecht and H. Hasumi, AGU Geophysical Monographs, p63-82.

Legg S. and J. Klymak, 2008. Internal Hydraulic Jumps and Overturning Generated by Tidal Flow over a Tall Steep Ridge, *J. Phys. Oceanogr.*, **38**, 1949-1964.

Legg S., B. Briegleb, Y. Chang, E.P. Chassignet, G. Danabasoglu, T. Ezer, A.L. Gordon, S. Griffies, R. Hallberg, L. Jackson, W. Large, T.M. Ozgokmen, H. Peters, J. Price, U. Riemenschneider, W. Wu, X. Xu and J. Yang, 2008: Improving oceanic overflow representation in climate models: the gravity current entrainment climate process team. *Bull. Am. Met. Soc.*, in press

Klymak, J.M., S. Legg and R. Pinkel, 2008: High-mode stationary waves in stratified flow over large obstacles, *J. Fluid Mech.*, submitted.

RECENT INVITED TALKS

Courant Institute CAOS workshop on “Vortices and Waves in Geophysical Flows”, New York, 2006; European Geophysical Union, session on “Steep Topography”, Vienna, 2006; Warwick University symposium on “Geophysical and Environmental Turbulence, 2006; Lamont-Doherty Earth Observatory, Columbia University, 2005; Los Alamos National Laboratory, 2005; NOAA Climate and Global Change 100th postdoctoral fellow celebration, Silver Spring, 2005; Columbia University, 2004; CLIVAR workshop on “North Atlantic Thermohaline Circulation Variability”, Kiel, 2004; IAPSO/SCOR symposium

on “Ocean Mixing”, Victoria, 2004; CLIVAR workshop on “The Ocean component of climate models”, 2004; Southampton Oceanography Centre, 2003; Florida State University, 2003; Aha Hulikoa Hawaiian Winter Workshop on “Boundary mixing and its parameterization”, 2003; University of Chicago, 2002; Workshop on z-coordinate ocean models, MIT, 2002; NOAA Geophysical Fluid Dynamics Laboratory, 2002; WHOI GFD Summer School rotating convection symposium, 2002; Courant Institute, 2001; Johns Hopkins University, 2001; Cargese International Summer School on “Stirring and Mixing”, 2001; DOME workshop, Miami, 2001; AGU fall meeting, special session to mark 10 years of the UCAR postdoctoral program, 2000; Scripps Institute of Oceanography, 2000; California Institute of Technology, 2000; Aha Hulikoa Hawaiian Winter Workshop on “Internal Waves”, 1999.