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Jacques Vanneste

Birth:	Malmedy (Belgium), 30th November 1969
Citizenship:	Belgian
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Professional experience

September 2001–present: NERC Advanced Research Fellow.

January 1999–present: Lecturer in the School of Mathematics at the University of Edinburgh.

September 1997–December 1998: Postdoctoral Fellow in the Department of Applied Mathematics and Theoretical Physics at the University of Cambridge.

October 1995–August 1997: Postdoctoral Fellow in the Department of Physics at the University of Toronto.

July–December 1996: Participation to the programme "Mathematics of the Atmosphere and Oceans", Isaac Newton Institute for the Mathematical Sciences, Cambridge.

Academic education

1992–1995: Preparation of a Ph.D. Thesis in Physics of the Université Pierre et Marie Curie (Paris VI) at LMD (CNRS, Ecole Polytechnique). Thesis defended on May 22 1995, with grade "très honorable avec les félicitations du jury".

1992: "DEA" (French equivalent of a MSc degree) in Meteorology, Oceanography, and the Environment at the Université Pierre et Marie Curie (Paris VI).

1987–1992: "Ingénieur civil en mécanique-physique" (undergraduate degree in Engineering Science, with specialisation in Fluid Mechanics) at the University of Liège (Belgium). Grade obtained: "la plus grande distinction avec les félicitations du jury".

Teaching experience

January 1999–present: Lectures for courses on Asymptotic Methods, Dynamical Systems, Calculus, and Algebra at the University of Edinburgh; tutorials for various mathematics courses.

1997–1998: Tutorials for courses of Mathematical Methods, and Dynamics at the University of Cambridge.

1993–1995: Teaching assistant in Physics and Mathematics at the Université Pierre et Marie Curie (Paris VI).

Students supervised:

S. Boyaval, 2004 (Ecole Polytechnique): Choreographies of point vortices.

E. I. Ólafsdóttir, 2003–present (Ph.D.): Asymptotics of fast–slow interactions in the atmosphere.

J. Powell, 2001–2004 (Ph.D.): Stochastic modelling of gravity waves.

J. Cook, 2001 (M.Sc.): Resonance-induced diffusion in the atmosphere.

S. Roussette, 2000 (ISITV, Toulon): Homogenisation of small-scale topography.

J. Paret, 1995 (Ecole Polytechnique): Baroclinic instability in a three-layer model.

Conference organisation

Co-organisation of the workshop 'Geometric Methods in Geophysical Fluid Dynamics' (Edinburgh 10–12 January 2001) sponsored by EPSRC.

Co-organisation of the workshop 'Small-scale mixing in strongly stratified flows' (Cambridge 10–12 December 1998) sponsored by the European Science Foundation.

Awards and grants

NERC Advanced Research Fellowship, 2001–2005.

Member of the NERC Peer-Review College, 2004.

EPRSC Network in Mathematics 'Geometric methods in geophysical fluid dynamics', 2001–2004 (CoI).

EPSRC Research Grant, 'Nonlinear stability of fluid flows in asymmetric domains', 2000.

NERC Research Grant, 'Modelling and parameterisation of small-scale mixing in the stratosphere', 1999.

European Community Marie Curie fellowship, 1997.

NATO research fellowship, 1995.

Thesis Grant from the French Ministry of Research, 1992–1995.

ERASMUS Fellowship, summer 1992.

F. Pisard Award, 1987.

Invited talks

CISM Summer School 'Nonlinear waves in fluids', Udine, September 2004, invited lecturer.

KCWD Workshop 'Environmental wave dynamics and wave–mean flow interactions', Keele, September 2003.

EGS General Assembly, 'Session on balanced dynamics', Nice, April 2002.

IMA Workshop 'Reduced descriptions of coupled GFD systems', Minneapolis, March 2002.

Publications

Papers in press or submitted may be downloaded from the web page
http://www.maths.ed.ac.uk/~vanneste/preprints.html

1. Vanneste J.: *Etude non-linéaire de l'instabilité barocline*, Dissertation, University of Liège, 103 pp. (1992).

2. Vanneste J.: The Kelvin-Helmholtz instability in a non-geostrophic baroclinic unstable flow, *Mathl. Comput. Modelling*, **17**, 149–154 (1993).

3. Vanneste J.: *Etude des interactions non-linéaires d'ondes géophysiques*, Ph.D. thesis, University Paris 6, 153 pp. (1995).

4. Vanneste J. and Vial F.: Nonlinear wave propagation on a sphere: interactions between Rossby waves and gravity waves; stability of Rossby waves. *Geophys. Astrophys. Fluid Dyn.*, **76**, 121–144 (1994).

5. Vanneste J.: The instability of internal gravity waves to localised disturbances, *Annales Geophysicae*, **13**, 196–210 (1995).

6. Vanneste J. and Vial F.: On the nonlinear interactions of geophysical waves in shear flows, *Geophys. Astrophys. Fluid Dyn.*, **78**, 115–141 (1994).

7. Vanneste J.: Explosive resonant interaction of baroclinic Rossby waves and stability of multilayer quasi-geostrophic flow. *J. Fluid Mech.*, **291**, 83–107 (1995).

8. Vanneste J. and Vial F.: Interaction equations for Rossby waves derived from Hamilton's principle in the Eulerian description, *Proc. R. Soc. Lond. Ser.* A, **450**, 667–676 (1995).

9. Paret J. and Vanneste J.: Nonlinear saturation of baroclinic instability in a three-layer model, *J. Atmos. Sci.*, **53**, 2905–2917 (1996).

10. Vanneste J.: Rossby wave interaction in a shear flow with critical levels, *J. Fluid Mech.*, **323**, 317–338 (1996).

11. Vanneste J. and Vial F.: On the nonlinear interactions between gravity waves in shear flows, in *Gravity Wave Processes and their Role in Climate Models*, ed. K. Hamilton, Springer–Verlag, (1997).

12. Vanneste J.: On the derivation of fluxes in conservation laws of Hamiltonian systems, *I.M.A. J. Appl. Math.*, **59**, 211–220 (1997).

13. Vanneste J. and Shepherd T.G.: On the group-velocity property for wave-activity conservation laws, *J. Atmos. Sci.*, **55**, 1063–1068 (1997).

14. Vanneste J.: A nonlinear critical layer generated by the interaction of free Rossby waves, *J. Fluid Mech.*, **371**, 319–344 (1998).

15. Vanneste J., Morrison P. J. and Warn T.: Strong echo effect and nonlinear transient growth in shear flows, *Phys. Fluids*, **10**, 1398–1404 (1998).

16. Bokhove O., Vanneste J. and Warn T.: A variational formulation for barotropic quasi-geostrophic flows, *Geophys. Astrophys. Fluid Dyn.*, **88**, 67–79 (1998).

17. Vanneste J. and Shepherd T. G.: On wave action and phase in the non-canonical Hamiltonian formulation, *Proc. R. Soc. London A*, **1981**, 3–22. (1999).

18. Vanneste J.: A spatial analogue of transient growth in shear flows, *J. Fluid Mech.*, **397**, 317–330 (1999).

19. Vanneste J.: Enhanced dissipation for quasi-geostrophic motion over small-scale topography, *J. Fluid Mech.*, **407**, 115–122 (2000).

20. Vanneste J. and Haynes P. H.: Intermittent mixing in strongly stratified fluids as a random walk, *J. Fluid Mech.*, **411**, 165–185 (2000).

21. Vanneste J.: Rossby-wave frequency change induced by small-scale topography, *J. Phys. Oceanogr.*, **30**, 1820–1826 (2000).

22. Alisse J-R., Haynes P. H., Vanneste J. and Sidi C.: Quantification of stratospheric mixing from turbulence microstructure measurements, *Geophys. Res. Lett.*, **27** , 2621–2624. (2000).

23. Vanneste J.: Mode conversion for Rossby waves over topography: Comments on on "Localized coupling between surface and bottom-intensified flow over topography", *J. Phys. Oceanogr.*, **31**, 1922-1925 (2001).

24. Vanneste J.: The impact of small-scale topography on large-scale ocean dynamics, in *Advances in the mathematical modelling of atmosphere and ocean dynamics*, P. F. Hodnett ed., Kluwer (2001).

25. Souprayen C., Vanneste J., Hertzog A. and Hauchecorne A.: Atmospheric gravity-wave spectra: a stochastic approach, *J. Geophys. Res.*, **106**, 24071–24086 (2001).

26. Vanneste J.: Nonlinear dynamics of anisotropic disturbances in plane Couette flow, *SIAM J. Appl. Maths.*, **62**, 924–944 (2002).

27. Vanneste J. and Bokhove O.: Dirac-bracket approach to nearly geostrophic balanced models, *Physica D*, **164**, 152–167 (2002).

28. Vanneste J.: Nonlinear dynamics over rough topography: barotropic and stratified quasi-geostrophic theory, *J. Fluid Mech.*, **474**, 299-318 (2003).

29. Haynes P. H. and Vanneste J.: Stratospheric tracer spectra, *J. Atmos. Sci.*, **61**, 161–178 (2004).

30. Vanneste J. and Yavneh I.: Exponentially small gravity waves and the breakdown of quasi-geostrophic balance, *J. Atmos. Sci.*, **61**, 211-223 (2004).

31. Vanneste J.: Inertia-gravity-wave generation by balanced motion: revisiting the Lorenz-Krishnamurthy model, *J. Atmos. Sci.*, **61**, 224–234 (2004).

32. Vanneste J.: Intermittent mixing, large-scale advection and stratospheric tracer distributions, *J. Atmos. Sci.*, **61**, 2749-2761 (2004).

32. Vanneste J.: Wave interactions, in *Nonlinear Waves in Fluids: Recent Advances and Modern Applications*, R. Grimshaw ed., Springer (2005).

34. Powell J. M. and Vanneste J.: Transport equations for randomly perturbed Hamiltonian systems, *Wave Motion*, submitted.

35. Ólafsdóttir E. I, A. B. Olde Daalhuis and Vanneste J.: Multiple Stokes multipliers in a inhomogeneous differential equation with a small parameter, *Proc. R. Soc. London*, submitted.

36. Wirosoetisno D. and Vanneste J.: Persistence of steady flows of two-dimensional perfect fluids in deformed domains, *Nonlinearity*, submitted.

37. Haynes P. H. and Vanneste J.: What controls the decay of passive scalars in smooth random flows, *Phys. Fluids*, submitted.

38. Vanneste J. and Yavneh I.: Unbalanced instabilities of rapidly rotating stratified shear flows, in preparation.

39. Vanneste J. and Wirosoetisno D.: Adiabatic invariance and geometric angle for two-dimensional perfect fluids in slowly deforming domains, in preparation.

40. Vanneste J.: Asymptotics of a slow manifold, in preparation.