GAEL FORGET

CURRENT POSITION

Research Scientist
Department of Earth, Atmospheric and Planetary Sciences,
Massachusetts Institute of Technology, 2007–present

EDUCATION

Massachusetts Institute of Technology, Cambridge, MA
Postdoctoral Researcher, 2005–2007
- Supervisor: Prof. Carl Wunsch

University of Brittany (UBO), Brest, France
Ph.D., physical oceanography, 2005
- Dissertation Topic: Argo Profiles And 4D Variational Assimilation To Monitor North Atlantic Climate Variability.
- Advisors: Dr. Herlé Mercier, Dr. Bruno Ferron

M.S., oceanography, meteorology, and environment, 2001
- Final Project Topic: Inverse Modeling Over The Western Equatorial Atlantic.

École Centrale Lyon (ECL), Lyon, France
M.S., engineering and fluid mechanics, 2000
- Final Project Topic: Objective Analysis of Argo Profile Data.

RESEARCH INTERESTS

Ocean circulation and climate variability; tracer transport and transformation processes; interaction of bio-geochemistry and physical processes; global cycles of heat, water, and carbon; observational turbulence statistics; forward and inverse modeling.

ASSOCIATION MEMBERSHIPS

MITgcm (MIT general circulation model) development team, 2005–present.

ECCO (Estimating the Circulation and Climate of the Ocean) consortium, 2005–present.

NSLCT (NASA Sea Level Change Team), 2015–present.

AGU (American Geophysical Union), 2005–present.

MODELLING COMMUNITY INVOLVEMENT

Design, development, and maintenance of forward and adjoint capabilities of the MITgcm.

Design, development, and maintenance of the ECCO version 4 model setup.

Design, development, and maintenance of the gcmfaces Matlab toolbox.

Design, production, dissemination, and archiving of ocean state estimates (OCCA, ECCO).

Contributions to ocean-seaice model intercomparison projects (CORE II, ORA-IP).

PEER-REVIEWED PUBLICATIONS

Song, H., Marshall, J., Follows, M., Dutkiewicz, S., and G. Forget, 2016: Source waters for the highly productive Patagonian shelf in the southwestern Atlantic. doi:10.1016/j.jmarsys.2016.02.009

Chaudhuri, A., R. M. Ponte, and G. Forget, 2016: Impact of uncertainties in atmospheric boundary conditions on ocean model solutions. doi:10.1016/j.ocemod.2016.02.003.

Chevallier, et al., 2016: Intercomparison of the Arctic sea ice cover in global ocean–sea ice reanalyses from the ORA-IP project. Climate Dynamics, 1-30, DOI: 10.1007/s00382-016-2985-y.

Danabasoglu, et al., 2016: North Atlantic simulations in Coordinated Ocean-ice Reference Experiments phase II (CORE-II). Part II: Inter-annual to decadal variability. Ocean Modelling, 97, 65-90, doi:10.1016/j.ocemod.2015.11.007.

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PEER-REVIEWED PUBLICATIONS

Forget, G., D. Ferreira, and X. Liang, 2015: On the observability of turbulent transport rates by argo: supporting evidence from an inversion experiment. Ocean Science, 11, 839–853, doi:10.5194/os-11-839-2015.

Forget, G., J.-M. Campin, P. Heimbach, C. N. Hill, R. M. Ponte, and C. Wunsch, 2015: Ecco version 4: an integrated framework for non-linear inverse modeling and global ocean state estimation. Geoscientific Model Development, 8, 3071-3104, doi:10.5194/gmd-8-3071-2015.

Forget, G. and R. Ponte, 2015: The partition of regional sea level variability. Progress in Oceanography, 137, 173–195, doi:10.1016/j.pocean.2015.06.002.

Piecuch, C., P., Heimbach, R. M., Ponte, and G. Forget, 2015: Sensitivity of contemporary sea level trends in a global ocean state estimate to effects of geothermal fluxes. Ocean Modelling, 96, 214-220.

McCaffrey, K., B. Fox-Kemper, and G. Forget, 2015: Estimates of Ocean Macro-turbulence: Structure Function and Spectral Slope from Argo Profiling Floats. Journal of Physical Oceanography, 45, 1773–1793.

Liang, X., C. Wunsch, P. Heimbach, and G. Forget, 2015: Vertical redistribution of oceanic heat content. Journal of Climate, 28 (9), 3821–3833.

Buckley, M. W., R. M. Ponte, G. Forget, and P. Heimbach, 2015: Determining the origins of advective heat transport convergence variability in the North Atlantic. Journal of Climate, 28 (10), 3943–3956.

Fukumori, I., O. Wang, W. Llovel, I. Fenty, and G. Forget, 2015: A near-uniform fluctuation of ocean bottom pressure and sea level across the deep ocean basins of the arctic ocean and the nordic seas. Progress in Oceanography, 134 (0), 152– 172.

Toyoda, T., et al., 2015: Interannual-decadal variability of wintertime mixed layer depths in the north pacific detected by an ensemble of ocean syntheses. Climate Dynamics, 1–17.

Toyoda, T., et al., 2015: Intercomparison and validation of the mixed layer depth fields of global ocean syntheses. Climate Dynamics, 1–21.

Storto, A., et al., 2015: Steric sea level variability (19932010) in an ensemble of ocean reanalyses and objective analyses. Climate Dynamics, 1–21.

Balmaseda, M., et al., 2015: The ocean reanalyses intercomparison project (ora-ip). Journal of Operational Oceanography, 8 (sup1), s80–s97.

Buckley, M. W., R. M. Ponte, G. Forget, and P. Heimbach, 2014: Low frequency SST and upper-ocean heat content variability in the North Atlantic. Journal of Climate, 27.

Danabasoglu, G., et al., 2014: North Atlantic simulations in coordinated ocean-ice reference experiments phase II (core-II). Part I: Mean states. Ocean Modelling, 73 (0).

Speer, K. and G. Forget (2013): Global distribution and formation of mode waters. Chapter 9 in: Ocean Circulation and Climate: a 21st Century Perspective, 211–226, doi:10.1016/B978-0-12-391851- 2.00009-X.

Chaudhuri, A. H., R. M. Ponte, G. Forget, and P. Heimbach, 2013: A comparison of atmospheric reanalysis surface products over the ocean and implications for uncertainties in air–sea boundary forcing. Journal of Climate, 26 (1), 153–170.

Roquet, F., C. Wunsch, G. Forget, P. Heimbach et al., 2013: Estimates of the southern ocean general circulation improved by animal-borne instruments. GRL, 40 (23), 6176–6180.

PEER-REVIEWED PUBLICATIONS

Forget, G., G. Maze, M. Buckley, and J. Marshall, 2011: Estimated seasonal cycle of North Atlantic eighteen-degree water volume. Journal of Physical Oceanography, 41 (2).

Heimbach, P., C. Wunsch, R. M. Ponte, G. Forget, C. Hill, and J. Utke, 2011: Timescales and regions of the sensitivity of Atlantic meridional volume and heat transport: Toward observing system design. Deep Sea Research II: Topical Studies in Oceanography, 58 (17).

Forget, G., 2010: Mapping ocean observations in a dynamical framework: A 2004-06 ocean atlas. Journal of Physical Oceanography, 40 (6), 1201–1221.

Maze, G., G. Forget, M. Buckley, J. Marshall, and I. Cerovecki, 2009: Using transformation and formation maps to study the role of air–sea heat fluxes in North Atlantic Eighteen Degree Water formation. Journal of Physical Oceanography, 39, 1818–1835

Hoteit, I., B. Cornuelle, S. Kim, G. Forget, A. Kohl, and E. Terrill, 2009: Assessing 4d-var for dynamical mapping of coastal high-frequency radar in san diego. Dynamics of Atmospheres and Oceans, 48 (1), 175–197.

Heimbach, P., G. Forget et al., 2009: Observational requirements for global-scale ocean climate analysis: Lessons from ocean state estimation. Proc. of the OceanObs09 Conf.: Sustained Ocean Observations and Information for Society, Venice, Italy, Vol. 2

Rienecker, M., et. al., 2009: Synthesis and assimilation systems - essential adjuncts to the global ocean observing system. Proc. of the OceanObs09 Conference: Sustained Ocean Observations and Information for Society, Venice, Italy, Vol. 1.

Marshall, J., et al., 2009: Observing the cycle of convection and restratification over the gulf stream and the subtropical gyre of the North Atlantic ocean: preliminary results from the CLIMODE field campaign. Bull. Amer. Meteor. Soc., 90, 1337–1350.

Forget, G., B. Ferron, and H. Mercier, 2008: Combining Argo profiles with a general circulation model in the North Atlantic. Part 1: Estimation of hydrographic and circulation anomalies from synthetic profiles, over a year. Ocean Modelling, 20 (1), 1–16.

Forget, G., H. Mercier, and B. Ferron, 2008: Combining Argo profiles with a general circulation model in the North Atlantic. Part 2: Realistic transports and improved hydrography, between spring 2002 and spring 2003. Ocean Modelling, 20 (1), 17–34.

Forget, G. and C. Wunsch, 2007: Estimated Global Hydrographic Variability. Journal of Physical Oceanography, 37 (8), 1997–2008.

Heimbach, P., R. Ponte, C. Evangelinos, G. Forget, M. Mazloff, D. Menemenlis, S. Vinogradov, and C. Wunsch, 2006: Combining altimetric and all other data with a general circulation model. Proceedings of the 15 Years of Progress in Radar Altimetry Symposium, Venice, Vol. 13, 18

Forget, G., 2005: Profils ARGO et assimilation 4Dvar pour le suivi climatique de l'ocean Nord Atlantique. Ph.D. thesis, University of Brest (UBO), Brittany, France

NON PEER REVIEWED

Adcroft, A et al., 2016: MITgcm user manual. MIT Department of EAPS, Cambridge

The ECCO Consortium (Forget, G., et al.), 2015: Estimating the Circulation and Climate of the Ocean (ECCO): Advancing CLIVAR Science. CLIVAR Exchanges, 67, 41-45.

The NASA Sea Level Change Team (Nerem, R. S., et al.), 2015: Advancing Sea Level Science; Decadal Survey in Earth Science and Applications from Space; White Paper

SELECTED TALKS

(2016) *ECCO Version 4: overview of release 2*, MIT, May 2016 ECCO meeting, *DOI: 10.13140/RG.2.2.33361.12647*.

(2016) *ECCO Version 4: Parameterized And Resolved Processes*, MIT, May 2016 ECCO meeting, *DOI: 10.13140/RG.2.2.26650.24001*.

(2016) *ECCO Version 4: Water Masses And Tracer Applications*, MIT, May 2016 ECCO meeting, *DOI: 10.13140/RG.2.2.36716.56967*.

(2016) *Model error varieties and their relative importance in ocean state estimation*, New Orleans, Ocean Sciences Meeting.

(2015) *On The Observability Of Turbulent Transport Rates By Argo: Supporting Evidence From An Inversion Experiment*, San Francisco, AGU Fall Meeting.

(2015) *ECCO v4: non-linear inverse modeling framework and state estimate*, University of Liège, International Liège Colloquium on Ocean Dynamics.

(2015) *Fitting general circulation dynamics to ocean data*, Lamont-Doherty Earth Observatory, Ocean and Climate Physics (OCP) (*Invited speaker).*

(2014) *The partition of regional sea level variability*, French Research Institute for Exploitation of the Sea (IFREMER, Brest) (*Invited speaker).*

(2014) *Global estimates of mixing parameters, upper ocean, abyss and sea surface height variability*, Scripps Institution of Oceanography, Climate, Atmospheric Science and Physical Oceanography (CASPO) (*Invited speaker)*

TEACHING EXPERIENCE

Massachusetts Institute of Technology

- Non-credit course: Introduction to Data Model Analysis', Winter 2015, 2016
- Co-advised Master's students; mentored graduate students and postdoctoral fellows

University of Brittany (UBO), Brittany, France

- Teaching Assistant, Oceanography, (Graduate)

SERVICES

Peer review: Journal of Physical Oceanography, Geophysical Research Letters, Ocean Modeling, Journal of Geophysical Research, Progress in Oceanography.

User support: MITgcm model, ECCO ocean state estimates, and gcmfaces Matlab toolbox.

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