JOHN A. WHITEHEAD 17 Nov 2017

SHORT VITA AND PUBLICATIONS

Scientist Emeritus, Department of Physical Oceanography

Faculty, Geophysical Fluid Dynamics Summer School

EDUCATION

B.S., Tufts University, 1963

M.S., Yale University, 1965

Ph.D., Yale University, 1968

SCIENTIFIC INTERESTS

Geophysical fluid dynamics: analytical and laboratory studies of fluid mechanics problems in oceans, atmospheres, and planetary interiors

HONORS

American Society of Mechanical Engineers "Old Guard" Undergraduate Competition, Division I Winner (Northeast United States), 1963

Senior Postdoctoral Fellowship, Advanced Study Program, National Center for Atmospheric Research, Boulder, Colorado, 1 December 1977–15 June 1978

John Simon Guggenheim Memorial Fellow, 1982–1983, Dept. of Applied Mathematics and Theoretical Physics and King's College, University of Cambridge

Fellow, American Physical Society, 1982, *"For the development of basic understanding of convection and rotating flows"*

Fellow, American Geophysical Union, 1997, *"For his numerous contributions to understanding fundamental fluid dynamical processes in the Earth's mantle and oceans, including mantle conduit and hotspot dynamics and the development of rotating hydraulics and its application to oceanic flows"*

Alumni Achievement Award, Dept. of Mechanical Engineering, Tufts University, 1999

Fellow, American Academy of Arts and Sciences, 2002

Fellow, American Meteorological Society, 2007

Henry Stommel Research Award, American Meteorological Society, 2007, *"For his fundamental contributions to Geophysical Fluid Dynamics and Physical Oceanography, for which his laboratory and observational studies of rotating hydraulic flows have been particularly illuminating"*

Maurice Ewing Medal, American Geophysical Union, 2014, *"For significant original contributions to the scientific understanding of the processes in the ocean"*

PUBLICATIONS

Book

Pratt, L. J. and J. A. Whitehead, 2007 Rotating Hydraulics– Nonlinear topographic effects in the ocean and atmosphere, Springer–Verlag, 608 pp.

Refereed

Chen, Michael M. and John A. Whitehead, 1968. Evolution of two-dimensional periodic Rayleigh convection cells of arbitrary wave–numbers. *Journal of Fluid Mechanics*, 31(1), 1–15.

Schubert, G. and J. A. Whitehead, 1969. Moving flame experiment with liquid mercury: possible implications for the Venus atmosphere. *Science,* 163, 71–72.

Newell, A. C. and J. A. Whitehead, 1969. Finite bandwidth, finite amplitude convection. *Journal of Fluid Mechanics,* 38, 279–303.

Howard, L. N., W. V. R. Malkus and J. A. Whitehead, 1970. Self-convection of floating heat sources: a model for continental drift. *Geophysical Fluid Dynamics*, 1, 123–142.

Whitehead, J. A. and Michael M. Chen, 1970. Thermal instability and convection of a thin fluid layer bounded by a stably stratified region. *Journal of Fluid Mechanics*, 40, 549–576.

Busse, F. H. and J. A. Whitehead, 1971. Instabilities of convection rolls in a high Prandtl number fluid. *Journal of Fluid Mechanics,* 47, 305–320.

Whitehead, J. A., 1971. Upon boundary conditions imposed by a stratified fluid. *Geophysical Fluid Dynamics*, 2, 289–298.

Whitehead, J. A., Jr., 1971. *The generation of mean flows by a negative Reynolds stress*. In: Environmental and Geophysical Heat Transfer, C. J. Cremers, F. Kreith and J. A. Clark, editors, Heat Transfer Division Vol. 4, American Society of Mechanical Engineers, New York; pp. 20–25.

Whitehead, J. A., 1972. Observations of rapid mean flows produced in mercury by a moving heater. *Geophysical Fluid Dynamics*, 3, 161–180.

Whitehead, J. A., 1972. Moving heaters as a model of continental drift. *Physics of the Earth and Planetary Interiors*, 5, 199–212.

Whitehead, John A., Jr., 1973. Observations of the dynamics of Rayleigh-Benard convection. Proceedings of the 13th International Congress of Theoretical and Applied Mechanics, Izdatelstra "Nauka," Moscow, U.S.S.R. (in Russian).

Whitehead, J. A., A. Leetmaa and R. A. Knox, 1974. Rotating hydraulics of strait and sill flows. *Geophysical Fluid Dynamics*, 6, 101–125.

Whitehead, J. A. and Roger F. Gans, 1974. A new, theoretically tractable earthquake model. *Geophysical Journal of the Royal Astronomical Society*, 39, 11–28.

Busse, F. H. and J. A. Whitehead, 1974. Oscillatory and collective instabilities in large Prandtl number convection. *Journal of Fluid Mechanics*, 66, 67–80.

Whitehead, John A., Jr., and Douglas S. Luther, 1975. Dynamics of laboratory diapir and plume models. *Journal of Geophysical Research*, 80, 705–717.

Whitehead, John A., Jr., 1975. Mean flow generated by circulation on a β-plane: An analogy with the moving flame experiment. *Tellus*, 27(4), 358–364.

Bye, John A. T. and John A. Whitehead, Jr., 1975. A theoretical model of the flow in the mouth of Spencer Gulf, South Australia. *Estuarine and Coastal Marine Science*, 3, 477–481.

Whitehead, J. A., Jr., and Gerald Chan, 1976. Stability of Rayleigh-Benard convection rolls and bimodal flow at moderate Prandtl number. *Dynamics of Atmospheres and Oceans*, 1, 33–49.

Sambuco, E. and J. A. Whitehead, Jr., 1976. Hydraulic control by a wide weir in a rotating fluid. *Journal of Fluid Mechanics*, 73, 521–528.

Whitehead, J. A., Jr., 1976. The propagation of dislocations in Rayleigh-Benard rolls and bimodal flow. *Journal of Fluid Mechanics*, 75, 715–720.

Whitehead, John A., Jr., 1976. Convection models: Laboratory versus mantle. *Tectonophysics,* 35, 215–228.

Whitehead, John A. and David L. Porter, 1977. Axisymmetric critical withdrawal of a rotating fluid. *Dynamics of Oceans and Atmospheres*, 2, 1–18.

Whitehead, J. A., Jr. and Barry Parsons, 1978. Observations of convection at Rayleigh numbers up to 760,000 in a fluid with large Prandtl number. *Geophysical and Astrophysical Fluid Dynamics*, 9, 201–217.

Skilbeck, John N. and John A. Whitehead, Jr., 1978. Formation of discrete islands in linear island chains. *Nature,* 272(5653), 499–501.

Whitehead, John A., Jr., and A. R. Miller, 1979. Laboratory simulation of the gyre in the Alboran Sea. *Journal of Geophysical Research*, 84(C7), 3733–3742.

Tapley, B. D., G. H. Born, H. H. Hagar, J. Lorell, M. E. Parke, J. M. Diamante, B. C. Douglas, C. C. Goad, R. Kolenkiewicz, J. G. Marsh, C. F. Martin, S. L. Smith III, W. F. Townsend, J. A. Whitehead, H. M. Byrne, L. S. Fedor, D. C. Hammond and N. M. Mognard, 1979. Seasat altimeter calibration: Initial results. *Science*, 204, 1410–1412.

Whitehead, John A., Jr., 1980. Selective withdrawal of rotating stratified fluid. *Dynamics of Atmospheres and Oceans*, 5, 123–135.

Whitehead, John A., Jr., 1981. Laboratory models of circulation in shallow seas. *Philosophical Transactions of the Royal Society of London*, A, 302, 583–595.

Gershenfeld, Neil A., Robert E. Frazel and John A. Whitehead, Jr., 1981. Rotating flume with uniformly flowing, linearly stratified water. *Reviews of Scientific Instruments*, 52(10), 1556–1559.

Whitehead, John A., Jr., and Neil A. Gershenfeld, 1981. Selective withdrawal from a rotating stratified current with applications to OTEC. *Ocean Engineering*, 8(5), 507–515.

Davey, M. K., and J. A. Whitehead, Jr., 1981. Rotating Rayleigh–Taylor instability as a model of sinking events in the ocean. *Geophysical and Astrophysical Fluid Dynamics*, 17, 237–253.

Stern, Melvin E., John A. Whitehead and Bach–Lien Hua, 1982. The intrusion of a density current along the coast of a rotating fluid. *Journal of Fluid Mechanics*, 123, 237–265.

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Whitehead, John A., Jr., and L. V. Worthington, 1982. The flux and mixing rates of Antarctic Bottom Water within the North Atlantic. *Journal of Geophysical Research*, 87(C10), 7903–7924.

Flierl, Glenn R., Melvin E. Stern and John A. Whitehead, Jr., 1983. The physical significance of modons: Laboratory experiments and general integral constraints. *Dynamics of Atmospheres and Oceans*, 7(4), 233–263.

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Whitehead, J. A., 1985. The deflection of a baroclinic jet by a wall in a rotating fluid. *Journal of Fluid Mechanics*, 157, 79–93.

Whitehead, J. A., Jr., 1985. A laboratory study of gyres and uplift near the Strait of Gibraltar. Journal of Geophysical Research, 90, 7045–7060. Correction photographs, *Journal of Geophysical Research*, 90, 12,011–12,013.

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Bulgakov, S. N., G. K. Korotaev, and J. A. Whitehead. 1996. The role of buoyancy fluxes in the formation of a large-scale circulation and stratification of sea water. Part 2: Laboratory experiments. *Izv. An. Fizika Atmosfery I Oceana* 32 (4), 557–564 (In Russian), *Izvestiya–Atmospheric and Oceanic Physics*, **32** (4), 514–520 (English translation).

Stern, Melvin E., Eric Chassignet and J. A. Whitehead, 1997. The wall jet in a rotating fluid. *Journal of Fluid Mechanics*, 335, 1–28.

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Hall, Melinda M., Michael McCartney and J. A. Whitehead, 1997. Antarctic bottom water flux in the equatorial western Atlantic. *Journal of Physical Oceanography,* 27, 1903–1926.

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Whitehead, J. A., 1998. Topographic control of ocean flows in deep passages and straits, *Reviews of Geophysics*, 36, 423–440.

Whitehead, J. A., G.K. Korotaev, and S. N. Bulgakov, 1998. Convective circulation in mesoscale abyssal basins. *Geophysical & Astrophysical Fluid Dynamics,* 89 (3–4) 169–203.

Park, Y. G. and J. A Whitehead, 1999. Rotating convection driven by differential bottom heating. *Journal of Physical Oceanography* 29, 1208–1220.

Wylie, Jonathan J., Barry Voight, and J. A. Whitehead, 1999. Instability of magma flow from volatile-dependent viscosity. *Science,* 285, 1883–1885.

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Whitehead, J. A., and Joseph Pedlosky, 2000. Circulation and boundary layers in differentially heated rotating stratified fluid. *Dynamics of Atmospheres and Oceans,* 31, 1–21.

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Whitehead, J. A. W., Gregory Lawson, and John Salzig, 2001. Multistate flow devices for geophysical fluid dynamics and climate. *American Journal of Physics*, 69 546–553.

Whitehead, J. A., and John Salzig, 2001. Rotating channel flow: Control and upstream currents. *Geophysical and Astrophysical Fluid Dynamics,* 95, 185–226.

Whitehead, J. A., 2002. A boundary layer flow with multiple equilibria, *Physics of Fluids*, 14, 7, 2575–2577.

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Members of Committee on Geodesy, 1978. Geodesy: Trends and Prospects, National Research Council; author of Chapters 3.3, *Ocean Dynamics*, pp. 25–27 and 5.2, Ocean Instrumentation, pp. 62–65; National Academy of Sciences, Washington, D.C., 86 pp.

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