Detelina Ivanova, Ph.D.

(858) 822 1564
divanova@ucsd.edu

9500 Gilman Drive, 0230
La Jolla, CA 92093-0230

http://www.linkedin.com/in/detelinaivanova

AREAS OF EXPERTISE

Metrics and methods for model

High resolution and climate modeling	Parallel supercomputing	Python, Fortran
Diagnosis and intercomparison of models and observations	Global/regional sea-ice/ocean modeling	Matplotlib, Matlab
	Oceanography, Meteorology	NCL, CDAT, Ferret
Statistical analysis of geoscience large scale data	Fluid Dynamics and Thermodynamics	MS Office, Adobe
	Physics	HTML, XML

EDUCATION

Ph.D. Physics of the Ocean and the Atmosphere, **2006**
Department of Marine Physics, Institute of Oceanology,
Bulgarian Academy of Sciences, Varna, Bulgaria.

M.Sc. Physics, Specialization Meteorology, **1991**
Physical Faculty, Sofia University "St. Kliment Ohridski,"
Sofia, Bulgaria.

RESEARCH INTERESTS

- Earth System Climate modeling – standard and high resolution (weather and eddy scales); ocean and sea ice modeling; Global and regional climate modeling;
- Developing metrics and methods for evaluation, diagnosis intercomparison and uncertainty quantification of climate models;
- Air-sea-ice interaction processes; Ocean heat budget; Water mass formation; Climate change impacts on sea ice and ocean; Polar oceans; Arctic sea ice decline; North Atlantic; Equatorial Pacific;
- Mesoscale phenomena and its role in climate;
- Modeling of physical processes in semi-enclosed and enclosed basins; general circulation and eddy-resolving regional models.

EXPERIENCE

Computational and Data Science Specialist IV **11/2016-present**
Scripps Institution of Oceanography (SIO)

Research Scientist/Climate Modeler **2014 - 2016**
Nansen Environmental and Remote Sensing Center
Bergen, Norway

- Performed evaluation, diagnostics and validation of NorESM.

- Designed and developed ocean diagnostics package for isopycnal ocean model MICOM.
- Collected and analyzed observational datasets for ocean and sea-ice variables including NASA PO.DAAC, NSIDC, ESA AVISO products.
- Conducting research addressing small scale processes is sea-ice such as leads and grease ice.
- Initiated and coordinated proposals for funding multi-group model development effort to improve model representation of atmospheric and oceanic boundary layers as well as the initial stage of sea ice formation (grease ice) in polar areas.
- Developed sea ice metrics and methods for multi-model comparison (CMIP5).

Research Scientist/Oceanographer **2010 – 2013**
Program for Climate Model Diagnosis and Intercomparison (PCMDI)
Lawrence Livermore National Laboratory (LLNL), Livermore, California, USA
Developing metrics and methods for evaluation, diagnosis and comparison of diverse climate models in supercomputing environment.

- Developed ocean and sea ice metrics for evaluation, diagnosis and intercomparison of models. This work will be part of PCMDI metrics package (in Python, UV-CDAT).
- Contributed to the Intergovernmental Panel for Climate Change (IPCC) Fifth Assessment Report (AR5), Chapter 9: "Climate model evaluation".
- Contributed to studies applying image processing and machine learning methods to uncertainty quantification in climate modeling.
- Studied climate variability of upper ocean heat budget, interannual variability (ENSO, NAO), meso-scale phenomena and its significance for climate, e.g. eddy heat transport in Equatorial Pacific.

Postdoctoral Researcher **2007 - 2010**
Program for Climate Model Diagnosis and Intercomparison
Lawrence Livermore National Laboratory, Livermore, California, USA
High-resolution ocean, sea- ice and fully coupled climate modeling. LLNL Grand Challenge project: “Ultra High Resolution Coupled Climate Simulations.” (http://www.pcmdi.llnl.gov/uhrccs).

- Beta-tested new high-resolution version of LANL ocean (POP) and sea ice (CICE) models in a coupled ocean/sea-ice mode, and as components in a high-resolution (eddy and storm resolving) fully-coupled NCAR climate model (CCSM4).
- Handled post processing, storing and visualization of large scale model data.
- Performed diagnostic, evaluation and analysis of ocean and sea-ice solutions in the coupled ocean/sea-ice and fully-coupled ultra high-resolution climate simulations via comparison with observed data and advanced statistics.
- Conducted studies of air-sea-ice interaction processes in marginal sea-ice zone in North Atlantic and their relation to NAO variability, upper ocean heat budget in Equatorial Pacific related to ENSO variability, water mass formation rates as a metric for climate model evaluation, meso-scale phenomena and its significance for climate, e.g. ocean pre-conditioning and response to storm passages.

Programmer/Analyst II **2005 – 2007**
Physical Oceanography Research Department
Scripps Institution of Oceanography, U. C. San Diego, California, USA
High-resolution ocean, sea-ice and coupled ice-ocean modeling.

- Tested and performed numerical simulations with medium and high resolution coupled ocean/sea-ice model (POP-CICE).
- Performed diagnostic and evaluation of ocean and sea ice solutions in standalone and coupled model simulations via comparison with observational data.

- Performed short-term climate, synoptic, and dynamical studies of global ocean and sea-ice simulations using statistical analyses of observational data and model results.

Research Associate **2001 - 2005**
Department of Oceanography
Naval Postgraduate School, Monterey, California, USA
High-resolution global and regional ocean modeling.

- Prepared, set up and run numerical experiments with high-resolution global and regional standalone ocean model (POP) forced with different atmospheric datasets (NCEP, NOGAPS, COAMPS). Developed subroutines in Fortran to introduce forcing in the model.
- Validated and evaluated ocean model solution via comparison with in-situ and satellite observations. Collected, visualized and analyzed satellite and in-situ observational data sets such as AVISO and PO.DAAC sea level products, ARGO ocean drifters, observational climatologies e.g. WOA and MDOT.
- Carried out global and regional ocean circulation dynamical studies, using statistical analyses of observational data and model results.

SKILLS AND TECHNIQUES

12 year of experience in supercomputing and parallel programming.
Machine Platforms: Linux Clusters, IBM SP, Cray XT5, SUN and SGI stations, Mac, PC.
Operating systems: MAC OX, Windows XP, IBM AIX , Linux Chaos, Red Hat Linux, SGI Irix.
Programming Languages: Python, Fortran90/95, Intel/PGI/XLF Fortran, MPI, OpenMP.
Tools: Matplotlib, Matlab, Ferret, NCL, NCO, CDAT, VCDAT, MS OFFICE, Adobe Illustrator/Photoshop.
Web-design: HTML, XML.
Languages: English, Russian, Norwegian (basic), Bulgarian (native).

SELECTED PUBLICATIONS

Ivanova, D., P. Gleckler, K. Taylor, P. Durack and K. Marvel (2016), Moving beyond the total sea ice extent in gauging model biases, (*J.Climate*, doi: 10.1175/JCLI-D-16-0026.1)
Marvel, K., D. Ivanova, and K. Taylor (2013), Scale space methods for climate model analysis, *J. Geophys. Res. Atmospheres*, 118, 5082–5097, doi:10.1002/jgrd.50433.
Lucas, D. D., Klein, R., Tannahill, J., Ivanova, D., Brandon, S., Domyancic, D., and Zhang, Y. (2013), Failure analysis of parameter-induced simulation crashes in climate models, *Geosci. Model Dev*., 6, 1157-1171, doi:10.5194/gmd-6-1157-2013.
Contributing author (2013), IPCC WGI Fifth Assessment Report (AR5), Chapter 9: "Climate model evaluation".
Ivanova, D. P., J. L. McClean, and E. C. Hunke (2012), Interaction of ocean temperature advection, surface heat fluxes and sea ice in the marginal ice zone during the North Atlantic Oscillation in the 1990s: A modeling study, *J. Geophys. Res*., *117*, C02031, doi:10.1029/2011JC007532.
Santer, B. D., C. Mears, C. Doutriaux, P. Caldwell, P.J. Gleckler, T.M.L. Wigley, S. Solomon, N.P. Gilett, D. Ivanova, T.R. Karl, J.R. Lanzante, G.A. Meehl, P.A. Stott, K.E. Taylor, P.W. Thorne, M.F. Wehner, and F.J. Wentz (2011), Separating signal and noise in atmospheric temperature changes: The importance of timescale, *J. Geophys. Res.-Atmos*., *116*, D22105, doi:10.1029/2011JD016263.
McClean, J.L., D.C. Bader, F.O. Bryan, M.E. Maltrud, J.M. Dennis, A.A. Mirin, P.W. Jones, Y.Y. Kim, D. P. Ivanova, M. Vertenstein, J.S. Boyle, R.L. Jacob, N. Norton, A. Craig, and P. H. Worley (2011), A

prototype two-decade fully-coupled fine-resolution CCSM simulation, *Ocean Modelling*, *39*, 10-30, doi:10.1016/j.ocemod.2011.02.011.
McClean, J.L., S. Jayne, M.E. Maltrud, D.P. Ivanova (2008), The Fidelity of Ocean Models with Explicit Eddies. In "Eddy-Resolving Ocean Modelling", M. Hecht and H. Hasumi, Eds., *AGU Geophysical Monograph Series*, *170*, 149-163.
Bala, G., R.B. Rood, D. Bader, A. Mirin, D. Ivanova and C. Drui (2008), Simulated Climate near Steep Topography: Sensitivity to Numerical Methods for Atmospheric Transport, *Geophys. Res. Lett.*, *35*, L14807, doi:10.1029/2008GL033204.
McClean, J. L., D. P. Ivanova, and J. Sprintall (2005) Remote origins of interannual variability in the Indonesian Throughflow region from data and a global POP simulation. *J. Geophys. Res*., *110*, C10013, doi:10.1029/2004JC002477.
Prasad, T. G., J. L. McClean, E. C. Hunke, A. J. Semtner, and D. P. Ivanova (2005), A Numerical Study of the Western Cosmonaut Polynya in a Coupled Ocean-Sea Ice Model. *J. Geophys. Res*., *110*, C10008, doi:10.1029/2004JC002858.