

JOHN A. WHITEHEAD

SHORT VITA AND PUBLICATIONS

23 June 2024

Scientist Emeritus, Department of Physical Oceanography

Steering Committee and Faculty, Geophysical Fluid Dynamics Summer School 1976-P
MS#21

Woods Hole Oceanographic Institution

Woods Hole, Massachusetts 02543

Date of Birth: April 21, 1941

B.S., Tufts University, 1963, M.S., Yale University, 1965, Ph.D., 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 Research Project Competition, Division I Winner (Northeast United States) 1963.

Senior Postdoctoral Fellowship, Advanced Study Program, National Center for Atmospheric Research, Boulder, Colorado, Dec. 1, 1977 - June 15, 1978.

John Simon Guggenheim Memorial Fellow, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, England, 1982-83.

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, Department of Mechanical Engineering, Tufts University, 1999

Fellow, American Academy of Arts and Sciences, 2002

Fellow, American Meteorological Society, 2007

Henry M. 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

Books

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

Whitehead, John A, 2024 Energy Flow and Earth, How Earth Works, SpringerBriefs in Earth Sciences, Springer Nature Switzerland.

Research articles, Refereed

PDFs of any article will be supplied upon request. Most refereed articles are available for your personal use in the publications section of my personal site (<http://www.whoi.edu/hpb/Site.do?id=2553>)

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.

Newell, A. C. and J. A. Whitehead, 1971. Review of the finite bandwidth concept. In: *Instability of Continuous Systems*, H. Leipholz, editor, Springer-Verlag, New York; pp. 284--289.

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., Jr., 1971. Cellular convection. *American Scientist*, 59(4), 444--451.

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*, Izdatel'stra '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., 1975. A survey of hydrodynamic instabilities. *Proceedings of the NATO Advanced Study Institute "Physics of Nonequilibrium Systems: Fluctuations, Instabilities and Phase Transitions"*, Tormod Riste, editor, Plenum Press, New York; pp. 153--180.

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.

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.

Whitehead, J. A., Jr., 1978. Problems in determining sea surface topography. *Proceedings of the Ninth GEOP (Geodesy/Solid-Earth and Ocean Physics) Research Conference, An International Symposium on the Applications of Geodesy to Geodynamics*, Oct. 2--5, 1978, Dept. of Geodetic Science Report No. 280, The Ohio State University, Columbus, OH; pp. 233--236.

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, J. A., Jr., 1980. Rotating critical flows in the ocean. *Proceedings of the Second International Symposium on Stratified Flows*, Torkild Carstens and Thomas McClimans, editors, TAPIR Press, Trondheim, pp. 72--80.

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.

Whitehead, John A., Jr., 1982. Instabilities of fluid conduits in a flowing earth -- are plates lubricated by the asthenosphere? *Geophysical Journal of the Royal Astronomical Society*, London, 70, 415--433.

*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.

Sugimoto, Takashige and John A. Whitehead, Jr., 1983. Laboratory models of bay-type continental shelves in the winter. *Journal of Physical Oceanography*, 13(10), 1819--1828.

Whitehead, John A., 1983. Dislocations in convection and the onset of chaos. *Physics of Fluids*, 26(10), 2899--2904.

Whitehead, J. A., 1983. Book Review - *Geodynamics*, by Turcotte and Schubert, for *Journal of Fluid Mechanics*, 134, 461--464.

Whitehead, J. A., 1983. Remote sensing of the oceans from space. In: *Oceanography: The Present and the Future*, P. G. Brewer, editor, Springer-Verlag, New York; pp. 255--281.

*Whitehead, John A., Jr., Henry J. B. Dick and Hans Schouten, 1984. A mechanism for magmatic accretion under spreading centers. *Nature*, 312, 146--148.

Whitehead, John A., Jr., 1984. Dislocation glide observed in bimodal convection. *Physics of Fluids*, 27, 2389--2390.

McDougall, Trevor J. and J. A. Whitehead, Jr., 1984. Estimates of the relative roles of diapycnal, isopycnal and double-diffusive mixing in Antarctic Bottom Water in the North Atlantic. *Journal of Geophysical Research*, 89(C6), 10,479--10,483.

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.

Schouten, Hans, Kim D. Klitgord, and John A. Whitehead, 1985. Segmentation of mid-ocean ridges. *Nature*, 317, 225--229.

Whitehead, J. A., 1986. Buoyancy driven instabilities of low viscosity zones as models of magma-rich zones. In: *Partial Melting Phenomena in the Earth and Planetary Evolution*, special issue, Harve S. Waff and Mineo Kumazawa, editors, *Journal of Geophysical Research*, 91(B9), 9303--9314.

*Huppert, Herbert E., R. Steven J. Sparks, John A. Whitehead and Mark A. Hallworth, 1986. The replenishment of magma chambers by light inputs. *Journal of Geophysical Research*, 91, 6113--6122.

Kinder, Thomas H., David C. Chapman and John A. Whitehead, Jr., 1986. Westward intensification of the mean circulation on the Bering Sea Shelf. *Journal of Physical Oceanography*, 16, 1217--1229.

Whitehead, John A., 1986. Flow of a homogeneous rotating fluid through straits. *Geophysical and Astrophysical Fluid Dynamics*, 36, 187--205.

Scott, David R., David J. Stevenson and John A. Whitehead, Jr., 1986. Observations of solitary waves in a viscous deformable pipe. *Nature*, 319, 759--761.

Whitehead, John A. and David C. Chapman, 1986. Laboratory observations of a gravity current on a sloping bottom: the generation of shelf waves. *Journal of Fluid Mechanics*, 172, 373--399.

Whitehead, John A. and Karl R. Helfrich, 1986. The Korteweg-deVries equation from laboratory conduit and magma migration equations. *Geophysical Research Letters*, 13, 545--546.

Whitehead, J. A., 1987. On the ratio of the mixing coefficients of heat and salt of Antarctic Bottom Water in the North Atlantic. *Journal of Geophysical Research*, 92, 2981--2984.

Whitehead, John A., 1987. The partition of energy by social systems: a possible sociological tool. *American Anthropologist*, 89, 686--700.

Whitehead, John A., 1987. A laboratory demonstration of solitons using a vertical watery conduit in syrup. *American Journal of Physics*, 55(11), 998--1003.

Whitehead, J. A., 1987, Dense water off continents. *Nature*, 327, 656.

Whitehead, John A., 1988. Fluid models of geological hotspots. *Annual Review of Fluid Mechanics*, 20, 61--87.

Speer, Kevin G. and John A. Whitehead, 1988. A gyre in a non-uniformly heated rotating fluid. *Deep-Sea Research*, 351, 1069--1077.

Whitehead, J. A., and K. R. Helfrich, 1988. Wave transport of deep mantle material. *Nature*, 336, 59--61.

Forsyth, D. and J. Whitehead 1988 Mantle Dynamics: Magma Generation and Delivery. in *The Mid-Oceanic Ridge-- A Dynamic Global System*, Ocean Studies Board, National Academy of Sciences, Academy Press Washington D. C.

Whitehead, J. A., 1989. Giant ocean cataracts. *Scientific American*, 260, 50--57.

Whitehead, J. A., 1989. Laboratory studies of isolated eddies in a rotating fluid. In: *Mesoscale/Synoptic Coherent Structures in Geophysical Turbulence*, J.C.J. Nihoul and B. M. Jamart, eds. Elsevier Science Publishers, B.V.A. Amsterdam, The Netherlands, pp. 627--637.

Whitehead, J. A., 1989. Surges of Antarctic Bottom Water into the North Atlantic. *Journal of Physical Oceanography*, 19, 853--861.

*Whitehead, J. A., 1989. Internal hydraulic control in rotating fluids- applications to oceans. *Geophysical and Astrophysical Fluid Dynamics*, 48, 169-192.

Helfrich, K. R., and J. A. Whitehead, 1990. Solitary waves on conduits of buoyant fluid in a more viscous fluid. *Geophysical and Astrophysical Fluid Dynamics*, 51, 35-52.

Whitehead, J. A., Melvin E. Stern, Glenn R. Flierl & Barry Klinger, 1990. Experimental Observations of Baroclinic eddies on a sloping bottom. *J. Geophys. Res.*, 95, 9585-9610.

Stern M. E. & J. A. Whitehead, 1990. Separation of a boundary jet in a rotating fluid. *J. Fluid Mechanics* 217, 41-69.

Whitehead, J.A. and K. R. Helfrich, 1990. Magma Waves and diapiric dynamics. In: *Magma Transport and Storage*, Michael P. Ryan, ed., J. Wiley and Sons, New York (420 pp.).

Whitehead, J.A. and K. R. Helfrich, 1991. Instability of flow with temperature-dependent viscosity: a model of magma dynamics. *Journal of Geophysical Research*, 96, (B3), 4145-55.

Wilcock, W.S.D. and J. A. Whitehead, 1991. The Rayleigh-Taylor instability of an embedded layer of low-viscosity fluid. *Journal of Geophysical Research*, 96, 12193-12200.

Whitehead, J.A. (1991). Small and mesoscale convection as observed in the laboratory. In: *Deep Convection and deep water formation in the Oceans*, P. C. Chu & J. C. Gascard, eds., Elsevier Publishing Company, New York. 355-68. The volume is from the workshop on "Formation of Deep Waters in the Ocean," Monterey CA. March 1990.

Grimshaw, R.H.J., Karl R. Helfrich and J.A. Whitehead, 1992. Conduit solitary waves in a visco-elastic medium. *Geophysical and Astrophysical Fluid Dynamics* 65, 127-147.

Hart, S. R., E. H. Hauri, L. A. Oschmann, and J. A. Whitehead, 1992. Mantle plumes and entrainment: Isotopic Evidence. *Science* 256, 517-520.

Hunkins, Kenneth, and J. A. Whitehead, 1992. Laboratory simulation of exchange through Fram Strait. *Journal of Geophysical Research*, 97, 11299-11321.

Whitehead, J. A. (1992) Laboratory Studies of Fluid Dynamics Problems Important to the Mediterranean Sea. Volume II, 319-353 in *Winds and Currents of the Mediterranean Basin*, Henry Charnock Ed.. Reports in Meteorology and Oceanography, Numbers 40 & 41 (Volumes I & II), Harvard University Division of Applied Sciences, 1992

Schouten H. & J. A. Whitehead (1992) A possible mechanism for ridge segmentation. *Oceanus*

Whitehead, J. A. 1993. A laboratory Model of Cooling over the Continental Shelf. *J. Physical Oceanography*, 23, #11, 2412-2427.

Whitehead, J. A. and Peter Kelemen, 1994. Fluid and Thermal dissolution instabilities in Magmatic Systems, 355-379 in *Magmatic Systems*, Michael P. Ryan, Editor, 355-379, Academic Press, New York.

Wilber, R. Jude, J. A. Whitehead, Robert B. Halley and John D. Milliman, 1993 Carbonate-pero platform sedimentation by density flows: A mechanism for rapid off-bank and vertical transport of shallow-water fines: comment . *Geology*, 21, 667-668.

Park, Young Gyu, J. A. Whitehead, and Anand Gnanadesikan, 1994. Turbulent Mixing in Stratified Fluids: Layer Formation and Energetics. *J. Fluid Mech.*, 279, 279-312.

Whitehead, J. A. and Ryuji Kimura, 1994. Rotating Hydraulic Models of Fronts at the Continental Shelf Break and in Circular Eddies. *Geophysical and Astrophysical Fluid Dynamics*, 76, 1-27.

*Hauri, Eric H., John. A. Whitehead, and Stanley R. Hart, 1994. Fluid dynamic and geochemical aspects of entrainment in mantle plumes *J. Geophys. Res.*, 99, 24275-24300.

Marshall, John, J. A. Whitehead, and Tom Yates, 1994. Laboratory and numerical experiments in oceanic Convection, P. Malanotte-Rizzoli and A. R. Robinson, (eds.) *Ocean Processes in Climate Dynamics: Global and Mediterranean Examples*, 173-201. Kluwer Academic Publishers.

Kelemen, Peter, B., J. A. Whitehead, Einat Aharonov, and Kelsey Jordahl, 1995. Experiments in flow focussing in soluble Porous Media, with Applications to Melt Extraction from the Mantle *J. Geophys. Res.* 100, 475-96.

*Aharonov, Einat, J. A. Whitehead, Peter Kelemen and Marc Spiegelman 1995. Channeling instability of upwelling melt in the mantle. *J. Geophys. Res.* 100, 20433-50.

Whitehead, J. A. 1995 Critical control by Topography- Deep Passages, Straits and Shelf Fronts. in "Topographic Effects in the Ocean", Peter Muller and Diane Henderson, eds., Proceeding of the 'Aha Huliko'a Winter Hawaiian Workshop, University of Hawaii at Manoa, January 17-20, 1995. SOEST Special Publication, 1995.

*Whitehead, J. A. 1995 Thermohaline Ocean Processes and Models. *Annual Review of Fluid Mechanics* 27, 89-114.

Whitehead, J. A. 1995. Review of the book: "Waves called Solitons: Concepts and Experiments" by M. Remoissenet. *American Journal of Physics* 63, 381-2.

Whitehead, J. A. 1996 Multiple States in doubly-driven flow, *Physica D*, 97, 311-321.

Whitehead, J. A., John Marshall and Gwynneth E. Hufford, 1996. Localized convection in rotating stratified fluid. *J. Geophys. Res.* 101 25,705-25,721.

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 1: The Theory. *Izv. AN. Fizika Atmosfery i Oceana* 32 (4), 548-556 (In Russian), *Izvestiya-Atmospheric and Oceanic Physics*, 32 (4), 506 --- 513 (English translation)..

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. *J. Fluid Mech.* 335,1-28.

*Pedlosky, Joseph, J. A. Whitehead and Graham Veitch 1997 Thermally driven motions in a rotating stratified fluid: theory and experiment, *J. Fluid Mech.* 339, 391-411.

*Hall, Melinda M., Michael McCartney and J. A. Whitehead 1997 Antarctic Bottom Water Flux in the Equatorial Western Atlantic *J. Physical Oc.* 27, 1903-1926.

Borenas, K. M. and J. A. Whitehead 1998. Upstream separation in a rotating channel flow. *J. Geophys Res.* 103, C4 7567-7578.

Whitehead, J. A. 1998 Multiple T-S States for Estuaries, Shelves and Marginal Seas. *Estuaries*, 21, 278-290.

*Whitehead, J. A. 1998. Topographic Control of Ocean Flows in Deep Passages and Straits, *Reviews of Geophys.*, 36, 423-440.

Whitehead, J. A., G.K. Korotaev, & S. N. Bulgakov. 1998 Convective Circulation in Mesoscale Abyssal Basins. *Geophys. Astrophys. Fluid Dyn.* 89 (3-4) 169-203.

*Park, Y. G. and J. A Whitehead, 1999. Rotating convection driven by differential bottom heating. *J. 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.

*Cenedese, C. and J. A. Whitehead 2000 Eddy-shedding from a boundary current around a cape over a sloping bottom *J. Phys. Oc.* 30, 1514-1531.

Whitehead, J. A and Joseph Pedlosky 2000 Circulation and boundary layers in differentially heated rotating stratified fluid, *Dyn. Atmos. Oc.* 31, 1-21.

*Whitehead, J. A. 2000 Stratified Convection with Multiple States. *Ocean Modelling*, 2, 109-121.

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, 2001 Gravity Currents (rotating) *Encyclopedia of Oceanography*, John Steele, Steve Thorpe and Karl Turekian, Eds.

Balmforth, N. J., A. Provenzale and J. A. Whitehead, 2001, The language of Pattern and Form, in “*Geomorphological Fluid Mechanics*”, N. J. Balmforth and A. Provenzale, Eds. Springer Verlag, New York, 3-33.

*Griffiths, R. W. and J. A. Whitehead, 2001, Earth’s surface morphology and convection in the mantle, in “*Geomorphological Fluid Mechanics*,” N. J. Balmforth and A. Provenzale, Eds. Springer Verlag, New York. 111-137.

*Whitehead, J. A. and R. W. Griffiths, 2001, Morphological instabilities in flows with cooling, freezing or dissolution. , in “*Geomorphological Fluid Mechanics*,” N. J. Balmforth and A. Provenzale, Eds., Springer Verlag, New York. 138-163.

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

*Baines P. G. and J. A. Whitehead, 2003 On multiple states in single-layer flows, *Phys Fluids*. 15, #2, 298-307.

*Whitehead, J. A. 2003 Constant Potential vorticity hydraulically controlled flow-complexities from passage shape. *J. Physical Oceanography*, 33, 305-312.

*Whitehead, J. A. , M. L. E. Timmermans, W. Gregory Lawson, S. N. Bulgakov, A. M. Zatarian, J. F. A. Medina, and John Salzig, 2003. Laboratory studies of thermally and/or Salinity-driven flows with partial mixing: Part 1 Stommel transitions and multiple flow states, *J. Geophys. Res.* 108, No. C2, 3036, doi:10.1029/2001JC000902.

Whitehead, J. A. 2003 Laboratory Studies of Mantle Convection with continents and other GFD problems in “Recent Research Developments in Fluid Dynamics”, Transworld Research Network, Kerala, India.

*Cenedese, Claudia, J. A. Whitehead, Tommaso Ascarelli, and Mitch Ohiwa, 2004 A dense current flowing down a sloping bottom in a rotating fluid, *Journal of Physical Oceanography* 34, 188-203.

Cenedese, Claudia, John C. Marshall, and John A. Whitehead, 2004. Thermocline depth and Exchange Fluxes across Circumpolar Fronts, *Journal of Physical Oceanography* 34, #3, 656-667.

*Limeburner, Richard, J. A. Whitehead, and Claudia Cenedese, 2005 Variability of Antarctic Bottom Water Flow into the North Atlantic. *Deep-Sea Research*, II 52, 495-512.

*Whitehead, J. A. 2005 The Effect of Potential Vorticity on Flow Rate Through a Gap. *J. Geophys. Res.*, Vol. 110, No. C7, C07007 10.1029/2004JC002720.

*Timmermans, M. L. E., P. Winsor and J. A. Whitehead, 2005. Deep-water flux over the Lomonosov Ridge, Arctic Ocean, *Journal of Physical Oceanography*: Vol. 35, No. 8, pp. 1489–1493. (doi: 10.1175/JPO2765.1).

*Whitehead, J. A. Lianke te Raa, Tomoki Tozuka, Joseph B. Keller, and Keith Bradley 2005. Laboratory observations and Simple Models of Slow Oscillations in Cooled Salt-Stratified Bodies *Tellus*, 57A, (5) 778-809, (doi:10.1111/j.1600-0870.2005.00150.x).

*Whitehead, J. A. and Keith Bradley, 2006. Laboratory Studies of Stratified Convection with Multiple States, *Ocean Modelling*, 11, 333-346.

*Qu, Tangdong, James B. Girtton, & J. A. Whitehead 2006. Deepwater Overflow through Luzon Strait *J. Geophys. Res.* 111, C01002, doi:10.1029/2005JC003139.

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

*Whitehead, J. A. and Ian Stevenson, 2007, Turbulent mixing of two-layer stratified fluid *Physics of Fluids* 19, 12, 5104. Also available at <http://scitation.aip.org/dbt/dbt.jsp?KEY=PHFLE6&Volume=19&Issue=12>.

Whitehead, J. A. and W. Wang, 2008. A laboratory model of vertical ocean circulation driven by mixing. *Journal of Physical Oceanography*, 38, 1091-1106.

Whitehead, J. A., 2008. The similarity solution for turbulent mixing of two-layer stratified fluid. *Environmental Fluid Mechanics*, **8**, 551-560.

Whitehead, J. A. 2009, Abrupt Transitions and Hysteresis in Thermohaline Laboratory Models, *Journal of Physical Oceanography*, **39**, 1231-1243.

Whitehead, J. A. and Peter D. Clift, 2009, Continent Elevation, Mountains, Erosion -- Freeboard Implications, *J. Geophys. Res. B.*, **114**, B05410, doi:10.1029/2008JB006176.

Holmes-Cerfon, M. C., and J.A. Whitehead, 2010. Instability and freezing in a solidifying melt conduit. *Physica D*, **240**(2), 131-139.

Whitehead, J. A., E. Shea, and M. Behn, 2011. Cellular convection in a chamber with a warm surface raft. *Physics of Fluids*, **23**, 104103.

Marcal, O., J.A. Whitehead, and A. Jensen, 2011. Penetration of a salinity front into a rotating basin: laboratory experiments and a simple theory. *Journal of Marine Research*, **69**, 603-645.

Whitehead, J. A., A. Cotel, S. Hart, C. Lithgow-Bertelloni, and W. Newsome, 2013. Numerical calculations of two-dimensional large Prandtl number convection in a box." *Journal of Fluid Mechanics* **729**, 584-602.

Whitehead, J. A., Erin Shea, and Mark D. Behn, 2014. Erratum: Cellular convection in a chamber with a warm surface raft" [Phys. Fluids **23**, 104103 (2011)]. *Physics of Fluids (1994-present)* **26**, 039901.

Whitehead, J. A. 2014. Laboratory Experiments with abrupt thermohaline transitions, in Modeling Atmospheric and Oceanic Flows: Insights from Laboratory Experiments

and Numerical Simulations. Thomas Von Larcher, and Paul D. Williams (eds.)
Geophysical Monograph Series # 205. John Wiley & Sons.

- Whitehead, J. A. and Mark Behn. 2015. The Continental Drift Convection Cell.
Geophysical Research Letters, **42**, 4301–4308, DOI: 10.1002/2015GL064480
- Cagney, Neil, William H. Newsome, Carolina Lithgow-Bertelloni, Aline Cotel, Stanley R. Hart, and John A. Whitehead. 2015, Temperature and velocity measurements of a rising thermal plume. *Geochemistry, Geophysics, Geosystems*, **16**, 579–599,
DOI: 10.1002/2014GC005576
- Cagney, N., Cramer, F., Newsome, W.H., Lithgow-Bertelloni, C., Cotel, A., Hart, S.R. and Whitehead, J.A. 2016. Constraining the source of mantle plumes. *Earth and Planetary Science Letters*, **435**, pp.55-63.
- Whitehead, J.A. 2016. Rotating Gravity Currents, Reference Module in Earth Systems and Environmental Sciences, Elsevier.
- Whitehead, J. A. 2016 Laboratory Studies of Turbulent Mixing. Reference Module in Earth Systems and Environmental Sciences, Elsevier.
- Whitehead, J. A. 2017. Dimensions of continents and oceans - water has carved a perfect cistern *Earth and Planetary Science Letters*, **467**, 18-29.
- Whitehead, J. A. 2017 Convection driven by temperature and composition flux with the same diffusivity, *Geophysical and Astrophysical Fluid Dynamics*,
10.1080/03091929.2017.1333608
copy at <http://www.tandfonline.com/eprint/n55mKI24TnxGSt86SVJe/full>
- Whitehead, J. A. 2018 Transitions and Oscillations in a thermohaline deep ocean model,
Geophysical and Astrophysical Fluid Dynamics, 112:5, 321-344.
<https://doi.org/10.1080/03091929.2018.1530351>
- Whitehead, J. A. 2021 Flows in horizontal thermohaline convection with differential diffusion, *Geophysical and Astrophysical Fluid Dynamics*, doi:
10.1080/03091929.2021.1888375 <https://doi.org/10.1080/03091929.2021.1888375>
- Whitehead, J. A. 2021 Fluid Flow with Three Upstream Configurations in Freezing Tubes, *J. Geophys. Res., Earth Surface*, 126 #6
<https://doi.org/10.1029/2020JF005969>
- Whitehead, J. A. 2023 Convection cells with accumulating crust: Models of continent and mantle evolution. *Journal of Geophysical Research: Solid Earth*, 128,
<https://doi.org/10.1029/2022JB025643>
- Whitehead, J.A. 2024 Converging material with two bulges. *Journal of Fluid Mechanics*. 980, A26. <https://doi.org/10.1017/jfm.2024.10>

Non-refereed Publications

- 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.
- Newell, A. C. and J. A. Whitehead, 1971. Review of the finite bandwidth concept. In: *Instability of Continuous Systems*, H. Leipholz, editor, Springer-Verlag, New York; pp. 284–289.
- Whitehead, J. A., Jr., 1971. Cellular convection. *American Scientist*, **59**(4), 444–451.
- Whitehead, John A., Jr., 1973. Observations of the dynamics of Rayleigh-Benard convection. Proceedings of the 13th International Congress of Theoretical and Applied Mechanics, Izdatel'stva 'Nauka', Moscow, U.S.S.R. (in Russian).
- Whitehead, J. A., Jr., 1975. A survey of hydrodynamic instabilities. Proceedings of the NATO Advanced Study Institute "Physics of Nonequilibrium Systems: Fluctuations, Instabilities and Phase Transitions", Tormod Riste, editor, Plenum Press, New York; pp. 153–180.
- 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.
- Whitehead, J. A., Jr., 1978. Problems in determining sea surface topography. Proceedings of the Ninth GEOP (Geodesy/Solid-Earth and Ocean Physics) Research Conference, An International Symposium on the Applications of Geodesy to Geodynamics, Oct. 2–5, 1978, Dept. of Geodetic Science Report No. 280, The Ohio State University, Columbus, OH; pp. 233–236.
- Whitehead, J. A., Jr., 1980. Rotating critical flows in the ocean. *Proceedings of the Second International Symposium on Stratified Flows*, Torkild Carstens and Thomas McClimans, editors, TAPIR Press, Trondheim, pp. 72–80.
- Whitehead, J. A., 1983. Book Review - *Geodynamics*, by Turcotte and Schubert, for *Journal of Fluid Mechanics*, **134**, 461–464.
- Whitehead, J. A., 1983. Remote sensing of the oceans from space. In: *Oceanography: The Present and the Future*, P. G. Brewer, editor, Springer-Verlag, New York; pp. 255–281.
- Whitehead, J. A., 1986. Buoyancy driven instabilities of low viscosity zones as models of magma-rich zones, NATO workshop on partially solidified systems, Lake Tahoe, California, May 13, 1986.
- Forsyth, D. and J. Whitehead, 1988. Mantle Dynamics: Magma Generation and Delivery in: The Mid-Oceanic Ridge--A Dynamic Global System, Ocean Studies Board, National Academy of Sciences, Academy Press Washington D. C.

- Whitehead, J. A., 1989. Laboratory studies of isolated eddies in a rotating fluid. In: *Mesoscale/Synoptic Coherent Structures in Geophysical Turbulence*, J.C.J. Nihoul and B. M. Jamart, editors. Elsevier Science Publishers, B.V.A., Amsterdam, The Netherlands; pp. 627–637.
- Whitehead, J. A., 1989. Giant Ocean Cataracts. *Scientific American*, **260**, 50–57.
- Whitehead, J. A., 1989. Laboratory studies of isolated eddies in a rotating fluid. In: *Mesoscale/Synoptic Coherent Structures in Geophysical Turbulence*, J.C.J. Nihoul and B. M. Jamart, eds. Elsevier Science Publishers, B.V.A. Amsterdam, The Netherlands, pp. 627–637.
- Whitehead, J.A., 1991. Small and mesoscale convection as observed in the laboratory. In: *Deep Convection and deep water formation in the Oceans*, P. C. Chu & J. C. Gascard, eds., Elsevier Publishing Company, New York. 355–68. The volume is from the workshop on "Formation of Deep Waters in the Ocean," Monterey CA. March 1990.
- Schouten H. and J. A. Whitehead, 1992. A possible mechanism for ridge segmentation. *Oceanus*.
- Whitehead, J. A., 1992. Laboratory Studies of Fluid Dynamics Problems Important to the Mediterranean Sea. Volume II, 319–353. In: *Winds and Currents of the Mediterranean Basin*, Henry Charnock, Ed., Reports in Meteorology and Oceanography, Numbers 40 & 41 (Volumes I & II), Harvard University Division of Applied Sciences.
- Hunkins, K. L., and J. A. Whitehead, 1993. A laboratory model of rotating, stratified exchange between polar and subpolar seas. IAPSO proceedings number 18, 387, IAPSO XX General Assembly, Vienna Austria, IAPSO, Office of the Secretary General, Del Mar, California.
- Whitehead, J. A. and Robert E. Frazel, 1993. A laboratory model of a cooled continental shelf. WHOI technical report WHOI-93-22.
- Wilber, R. Jude, J. A. Whitehead, Robert B. Halley and John D. Milliman, 1993. Carbonate-peroplatform sedimentation by density flows: A mechanism for rapid off-bank and vertical transport of shallow-water fines: comment. *Geology*, **21**, 667–668.
- Marshall, John, J. A. Whitehead, and Tom Yates, 1994. Laboratory and numerical experiments in oceanic Convection, P. Malanotte-Rizzoli and A. R. Robinson (eds.) *Ocean Processes in Climate Dynamics: Global and Mediterranean Examples*, 173–201. Kluwer Academic Publishers.
- Whitehead, J. A., S. N. Bulgakov, and G. K. Korotaev, 1994. Salt flux as a mechanism for large-scale circulation in the Black Sea. AMERICAN GEOPHYSICAL UNION Ocean Sciences Meeting, paper 031I-8. San Diego, CA, Feb. 21–25, 1994. *Eos, Transactions, American Geophysical Union*, **75**(3).
- Whitehead, J. A., 1995. Critical control by topography – deep passages, straits, and shelf fronts. In: *Topographic Effects in the Ocean*, Proceedings, 'Aha Huliko'a, Hawaiian Winter Workshop, University of Hawaii at Manoa, January 17–20, 1995; Peter Müller and Diane Henderson, editors; School of Ocean and Earth Science and Technology (SOEST) Special Publication; pp. 144–156.

- Whitehead, J. A., 1995. Thermohaline Ocean Processes and Models. *Annual Review of Fluid Mechanics*, **27**, 89–114.
- Whitehead, J. A. 1995. Review of the book: "Waves called Solitons: Concepts and Experiments" by M. Remoissenet. *American Journal of Physics*, **63**, 381-2.
- Whitehead, J. A., 1997. Critical control at deep ocean passages. *WOCE Newsletter*, **28**, 14–16.
- Balmforth, N. J., A. Provenzale and J. A. Whitehead, 2001. The language of Pattern and Form, in "Geomorphological Fluid Mechanics", N. J. Balmforth and A. Provenzale, Eds. Springer Verlag, New York, 3–33.
- Griffiths, R. W. and J. A. Whitehead, 2001. Earth's surface morphology and convection in the mantle, in "Geomorphological Fluid Mechanics," N. J. Balmforth and A. Provenzale, Eds. Springer Verlag, New York. 111–137.
- Whitehead, J. A. and R. W. Griffiths, 2001. Morphological instabilities in flows with cooling, freezing or dissolution. in "Geomorphological Fluid Mechanics," N. J. Balmforth and A. Provenzale, Eds., Springer Verlag, New York. 138–163.
- Whitehead, J. A., 2001. Rotating gravity currents. In: *Encyclopedia of Ocean Sciences*, John H. Steele, Steve A. Thorpe, and Karl K. Turekian, Editors, Academic Press, San Diego, **4**, 2444-2449.
- Whitehead, J. A., 2003. Laboratory Studies of Mantle Convection with continents and other GFD problems. In: "Recent Research Developments in Fluid Dynamics", Transworld Research Network, Kerala, India.

Technical Reports

- Whitehead, J. A., 1975. Experimental hydrodynamic observations of transition phenomena. *Woods Hole Oceanographic Institution Technical Report WHOI-75-30*, 65 pp.
- Whitehead, John A., Jr., 1983. Final technical report, Contract N00014-81-C-0010, 1 October 1980–30 September 1982. *Woods Hole Oceanographic Institution Technical Report WHOI-83-11*, 207 pp.
- Whitehead, John A., 1984. A laboratory excursion. In: 1984 Summer Study Program in Geophysical Fluid Dynamics, Woods Hole Oceanographic Institution, Dynamic Differentiation. *Woods Hole Oceanographic Institution Technical Report WHOI-84-44*, p. 73 (abstract).
- Whitehead, John A., Jr., 1984. Buoyant motions with large viscosity differences have large lateral motion. In: 1984 Summer Study Program in Geophysical Fluid Dynamics, Woods Hole Oceanographic Institution. *Woods Hole Oceanographic Institution Technical Report WHOI-84-44*, p. 143–144 (abstract).
- Whitehead, J. A. and Robert E. Frazel, 1993, A laboratory model of a cooled continental shelf. WHOI technical report WHOI-93-22.

Tarbell, Susan A., John A. Whitehead, Melinda M. Hall and Michael S. McCartney, 1997. Trans-Equatorial Bottom Water Flow in the Western Atlantic, Volume XLVI in series of reports presenting data from moored current meters. *Woods Hole Oceanographic Institution Technical Report* WHOI-97-01, 86 pp. and 3 fiche.