

Andrew F. Thompson

NERC Advanced Fellow

Dept. of Applied Mathematics and Theoretical Physics
Centre for Mathematical Sciences
University of Cambridge
Wilberforce Road, Cambridge CB3 0WA
Tel: +44 (0) 1223 760431; Fax: +44 (0)1223 760419
E-mail: A.F.Thompson@damtp.cam.ac.uk
Webpage: <http://www.atm.damtp.cam.ac.uk/people/aft26>

British Antarctic Survey
High Cross, Madingley Road
Cambridge CB3 0ET
Tel: +44 (0) 1223 221362
E-mail: athmp@bas.ac.uk

Education

2006 Ph.D. in Oceanography, Scripps Institution of Oceanography, La Jolla, CA
2002 M.Phil. in Fluid Flow, University of Cambridge, U.K.
2001 Certificate of Advanced Study in Mathematics, University of Cambridge, U.K.
2000 B.A. in Engineering Sciences, Dartmouth College, Hanover, NH

Professional Experience

2010 - present **NERC Advanced Fellow**, British Antarctic Survey
2007 - 2010 **NERC Postdoctoral Fellow**, University of Cambridge
College Research Associate, St. John's College, Cambridge
2006 - 2007 **Senior Research Associate**, University of East Anglia
2002 - 2006 **Graduate Research Assistant**, Scripps Institution of Oceanography
2000 - 2002 **Keasbey Memorial Fellow**, Trinity College, University of Cambridge

Honors and Awards

2010 Natural Environment Research Council Advanced Fellowship, tenure 2010-2015
2008 Rupert Ford Travel Award, Royal Meteorological Society
2008 Invited contribution, Young Researchers' Issue, *Phil. Trans. Roy. Soc. A*
2007 Natural Environment Research Council Postdoctoral Fellowship, tenure 2007-2010
2006 Invited participant, Physical Oceanography Dissertation Symposium (PODS IV)
2006 Outstanding Student Paper Award, AGU Ocean Sciences Meeting
2006 California Space Institute Grant Fellowship
2005 Phi Beta Kappa Graduate Fellowship
2003 Woods Hole Oceanography Institution Geophysical Fluid Dynamics Fellowship
2002 National Defense Science and Engineering Graduate (NDSEG) Fellowship, tenure 2002-2005
2000 Keasbey Memorial Scholarship, tenure 2000-2002

Funded Research Grants

- 2010 - 2015 Natural Environment Research Council Advanced Research Fellowship, “Mesoscale Eddies at the Antarctic Margins” (single PI)
- 2010 - 2013 Antarctic Funding Initiative (Natural Environment Research Council), “GENTOO: Gliders Excellent New Tools for Observing the Ocean” (co-I, K. J. Heywood leading PI)
- 2009 - 2011 Natural Environment Research Council standard grant, “Mixing regions, mixing barriers and a closure theory for baroclinic turbulence” (co-I, J. G. Esler leading PI)
- 2008 Royal Society, Conference Grant to attend 2008 Ocean Sciences Meeting
- 2007 - 2010 Natural Environment Research Council award, “Coherent structures in baroclinic turbulence: jets, eddies and their influence on ocean circulation” (single PI)

Publications

Refereed Articles

- Thompson, A. F. & Richards, K. J., 2010. Low frequency variability of Southern Ocean jets. *J. Geophys. Res.*, submitted.
- Thompson, A. F., Haynes, P. H., Wilson, C. & Richards, K. J., 2010. Rapid Southern Ocean front transition in an eddy-resolving ocean GCM. *Geophys. Res. Lett.*, submitted.
- Heywood, K. J., Price, M. R., Stevens, D. P., King, B. A., Naveira Garabato, A. C. & Thompson, A. F., 2010. Topographically-forced internal variability of the Antarctic Circumpolar Current. *Ocean Dyn.*, submitted.
- Thompson, A. F., 2010. Jet formation and evolution in baroclinic turbulence with simple topography. *J. Phys. Oceanogr.*, **40**, 257-278.
- Hughes, C. W., Thompson, A. F. & Wilson, C., 2010. Identification of jets and mixing barriers from sea level vorticity measurements using simple statistics. *Ocean Model.*, **32**, 44-57.
- Thompson, A. F. & Rahmstorf, S., 2009. Ocean Circulation. In *Surface Ocean-Lower Atmosphere Processes*, C. Le Quéré and E. S. Saltzman, eds. American Geophysical Union, Washington DC, 99-118.
- Thompson, A. F., Heywood, K. J., Thorpe, S. E., Renner, A. & Trasviña Castro, A., 2009. Surface circulation at the tip of the Antarctic Peninsula from drifters. *J. Phys. Oceanogr.*, **39**, 3-26.
- Thompson, A. F., 2008. The atmospheric ocean: eddies and jets in the Antarctic Circumpolar Current. *Phil. Trans. Roy. Soc. A*, **366**, 4529-4541.
- Thompson, A. F. & Heywood, K. J., 2008. Frontal structure and transport in the northwestern Weddell Sea. *Deep-Sea Res. I*, **55**, 1229-1251.
- Thompson, A. F. & Young, W. R., 2007. Baroclinic eddy heat fluxes: zonal flows and energy balance. *J. Atmos. Sci.*, **64**, 3214-3231.

Thompson, A. F., Gille, S. T., MacKinnon, J. A. & Sprintall, J., 2007. Spatial and temporal patterns of small-scale mixing in Drake Passage. *J. Phys. Oceanogr.*, **37**, 572-592.

Thompson, A. F. & Young, W. R., 2006. Scaling baroclinic eddy fluxes: vortices and energy balance. *J. Phys. Oceanogr.*, **36**, 720-738.

Thompson, A. F. & Veronis, G., 2005. Diffusively-driven overturning of a stable density gradient. *J. Mar. Res.*, **63**, 291-313.

Thompson, A. F., Huppert, H. E., Worster, M. G. & Aitta, A., 2003. Solidification and compositional convection of a ternary alloy. *J. Fluid Mech.*, **497**, 167-199.

Thompson, A. F., Huppert, H. E. & Worster, M. G., 2003. Appendix: A global conservation model for diffusion-controlled solidification of a ternary alloy. *J. Fluid Mech.*, **483**, 191-197.

Non-Refereed Publications

Thompson, A. F., 2007. ADELIE cruise report, RRS James Clark Ross cruise 158, *UEA Cruise Report Series No. 9*, University of East Anglia, Norwich, U.K., 86 pp.

Thompson, A. F., 2006. Eddy fluxes in baroclinic turbulence. Ph.D. dissertation. University of California, San Diego.

Thompson, A. F., 2003. Diffusively-driven overturning from a stable density gradient. Proceedings of the Geophysical Fluid Dynamics Program.

Thompson, A. F., 2002. Aspects of the solidification of a ternary alloy. Masters Thesis. University of Cambridge.

Presentations

2010 *Connectivity and coherent structures in the Southern Ocean*. 2010 AGU Fall Meeting, San Francisco, **invited talk**.

2010 *Surface and subsurface signatures of fronts in the Southern Ocean*. Challenger Society 2010, Southampton, UK, **talk**.

2010 *Jet-topography interactions in the Southern Ocean*. CLIVAR Southern Ocean Panel Meeting, **invited talk**.

2010 *The structure and distribution of potential vorticity in the Antarctic Circumpolar Current*. International Polar Year Oslo Science Conference, Oslo, **talk**.

2010 *Jet-Topography interactions in the Southern Ocean*. Ocean Sciences Meeting, Portland, OR, **talk**.

2009 *Southern Ocean jets*. Ocean Modelling Group Meeting, Oxford, UK, **talk**.

2009 *Mixing across unsteady jets*. 17th Conference on Atmospheric and Oceanic Fluid Dynamics, Stowe, VT, **talk**.

- 2009 *Vacillating jets: baroclinic turbulence and topography*. EGU General Assembly 2009, Vienna, **talk**.
- 2008 *Jet formation and transport in baroclinic turbulence with simple topography*. Rotating Stratified Turbulence and Turbulence in the Atmosphere and Oceans. Cambridge, UK, **talk**.
- 2008 *Scaling baroclinic eddy fluxes: vortices and jets*. Structures and Waves in Anisotropic Turbulence Workshop. Warwick, UK, **talk**.
- 2008 *Jet formation and transport over simple topography*. Challenger Society 2008, Bangor, UK, **poster**.
- 2008 *Baroclinic eddy fluxes in quasi-geostrophic turbulence with simple topography*. Nonlinear Processes in Atmospheric and Oceanic Flows Workshop, Castro Urdiales, Spain, **talk**.
- 2008 *Surface drifters and topography at the tip of the Antarctic Peninsula*. AGU, Ocean Sciences Meeting, Orlando, FL, **invited talk**.
- 2007 *Topographically-steered jets at the tip of the Antarctic Peninsula*. IUGG XXIV, Perugia, **talk**.
- 2006 *Baroclinic eddy fluxes: vortices and β -plane jets*. Physical Oceanography Dissertation Symposium, Honolulu, HI, **talk**.
- 2006 *Spatial and temporal patterns of small-scale mixing in Drake Passage*. AGU, Ocean Science Meeting, Honolulu, HI, **talk**.
- 2005 *Stratification of a closed region containing two buoyancy sources*. 58th Annual Meeting of the Division of Fluid Dynamics, Chicago, IL, **talk**.
- 2005 *Scaling baroclinic eddy fluxes: vortices and energy balance*. 15th Conference on Atmospheric and Oceanic Fluid Dynamics, Cambridge, MA, **poster**.
- 2004 *Solidification and compositional convection of a ternary alloy*. Int. Congress of Theoretical and Applied Mechanics, Warsaw, **solicited talk**.
- 2004 *Scaling baroclinic eddy fluxes*. Global Circulation and the Atmosphere, Caltech, Pasadena, CA, **poster**.

Invited Seminars

- 2010 Climate Seminar Series, Harvard University, USA
- 2010 Environmental Science & Engineering Seminar Series, California Institute of Technology, USA
- 2010 Physical Oceanography Seminar Series, Woods Hole Oceanographic Institution, USA
- 2009 Program in Atmosphere, Oceans and Climate Seminar Series,
Massachusetts Institute of Technology, USA
- 2009 Ocean Science Seminar Series, University of Liverpool, UK
- 2009 Physical Oceanography & Climate Seminar Series,
National Oceanography Centre, Southampton, UK
- 2008 Climate, Atmospheric Sciences and Physical Oceanography Seminar Series,
Scripps Institution of Oceanography, USA
- 2008 Fluid Mechanics Seminar, DAMTP, University of Cambridge, UK

2008 Dept. of Space and Atmospheric Physics, Imperial College, London
2008 Proudman Oceanography Laboratory, Liverpool, UK
2008 Institute of Theoretical Geophysics, University of Cambridge, UK
2007 Applied Mathematics Seminar Series, University College London, UK
2007 Applied Modelling and Computation Group Seminar Series, Imperial College, UK
2007 British Antarctic Survey, Cambridge, UK
2007 Physical Oceanography & Climate Seminar Series,
National Oceanography Centre, Southampton, UK
2007 Department of Meteorology, University of Reading, UK
2006 School of Environmental Sciences, University of East Anglia, UK
2005 Department of Oceanography, CICESE, Ensenada, Mexico
2003 Institute of Theoretical Geophysics, University of Cambridge, UK

Teaching Experience

2009 - present **University of Cambridge**, co-Supervisor, Ph.D. student
Co-supervising Emma Thompson, a student at the British Antarctic Survey studying the influence of Southern Ocean jets on ACC transport (part of the DIMES project).

2009 - 2010 **University of Cambridge**, Supervisor, *Mathematics IA*, Natural Sciences Tripos
Conducted weekly problem sessions and tutorials for four groups of two students on mathematical methods (e.g. integration, differential equations, pdes, Fourier series).

2009 **University of Cambridge**, Advisor of undergraduate student
Co-supervised Samuel Bouvier, a visiting student from ENSTA in France. He performed geophysical turbulence simulations to examine the role of topography on heat transport.

2007 - 2008 **University of Cambridge**, Supervisor, *Dynamical Systems*, Part II of the Math. Tripos
Conducted bi-weekly problem sessions and tutorials for four groups of two students on topics including stability theory, bifurcation theory, chaos.

2007 **University of East Anglia**, Advisor of undergraduate student
Co-supervised Marie Porter on undergraduate research project. She analyzed surface drifter trajectories to calculate relative dispersion near the Antarctic Peninsula.

2006 **University of California, San Diego**, Advisor of two undergraduate students
Co-supervised Anais Madaule and Kristell Pedron on undergraduate summer project. They performed laboratory experiments to determine the circulation and stratification arising from multiple buoyancy sources in a closed tank.

2004 **Scripps Institution of Oceanography**, Teaching Assistant, *Fluid Dynamics*
Gave one week of lectures in this graduate-level course. Ran weekly problem solving sessions and office open hours.

Activities

- Reviewer** Journal of Fluid Mechanics, Journal of Physical Oceanography, Journal of the Atmospheric Sciences, Geophysical Research Letters, Journal of Geophysical Research-Oceans, Deep-Sea Research, Ocean Modelling, Antarctic Science, Ocean Science, Journal of Atmospheric and Oceanic Technology, Springer
- Reviewer** National Science Foundation, Natural Environment Research Council, Australian Antarctic Program
- Member** American Geophysical Union, Challenger Society for Marine Science, American Meteorological Society
- Organizer** Cambridge Oceanography Group, 2007 - present
International Polar Year Young Scientist Workshop, Challenger Society Meeting, 2008
Scripps Physical Oceanography Distinguished Lecturer Series, 2005
- President** Students@SIO, 2005 - 2006, (Vice-President, 2005)
- Member** Dartmouth Class of 2000 Executive Committee, 2000 - 2005
- Outreach** Multiple talks for elementary school children related to the ADELIE project, 2007
- Avenue Middle School, Norwich & Coton C of E School, Cambridge, UK
- Monsignor Gadoury Primary School, Woonsocket, RI, USA
DAMTP fluids laboratory open day, Cambridge Science Festival, 2008, 2010

Cruise Experience

- February 2007 **Antarctic Drifter Experiment: Links to Isobaths and Ecosystems (ADELIE)**
Deployed surface drifters and floats and carried out a hydrographic section in the Weddell Sea, off the tip of the Antarctic Peninsula on the RRS James Clark Ross.
- March 2005 **SIO High Resolution XBT/XCTD Network**
Collected a temperature and temperature/salinity section across Drake Passage using expendable instruments on the R/V Laurence M. Gould.
- August 1999 **Global Ocean Ecosystem Dynamics (GLOBEC) Program**
Mooring recovery from the R/V Oceanus over George's Bank in the Gulf of Maine.

Schools and Workshops

- March 2007 **Two-dimensional Turbulence**
Lorentz Center, University of Leiden, The Netherlands
- June 2004 **Alpine Summer School: *Transport in Geophysical Flows, Ten Years After***
Valle d'Aosta, Italy
- Summer 2003 **Geophysical Fluid Dynamics Program**
Woods Hole Oceanographic Institution
- September 2001 **Geophysical and Environmental Fluid Dynamics School**
University of Cambridge, UK

Graduate and Postgraduate Advisors

Postdoctoral Advisor: Professor Karen Heywood, University of East Anglia
Doctoral Advisor: Professor William Young, Scripps Institution of Oceanography
Masters Advisors: Professor Herbert Huppert & Professor Grae Worster, University of Cambridge

References

Prof. Peter H. Haynes
Dept. of Applied Mathematics and Theoretical Physics
University of Cambridge
Wilberforce Road, Cambridge CB3 0WA
Tel. +44 1223 337862
Email: phh@damtp.cam.ac.uk

Prof. Karen J. Heywood
School of Environmental Sciences
University of East Anglia
Norwich NR4 7TJ
Tel. +44 1603 592555
Email: k.heywood@uea.ac.uk

Prof. William R. Young
Scripps Institution of Oceanography, UCSD
Mail Code: 0213, 9500 Gilman Drive
La Jolla, CA 92093-0213, USA
Tel. +1 858 534 1380
Email: wryoung@ucsd.edu

Prof. Sarah T. Gille
Scripps Institution of Oceanography, UCSD
Mail Code: 0230, 9500 Gilman Drive
La Jolla, CA 92093-0213, USA
Tel. +1 858 822 4425
Email: sgille@ucsd.edu