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Education

PhD Geophysical Fluid Dynamics University of Utrecht, The Netherlands, 1990
Dissertation: *Barotropic Vortices in a Rotating Fluid* (209 pp.)
Approximately 400 copies distributed worldwide by the University.

MSc Physics University of Utrecht, The Netherlands, 1986
Dissertation: *Minimum Enstrophy Vortices* (121 pp.)

BSc Physics/Applied Mathematics University of Utrecht, The Netherlands, 1983

Research Experience

Researcher (Asst.) 11/16/1992—present
School of Ocean & Earth Science & Technology, University of Hawaii, Honolulu, USA
Theoretical and numerical research in geophysical fluid dynamics, vortex dynamics,
hydrodynamic stability and wave dynamics

Visiting Researcher 10/01/1993—03/13/1994
Scripps Institution of Oceanography, University of California, San Diego, USA
Research in vortex dynamics

Postdoctoral Researcher 02/01/1990—11/15/1992
Institute for Nonlinear Science, University of California, San Diego, USA
Theoretical and experimental research in vortex dynamics and turbulent jets

Doctorant 02/01/1986—01/31/1990
Institute for Marine and Atmospheric Research, University of Utrecht, The Netherlands
Theoretical and experimental research in the dynamics of rotating fluids

Research Funding (PI, unless noted otherwise)

Current

R.C. Kloosterziel *Equilibration of ocean currents via inertial instability*
National Science Foundation
Award **\$294,386**
Date 09/01/2007

R.C. Kloosterziel *Inertially unstable currents and internal waves* (continuation)
National Science Foundation
Award **\$219,142**
Date 09/01/2005

Past funding

R.C. Kloosterziel *Inertially unstable currents and internal waves*
 National Science Foundation
 Award **\$205,669**
 Date 04/15/2002

R.C. Kloosterziel *The effects of rotation and stratification on three-dimensional vortices*
 National Science Foundation
 Award **\$223,000**
 Date 02/01/1998

R.C. Kloosterziel *Three-dimensional scattering of internal waves*
 Office of Naval Research
 Award **\$415,616**
 Date 04/01/1996

G.F. Carnevale (PI) & R.C. Kloosterziel *Stability of circular vortices*
 National Science Foundation
 Award **\$149,000**
 Date 06/01/1992

Pending

R.C. Kloosterziel *Topographic control of airplane wake vortices*
 National Science Foundation
 Requested award amount **\$161,321**
 Requested starting date 04/01/2008

Declined Proposals

none

Awards

SOEST Young Investigator Award, University of Hawaii 1992 (**\$100,000**)
 8th Annual Fluid Mechanics Photo Contest Prize, American Physical Society 1991

Refereed Publications

- [1] Kloosterziel, R.C. & Carnevale, G.F. 2008 Vertical scale selection in inertial instability *J. Fluid Mech.* **594**, 249–269.
- [2] Kloosterziel, R.C. & Carnevale, G.F. 2007 Generalized energetics for inertially stable parallel shear flows. *J. Fluid Mech.* **585**, 117–126.
- [3] Kloosterziel, R.C., Orlandi, P. & Carnevale, G.F. 2007 Saturation of inertial instability in rotating planar shear flows. *J. Fluid Mech.* **583**, 413–422.
- [4] Kloosterziel, R.C., Carnevale, G.F. & Orlandi, P. 2007 Inertial instability in rotating and stratified flows: barotropic vortices. *J. Fluid Mech.* **583**, 379–412.
- [5] Kloosterziel, R.C. & Carnevale, G.F. 2003 Closed-form linear stability conditions for magneto-convection *J. Fluid Mech.* **490**, 333–345.
- [6] Kloosterziel, R.C. & Carnevale, G.F. 2003 Closed-form linear stability conditions for rotating Rayleigh-Bénard convection with rigid, stress-free upper and lower boundaries *J. Fluid Mech.* **480**, 25–42.

- [7] Carnevale, G.F., Orlandi, P., Zhou, Y. & Kloosterziel, R.C. 2002 Rotational suppression of Rayleigh-Taylor instability *J. Fluid Mech.* **457** 181-190.
- [8] Kloosterziel, R.C. 2000 Surface forced internal waves and vortices in uniformly stratified and rotating fluids. *J. Fluid Mech.* **421**, 39-81.
- [9] Lumpkin, R., Flament, P., Kloosterziel, R.C. & Armi, L. 2000 Vortex merging in a $1\frac{1}{2}$ -layer fluid on an f -plane. *J. Phys. Oceanogr.* **30**, 233-242.
- [10] Kloosterziel, R.C. & Carnevale, G.F. 1999 On the evolution and saturation of instabilities of 2-D isolated circular vortices. *J. Fluid Mech.* **388**, 217-257.
- [11] Moore, D.W., Kloosterziel, R.C. & Kessler, W.S. 1998 Evolution of mixed Rossby-gravity waves. *J. Geophys. Res.* **103**, 5331-5346.
- [12] Carnevale, G.F., Briscolini, M., Kloosterziel, R.C. & Vallis, G.K. 1997 Three-dimensionally perturbed vortex tubes in a rotating flow. *J. Fluid Mech.* **341**, 127-163.
- [13] Kloosterziel, R.C. & Müller, P. 1995 Evolution of near-inertial waves. *J. Fluid Mech.* **301**, 269-294.
- [14] Carnevale, G.F. & Kloosterziel, R.C. 1994 Emergence and evolution of triangular vortices. *J. Fluid Mech.* **259**, 305-331.
- [15] Carnevale, G.F. & Kloosterziel, R.C. 1994 Lobe shedding from propagating vortices. *Physica D* **76**, 147-167.
- [16] Kloosterziel, R.C., Carnevale, G.F. & Philippe, D. 1993 Propagation of barotropic dipoles over topography in a rotating tank. *Dyn. Atmos. Oceans* **19**, 65-100.
- [17] Kloosterziel, R.C. & Carnevale, G.F. 1992 Formal stability of circular vortices. *J. Fluid Mech.* **242**, 249-278.
- [18] Kloosterziel, R.C. & van Heijst, G.J.F. 1992 The evolution of stable barotropic vortices in a rotating free-surface fluid. *J. Fluid Mech.* **239**, 607-629.
- [19] van Heijst, G.J.F., Kloosterziel, R.C. & Williams, C.W.M. 1991 Laboratory experiments on the tripolar vortex in a rotating fluid. *J. Fluid Mech.* **225**, 301-331.
- [20] van Heijst, G.J.F., Kloosterziel, R.C. & Williams, C.W.M. 1991 Formation of a tripolar vortex in a rotating fluid. *Phys. Fluids A* **9**, 2033.
- [21] Kloosterziel, R.C. & van Heijst, G.J.F. 1991 An experimental study of unstable barotropic vortices in a rotating fluid. *J. Fluid Mech.* **223**, 1-24.
- [22] Carnevale, G.F., Kloosterziel, R.C. & van Heijst, G.J.F. 1991 Propagation of barotropic vortices over topography in a rotating tank. *J. Fluid Mech.* **233**, 119-139.
- [23] Kloosterziel, R.C. 1990 On the large-time asymptotics of the diffusion equation on infinite domains. *J. Engng. Math.* **24**, 213-236.
- [24] van Heijst, G.J.F. & Kloosterziel, R.C. 1989 Tripolar vortices in a rotating fluid. *Nature* **338** (no.6216), 569-571.

Chapters in Books

- [25] Kloosterziel, R.C. & Carnevale, G.F. 2003 A low-dimensional dynamical system for tripole formation. *Nonlinear Processes in Geophysical Fluid Dynamics*, pp. 355-374. Kluwer.
- [26] Carnevale, G.F., Kloosterziel, R.C., Orlandi, P., & Zhou, Y. 2003 Effects of rotation on convective instability. *Nonlinear Processes in Geophysical Fluid Dynamics*, pp. 325-338. Kluwer.

- [28] Carnevale G.F., Orlandi, P, Briscolini, M. & Kloosterziel, R.C. 2003 Internal-wave-packet propagation and breaking. *Statistical theories and computational approaches to turbulence*, pp. 289-316. Springer-Verlag.
- [29] Kloosterziel, R.C. & Carnevale, G.F. 1994 Stability of 2-D circular vortices. *Modelling of Oceanic Vortices*, pp. 161–168. Elsevier.
- [30] Carnevale, G.F. & Kloosterziel, R.C. 1994 Stability of isolated compound vortices. *Modelling of Oceanic Vortices*, pp. 217–229. Elsevier.
- [31] Kloosterziel, R.C. & van Heijst, G.J.F. 1989 On tripolar vortices. *Mesoscale/Synoptic Coherent Structures in Geophysical Turbulence*, pp. 609–625. Elsevier.

Work in Progress (close to completion)

Kloosterziel, R.C., Carnevale, G.F. & Orlandi, P. Inertial instability in rotating and stratified fluids: baroclinic vortices (to be submitted to *J. Fluid Mech.*)

Kloosterziel, R.C. Nonlinear stability of the point-vortex tripole (to be submitted to *Phys. Fluids*)

Kloosterziel, R.C. & Moore, D.W. Forced equatorial Kelvin and Yanai waves (to be submitted to *J. Geophys. Res.*)

Kloosterziel, R.C. On the response of rotating stratified fluids to forcing at sloping boundaries (to be submitted to *J. Fluid Mech.*)

Additional current efforts concern: rotating magneto-convection, equatorial inertial instability, generation of unbalanced currents by propagating, transient internal wave packets.

Miscellaneous

Photographs from my early experimental work appear

On: 2005 recruitment poster for graduate studies at the University of Hawaii.

In: *Annual Review of Fluid Mechanics* **25**, 1993 J.L Lumley, M. Van Dyke, H. Reed (eds.)

On: Poster for the 9th Annual Summer School of the California Coordinating Committee for Nonlinear Studies: *Vortices in the Four States of Matter*, June—July, 1993, University of California, San Diego.

In: *Enciclopedia Della Scienze Fisiche* (Encyclopaedia of Physical Sciences, in 6 volumes), A. Ficheria (ed.), Istituto della Enciclopedia Italiana, 1993.

In: *Engineering Fluid Mechanics* by J.A. Roberson & C.T. Crowe, 5th edition Boston: Houghton Mifflin, 1993.

In: La Dance de Tourbillons, *La Recherche*. 1990 **21** (218), pp. 224–227.

Invited Lectures (since 2000)

June 13, 2005 University of St. Andrews, Department of Applied Mathematics, Scotland. ‘Adjustment of unbalanced vortices through wave radiation’

Lecture series ‘Vortex dynamics in geophysical fluids’ at Dipartimento di Meccanica e Aeronautica, University of Rome, Italy (with G.F. Carnevale)

June 7, 2004: ‘Quasi-two dimensional vortex dynamics in homogeneous rotating fluids’

June 10, 2004: ‘The β -effect’

June 14, 2004: ‘Vortex interactions with topography’

June 17, 2004: ‘The influence of boundaries’

October 4, 2002 CICESE, Ensenada, Mexico. ‘Inertial instability of vortices and currents in rotating and stratified fluids’

June 3, 2002 PMEL, National Oceanic & Atmospheric Administration, Seattle. ‘Surface forced internal waves and vortices in uniformly rotating and stratified fluids’

July 10, 2000 EPFL/University of Lausanne, Department of Condensed Matter Physics, Switzerland. ‘Vortices and Stuff’

Invited Work Visits (since 2000)

May–July 2004: Dipartimento di Meccanica e Aeronautica, University of Rome, Italy
Host: Prof. P. Orlandi

July 2003: Laboratoire des Ecoulements Geophysique et Industriels, INPG, Grenoble, France
Host: Dr. J.B. Flor

July–August 2002: Department of Condensed Matter Physics, EPFL/University of Lausanne, Switzerland
Host: Prof. W.D. Schneider

June 2002: Ocean Climate Research Division, PMEL, NOAA, Seattle, USA
Host: Dr. D.W. Moore

July–August 2001: Department of Condensed Matter Physics, EPFL/University of Lausanne, Switzerland
Host: Prof. W.D. Schneider

June–August 2000: Department of Condensed Matter Physics, EPFL/University of Lausanne, Switzerland
Host: Prof. W.D. Schneider

Yearly visits of 2-3 months to Scripps Institution of Oceanography, San Diego, USA
Host: Dr. G.F. Carnevale

Conference Presentations

EGS, XXVII General Assembly 2002
Nice, France (3 presentations)

AGU, Spring Meeting 2001
Boston, USA

EGS, XXVI General Assembly 2001
Nice, France

6th Colloquium on the Modelling of Oceanic Vortices 1992
Rijksuniversiteit Amsterdam, The Netherlands

AGU, Ocean Sciences Meeting 1992
New Orleans, Louisiana, USA

APS 44th Annual Meeting of the Division of Fluid Dynamics 1991
Scottsdale, Arizona, USA

5th Colloquium on the Modelling of Oceanic Vortices 1990
Dartmouth College, Thayer School of Engineering, USA

4th Colloquium on the Modelling of Oceanic Vortices 1988
University of Liège, Belgium

Most Cited Papers (> 25)

Source: *Science Citation Index*

- (94) Kloosterziel, R.C. & van Heijst, G.J.F. 1991 An experimental study of unstable barotropic vortices in a rotating fluid. *J. Fluid Mech.* **223**, 1-24.
- (83) van Heijst, G.J.F., Kloosterziel, R.C. & Williams, C.W.M. 1991 Laboratory experiments on the tripolar vortex in a rotating fluid. *J. Fluid Mech.* **225**, 301-331.
- (69) Carnevale, G.F., Kloosterziel, R.C. & van Heijst, G.J.F. 1991 Propagation of barotropic vortices over topography in a rotating tank. *J. Fluid Mech.* **233**, 119-139.
- (58) van Heijst, G.J.F. & Kloosterziel, R.C. 1989 Tripolar vortices in a rotating fluid. *Nature* **338** (no.6216), 569-571.
- (49) Carnevale, G.F. & Kloosterziel, R.C. 1994 Emergence and evolution of triangular vortices. *J. Fluid Mech.* **259**, 305-331.
- (26) Kloosterziel, R.C. & van Heijst, G.J.F. 1992 The evolution of stable barotropic vortices in a rotating free-surface fluid. *J. Fluid Mech.* **239**, 607-629.

Professional Activities

referee for

Dynamics of the Atmosphere and Oceans
 Journal of Fluid Mechanics
 Journal of Marine Research
 Journal of Physical Oceanography
 Journal of the Atmospheric Sciences
 National Science Foundation
 Physics of Fluids

Collaborators/Co-Authors

Prof. L. Armi, Scripps Institution of Oceanography, San Diego, USA
 Dr. M. Briscolini, IBM Italia, Rome, Italy
 Dr. G.F. Carnevale, Scripps Institution of Oceanography, San Diego, USA
 Prof. P. Flament, SOEST, University of Hawaii, Honolulu, USA
 Prof. G.J.F. van Heijst, Eindhoven University of Technology, The Netherlands
 Dr. W.S. Kessler, Pacific Marine Environmental Laboratory, NOAA, Seattle, USA
 Dr. D.W. Moore, Pacific Marine Environmental Laboratory, NOAA, Seattle, USA
 Prof. P. Müller, SOEST, University of Hawaii, Honolulu, USA
 Prof. P. Orlandi, University of Rome, 'La Sapienza', Rome, Italy
 Prof. G.K. Vallis, GFDL, Princeton University, Princeton, USA
 Dr. Y. Zhou, Lawrence Livermore National Laboratory, Livermore, USA
 Students: R. Lumpkin (Hawaii), D. Philippe (UCSD, deceased), C.W.M. Williams (Utrecht)