BIOGRAPHICAL SKETCH: IRINA MARINOV

Assistant Professor, University of Pennsylvania imarinov@sas.upenn.edu
Department of Earth & Environmental Science http://www.sas.upenn.edu/climate

SUMMARY OF RELEVANT EXPERIENCE: I am a climate scientist and modeler working at the interface of chemical, biological and physical oceanography and large-scale atmosphere and climate dynamics. I run and analyze satellite data and output of the latest generation of climate models, to understand and predict changes in global carbon, oxygen and energy cycles on the planet. I have broad interdisciplinary interests and have also worked on groundwater quality. At Penn, I teach classes on: "Global Climate Change" and "Ocean-Atmosphere Dynamics". In 2016, I received from U. of Pennsylvania the Provost's *Undergraduate Research Mentorship award.*

EDUCATION

Princeton University Atmospheric and Ocean Sciences Ph.D. 2005
PhD advisors: Prof. Jorge Sarmiento and Dr. Anand Gnanadesikan
Middlebury College, VT Physics and Mathematics. Class Salutatorian, Summa cum Laude, Phi Beta Kappa. B.A. 1998

APPOINTMENTS

University of Pennsylvania Philadelphia, PA
Assistant Professor, Earth and Environmental Science Dept. June 2012-present
Lecturer A, Earth and Environmental Science Dept. Jan 2009-June 2012
Woods Hole Oceanographic Institution Woods Hole, MA
Long Term Guest Investigator 2009-present
Postdoctoral Investigator in the Marine Chemistry and Geochemistry Dept. 2007-2009
Postdoctoral Mentor: Dr. Scott C. Doney
Massachusetts Institute of Technology (Earth and Planetary Sciences Dept.) Cambridge, MA
Postdoctoral Fellow, NOAA Postdoctoral Program in Climate and Global Change 2005-2007
Postdoctoral Mentor: Prof. Mick Follows

PUBLICATIONS (selected; Marinov postdocs/students underlined)

Cabré, A., **Marinov, I.** and Gnanadesikan, *Global atmospheric teleconnections and multi-decadal climate oscillations driven by Southern Ocean convection,* J. Climate 30, 8107-8126, https://doi.org/10.1175/JCLI-D-16-0741.1 (2017)

Kostadinov, T.S. A. Cabré, H. Vedantham, **I. Marinov**, A. Bracher, R. Brewin, A. Bricaud, T. Hirata, T. Hirawake, N. Hardman-Mountford, C. Mouw, S. Roy and J. Uitz, *Inter-Comparison of Phytoplankton Functional Types Derived from Ocean Color Algorithms and Earth System Models: Phenology*. Remote Sensing of Environment 190, 162-177 (2017)

Kostadinov, T.S., Milutinović, S., **I. Marinov**, A. Cabré, *Carbon-Based phytoplankton size classes retrieved via ocean color estimates of the particle size distribution*, Ocean Sci., 12, 1-15, doi:10.5194/os-12-1-2016 (2016)

Cabré, A., D. Shields, **I. Marinov** and T. S. Kostadinov, *Phenology of Size-Partitioned Phytoplankton Carbon-Biomass from Ocean Color Remote Sensing and CMIP5 Models*, Front. Mar. Sci, 3:39, doi: 10.3389/fmars.2016.00039 (2016)

Leung, S., A. Cabré and **I. Marinov**, *A latitudinally-banded Phytoplankton response to 21st Century Climate Change in the Southern Ocean across the CMIP5 Model Suite,* Biogeosciences, 12, 5715-5734, doi:10.5194/bg-12-5715-2015, (2015)

Cabré, A., **I. Marinov,** R. Bernardello and D. Bianchi: *Oxygen minimum zones in the tropical Pacific across CMIP5 models: mean state differences and climate change trends*, Biogeosciences, 12, 5429–5454 doi:10.5194/bg-12-5429-2015, (2015)

Marinov, I., R. Bernardello and J. B. Palter: *Present and projected climate variability at high latitudes and its impact on the ocean carbon cycle*. US CLIVAR Variations, 13(2), (2015)

Cabré, A., **I. Marinov**, S. Leung, *Consistent global responses of marine ecosystems to future climate change across the IPCC AR5 Earth System Models,* Climate Dynamics, doi: 10.1007/s00382-014-2374-3, (2015)

Bernardello, R., **Marinov, I.,** Palter, J.B., Galbraith, E.D., Sarmiento, J.L. *Impact of Weddell Sea deep convection on natural and anthropogenic carbon in a climate model*, Geophysical Research Letters, 41 (20), 7262-7269, (2014)

Marinov, I. and A.M. Marinov, *A Coupled Mathematical Model to Predict the Influence of Nitrogen Fertilization on Crop, Soil and Groundwater Quality*, Water Resources Management, 28 (15), 5231-5246, doi: 10.1007/s11269-014-0664-5, (2014)

Marinov, I. and A.M. Marinov, *The influence of a municipal solid waste landfill on groundwater quality: a modelling case study for Raureni-Ramnicu Valcea (*Romania*),* International Journal of Computational Methods and Experimental Measurements, 2 (2), p. 1-18, WIT Press, doi: 10.2495/CMEM-V0-NO-1-18, (2014)

de Lavergne, C., J. B. Palter, E. D. Galbraith, R. Bernardello and **I. Marinov**. *Cessation of Weddell Sea convection due to climate warming*, **Nature Climate Change**, 4(4), 278-282, doi: 10.1038/nclimate2132, (2014)

Bernardello, R., **I. Marinov**, J B. Palter, J L. Sarmiento, E D. Galbraith, R D. Slater. *Response of the Ocean Natural Carbon Storage to Projected Twenty-First-Century Climate Change.* J. Climate, 27, 2033–2053, doi: 10.1175/JCLI-D-13-00343.1, (2014)

Marinov, I., S. Doney, I. Lima, K. Lindsey, K. Moore and N. Mahowald. *North-South asymmetry in the modeled phytoplankton community response to climate change over the 21st century,* Global Biogeochem. Cycle, 27, (2013)

Moore, C.M., Mills, M.M., Arrigo, K., Berman-Frank, I., Bopp, L., Boyd, P.W., Galbraith, E., Geider, R.J., Guieu, C., Jaccard, S, Jickells, T., La Roche, J., Lenton, T., Mahowold, N., Maranon, E., **Marinov, I.,** et al. *Oceanic nutrient limitation: processes, patterns and potential for change*, **Nature Geoscience***.* doi:10.1038/ngeo1765, (2013)

Palter, J., **I. Marinov**, J. Sarmiento, and N. Gruber. *Large scale nutrient fronts of the world ocean: impacts on biogeochemistry.* In: Large-Scale Chemical Fronts of the World Ocean, Springer-Verlag, ed. I. Belkin, doi:10.1007/698_2013_241, (2013)

Bernardello, R. Cardoso, J. G., Bahamon, N., Donis, D., **Marinov, I.**, and Cruzado, A. *Factors controlling interannual variability of vertical organic matter export and phytoplankton bloom dynamics – a numerical case-study for the NW Mediterranean Sea*, Biogeosciences 9, 4233-4245,doi:10.5194/bg-9-4233-2012, (2012)

Marinov, I. and A. Gnanadesikan, *Changes in ocean circulation and carbon storage are decoupled from air-sea CO_2 fluxes,* Biogeosciences 8, 505-513, doi:10.5194/bg-8-505-2011, (2011)

Marinov, A.M. and **I. Marinov**, *Pumping regime influence on groundwater quality in the proximity of a polluted lake*, Water Resources Management VI, WIT Transactions on Ecology and the Environment, Vol 145, 423-435, doi:10.2495/WRM110371, www.witpress.com, online ISSN 1743-3541, (2011)

Marinov, I., S. Doney and I. Lima, *Response of ocean phytoplankton community structure to climate change over the 21st century: partitioning the effects of nutrients, temperature and light*, Biogeosciences 7, 3941–3959, (2010)

Sarmiento, J. L., A. Gnanadesikan, **I. Marinov**, and R. D. Slater, *The role of marine biota in the CO_2 balance of the ocean-atmosphere system*. In: C.M. Duarte (Ed.). The Role of Marine Biota in the Functioning of the Biosphere. Fundación BBVA, Madrid, (2010)

Gnanadesikan, A. and **I. Marinov,** *Export is not enough: Nutrient cycling and carbon sequestration*, Marine Ecological Progress Series, invited contribution to the Thematic Section on "Implications of large scale iron fertilization of the oceans", Vol. 364, 289-294, doi:10.3354/meps/07750, (2008)

Marinov, I., A. Gnanadesikan, J.L. Sarmiento, R. Toggweiler and B. Mignone, *Impact of oceanic circulation on the ocean biological carbon storage and atmospheric pCO_2,* Global Biogeochem. Cycles, Vol 22, GB3007, (2008)

Marinov, I., M. Follows, A. Gnanadesikan, J.L Sarmiento and R.D. Slater, *How does ocean biology affect atmospheric pCO_2? Theory and models,* JGR Oceans, Vol 113, C07032, doi:10.1029/2007JC004598, (2008)

Marinov, I., A. Gnanadesikan, R. Toggweiler, and J.L. Sarmiento, *The Southern Ocean Biogeochemical Divide*, **Nature** (441), 946-967, doi: 10.1038/nature04883, (2006)

Marinov, I. and Warren Judd, *Ocean Carbon,* New Zealand Geographic, nr. 81, (2006)

Marinov, I. and J.L. Sarmiento, *The role of the oceans in the global carbon cycle: an overview*, Ocean Carbon Cycle and Climate, NATO ASI volume (251-295) ed. M. Follows & T. Oguz, Kluwer Academic Publ, (2004)

Smith, K.S., G. Boccaletti, C.C. Henning, **I. Marinov**, C.Y. Tam, I.M. Held and G.K.Vallis, *Turbulent Diffusion in the Geostrophic Inverse Cascade*, Journal of Fluid Mechanics, 469, 13-48, (2002)

Abott, S., and **I. Marinov**, *The Boundedness of the Riesz projection on spaces with weights*, Pacific Journal of Mathematics, 198 (2), 257-267, (2001)

SYNERGISTIC ACTIVITIES

1) **Research mentor:** 4 postdocs (Behzad Asadieh Aug 2017-present; Dr. Anna Cabre 2012-2015; Raffa Bernardello 2011-2014; Dr. Svetlana Milutinovic 2012-2014), 16 undergraduates, 3 masters students and 2 PhD students since Fall 2012. Dr. Cabre and Bernardello were both awarded Marie Curie oceanography fellowships in Spain.
2) **Current instructor** of two classes: "Global climate change" and "Atmospheric-Ocean Dynamics and Implications for future Climate Change" at University of Pennsylvania.
3) **Member** of the joint US CLIVAR - OCB working group on "Heat & carbon uptake by the SO" (2012 - 2015). Associate member of NSF-funded SO Carbon and Climate Observations and Modeling (SOCCOM), 2014-present. **Panelist** for 2 NSF, 2 NASA, 1 Schmidt Ocean Institute panels since 2013. Reviewer: NSF and NASA proposals.
4) **Outreach**: Organized "Penn Water Day" outreach event for summer camp kids, grades 1-6 (June 2017); Interview on NPR's Radio Times with Marty Moss-Coane on "Climate change: science, politics and public opinion" (Jan 2015); Faculty host for "Penn Alumni expedition to the Antarctic Peninsula-Weddell Sea" (Feb 2014); Participated in Penn Faculty panels on "Energy, sustainability & the environment" for alumni (DC&Chicago).
5) **Session co-Chair**: "Physical and Biogeochemical processes in the Southern Ocean: Observations, State Estimation and Modeling" at the 2016 Ocean Sciences Meeting (5 sessions); "Improving the representation of plankton ecology in earth system models " at the 2012 Ocean Sciences Meeting (2 sessions).
6) University leadership: Member of the University of Pennsylvania **Senate Committee on Faculty and Administration** since Sept 2014. Faculty Representative, Ad Hoc Advisory Committee on Fossil Fuel Divestment, UPenn, March-May 2016. **Penn Faculty Pathways Program for faculty leadership**: 2013-2014; 2014-2015.