

Sergey Frolov, Ph.D.

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PROFESSIONAL PREPARATION:

Ph.D.: Environmental Science and Engineering, Oregon Health & Science University, Portland, 2007

M.S. Environmental Science and Policy, Central European University, 2000

B.S. Environmental fate of radionuclides, International Sakharov Environmental University, 1999

APPOINTMENTS:

2022-present **Reanalysis and Data Assimilation Team Lead**, NOAA, Physical Sciences Laboratory.
2019-present **Physical Scientist**, NOAA, Physical Sciences Laboratory.
2019-2021 **Scientist**, Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder (under contract to PSL/NOAA).
2016-2019 **Physical Scientist**, Naval Research Laboratory, Monterey, CA
2017 (summer) **ERA-CLIM Visiting Scientist**, European Center for Medium Range Weather Forecasting, Reading, UK
2012-2016 **UCAR Visiting Scientist**, Naval Research Laboratory, Monterey, CA
2011-2012 **Research Specialist**, Monterey Bay Aquarium Research Institute, Moss Landing, CA
2008-2011 **Postdoctoral Fellow**, Monterey Bay Aquarium Research Institute, Moss Landing, CA
2007-2008 **Senior Research Assistant**, NSF Science and Technology Center for Coastal Margin Observation and Prediction, Portland, OR
2001-2007 **Graduate Research Assistant**, Oregon Health & Science University, Portland, OR
2000-2001 **Software and database developer**, Credo-Dialog, Minsk, Belarus.

STATEMENT OF EXPERTISE:

Dr. Frolov is a data assimilation and coupled model forecasting expert with strong track record of formulating and implementing advance computing algorithms that drive Earth Science modeling and observation workflows. Past contributions include scientific support for negotiation of the US-Canada water sharing treaty; design of the US strategy for harmful algal bloom observations; implementation of the coupled data assimilation and coupled ensemble forecast component of the Navy's S2S forecast model. Dr. Frolov's present focus is on the development of the coupled reanalysis with the NOAA's Unified Forecast System and on the development of the NOAA-native AI models for Earth system prediction.

RELEVANT PUBLICATIONS (41 TOTAL / 17 FIRST AUTHOR):

1. **Frolov, S. et al.** (2024) Integration of emerging data-driven models into the NOAA research to operation pipeline for numerical weather prediction, *Bulletin of the American Meteorological Society*.
2. **Frolov, S. et al.** (2024) 'Local volume solvers for Earth system data assimilation: Implementation in the framework for Joint Effort for Data Assimilation Integration', *Journal of Advances in Modeling Earth Systems*.
3. **Frolov, S. et al.** (2023) 'Road Map for the Next Decade of Earth System Reanalysis in the United States', *Bulletin of the American Meteorological Society*. 104(3).

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4. Chen T.C., **Frolov S.**, et.al (2022) Correcting Systematic and State-Dependent Errors in the NOAA FV3-GFS Using Neural Networks, *Journal of Advances in Modeling Earth Systems* 14 (11), e2022MS003309.
5. **Frolov, S.** et al. (2021) ‘Coupled Ocean–Atmosphere Covariances in Global Ensemble Simulations: Impact of an Eddy-Resolving Ocean’, *Monthly Weather Review*. American Meteorological Society, 149(5), pp. 1193–1209.
6. Thoppil, P. G. **Frolov, S.** et al. (2021) ‘Ensemble forecasting greatly expands the prediction horizon for ocean mesoscale variability’, *Communications Earth & Environment* 2021 2:1. Nature Publishing Group, 2(1), pp. 1–9.
7. Barton, N. et al. (2020) ‘The Navy’s Earth System Prediction Capability: a new global coupled atmosphere-ocean-sea ice prediction system designed for daily to subseasonal forecasting’, *Earth and Space Science*.
8. Crawford, W. **Frolov S.** et al. (2020) ‘Using analysis corrections to address model error in atmospheric forecasts’, *Monthly Weather Review*. American Meteorological Society, 148(9), pp. 3729–3745.
9. **Frolov S.**, W. Campbell, B. Ruston, C. Bishop, D. Kuhl, J. McLay, M. Flatau, (2020) Assimilation of low-peaking satellite observations using the coupled interface framework, *Monthly Weather Review*.
10. **Frolov, S.**, D. R. Allen, C. H. Bishop, R. Langland, K. W. Hoppel, and D. D. Kuhl, 2018: First Application of the Local Ensemble Tangent Linear Model (LETLM) to a Realistic Model of the Global Atmosphere. *Mon. Weather Rev.*, 2247–2270.
11. **Frolov, S.**, C. H. Bishop, T. R. Holt, J. A. Cummings, and D. D. Kuhl, 2016a: Facilitating strongly-coupled ocean-atmosphere data assimilation with an interface solver. *Mon. Weather Review*.
12. **Frolov, S.**, Garau B., Bellingham J. (2014) " Can we do better than the grid survey: Optimal synoptic surveys in presence of variable uncertainty and decorrelation scales", *Journal of Geophysical Research*.
13. **Frolov, S.**, R., Kudela, J., Bellingham (2012c) “Monitoring of harmful algal blooms in the era of diminishing resources: a case study of the U.S. West Coast”, *Harmful Algae*.

PROFESSIONAL AND COMMUNITY SERVICE:

- **Reviewer** – Science; Nature; Ocean Modeling; JGR-oceans; GRL; Monthly Weather Review; Quarterly Journal of Royal Meteorological society; National Science Foundation, National Oceanographic and Atmospheric Administration.
- **Active committee memberships:** Co-leader of the NOAA AI4NWP tiger team, co-leader for the task team on ocean assimilation for OceanPredict. Member of the WMO/WWRP Working Group on Predictability, Dynamics and Ensemble Forecasting.
- **Past committee work:** CLIVAR POS panel (2019-2022), GODAE data assimilation task team (2018-present), associate editor of Monthly Weather Review (2018); strategic planning committee at NRL-MRY; NRL-MRY diversity and inclusion team; NRL-FNMOC-NPS committee for development of S2S products, OHSU/OGI student Council (2004-2007), MBARI professional development (2009-2010).