ALISTAIR ADCROFT

Program in Atmospheric and Oceanic Sciences

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EDUCATION

Ph.D. in Oceanography, Department of Physics, **Imperial College, London**   *1995*
(advisor John Marshall)
B.Sc., M.Phil, **Imperial College, London**   *1990*

EMPLOYMENT

Research Oceanographer   *2004-present*
Program in Atmospheric and Oceanic Sciences, **Princeton University**
Principal Research Scientist   *2003-2004*
Program in Atmospheres, Oceans and Climate, **Massachusetts Institute of Technology**
Visiting Research Oceanographer   *Summer 2003*
Program in Atmospheric and Oceanic Sciences, **Princeton University**
Research Scientist   *1999-2003*
Program in Atmospheres, Oceans and Climate, **Massachusetts Institute of Technology**
Research Fellow   *1997-1999*
Climate Modeling Initiative, **Massachusetts Institute of Technology**
UCAR Ocean Modeling Fellowship   *1995-1997*
(hosted by David Neelin) **University of California, Los Angeles**

COMMUNITY SERVICE ACTIVITIES

2021 - present	NCAR CESM Scientific Steering Committee (SSC)
2023 - 2024	International CLIVAR Ocean Model Development Panel co-chair
2019 - 2022	Expert Advisory Board member to IMMERSE H2020 (EU funded project)
2017 - 2022	International CLIVAR Ocean Model Development Panel member
2018 Jan	Paul Allen Philanthropies Climate Modelling charette, Seattle, WA
2014-2018	Associate editor AGU J. of Advances in Modeling Earth Systems

INVITED TALKS

2022 Nov	*Sea-ice, icebergs, and ice0shelves in climate models*
	COSIMA VI annual meeting (keynote)
2020 Sept	*Motivations, successes, and problems, with the Lagrangian-remap dynamical core*
	ECMWF annual seminar (invited)
2019 Oct	*State of the Art in Ocean (Climate) Modeling.*
	BIRS Workshop on physics-dynamics coupling in Earth System Models, Banff, CA
2019 Feb	Physical, Numerical, and Computational Challenges in Modelling Oceans for Climate.
	SIAM CSE, Spokane, WA (plenary speaker)
2015 June	*Coordinate-Free Modeling and Resolution-Independent Topography.*
	Gordon Research Conference Invited speaker on Coastal Ocean Modelling

2015 Mar	*Representing Topography in ESMs with Porous Barriers.*
	SIAM Conference on Computational Science and Engineering
2005 Mar	*Algorithmic considerations for modeling the ocean in general coordindates.*
	EGU General Assembly, Vienna, Austria

OTHER EXTERNAL ACTIVITIES (WORKSHOPS, PANELS, ETC.)

2020 Sept	ECMWF annual seminar on Numerical methods for atmospheric and oceanic modelling: recent advances and future prospects, Reading, UK
2020 Jan	COMMODORE workshop on numerical methods for ocean models, Hamburg
2020 Feb	CLIVAR OMDP business meeting, San Diego, CA
2019 Mar	CLIVAR OMDP business meeting, Tallahassee, FL
2019 Mar	Workshop on Sources and Sinks of Mesoscale Eddy Energy, FSU (CLIVAR sponsored)
2019 Feb	IMMERSE, European Commission project (Expert Advisory Board member)
2019 Jan	DRAKKAR workshop, Grenoble, France
2018 Nov	CLIVAR SSG meeting, OMDP representative, Washington D.C.
2018 Sept	COMMODORE workshop on numerical methods for ocean models, Paris
2018 May	Atmosphere, Oceans, and Computational Infrastructure workshop, CalTech
2018 Jan	CESM Winter Ocean Modelling Working Group, Boulder, CO
2017 Nov	Future of Earth System Modelling workshop, CalTech, Los Angeles, CA
2017 Oct	CLIVAR OMDP, pan-WRCP meeting, Exeter, UK
2017 Sum	Visiting Scientist at NCAR, Boulder, CO
2017 Feb	CESM Winter Ocean Modelling Working Group, Boulder, CO
2016 June	CESM Summer Ocean Modelling Working Group, Breckenridge, CO
2015 Oct	CLIVAR Workshop Translating Process Understanding to Improve Climate Models
2014 Apr	CLIVAR WGOMD Workshop on High Resolution Ocean Climate Modeling
2012 Sept	Isaac Newton Institute for Mathematical Sciences Adaptive Multiscale Methods for the Atmosphere and Ocean
2011 Sept	NSF-CMG Forward Looking Workshop on Mathematical Geosciences
2011 Feb	NERC UK Ocean Modelling Road-map steering group
2009 Oct	Organized CLIVAR-WGOMD meeting on Ocean, Sea-ice and Ice-shelf modeling (GFDL/Princeton)
2007 Nov	Eddy-Mixed Layer Interaction Climate Process Team (Seattle)
2007 Sum	CLIVAR-WGOMD, Workshop on Numerical Methods in Ocean Models Layered Ocean Model Meeting (Bergen)
2006 Sept	Eddy-Mixed Layer Interaction Climate Process Team (GFDL)
2006 May	Gravity Current Entrainment Climate Process Team (GFDL)
2005 Jan	Participated in CLIVAR Southern Oceans panel session on modeling
2004 Jun	Organized "Future directions" session for CLIVAR Workshop on the ocean component of climate models
2004 May	ONR Workshop on "Assessing the Effectiveness of Submesoscale Ocean Parameterizations"
2001-2004	Participant in the ONR "Experts Group" on Terrain-following Coordinate Ocean Modeling Systems.
2002 Sum	Organized and hosted the Z-coordinate Ocean Modeling meeting (pre-OMDP)
2000-2002	U.S. Climate Modeling Infrastructure working group.
2001 Sum	NOPP Review Panel (NSF-ONR)

AWARDS AND GRANTS

2021	American Geophysical Union, Ocean Sciences Award
2020-2025	Schmidt Futures, VESRI: Multiscale Machine Learning In coupled Earth System Modeling. (Co-PI, led by L. Zanna)
2019-2022	NOAA/NSF CPT, Ocean Transport and Eddy Energy. (Co-PI, led by L. Zanna)
2018-2020	NSF, Collaborative Research Modeling Giant Icebergs and Their Decay. (PI with T. Wagner)
2016-2018	ExxonMobil seed grant, Exploring the use of smoothed particle-hydrodynamics for modeling sea ice in fine-resolution circulation models for prediction and climate. (PI)
2015-2018	NSF, Collaborative Research Energetically Consistent, Resolution Aware, Parameterization of Meso-Scale Eddies. (Co-PI with M. Jansen)
2013-2016	NOAA-MAPP Collaborative Research: Representing calving and iceberg dynamics in global climate models. (PI)
2007-2009	National Science Foundation SGER grant: Toward a Community Environment for Advanced Oceanic Modeling.
2005-2011	National Aeronautics and Space Administration grant: Estimating the Circulation and Climate of the Ocean II: High Resolution Global-Ocean and Sea-Ice Reanalysis.
2002-2004	Office of Naval Research (USA) grant: Developing numerical methods for non-hydrostatic modeling of coastal scale processes. (PI)
2003	Princeton University Visiting Fellowship
1995-1997	Universities Corporation for Atmospheric Res., Ocean Model. Fellowship
1991-1993	National Environment Research Council, UK, Studentship

PROFESSIONAL SOCIETIES

American Geophysical Union (AGU), American Institute of Physics (AIP),
Society for Industrial and Applied Mathematics (SIAM)

TEACHING/MENTORING EXPERIENCE

Undergraduate interns: Eowyn Connolly-Brown, William Foust, Mon Tre'D Hudson, Nicholas Ordonez, Nabhonil Kar, Esther Liao, Paula Gradu

External examiner: U. New South Wales, Australia, M.I.T.

Post-doctoral fellows/mentees: Whit Anderson, Laurent White, Mehmet Ilicak, Malte Jansen, Alon Stern, Anders Damsgaard, Sina Khani, Alexander Huth

Courses:

2004 Fall	Lectures for AOS575: Numerical prediction of the Atmosphere and Ocean
2002-2004	Created/taught 12.950: Atmospheric and Oceanic Modeling (graduate course, published as MIT Open Course Ware)
2001 Fall	Co-wrote Ocean modeling (graduate course)
1992-1995	T.A. for Physics of the Fluid Earth (undergraduate course)

REFEREED PUBLICATIONS

(* indicates mentees/intern/postdoc at time of study)

[1] Adcroft, A., Hill, C., Marshall, J., Representation of Topography by Shaved Cells in a Height Coordinate Ocean Model, *Mon. Wea. Rev.*, 125 (9), p. 2293–2315, Sep. 1997. DOI: `10.1175/1520-0493(1997)125<2293:ROTBSC>2.0.CO;2`.

[2] Marotzke, J., Adcroft, A., Comment on "Climate control requires a dam at the Strait of Gibraltar", *Eos Trans. AGU*, 78 (45), p. 507–507, Nov. 1997. DOI: `10.1029/97EO00309`.

[3] Marshall, J., Adcroft, A., Hill, C., Perelman, L., Heisey, C., A finite-volume, incompressible Navier Stokes model for studies of the ocean on parallel computers, *J. Geophys. Res.*, 102 (C3), p. 5753–5766, Mar. 1997. DOI: `10.1029/96JC02775`.

[4] Marshall, J., Hill, C., Perelman, L., Adcroft, A., Hydrostatic, quasi-hydrostatic, and nonhydrostatic ocean modeling, *J. Geophys. Res.*, 102 (C3), p. 5733–5752, Mar. 1997. DOI: `10.1029/96JC02776`.

[5] Adcroft, A., How slippery are piecewise-constant coastlines in numerical ocean models? *Tellus A*, 50 (1), 1998. DOI: `10.3402/tellusa.v50i1.14514`.

[6] Adcroft, A. J., Hill, C. N., Marshall, J. C., A New Treatment of the Coriolis Terms in C-Grid Models at Both High and Low Resolutions, *Mon. Wea. Rev.*, 127 (8), p. 1928–1936, Aug. 1999. DOI: `10.1175/1520-0493(1999)127<1928:ANTOTC>2.0.CO;2`.

[7] Hoe, J. C., Hill, C., Adcroft, A., A Personal Supercomputer for Climate Research, *SC '99: PROCEEDINGS of the 1999 ACM/IEEE Conference on Supercomputing*, Nov. 1999, p. 59–59. DOI: `10.1109/SC.1999.10009`.

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[10] Stammer, D., Wunsch, C., Giering, R., Eckert, C., Heimbach, P., Marotzke, J., Adcroft, A., Hill, C. N., Marshall, J., Global ocean circulation during 1992–1997, estimated from ocean observations and a general circulation model, *J.-Geophys.-Res.*, 107 (C9), p. 3118, Sep. 2002. DOI: `10.1029/2001JC000888`.

[11] Legg, S., Adcroft, A., Internal Wave Breaking at Concave and Convex Continental Slopes, *J. Phys. Oceanogr.*, 33 (11), p. 2224–2246, Nov. 2003. DOI: `10.1175/1520-0485(2003)033<2224:IWBACA>2.0.CO;2`.

[12] Stammer, D., Wunsch, C., Giering, R., Eckert, C., Heimbach, P., Marotzke, J., Adcroft, A., Hill, C. N., Marshall, J., Volume, heat, and freshwater transports of the global ocean circulation 1993–2000, estimated from a general circulation model constrained by World Ocean Circulation Experiment (WOCE) data, *J. Geophys. Res.*, 108 (C1), p. 3007, Jan. 2003. DOI: `10.1029/2001JC001115`.

[13] Adcroft, A., Campin, J.-M., Rescaled height coordinates for accurate representation of free-surface flows in ocean circulation models, *Ocean Modelling*, 7 (3), p. 269–284, Jan. 2004. DOI: `10.1016/j.ocemod.2003.09.003`.

[14] Adcroft, A., Campin, J.-M., Hill, C., Marshall, J., Implementation of an Atmosphere–Ocean General Circulation Model on the Expanded Spherical Cube, *Mon. Wea. Rev.*, 132 (12), p. 2845–2863, Dec. 2004. DOI: `10.1175/MWR2823.1`.

[15] Campin, J.-M., Adcroft, A., Hill, C., Marshall, J., Conservation of properties in a free-surface model, *Ocean Modelling*, 6 (3), p. 221–244, Jan. 2004. DOI: `10.1016/S1463-5003(03)00009-X`.

[16] Losch, M., Adcroft, A., Campin, J.-M., How Sensitive Are Coarse General Circulation Models to Fundamental Approximations in the Equations of Motion? *J. Phys. Oceanogr.*, 34 (1), p. 306–319, Jan. 2004. DOI: `10.1175/1520-0485(2004)034<0306:HSACGC>2.0.CO;2`.

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[23] White*, L., Adcroft, A., A high-order finite volume remapping scheme for nonuniform grids: The piecewise quartic method (PQM), *Journal of Computational Physics*, 227 (15), p. 7394–7422, Jul. 2008. DOI: `10.1016/j.jcp.2008.04.026`.

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[25] Hallberg, R., Adcroft, A., Reconciling estimates of the free surface height in Lagrangian vertical coordinate ocean models with mode-split time stepping, *Ocean Modelling*, 29 (1), p. 15–26, Jan. 2009. DOI: `10.1016/j.ocemod.2009.02.008`.

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[33] Delworth, T. L., Rosati, A., Anderson, W., Adcroft, A. J., Balaji, V., Benson, R., Simulated Climate and Climate Change in the GFDL CM2.5 High-Resolution Coupled Climate Model, *J. Climate*, 25 (8), p. 2755–2781, Apr. 2012. DOI: `10.1175/JCLI-D-11-00316.1`.

[34] Dunne, J. P., John, J. G., Adcroft, A. J., Griffies, S. M., Hallberg, R. W., Shevliakova, E., GFDL's ESM2 Global Coupled Climate–Carbon Earth System Models. Part I: Physical Formulation and Baseline Simulation Characteristics, *J. Climate*, 25 (19), p. 6646–6665, Apr. 2012. DOI: `10.1175/JCLI-D-11-00560.1`.

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[38] Hallberg, R., Adcroft, A., Dunne, J. P., Krasting, J. P., Stouffer, R. J., Sensitivity of Twenty-First-Century Global-Mean Steric Sea Level Rise to Ocean Model Formulation, *J. Climate*, 26 (9), p. 2947–2956, 2013. DOI: `10.1175/JCLI-D-12-00506.1`.

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