

Olivier Pauluis

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Citizenship: Belgian

Languages: French (native), English (fluent), Dutch (basic), and Spanish (basic).

Research Interests

Climate dynamics and the general circulation of the atmosphere. Tropical meteorology. Thermodynamics and moist convection.

Professional Experience

New York University New York, NY
Assistant Professor, Center for Atmosphere-Ocean Science at the Courant Institute
of Mathematical Sciences
(September 2004-Present)

Princeton University Princeton, NJ
Research Associate. Atmospheric and Oceanic Sciences Program
(August 2002 – August 2004)

Massachusetts Institute of Technology Cambridge, MA
Postdoctoral Fellow. Department of Earth, Planetary and Atmospheric Sciences.
(February 2000 – July 2002).

Education

Princeton University Princeton, NJ
Ph.D. in Atmospheric and Oceanic Sciences (September 1995 - January 2000).
Dissertation title: *Entropy budget of an atmosphere in radiative-convective equilibrium.*

Université Catholique de Louvain, Louvain-La-Neuve, Belgium
Diplome d'ingénieur civil en Mathématiques Appliquées. (September 1990 –
September 1995). This degree would be equivalent to a B.S. in Engineering and an
M.S. in Applied Mathematics.

Grants and awards

National Science Foundation CAREER “The maintenance of the atmospheric circulation: the entropy perspective.” (2006-2010)

NOAA Postdoctoral program in Climate and Global Change Fellowship (1999 - 2001).

Belgian American Educational Foundation fellowship (1995-1996).

Teaching Experience

New York University

Linear Algebra (Undergraduate course, Spring 2007); Facing Nature's Wrath: the history and science of hurricanes (Freshman Honors Seminar, Fall 2006); Most convection and tropical Meteorology (Graduate course, Spring 2006); Calculus I (Undergraduate course – Fall 2005); Atmospheric Dynamics (Graduate Course, Spring 2005)

Current Research and Collaborations

Energetics of the atmosphere (with I. Held, K. Emanuel, A. Smith-Mrowiec – 1995-present)

Understanding the processes controlling the intensity of the atmospheric circulation, and how it may be affected by future climate changes. Current project involves combining analysis of the entropy and available potential energy budgets in hurricanes, and investigation of the intensity of hurricanes.

Moist processes in baroclonic eddies (A. Czaja, I D. Frierson, P. Zurita-Gotor, 2003 - present)

Analyze the role of water vapor in the midlatitude storm tracks. Current project: latent and sensible energy transport in reanalysis (with A. Czaja) and simplified convective parameterizations for GCMs (with D. Frierson).

Zeta Model: (with L. Donner, D. Frierson, S. Garner, I. Held, C. Kerr, I. Orlanski, G. Vallis 2002-Present)

Development and use of a high-resolution non-hydrostatic model to investigate the interaction between convection and large-scale circulation, and to determine the requirement for global cloud resolving models.

Multiscale models for the Tropics (with A. Majda, S. Stechmann and J. Dias, 2003-present)

Theoretical framework for understanding the impact of convection on the atmospheric circulation. Aims at developing new applied mathematical models to explain the behavior of the tropical atmosphere.

Service

Member of the American Meteorological Society, American Geophysical Union and American Mathematical Society.

Reviewer for several scientific journals: *Journal of the Atmospheric Sciences*, *Journal of Climate*, *Monthly Weather Review*, *Quarterly Journal of the Royal Meteorological Society*, *Climate Dynamics*, *Journal of Physical Oceanography*.

Publications

Pauluis, O.: Thermodynamic Consistency of the Anelastic Approximation for a Moist Atmosphere. *Submitted to J. Atmos. Sci.*

Pauluis O., D.M. Frierson and A. Majda: The propagation of precipitation fronts. *Submitted to J. Atmos. Sci.*

Pauluis O., 2006: Sources and sinks of available potential energy in a moist atmosphere. To be published in *J. Atmos. Sci.*

Pauluis, O., D.M. Frierson, S. Garner, I. Held, and G. Vallis 2006: The hypo-hydrostatic rescaling and its impacts on atmospheric convection. *Theoretical and Computational Fluid Dynamics*, **20**, 485-499.

Pauluis, O., and S. Garner 2006: Sensitivity of Radiative convective equilibrium simulations to horizontal resolution. *J. Atmos. Sci.* **63**, 1910-1923.

Frierson, D., A. Majda and O. Pauluis, 2004: Large Scale Dynamics of Precipitation Fronts in the Tropical Atmosphere: A Novel Relaxation Limit. *Comm. Math. Sci.*, **2**, 591-626.

Pauluis, O., 2004: Chapter 7. Water vapor and entropy production in the Earth's atmosphere. In *Non-equilibrium Thermodynamics and the Production of Entropy : Life, Earth*. A. Kelidon and R.D. Lorenz (ed.), Springer-Verlag.

Pauluis, O., 2004: Axisymmetric circulation in a moist atmosphere. *J. Atmos. Sci.*, **61**, 1161-173.

Pauluis, O. and K. Emanuel, 2004: Numerical Instability Resulting from Infrequent Calculation of Radiative Heating. *Monthly Weather Review*, **132**, pp. 673-686.

Pauluis, O. and I.M. Held, 2002: Entropy budget of an atmosphere in radiative-convective equilibrium. Part I: Maximum work and frictional dissipation. *J. Atmos. Sci.*, **59**, 140-149.

Pauluis, O. and I.M. Held, 2002: Entropy budget of an atmosphere in radiative-convective equilibrium. Part II: Latent heat transport and moist processes. *J. Atmos. Sci.*, **59**, 125-139.

Pauluis, O., V. Balaji and I.M. Held, 2001: Comments on frictional dissipation in a precipitating atmosphere. *J. Atmos. Sci.*, **58**, 1178-1179

Pauluis, O., V. Balaji and I.M. Held, 2000: Frictional dissipation in a precipitating atmosphere. *J. Atmos. Sci.*, **57**, 989-994.

Pauluis, O., 2000: *Entropy budget of an atmosphere in radiative-convective equilibrium*. Ph.D. dissertation, Princeton University, 274pp.

Pauluis, O., 1995: *Systèmes dynamiques et phénomènes de synchronisation dans un modele climatique*. Dissertation, Université Catholique de Louvain.