ALEXANDER GLUHOVSKY

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PERSONAL INFORMATION

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Marital Status Married, one son
Citizenship U.S. Citizen

EDUCATION

Ph.D.	USSR Academy of Sciences	Applied Mathematics	1973
M.S.	Moscow State University	Mathematics/Statistics	1967

PROFESSIONAL EXPERIENCE

Professor	Dept. of Earth & Atmospheric Sciences and Dept. of Statistics Purdue University	2010 – present
Associate Professor	Dept. of Earth & Atmospheric Sciences and Dept. of Statistics Purdue University	2007 – 2010
Visiting Professor	Dept. of Statistics, Purdue University	1996 – 2007
Sr. Research Scientist	Dept. of Earth & Atmospheric Sciences, Purdue University	1995 – 2007
Visiting Professor	Dept. of Earth & Atmospheric Sciences, Purdue University	1992 - 1995
Sr. Research Scientist	Institute of Atmospheric Physics, USSR Academy of Sciences	1981 - 1992
Research Scientist	Institute of Atmospheric Physics, USSR Academy of Sciences	1973 - 1981

RESEARCH AREAS

Geophysical Fluid Dynamics: Atmospheric and climate low-order models, convection, coherent structures in turbulent flows.

Computational Statistics: Atmospheric and climate time series analysis (resampling methods, long memory, trends and extremes).

Complexity in Atmospheric and Climate Dynamics.

RESEARCH GRANTS

PI "Taming Complexity of Mesoscale Dynamics with Low-Order Models", NSF, Grant AGS-1050588 ($429,712), 2011 – 2016.

CO-PI "The Response of Convective Precipitating Storms to Anthropogenically Enhanced Global Radiative Forcing". NSF, Grant AGS-0756624 ($616,110), 2008 – 2011.

CO-PI "Sub-Daily Scale Extreme Precipitation in Future Climate-Change Scenarios: A Pilot Study", NSF, Grant ATM-0541491 ($275,075), 2006 – 2008.

CO-PI "Modeling Coherent Structures in Convective Boundary Layers", NSF, Grant ATM-0514674 ($407,722), 2005 –2007.

PI "Modeling Mesoscale Convection by Coupled Nonlinear Systems", NSF, Grant ATM-0413382 ($60,000), 2004 – 2005.

PI "Modeling Mesoscale Convection by Coupled Nonlinear Systems", NSF, Grant ATM-9909009 ($255,071), 2000 – 2004.

CO-PI "Understanding and prediction of critical transitions in complex systems", McDonnell Foundation/UCLA ($153,733), 2001 – 2003.

PI "Modeling Mesoscale Convection by Coupled Nonlinear Systems", NSF, Grant ATM-9523572 ($210,340), 1995 – 1999.

TEACHING (*courses developed and/or taught at Purdue*)

EAPS 310	Introductory Statistics in Geosciences
EAPS 509/STAT 598	Data Analysis Techniques in Earth and Atmospheric Sciences
EAPS 510/STAT 598	Climate Time Series Analysis
EAS 591/STAT 598	Statistical Methods for Atmospheric Science
EAS 591/STAT 598	Statistics of Extremes
EAS 591/STAT 598	Trends, Extremes and Predictability
EAS 591/STAT 598	Chaos and Complexity in Atmospheric and Climate Dynamics
ATMS 591	Chaotic Dynamics
STAT 420	Introduction to Time Series
STAT 511	Statistical Methods
STAT 225	Introduction to Probability Models
STAT 301T	Elementary Statistical Methods
STAT 350	Introduction to Statistics
STAT/MA 416	Probability
STAT 503	Statistical Methods for Biology

PROFESSIONAL AFFILIATIONS

American Geophysical Union, American Physical Society, European Geosciences Union.

REVIEWER

Atmospheric Science Letters, Geophysical Research Letters, International Journal of Climatology, Journal of Applied Meteorology and Climatology, Journal of Atmospheric Sciences, Journal of Climate, Journal of Nonlinear Science, Mathematical Geosciences, Nonlinearity, Nonlinear Analysis: Real World Applications, PLOS One, Statistics and Probability Letters.

PUBLICATIONS (*Refereed Papers in Journals and Books*)

1. Gluhovsky, A., 1969: On the statistical simulations of meteorological fields. *Izv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **5**, 413 – 416.

2. Gluhovsky, A., 1971: Statistical description of Brownian motion of a particle in turbulent flow. *Izv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **7**, 687 – 690.

3. Gluhovsky, A., 1973: Correlation spectra for functions of normally distributed random vectors. *Izv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **9**, 41 – 43.

4. Gluhovsky, A., and V. I. Klyatskin, 1973: Stochastic "noise" in elementary nonlinear fluid dynamical systems. *Izv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **9**, 381 – 386.

5. Gluhovsky, A., 1975: Stability of nonlinear chain-type systems modeling cascaded energy transfer processes. *Izv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **11**, 491 – 495.

6. Gluhovsky, A., 1975: Influence of the scale splitting coefficient on the stability of chain-type nonlinear systems. *Izv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **11**, 1323 – 1326.

7. Obukhov, A. M., A. Gluhovsky and Yu. L. Chernous'ko, 1976: Reversal phenomena in the simplest fluid dynamical systems. *Izv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **12**, 693 – 696.

8. Gluhovsky, A., and V. I. Klyatskin, 1977: On dynamics of flipover phenomena in simple hydrodynamic models. *Doklady, Earth Science Sections*, **237**, 18 – 20.

9. Gluhovsky, A., 1977: Effect of quadratic friction in multistory nonlinear systems. *Izv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **13**, 627 – 637.

10 Gluhovsky, A., and F. V. Dolzhansky, 1980: Three component models of convection in a rotating fluid. *Izv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **16**, 311 – 318.

11. Gluhovsky, A., 1980: Stationary regimes in self-similar multilevel systems of the hydrodynamic type. *Izv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **17**, 600 – 603.

12. Gluhovsky, A., A. M. Obukhov and V. I. Klyatskin, 1980: Hydrodynamic models and reversal phenomena. *Atmospheric Physics and the problem of Climate*, G. S. Golitsyn and A. M. Yaglom, Eds., Nauka, Moscow, 114 – 138 (in Russian).

13. Gluhovsky, A., 1982: Nonlinear systems that are superpositions of gyrostats. *Sov. Phys. Doklady*, **27**, 823 – 825.

14. Gluhovsky, A., and M. I. Fortus, 1982: Estimating the statistical reliability of empirical orthogonal functions. *Izv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **18**, 345 – 351.

15. Gluhovsky, A., and M. I. Fortus, 1984: On the statistical reliability of an analysis of the vertical profiles of meteorological elements. *Izv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **20**, 967 – 975.

16. Gluhovsky, A., 1986: Structure of Galerkin approximations for Rayleigh-Benard convection. *Trans. (Doklady) USSR Acad. Sci. Earth Sci. Sections*, **286**, 36 – 39.

17. Gluhovsky, A., 1986: On systems of coupled gyrostats in problems of geophysical hydrodynamics. *Izv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **22**, 543 – 549.

18. Gluhovsky, A., and M. I. Fortus, 1987: Statistical significance of canonical correlations determined from finite sampling. *Izv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **23**, 328 – 331.

19. Gluhovsky, A., 1987: Cascade system of coupled gyrostats for modeling fully developed turbulence. *Izv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **23**, 952 – 958.

20. Gledzer, E. B., and A. Gluhovsky, 1987: On stability criteria for stationary solutions of cascade type discrete chains. *Siberian Math. Journal*, **28**, 26 – 31 (in Russian).

21. Gledzer, E. B., A. Gluhovsky and A. M. Obukhov, 1988: Modeling by cascade systems of nonlinear processes in hydrodynamics including turbulence. *J. Theor. Appl. Mech., Special issue: 'Atmospheric flows: asymptotic modeling and numerical simulations'* (suppl. to Vol. **7**), 111 – 128.

22. Gluhovsky, A., 1989: Modeling of two-dimensional turbulence with cascade systems of coupled gyrostats. I*zv. Acad. Sci. USSR, Atmos. Oceanic Phys.*, **25**, 927 – 930.

23. Gluhovsky, A., 1993: Modeling turbulence by systems of coupled gyrostats. *Nonlinear Waves and Weak Turbulence*, N. Fitzmaurice *et al.* Eds., Birkhauser, Boston, 179 – 197.

24. Gluhovsky, A., and E. M. Agee, 1994: A definitive approach to turbulence statistical studies in planetary boundary layers. *J. Atmos. Sci.*, **51**, 1682 – 1690.

25. Gluhovsky, A., and E. M. Agee, 1995: Reply to "Comments on 'A definitive approach to turbulence statistical studies in planetary boundary layers'". *J. Atmos. Sci.*, **52**, 3197 – 3198.

26. Gluhovsky, A., and E. M. Agee, 1997: An interpretation of atmospheric low-order models. *J. Atmos. Sci.*, **54**, 768 – 773.

27. Agee E., and A. Gluhovsky, 1999: LES models sensitivities to domains, grids and large eddy time scales. *J. Atmos. Sci.*, **56**, 599 – 604.

28. Agee E., and A. Gluhovsky, 1999: Further aspects of large eddy simulation model statistics and inconsistencies with field data. *J. Atmos. Sci.*, **56**, 2948 – 2950.

29. Gluhovsky, A., and C. Tong, 1999: The structure of energy conserving low-order models. *Phys. Fluids*, **11**, 334 – 343.

30. Gluhovsky, A., and C. Tong, 2000: Low-order models of atmospheric dynamics with physically sound behavior. A*dvances in Mathematical Modelling of Atmosphere and Ocean Dynamics*, P. F. Hodnett, Ed., Kluwer, Dordrecht, 147 – 152.

31. Gluhovsky, A., and E. M. Agee, 2002: Improving the statistical reliability of data analysis from atmospheric measurements and modeling. *Mon. Wea. Rev*., **130**, 761-765.

32. Gluhovsky, A., C. Tong, and E. M. Agee, 2002: Selection of modes in convective low-order models. *J. Atmos. Sci*., **59**, 1383-1393.

33. Tong C., and A. Gluhovsky, 2002: Energy-conserving low-order models for three-dimensional Rayleigh-Bénard convection. *Phys. Rev. E*, **65**, 046306 (11 pages).

34. Gluhovsky, A., and D. N. Politis, 2002: Subsampling - based inference for parameters of the atmospheric boundary layer. *Computing Science and Statistics*, **34**, 401-407.

35. Gluhovsky, A., M. Zihlbauer, and D. N. Politis, 2005: Subsampling confidence intervals for parameters of atmospheric time series: block size choice and calibration. *J. Stat. Comput. Simul.*, **75**, 381-389.

36. Gluhovsky, A., 2006: Energy-conserving and Hamiltonian low-order models in geophysical fluid dynamics. *Nonlin. Proc. Geophys.*, **13**, 125-133.

37. Gluhovsky, I., and A. Gluhovsky, 2007: Smooth location dependent bandwidth selection for local polynomial regression. *J. Amer. Stat. Assoc.*, **102**, 718-725.

38. Gluhovsky, A., and E. M. Agee, 2007: On the analysis of atmospheric and climatic time series. *J. Appl. Meteorol. Climatol.*, **46**, 1125-1129.

39. Tong, C., and A. Gluhovsky, 2008: Gyrostatic extensions of the Howard-Krishnamurti model of thermal convection with shear. *Nonlin. Proc. Geophys.*, **15**, 71-79.

40. Gluhovsky, A., 2008: Subsampling methodology for the analysis of nonlinear atmospheric time series. *Nonlinear Time Series Analysis in the Geosciences. Lecture Notes in Earth Sciences, Vol. 112*. R. V. Donner, S. M. Barbosa, Eds., Springer, 3-16.

41. Trapp, R. J., N. S. Diffenbaugh, and A. Gluhovsky, 2009: Transient response of severe thunderstorm forcing to elevated greenhouse gas concentrations, *Geophys. Res. Lett.*, **36**, L01703.

42. Gluhovsky, A., and E. M. Agee, 2009: Estimating higher-order moments from time series observed in convective boundary layers. *J. Appl. Meteorol. Climatol.*, **48**, 1948-1954.

43. Hitchens, N. M., R. J. Trapp, M. E. Baldwin and A. Gluhovsky, 2010: Characterizing subdiurnal extreme precipitation in the Midwestern United States. *J. Hydrometeor.*, **11**, 211-218.

44. Fall, S., D. Niyogi, A. Gluhovsky, R. A. Pielke Sr., E. Kalnay and G. Rochon, 2010: Impacts of land use land cover on temperature trends over the continental United States: assessment using the North American Regional Reanalysis. *Int. J. Climatol.*, **30**, 1980-1993.

45. Gluhovsky, A., 2011: Statistical inference from atmospheric time series: detecting trends and coherent structures. *Nonlin. Proc. Geophys.*, **18**, 537-544.

46. Gluhovsky, A., and C. Tong, 2012: Comments on ‘‘Modeling of chaotic motion of gyrostats in resistant environment on the base of dynamical systems with strange attractors’’ (Commun Nonlinear Sci Numer Simul 2011;16:3188–3202). *Commun. Nonlinear Sci. Numer. Simulat.*, **17**, 3112-3113.

47. Gluhovsky, A., and T. Nielsen, 2012: Improving the actual coverage of subsampling confidence intervals in atmospheric time series analysis. *Nonlin. Proc. Geophys.*, **19**, 473-477.

48. Gluhovsky, A., 2014: Comment on ‘‘Minimal atmospheric finite-mode models preserving symmetry and generalized Hamiltonian structures, Physica D 240 (2011) 599-606”. *Physica D*, **268**, 118-120.

49. Gluhovsky, A., and C. Tong, 2014: Comments on “Analogies of ocean/atmosphere rotating fluid dynamics with gyroscopes”. *Bull. Amer. Meteor. Soc.,* **95**, 445-446.

50. Privalsky, V., and A. Gluhovsky, 2015: On reconstruction of time series in climatology. *Clim. Past Discuss.*, **11**, 4701-4728, 2015.

51. Gluhovsky, A., and K. Grady, 2016: Effective low-order models for atmospheric dynamics and time series analysis. *Chaos*, **26**, 023119.

52. Gluhovsky, A., 2017: A gyrostatic low-order model for the El Ñino-Southern Oscillation. *Complexity*, **2017**, 6176045.

53. Grady, K., and A. Gluhovsky, 2018: Exploring atmospheric convection with physically sound nonlinear low-order models. *Commun. Nonlinear Sci. Numer. Simulat.*, **60**, 128-136.

CONFERENCE PAPERS AND INVITED TALKS

Nonlinear and statistical aspects of atmospheric dynamics and turbulence.
Math Colloquium, University of Wisconsin – Milwaukee (February 1999).

Tong, C., and A. Gluhovsky: Gyrostatic low-order models in fluid dynamics.
Centennial Meeting of the American Physical Society, Atlanta, GA (March 1999).

Gluhovsky, A. and C. Tong: Nonlinear models in geophysical fluid dynamics in the form of coupled gyrostats. *XXIV General Assembly of the European Geophysical Society*, The Hague, The Netherlands (April 1999).

Gluhovsky, A., and E. M. Agee: On discrepancies between characteristics of PBL from field data and models. *XXIV General Assembly of the European Geophysical Society*, The Hague, The Netherlands (April 1999).

Gluhovsky, A., and E. M. Agee: Comparative statistical analysis of atmospheric observations and modeling. *The 1999 Joint Statistical Meetings*, Baltimore, MD (August 1999).

Gluhovsky, A.: Increasing the statistical reliability of atmospheric data analysis and modeling.
Lake-ICE/SNOWBAND Workshop, University of Illinois (October 1999, Invited).

Gluhovsky, A.: Low-Order Models of Atmospheric Dynamics and Turbulence with Chaotic Behavior.
Chaos and Complex Systems Seminar. University of Wisconsin – Madison (October 1999).

Gluhovsky, A.: Modeling atmospheric dynamics and turbulence. *Seminar*.
The IBM Thomas J. Watson Research Center, Yorktown Heights, NY (March 2000).

Gluhovsky, A. and C. Tong: Low-order models of atmospheric dynamics with physically sound behavior.
IUTAM Symposium: Advances in Mathematical Modeling of Atmosphere and Ocean Dynamics, Limerick, Ireland (July 2000).

Gluhovsky, A. and C. Tong: Low-order models of a sheared convective boundary layer.
14th Symposium on Boundary Layers and Turbulence, Aspen, CO (August, 2000).

Agee, E., S. Zurn-Birkhimer, and A. Gluhovsky: Coherent structures and transitional patterns in convective boundary layers. *14th Symposium on Boundary Layers and Turbulence*, Aspen, CO (August, 2000).

Gluhovsky, A., C. Tong, and E. Agee: Energy conserving low-order models for potential vorticity dynamics and convection with shear. *13th Conference on Atmospheric and Oceanic Fluid Dynamics*, Breckenridge, CO (June 2001).

Gluhovsky, A. and C. Tong: Physically motivated Galerkin approximations in Geophysical Fluid Dynamics.
54th Annual Meeting of the APS Division of Fluid Dynamics. San Diego, CA (November 2001).

C. Tong and A. Gluhovsky, 2002: An energy-conserving low-order model for 3D thermal convection.
Annual March Meeting of the American Physical Society, Indianapolis, IN (March 2002).

Gluhovsky, A. and D. N. Politis. Subsampling-based inference for parameters of the atmospheric boundary layer. *34th Interface Symposium*. Montreal, Canada (April 2002).

Gluhovsky, A.: Subsampling in Atmospheric Data Analysis. *International Conference on Current Advances and Trends in Nonparametric Statistics*, Crete, Greece (July 2002).

Gluhovsky, A. and D. N. Politis: Subsampling Confidence Intervals: Block Size Choice and Calibration for Atmospheric Data. *The 2003 Joint Statistical Meetings*, San Francisco, CA (August 2003).

Gluhovsky, A.: Energy-conserving and Hamiltonian extensions of the Lorenz model.
85th AMS Annual Meeting: *The Ed Lorenz Symposium.* San Diego, CA (January 2005).

Gluhovsky, A.: Hamiltonian Galerkin approximations for equations of geophysical fluid dynamics.
58th Annual Meeting of the APS Division of Fluid Dynamics. Chicago, IL (November 2005).

Gluhovsky, A., and E. M. Agee: Resampling methods for meteorological and climatological data analysis. *86th AMS Annual Meeting*: *18th Conference on Probability and Statistics in the Atmospheric Sciences*, Atlanta, GA (January 2006).

Gluhovsky, A. and E. Agee: Reliable statistical inference for weather and climate. *87th AMS Annual Meeting*: *19th Conference on Climate Variability and Change*, San Antonio, TX (January 2007).

Gluhovsky, A.: Advances in subsampling methodology for analysis of nonlinear atmospheric time series. *IUGG XXIV General Assembly, IAMAS Symposium "Extreme Weather and Climate Events: Past Occurrences and Future Likelihoods"*, Perugia, Italy (July 2007).

Gluhovsky, A.: Estimating the skewness and kurtosis of nonlinear time series: analysis of turbulent flows with coherent structures. *The 2008 Joint Statistical Meetings*, Denver, CO (August 2008).

Trapp, R. J., N. S. Diffenbaugh, and A. Gluhovsky: Transient response of severe convective storm forcing associated with global increases in greenhouse gas concentrations. *AMS 24th Conference on Severe Local Storms*, Savannah, GA (October 2008).

Hitchens, N. M., R. J. Trapp, M. E. Baldwin, and A. Gluhovsky: Characteristics of sub-diurnal extreme precipitation-producing systems. *AMS 24th Conference on Severe Local Storms*, Savannah, GA (October 2008).

Gluhovsky, A.: Subsampling confidence bands for trends in atmospheric time series. *European Geosciences Union General Assembly 2009*, Vienna, Austria (April 2009).

Gluhovsky, A.: Subsampling inference for trends and extremes in climate data. *11th International Meeting on Statistical Climatology*, Edinburgh, UK (July 2010).

Gluhovsky, A.: Detecting coherent structures and trends from atmospheric data. *2nd International Conference on Data Analysis and Modeling in Earth Sciences*, Lisbon, Portugal (September 2010).

Gluhovsky, A.: Confidence bands for time series trends. *2010 AGU Fall Meeting*, San Francisco, CA (December 2010).

Gluhovsky, A., and T. Nielsen: Improving the actual coverage of subsampling confidence intervals for parameters of atmospheric time series. *92nd AMS Annual Meeting*: *21st Conference on Probability and Statistics in the Atmospheric Sciences*, New Orleans, LA (January 2012).

Gluhovsky, A.: Analysis of time series generated by low-order models of atmospheric dynamics. *The 2012 Joint Statistical Meetings*, San Diego, CA (August 2012).

Gluhovsky, A: Low-order models for atmospheric time series analysis. *3rd International Conference on Data Analysis and Modeling in Earth Sciences*, Potsdam, Germany (October 2012).

Gluhovsky, A: Drawing reliable statistical inference from atmospheric and climate data. Seminar at EFPL (École polytechnique fédérale de Lausanne, Lausanne, Switzerland (January 2013).

Gluhovsky, A: Progress in Atmospheric Time Series Analysis. Seminar at ENS (École Normale Supérieure, Paris, France (April 2013).

Gluhovsky, A.: Time series analysis of Rayleigh–Bénard convection. *European Geosciences Union General Assembly 2013*, Vienna, Austria (April 2013).

Gluhovsky, A.: Gyrostatic extensions of the Lorenz 1963 System as novel time series models for atmospheric data. *2013 SIAM Conference on Applications of Dynamical Systems*, Snowbird, UT (May 2013).

Gluhovsky, A.: Inference from short atmospheric time series. *2014 Joint Statistical Meetings*, Boston, MA (August 2014).

Grady, K., and A. Gluhovsky: Efficient Nonlinear Low-Order Models in Atmospheric Dynamics. *2014 AGU Fall Meeting*, San Francisco, CA (December 2014).