Dhruv Balwada

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Education

PhD Geophysical Fluid Dynamics 2010-2016
Geophysical Fluid Dynamics Institute, Florida State University, USA

MS Applied and Computational Mathematics 2010-2015
Florida State University, USA

BE Chemical Engineering 2006-2010
Birla Institute of Technology and Science, India

Research Interests

Large-scale ocean circulation, mesoscale and submesoscale turbulence, eddy dynamics and parameterizations, Lagrangian observations and analysis methods.

Research Experience

Postdoctoral Research Associate Jan 2017-present
Courant Institute of Mathematical Sciences, New York, USA

Graduate Research Assistant 2010-2016
Florida State University, FL, USA

Undergraduate Researcher 2009
Center for Mathematical Modeling and Computer Simulations, Bangalore, India

Academic Activities

Planetary Boundary Layers in Atmospheres, Oceans, and Ice on Earth and Moons 2018
Kavli Institute of Theoretical Physics, Santa Barbara, CA, USA

Summer School on Fundamental Aspects of Turbulent Flow in Climate Dynamics 2017
Les Houches, Chamonix, France

Summer School on Dynamics, Stochastics and Predictability of the Climate System 2014
Valsavarenche, Valle d'Aosta, Italy

Visiting Student at WHOI Geophysical Fluid Dynamics Program 2013
Woods Hole, MA, USA

Summer School on Indian Ocean Dynamics 2010
Goa, India

Experience at Sea

Field work for Marine Field Method Course, 1 week in Apalachicola Bay 2015
US-5 DIMES Cruise, 3 weeks in Drake Passage 2013
UK-3 DIMES Cruise, 6 weeks in Scotia Sea 2012

Computational Skills

Frequently – Python, MATLAB, Fortran, Linux, LATEX, Paraview
Not within last 2 years – Java, C, C++, Javascript, HTML, Ferret

Teaching Experience

Instructor/Teaching Assistant (Fall 2014)

Introduction to Simple Models of oceans and climate (graduate level course, Supervised by Dr. Kevin Speer) – classroom teaching for 8 weeks, prepared course structure, course materials, homework, etc.

Teaching Assistant (5 semesters during graduate school)

Introduction to Oceanography, OCE1001 (online, undergraduate)

Service and Outreach

Reviewer

National Oceanographic and Atmospheric Administration-Climate Program Office, 2017.

Journal Reviewer

Journal of Physical Oceanography, Geophysical Research Letters, Ocean Modeling, Journal of Geophysical Research: Oceans, Quarterly Journal of Royal Meteorological Society.

Educational Outreach

- Classroom demonstrations for 7th graders, February 2015 – Talk, presentation and demos about general oceanography and rotating fluids.
- Science fair judge at Celebration Baptist Church for homeschooled 8th graders, January 2015.
- 9 educational videos (each 5 minutes in length) created in collaboration with CPALMS for K-12 educators to use in mathematics/physics/oceanography/environment curriculum, September 2013.

Mentorship

Undergraduate: Chelsea Dodge (Fall 2013, FSU), Nicholas Convery (Fall 2013, FSU)
High School Student: William Chen (Fall 2017, NYU)

References

1. K. Shafer Smith, New York University
   shafer@cims.nyu.edu
2. Ryan Abernathey, Columbia University
   rpa@ldeo.columbia.edu
3. Kevin Speer, Florida State University
   kspeer@fsu.edu

Publications

Published and Submitted

1. Modulation of Lateral Transport by Submesoscale Eddies and Inertia Gravity Waves
   Anirban Sinha, **D. Balwada**, N. Tarshish, and R. Abernathey
   Journal of Advances in Modeling Earth Systems (in review)
2. Submesoscale Vertical Velocities Enhance Tracer Subduction in an Idealized Antarctic Circumpolar Current
   Dhruv Balwada, S. Smith, R. Abernathey
   Geophysical Research Letters (2018)
3. Global Observations of Horizontal Mixing from Argo float and Surface drifter trajectories
   Christopher Roach, **D. Balwada**, K.G. Speer
   Journal of Geophysical Research: Oceans (2018)
4. Scale Dependent Distribution of Kinetic Energy from Surface Drifters in the Gulf of Mexico
   Dhruv Balwada, J.H. LaCasce & K.G. Speer
   Geophysical Research Letters (2016)
5. Horizontal Mixing in the Southern Ocean from ARGO Float Trajectories
   Christopher Roach, **D. Balwada**, K.G. Speer
   Journal of Geophysical Research: Oceans (2016)
6. Circulation and stirring in the South East Pacific Ocean and the Scotia Sea Sectors of the ACC
   Dhruv Balwada, K. G. Speer, J. H. LaCasce, B. Owens, R. Ferrari and J. Marshall
   Journal of Physical Oceanography (2016)
7. Tracking with Ranked Signals
   Tianyang Li, H. Pareek, P. Ravikumar, **D. Balwada** & K.G. Speer
   31 Conf. on Uncertainty in Artificial Intelligence (2015)
8. Float-derived Isopycnal Diffusivities in the DIMES experiment
   Joseph H. LaCasce, R. Ferrari, R. Tulloch, **D. Balwada** and K.G. Speer
   Journal of Physical Oceanography (2014)
9. The Diapycnal and Isopycnal Mixing Experiment: A First Assessment
   Sarah T. Gille, J. Ledwell, A. Naveira-Garabato, K. Speer, **D. Balwada**, A. Brearley, J. B. Girton, A. Griesel, R. Ferrari, A. Klocker, J. LaCasce, P. Lazarevich, N. Mackay, M. P. Meredith, M.J. Messias, B. Owens, J.-B. Sallée, K. Sheen, E. Shuckburgh, D. A. Smeed, L. C. St. Laurent, J. M. Toole, A. J. Watson, N. Wienders, and U. Zajaczkovski
   CLIVAR Exchanges (2012)

In Preparation

1. Diagnosing the Eddy Mixing Tensor to Dynamically Inform Parameterizations
   Dhruv Balwada, S. Smith, & R. Abernathey
2. Relative Dispersion in the Antarctic Circumpolar Current
   Dhruv Balwada, J.H. LaCasce, K.G. Speer, & R. Ferrari
3. Eddy Driven Meridional Transport Across the Antarctic Circumpolar Current
   Dhruv Balwada, L. Juillon, K. G. Speer, R. Ferrari, & J. Marshall
4. A Dispersion Field Study in a Shallow Estuary: Apalachicola Bay
   Natalie L. Geyer, **D. Balwada**, & Markus Huettel
5. The Impact of Seasonality in Eddy Iron Fluxes on Primary Production in the Southern Ocean
   Takaya Uchida, R. Abernathey, **D. Balwada**, G. McKinley, S. Smith, & M. Levy

6. Revisiting the Characterization of Seasonality in Phytoplankton Biomass in the Southern Ocean Using Bio-Optical Floats
   Takaya Uchida, **D. Balwada**, & R. Abernathey
7. Spectral Energy Fluxes from Surface Drifter Observation
   Jin-Han Xie, & **D. Balwada**

Selected Oral Presentations

1. Global Redi and Gent-McWilliams diffusivities from Surface drifters, Argo floats and RAFOS floats
   AGU Fall Meeting, December 2018
2. Submesoscale Subduction and Ventilation in an Idealized Southern Ocean Model
   Ocean Science Meeting, February 2017
3. Scale Dependent Distribution of Kinetic Energy from Surface Drifters in the Gulf of Mexico
   Atmospheric and Oceanic Fluid Dynamics, June 2017
4. A Lagrangian View of Oceanic Turbulence
   AOS Colloquium, CIMS, NYU, February 2017
5. Lagrangian Observations of Ocean Turbulence
   WHOI, August 2016
6. Lagrangian Observations of Ocean Turbulence
   CNLS, Los Alamos, August 2016
7. Potential vorticity and across ACC eddy transport in the Upper Circumpolar Deep Waters
   Ocean Science Meeting, AGU, February 2016:
8. A multi-basin three dimensional perspective on the meridional overturning circulation in the Southern Ocean
   Graduate Climate Conference, November 2015
9. Relative Dispersion in the Antarctic Circumpolar Current
   Lagrangian Analysis and Prediction of Coastal Ocean Dynamics Winter Harbor Meeting, July 2015
10. Relative Dispersion in the Antarctic Circumpolar Current
    Atmospheric and Oceanic Fluid Dynamics, June 2015
11. Floating around Antarctica
    Natural Sciences Graduate Symposium, October 2014
12. DIMES float results
    International Meeting for the Diapycnal and Isopycnal Mixing Experiment in the Southern Ocean, November 2013:
13. DIMES Floats: A Lagrangian perspective of flow and isopycnal mixing in the Southern Ocean (Invited talk)
    University of South Florida, October 2013
14. Preliminary results from Diapycnal and Isopycnal Mixing Experiment in the Southern Ocean (DIMES): Dispersion in the Southern Ocean (Invited talk)
    CSIR Centre for Mathematical Modelling and Computer Simulation (C-MMACS), May 2012