MARCIN JOZEF KUROWSKI

PERSONAL

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EDUCATION

2010	**PhD in atmospheric physics** (Univ of Warsaw) advisors: Prof. K. Haman and Dr. W. Grabowski
2003	**Master degree in atmospheric physics** (Univ of Warsaw) advisor: Dr. K. Bajer

PROFESSIONAL EXPERIENCE

2018-present	Technologist at the Jet Propulsion Laboratory, NASA, CA, USA
2016-2018	Researcher/Project Scientist at the Joint Institute for Regional Earth System Science and Engineering (JIFRESSE), UCLA, CA, USA, advisor: Dr. J. Teixeira
2015-2016	Postdoctoral researcher at JPL/CALTECH, CA, USA advisor: Dr. J. Teixeira
2012-2014	Postdoctoral researcher at NCAR, Boulder, CO, USA advisors: Dr. W. Grabowski, Dr. P. Smolarkiewicz
2010-2014	Researcher/developer at the Institute of Meteorology and Water Management, Warsaw, Poland
2008	Meteorologist for TV-Puls (Polish TV station)
2007-2009	Assistant researcher at the Institute of Geophysics, University of Warsaw, Warsaw, Poland

SCIENTIFIC PROJECTS

2022 – present	NASA project “Stochastic parameterization of an atmospheric model assisted by quantum annealing”.
2022 – present	NASA project “An OSSE Framework for the NASA PBL Decadal Survey Incubation Activity”.

2022 – present	NASA project "A novel data assimilation tool for optimizing PBL observing system design in support of parameterization development".
2022 – present	JPL SRTD project "The Southern Ocean Carbon Cycle in 2050: The role of ocean-ice-atmosphere coupling on air-sea exchange".
2019 – 2021	NASA project "Planetary Boundary Layer from Space": developed a PBL Observing System Simulation Experiment framework for testing new technologies for probing the PBL structure from space.
2019 – present	NSF project on "Climate Process Team: From Boundary Layer to Deep Convection: The Multi-Plume Eddy- Diffusivity/Mass-Flux (EDMF) Unified Parameterization": Supporting the development and implementation of the unified multi-plume stochastic Eddy-Diffusivity/Mass-Flux (EDMF) parameterization into the GFDL and NCAR climate models.
2018 – present	DOE project on "The Multi-Plume Eddy-Diffusivity/Mass-Flux (EDMF) Unified Parameterization: Stratocumulus and the Transition to Cumulus Boundary Layers": supporting the implementation of the unified EDMF parameterization into the DOE climate model.
2018 – 2021	JPL Strategic (SRTD) project on "The Planetary Boundary Layer: A Decadal Survey Incubation Challenge": Built the library of PBL cases using LES models and facilitating the utilization of model data by instrument simulators.
2015-2018	DOE project entitled "An Integrated Parameterization of Boundary Layer and Convective Mixing: The Eddy-Diffusivity/Mass-Flux (EDMF) Approach" and in collaboration with the NASA Jet Propulsion Laboratory (JPL) and the DOE Lawrence Berkeley National Laboratory (LBL): working on a unified parameterization for PBL turbulence, convection and clouds to improve weather, seasonal and climate forecasts for the DOE.
2012-2014	Multiscale modeling of moist atmospheric flows (NCAR): development and testing of the all-scale moist EULAG model for both anelastic and compressible dynamical cores
2011-2013	European Union Cloud Intercomparison, Process Study and Evaluation Project: LES modeling of a Lagrangian PBL

	transition from stratocumulus to cumulus based on ASTEX field campaign
2010-2013	Conservative Dynamical Core Project: development and testing of the anelastic dynamical core of the EULAG model as a prospective dynamical core of the NWP COSMO model for Polish MetOffice
2007	Polish Science Foundation grant on the mesoscale ensemble modeling: preparing real case database for the comparison with modeling results
2005-2007	DYCOMS-II (Dynamics and Chemistry of Marine Stratocumulus Phase II) – post processing and data analysis from the ultra-fast thermometer (UFT), fast forward scattering spectrometer probe (FFSSP), and other aircraft-loaded probes; LES modeling of selected cases

SKILLS

- Modeling of moist geophysical flows across scales: from small to planetary
- Development/testing/utilization of atmospheric models: EULAG, COSMO, WRF, CESM/CAM, E3SM, SAM
- High performance computing on petascale systems
- Data processing and the analysis of measurement/simulation results
- Writing technical documentations, proposals, and peer-reviewed articles
- Programming skills (FORTRAN 77/95, C, shell scripts, Python, Matlab, NCL)
- Visualization software: NCL, Matlab, gnuplot, Vis5D
- Systems: UNIX/LINUX, Mac, Windows
- Ability to work in a team, excellent communication and interpersonal skills
- Leading group tasks, conducting group meetings, writing reports

SCIENTIFIC INTERESTS

- Geophysical fluid dynamics
- Numerical weather prediction, meteorology
- Planetary boundary layer
- Dynamics of PBL clouds, cold pool dynamics
- Entrainment and mixing processes within clouds, atmospheric turbulence
- Unified and scale-aware convection parameterizations
- Convection organization and extreme weather
- Convection-microphysics-dynamics interactions
- Modeling of atmospheric flows: DNS, LES, mesoscale, planetary-scale flows; intercomparison and sensitivity studies

- Development and evaluation of atmospheric models/parameterizations including validation against observations
- High resolution temperature aircraft measurements and data analysis

COMMUNITY WORK

- NASA Panel Reviewer
- Reviewer for the Journal of Atmospheric Sciences, Journal of Geophysical Research – Atmospheres, Geophysical Research Letters, Monthly Weather Review, Atmospheric Measurement Techniques, Atmospheric Chemistry and Physics, Journal of Advances in Modeling Earth Systems, Bulletin of the Polish Academy of Sciences
- AGU 2019 student poster judge
- Instructor at the 2018 JPL/CALTECH Center for Climate Science Summer School
- Teacher assistant (during PhD studies at the Univ of Warsaw)

PEER-REVIEWED PUBLICATIONS

27. **Kurowski M. J.**, J. Teixeira, C. Ao, S. Brown, A. Davis, L. Forster, K.-N. Wang, M. Lebsock, M. Morris, V. Payne, M. Richardson, R. Roy, D. R. Thompson, R. C. Wilson, 2022: Synthetic Observations of the Planetary Boundary Layer from Space: An Observing System Simulation Experiment Framework (in preparation).

26. Lebsock M. D., H. Takahashi, R. Roy, **M. J. Kurowski**, L. Oreopoulos, Understanding Errors in Cloud Water Path Retrievals derived from CloudSat Path Integral Attenuation, J. Appl. Meteor. and Clim. (accepted).

25. Witte M. K., A. Herrington, J. Teixeira, **M. J. Kurowski**, Chinita, R. L. Storer, K. Suselj, G. Matheou, J. Bacmeister, Augmenting the double-Gaussian representation of atmospheric turbulence and convection via a coupled stochastic multi-plume mass flux scheme, Mon. Wea. Rev. (accepted).

24. Richardson, M. T., Thompson, D. R., **Kurowski, M. J.,** and Lebsock, M. D.: New sampling strategy mitigates a solar-geometry-induced bias in sub-kilometre vapour scaling statistics derived from imaging spectroscopy, Atmos. Meas. Tech., 15, 117–129, 2022.

23. Roy, R. J., Lebsock, M., and **Kurowski, M. J.**: Spaceborne differential absorption radar water vapor retrieval capabilities in tropical and subtropical boundary layer cloud regimes, Atmos. Meas. Tech., 14, 6443–6468, 2021.

22. Richardson, M. T., Thompson, D. R., **Kurowski, M. J.**, and Lebsock, M. D.: Boundary layer water vapour statistics from high-spatial-resolution spaceborne imaging spectroscopy, Atmos. Meas. Tech., 14, 5555–5576, 2021.

21. Suselj K., J. Teixeira, **M.J. Kurowski**, A. Molod, 2021: Improving the representation of subtropical boundary layer clouds in the NASA GEOS model with the Eddy-Diffusivity/Mass-Flux parameterization, *Mon. Wea. Rev*., **149**, 793-809.

20. **Kurowski M. J.**, W. W. Grabowski, K. Suselj, J. Teixeira, 2020: The strong impact of weak horizontal convergence on continental shallow convection, *J. Atmos. Sci.,* **77** (9), 3119-3137.

19. MacDonald M., **M. J. Kurowski,** J. Teixeira, 2020: Direct Numerical Simulation of the Moist Stably Stratified Surface Layer: Turbulence and Fog Formation, *Boundary-Layer Meteorol.,* **175,** 343–368.

18. Wu E., H. Yang, J. Kleissl, K. Suselj, **M.J. Kurowski**, J. Teixeira, 2020: On the Parameterization of Convective Downdrafts in Marine Stratocumulus Clouds, *Mon. Wea. Rev.,* **148**, 1931–1950.

17. **Kurowski M. J.**, H. T. Thrastarson, K. Suselj, J. Teixeira, 2019: Towards Unifying the Planetary Boundary Layer and Shallow Convection in CAM5 with the Eddy-Diffusivity/Mass-Flux Approach, *Atmosphere*, **10**, 484.

16. Suselj K., **M. J. Kurowski**, J. Teixeira, 2019: A Unified Eddy-Diffusivity/Mass-Flux Approach for Modeling Atmospheric Convection, *J. Atmos. Sci.*, **76**, 2505-2537.

15. Suselj K., **M. J. Kurowski**, J. Teixeira, 2019: On the Factors Controlling Development of Shallow Convection in Eddy-Diffusivity/Mass-Flux Models, *J. Atmos. Sci.*, **76**, 433-456.

14. **Kurowski M. J.**, K. Suselj, W. W. Grabowski, 2019: Is shallow convection sensitive to environmental heterogeneities? *Geophys. Res. Let.*, **46**, 785-793.

13. **Kurowski M. J.**, K. Suselj, W. W. Grabowski, J. Teixeira, 2018: Shallow-to-deep transition of continental moist convection: cold pools, surface fluxes, and mesoscale organization. *J. Atmos. Sci.,* **75***,* 4071-4090*.*

12. **Kurowski M. J.**, J. Teixeira, 2018: A scale-adaptive turbulent kinetic energy closure for the dry convective boundary layer, *J. Atmos. Sci., **75**,* 675-690.

11. **Kurowski M. J.**, D. Wojcik, M. Ziemianski, B. Rosa, Z. Piotrowski, 2016: Convection-permitting regional weather modeling with COSMO-EULAG: Compressible and anelastic solutions for a typical westerly flow over the Alps, *Mon. Wea. Rev*., **144**, 1961–1982.

10. **Kurowski M. J.**, W. W. Grabowski, and P. K. Smolarkiewicz, 2015: Anelastic and compressible simulation of moist dynamics at planetary scales, *J. Atmos. Sci.*, **72**, 3975-3995.

9. **Kurowski M. J.,** W. W. Grabowski, and P. K. Smolarkiewicz, 2014: Anelastic and compressible simulation of moist deep convection, *J. Atmos. Sci.*, **71**, 3767–3787.

8. **Kurowski M. J.,** W. W. Grabowski, and P. K. Smolarkiewicz, 2013: Towards multiscale simulation of moist flows with soundproof equations, *J. Atmos. Sci.*, **70**, 3995-4011.

7. van der Dussen, J. J., S. R. de Roode, A. S. Ackerman, P. N. Blossey, C. S. Bretherton, **M. J. Kurowski**, A. P. Lock, R. A. J. Neggers, I. Sandu, and A. P. Siebesma, 2013: The GASS/EUCLIPSE model intercomparison of the stratocumulus transition as observed during ASTEX: LES results, *J. Adv. Model. Earth Syst.*, **5**, 483-499.

6. Wojcik D., **M. J. Kurowski**, B. Rosa and M. Ziemiański, 2012: A study on parallel performance of the EULAG F90/95 code, *Springer Lecture Notes in Computer Science*, 7204/2011, 419-428.

5. Ziemianski M., **M. J. Kurowski**, Z. P. Piotrowski, B. Rosa and O. Fuhrer, 2011: Toward very high resolution NWP over Alps: Influence of the increasing model resolution on the flow pattern, *Acta Geophysica*, **59**, 1205-1235.

4. **Kurowski M. J**., B. Rosa and M. Ziemiański, 2011: Testing the anelastic nonhydrostatic model EULAG as a prospective dynamical core of a numerical weather prediction model. Part II - simulations of a supercell, *Acta Geophysica*, **59**, 1267-1293.

3. Rosa B., **M. J. Kurowski**, and M. Ziemiański, 2011: Testing the anelastic nonhydrostatic model EULAG as a prospective dynamical core of a numerical weather prediction model. Part I: dry benchmarks, *Acta Geophysica*, **59**, 1236-1266.

2. **Kurowski M. J.**, W.W. Grabowski, and S.P. Malinowski, 2009: Numerical investigation of entrainment and transport within stratocumulus-topped boundary layer, *Quart. J. Roy. Met. Soc.*, **135**, 77-92.

1. Haman K., S.P. Malinowski, **M. J. Kurowski**, H. Gerber and J-L.Brenguier, 2007: Small scale mixing processes at the top of a marine stratocumulus - a case study, *Quart. J. Roy. Met. Soc*., **133**, 213-226.