

LAKSHMI KANTHA

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PROFESSIONAL HISTORY

- 1991- Professor, Department of Aerospace Engineering Sciences, University of Colorado, Boulder, Colorado (Tenured 1995).
- 1993- Affiliate Faculty, Program in Atmospheric and Oceanic Sciences, University of Colorado, Boulder, Colorado.
- 2011- Associate Scientist, Istituto di Scienze Marine (Institute for Marine Research), Consiglio Nazionale della Ricerca (National Research Council), Venice, Italy.
- 2007- Affiliate Faculty, Applied Mathematics, University of Colorado, Boulder, Colorado.
- 2007- Affiliate Faculty, CIRES, University of Colorado, Boulder, Colorado.
- 1999-00 Visiting Research Scientist, NATO SACLANT Undersea Research Center, La Spezia, Italy.
- 1991-99 IPA Appointment, Naval Oceanographic Office, Stennis Space Center, Mississippi.
- 1991-97 Expert Consultant, Naval Research Laboratory, Stennis Space Center, Mississippi.
- 1990-91 Oceanographer, Navy Oceanographic and Atmospheric Research Laboratory, Stennis Space Center, Mississippi.
- 1988-90 Scientist III, Institute for Naval Oceanography, Stennis Space Center, Mississippi.
- 1986-88 Senior Visiting Scientist, Atmospheric and Oceanic Sciences Program, Princeton University, Princeton, New Jersey.
- 1980-86 Research Scientist, Dynalysis of Princeton, Princeton, New Jersey.
- 1979-80 Research Scientist, Department of Earth and Planetary Sciences, The Johns Hopkins University, Baltimore, Maryland
- 1975-79 Associate Research Scientist, Department of Earth and Planetary Sciences, The Johns Hopkins University, Baltimore, Maryland
- 1974-75 Post-doctoral Research Fellow, Department of Earth and Planetary Sciences, The Johns Hopkins University, Baltimore, Maryland
- 1969-73 Research Assistant, The Department of Aeronautics and Astronautics, Massachusetts Institute of Technology, Cambridge, Massachusetts
- 1968-69 Junior Research Fellow, National Aeronautical Laboratory, Bangalore, India

EDUCATION

- Nov 1973 Doctor of Philosophy in Fluid Mechanics, Aeronautics and Astronautics, Massachusetts Institute of Technology, Cambridge, Massachusetts
- Aug 1969 Master of Engineering (with distinction) in Aerodynamics, Aeronautical Engineering, Indian Institute of Science, Bangalore, India
- Apr 1967 Bachelor of Engineering (with distinction) in Mechanical Engineering, Bangalore University, Bangalore, India

HONORS

- 2000 North Atlantic Treaty Organization SACLANT Undersea Research Centre Certificate of Service
- 1996 Naval Oceanographic Office and Naval Research Laboratory Special Act Award for Transitions

- 1991 Naval Oceanographic and Atmospheric Research Laboratory Commendation for Outstanding Performance during Desert Storm
- 1991 Institute for Naval Oceanography Incentive Award for assistance to U. S. Navy during Desert Storm.
- 1968-69 Junior Research fellowship, National Aeronautical Laboratory, Council of Scientific and Industrial Research, India
- 1967-68 Fellowship, Indian Institute of Science, Bangalore, India
- 1966-67 Institute of Engineers (India) Centenary Merit Scholarship
- 1962-66 Government of India National Merit Scholarship

PROFESSIONAL SERVICE/ACTIVITIES

- Member, National Science Foundation Review Panel, 2004
- American Geophysical Union, Member, 1983 -
- American Meteorological Society, Member, 1983 -
- Member, National Science Foundation Review Panel, 2001
- Member, Editorial Board, Journal of the Korean Society of Oceanography, 1996
- Member, National Academy of Sciences, Naval Studies Board Shallow Water Committee, 1993
- Member, Navy CIMREP panel on Navy operational ocean modeling, 1991-1994
- Member, International Working Group on Crater Lakes, 1994 -
- Oceanography Society, Member, 1988 - 1991
- American Institute of Aeronautics and Astronautics, Senior Member, 1991 -
- Korean Society of Oceanography, Member 1994 -
- Guest Co-Editor, J. Geophysical research Special MIZEX issue, 1990.
- AGU Chapman Conference Committee on the Gulf of Mexico, Member, 1989.

RESEARCH INTERESTS

Primary interest is in numerical models of the oceans, and related physical processes. Modeling turbulent mixing in the oceans and the atmosphere is also a topic of interest. Study of oceanic processes through assimilation of remotely sensed data (including altimetry) into numerical ocean models, nowcasting, hindcasting and short-term forecasting of the ocean state is the current long-term objective. Focus is principally on circulation in marginal and coastal bodies of water. Study of ecosystems via physical-biological coupled ocean models, and ocean-ice-atmosphere interactions and their implications to long term weather and climate via coupled models are also topics of my current interest.

TEACHING EXPERIENCE

- Foundations of Aerospace Propulsion, required undergraduate course, 2001- (enrollment ~50-80)
- Rocket and Spacecraft Propulsion, graduate level course, 2000- (enrollment ~15-30)
- Gas Turbine Propulsion, graduate level course, 2004- (enrollment 3-7)
- Computational Fluid Dynamics, undergraduate/graduate level course, 1991-1998 (enrollment 10 to 68)
- Fluid Mechanics, graduate level course, 1999-2003 (enrollment ~12)
- Ocean Modeling, graduate level course, 1992-1996 (enrollment 3-10)
- Small Scale Processes, graduate level course, 1992-1997 (enrollment 3-11)

STUDENTS SUPERVISED

- Undergraduates - 15
- Masters Level Graduate Students - 12
- Ph. D. Level Graduate Students - 12
- Thesis Committees Served On - 22
- Masters Degrees Awarded - 8
- Ph. D. Degrees Awarded - 9
- 1. Dr. Denise Tremblay (1993) - Co-chair
- 2. Dr. Carol Anne Clayson (1994) - Co-chair
- 3. Dr. Gary Wick (1994) - Co-chair

4. Dr. Douglas Engelhardt (1996) - Co-chair
5. Dr. Cindy Willett (1997) - Co-chair
6. Dr. Craig Tierney (1998) - Co-chair
7. Dr. Joseph Lopez (1998)
8. Dr. Mark Potts (1998)
9. Dr. Scott Stewart (2000)
10. Dr. Sandro Carniel (2003 at University of Venice, Italy) – Co-chair
11. Dr. Thaned Rojsiraphisal (2007)

REVIEWER

Journal of Fluid Mechanics, Journal of Physical Oceanography, Journal of Geophysical Research (Oceans and Solid Earth), Geophysical Research Letters, Deep Sea Research, Science, Nature, Journal of Atmospheric and Oceanic Technology, Tellus, Monthly Weather review, Ocean Modelling, Journal of Marine Research.

NSF, ONR, NASA, NOAA, NERC and other agency proposals

BOOKS

- Kantha, L. H., and C.A. Clayson, 2000a: *Small Scale Processes in Geophysical Flows*. Academic Press, San Diego, pp 888 (Foreward by Dr. Walter H. Munk).
- Kantha, L. H., and C.A. Clayson, 2000b: *Numerical Models of Oceans and Oceanic Processes*. Academic Press, San Diego, pp 940 (Foreword by Dr. Kirk Bryan).

PUBLICATIONS (REFEREED)

- Carniel, S., L. Kantha, J. W. Book, M. Sclavo and H. Prandke, 2011. Turbulence variability in the upper layers of the Southern Adriatic Sea under a variety of atmospheric forcing conditions. *Continental Shelf Research* (in press). doi:10.1016/j.csr.2011.01.003.
- Kantha, L., S. Carniel, C. A. Clayson, and M. Sclavo, 2011. On the use of a simple primary productivity model to assess the skill of a physical ocean model. *Chemistry and Ecology* (in press).
- Kantha, L., 2011. Modeling turbulent mixing in the global ocean: second moment closure models. Chapter 1 of "*Turbulence: Theory, Types and Simulation*," ed. by R. J. Marcuso, Nova Publishers, 68 pp.
- Kantha, L., 2011. Turbulence dissipation rates in the free atmosphere from high-resolution radiosondes. Chapter 7 of "*Turbulence: Theory, Types and Simulation*," ed. by R. J. Marcuso, Nova Publishers, 25 pp.
- Kantha, L., and W. Hocking, 2011. Dissipation rates of turbulence kinetic energy in the free atmosphere: MST radar and radiosondes. *J. Atmos. Solar-Terrestrial Phys.* (published on line). doi:10.1016/j.jastp.2010.11.024
- Carniel, S., L. Kantha, A. Bergamasco, H. Prandke, R. J. Small, and M. Sclavo, 2010. Layered structures in the upper Ligurian Sea, *Il Nuovo Cimento*, 125, 1567-1586. doi:10.1393/ncb/i2010-10945-8.
- Kantha, L., 2010. Decay of aircraft wake vortices under daytime free convection conditions. *AIAA J. Aircraft*, 47, 2159-2164.
- Kantha, L., S. Carniel, and M. Sclavo, 2010. A note on modeling double diffusive mixing in the global ocean. *Ocean Modelling*, 36, 40-48. doi:10.1016/j.ocemod.2010.09.003.
- Kantha, L., 2010. Discussion of "A hydrodynamics-based surge scale for hurricanes". *Ocean Engineering*, 37,1081-1084. doi:10.1016/j.oceaneng.2010.04.003
- Balsley, B., L. Kantha, and W. Cogan, 2010. On the use of slow ascent meter-scale sampling (SAMS) radiosondes for observing overturning events in the free atmosphere. *J. Atmos. Oceanic Tech.*, 27, 766-775.
- Kantha, L. H. U. Lass, and H. Prandke, 2010. A note on Stokes production of turbulence kinetic energy in the oceanic mixed layer: Observations in the Baltic Sea, *Ocean Dynamics*, 60, 171-180. DOI: 10.1007/s10236-009-0257-7 (errata - DOI 10.1007/s10236-010-0283-5)

- Rojsiraphisal, T., B. Rajagopalan, and L. Kantha, 2009. The use of MTM-SVD technique to explore the joint spatio-temporal modes of wind and sea surface variability in the North Indian Ocean during 1993-2005. *International J. Oceanogr.* doi:10.1155/2009/214828.
- Kantha, L. and S. Carniel, 2009. A Note on modeling mixing in stably stratified flows *J. Atmos. Sci.*, 66, 2501-2505.
- Rojsiraphisal, T., and L. Kantha, 2009. Meridional heat fluxes in the North Indian Ocean, Chapter 8 in *The Atlantic and Indian Oceans*, eds. E. S. Askew and J. P. Bromley, Nova Science Publishers, 169-178.
- Rojsiraphisal, T., L. Kantha and Y. Masumoto, 2009. Variability of currents at 90°E in the equatorial Indian Ocean, Chapter 9 in *The Atlantic and Indian Oceans*, eds. E. S. Askew and J. P. Bromley, Nova Science Publishers, 179-199.
- Kantha, L., P. Wittmann, M. Sclavo and S. Carniel, 2009. A preliminary estimate of the Stokes dissipation of wave energy in the global ocean. *Geophys. Res. Lett.*, 36, doi:10.1029/2008GL036193, 2009.
- Brown, J., C. A. Clayson, L. Kantha, and T. Rojsiraphisal, 2008. North Indian Ocean variability during the Indian Ocean Dipole, *Ocean. Sci. Discuss.*, 5, 213-253.
- Kantha, L., S. Carniel and M. Sclavo, 2008. A note on the multimodel superensemble technique for reducing forecast errors. *Il Nuovo Cimento*, 31, 199-214. DOI 10.1393/ncc/i2008-10288-2
- Lipphardt, B. L., Jr., A. C. Poje, A. D. Kirwan, Jr., L. Kantha and M. Zweng, 2008. Death of three Loop Current rings, *J. Mar. Res.*, 66, 25-60.
- Clayson, C. A. and L. Kantha, 2008. Turbulence and mixing in the free atmosphere inferred from high-resolution soundings, *J. Atmos. Oceanic Tech.*, 25, 833-852.
- Kantha, L., 2008. Tropical Cyclone destructive potential by integrated kinetic energy. *Bull. Amer. Meteorol. Soc.*, 89, 219-221.
- Carniel, S., M. Sclavo, L. Kantha and H. Prandke, 2008. Double-diffusive layers in the Adriatic Sea. *Geophys. Res. Lett.* 35, L02605, doi:10.1029/2007GL032389.
- Kantha, L., T. Rojsiraphisal and J. Lopez, 2008. The North Indian Ocean circulation and its variability as seen in a numerical hindcast of the years 1993-2004. *Prog. Oceanogr.* 76, 111-147.
- Kirwan, A. D. Jr., B. L. Lipphardt, Jr., A. C. Poje, L. Kantha, L. and M. Zweng, 2007. 25 years of nonlinearity in oceanography from the Lagrangian perspective. In *Nonlinear Dynamics in Geosciences*, ed. Tonis, A. A., and J. B. Elsner, Springer, NY, 177-196.
- Kantha, L. H., and C. A. Clayson, 2007. On leakage of energy from turbulence to internal waves in the oceanic mixed layer, *Ocean Dynamics*, 57, 151-156 (DOI: 10.1007/s10236-006-0100-3).
- Kantha, L., 2006. Discussion on "Second-order closure models for geophysical boundary layers: A review of recent work", *Continental Shelf Research*, 26, 819-822.
- Kantha, L., 2006. Time to replace the Saffir-Simpson hurricane scale? *EOS Transactions*, 87, 3&6.
- Kantha, L. H., 2006. A note on the decay rate of swell, *Ocean Modelling*, 11, 167-173.
- Carniel, S., M. Sclavo, L. H. Kantha and C. A. Clayson, 2005, Langmuir cells and mixing in the upper ocean, *Il Nuovo Cimento*, 28, 33-54.
- Kantha, L., 2005. Barotropic tides in the Gulf of Mexico, in *Circulation in the Gulf of Mexico: Observations and Models*, eds. W. Sturges and A. Lugo-Fernandez, American Geophysical Union, 159-164.
- Kantha, L. H., J.-K. Choi, K. J. Schaudt and C. K. Cooper, 2005. A regional data-assimilative model for operational use in the Gulf of Mexico, in *Circulation in the Gulf of Mexico: Observations and Models*, eds. W. Sturges and A. Lugo-Fernandez, American Geophysical Union, 165-180.
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- Kantha, L. H., 2005. Development, testing and implementation of a real-time nowcast/forecast capability for the Gulf of Mexico, *Monthly Kaiyo (Japan)*, 37, 239-256.
- Kantha, L. H., 2005. Comments on "Turbulence Closure, Steady State, and Collapse into Waves", *J. Phys. Oceanogr.*, 35, 131-134.
- Kantha, L. H., 2005. Ocean Mixed Layer, in *Marine Turbulence*, eds. H. Baumert, J. Simpson and J. Sundermann, Cambridge University Press, 244-249.
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- Kantha, L., J.-W. Bao and S. Carniel, 2005. A note on Tennekes hypothesis in second moment closure models, *Ocean Modelling*, 9, 23-29.
- Carniel, S., L. Kantha, and M. Sclavo, 2004. Influence of Langmuir cells on the velocity structure in the mixed layer, *Annales Hydrographiques*, Shom ed., 6e serie, Vol 3, 8-1/8-5.
- Kantha, L. H., 2004, A general ecosystem model for applications to carbon cycling and primary productivity studies in the global oceans, *Ocean Modelling*, 6, 285-334.
- Kantha, L. H., 2004. The length scale equation in turbulence models. *Nonlin. Processes Geophys.*, 11, 83-97.
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- Kantha, L. and C. A. Clayson, 2004. On the effect of surface gravity waves on mixing in an oceanic mixed layer, *Ocean Modelling*, 6, 101-124.
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- Kantha, L. H., 2003. On an improved model for the turbulent PBL, *J. Atmos. Sci.*, 60, 2239-2246.
- Toner, M., A. D. Kirwan, Jr., A. C. Poje, L. H. Kantha, F. E. Muller-Karger and C.K.R.T. Jones, 2003, Chlorophyll dispersal by eddy-eddy interactions in the Gulf of Mexico. *J. Geophys. Res.*, 108(C4), 3105, DOI:10.1029/2002JC001499.
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- Kuznetsov, L., M. Toner, A. D. Kirwan, Jr., C. K. R. T. Jones, L. Kantha, and J. Choi, 2002, The Loop Current and adjacent rings delineated by Lagrangian analysis, *J. Mar. Res.*, 60, 405-429.
- Carniel, S., G. Umgiesser, L. Kantha, and S. Monti, 2002, Tracking the drift of a human body in coastal waters using numerical prediction models of the oceanic, atmospheric and wave conditions. *Science and Justice*, 42, 143-151.
- Kantha, L. H., and C. A. Clayson, 2002. Ocean Mixed Layer, in *Encyclopedia of Atmospheric Sciences*, ed. J. Holton, Academic Press.
- Chu, P. C., L. M. Ivanov, L. H. Kantha, O. V. Melnichenko, and Y. A. Poberezhny, 2002. Power law decay in model predictability skill, *Geophys. Res. Lett.*, 29, 15-17.
- Toner, M., A. D. Kirwan, Jr., L. Kantha, and J.-K. Choi, 2001, Can general circulation models be assessed and enhanced with drifter data? *J. Geophys. Res.*, 106, 19,653-19,679.
- Lopez, J. W., and L. H. Kantha, 2000, Results from a numerical model of the northern Indian Ocean: Circulation in the South Arabian Sea. *J. Mar. Syst.*, 24, 97-117.
- Lopez, J. W., and L. H. Kantha, 2000, A data-assimilative model of the North Indian Ocean. *J. Atmos. Oceanic Tech.*, 17, 1525-1540.
- Bao, J.-W., J. M. Wilczak, J.-K. Choi, and L. H. Kantha, 2000. Numerical simulations of air-sea interaction under high wind conditions using a coupled model: A study of hurricane development, *Monthly Weather Review*, 128, 2190-2210.
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- Clayson, C. A., and L. H. Kantha, 1999: Turbulent kinetic energy and dissipation rate in the equatorial mixed layer. *J. Phys. Oceanogr.*, 29, 2146-2166.
- Overland, J. E., S. Solo, L. H. Kantha, and C. A. Clayson, 1999: Thermal stratification and mixing on the Bering Shelf, in *Dynamics of the Bering Sea*, Eds. T. R. Loughlin and K. Ohtani, Univ. Alaska Sea Grant, Fairbanks, Alaska, 129-146.
- Kantha, L. H., 1998, Tides - a modern perspective, *Marine GEODESY*, 21, 275-297.
- Kantha, L. H., 1998, Empirical model of the transport and decay of aircraft wake vortices. *AIAA J. Aircraft*, 35, 649-653.
- Kantha, L. H., J. S. Stewart, and S. Desai, 1998, Long period lunar fortnightly and monthly ocean tides, *J. Geophys. Res.*, 103, 12,639-12,647.
- Bruce, J. G., J. C. Kindle, L. Kantha, J. L. Kerling, and J. F. Baily, 1998, A note on recent observations in the Arabian Sea Laccadive Eddy region. *J. Geophys. Res.*, 103, 7593-7600.
- Kantha, L. H., and C. C. Tierney, 1997. Global baroclinic tides, *Prog. Oceanogr.*, 40, 163-178.
- Clifford, M., C. Horton, J. Schmitz, and L. Kantha, 1997: An oceanographic nowcast/forecast system for the Red Sea, *J. Geophys. Res.*, 102, 25,101-25,122.

- Horton, C., M. Clifford, J. Schmitz, and L. Kantha, 1997: A real-time oceanographic nowcast/forecast system for the Mediterranean Sea, *J. Geophys. Res.*, 102, 25,123-25,156 (Corrections: *J. Geophys. Res.*, 102, 27,911, 1997, and *J. Geophys. Res.*, 103, 18,811, 1998).
- Chang, K.-I., C.-K. Kim, M.-S. Suk, S.-Y. Nam, and L. H. Kantha, 1997, Barotropic circulation of the South Sea - Preliminary model results, *Ocean Research*, 19, 139-152.
- Kantha, L. H., I.- K. Bang, J.- K. Choi, and M.- S. Suk, 1996, Shallow water tides in the Yellow Sea. *J. Korean Soc. Oceanography*, 31, 123-133.
- Bang, I.-K., J.-K. Choi, L. H. Kantha, C. Horton, M. Clifford, M.-S. Suk, K.-I. Chang, S.-Y. Nam and H.-J. Lie, 1996, A hindcast experiment in the East Sea (Sea of Japan). *La Mer*, 34, 108-130.
- Kantha, L. H., 1996, A simple empirical model of the transport and decay of aircraft wake vortices between parallel runways. *AIAA J. Aircraft*, 33, 752-760.
- Kantha, L. H., and S. Piacsek, 1996. Computational ocean modeling. in *The Computer Science and Engineering Handbook*, ed. A. B. Tucker, Jr., 934-958, CRC Press, Florida.
- Kantha, L. H., and S. J. Freeth, 1996, A numerical simulation of the evolution of temperature and CO₂ stratification in Lake Nyos since the 1986 disaster, *J. Geophys. Res.*, 101, 8,187-8,203.
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- Kantha, L. H., 1995. Barotropic tides in the global oceans from a nonlinear tidal model assimilating altimetric tides. Part 1: Model description and results. *J. Geophys. Res.*, 100, 25,283-25,308.
- Kantha, L. H., S. D. Desai, J. W. Lopez, C. Tierney, M. Parke and L. Drexler 1995. Barotropic tides in the global oceans from a nonlinear tidal model assimilating altimetric tides. Part 2: Altimetric and geophysical implications. *J. Geophys. Res.*, 100, 25,309-25,317.
- Kantha, L. H., 1995. A numerical model of Arctic leads. *J. Geophys. Res.*, 100, 4653-4672.
- Kantha, L. H. and C. A. Clayson, 1994. An improved mixed layer model for geophysical applications. *J. Geophys. Res.*, 99, 25235-25266.
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- Hakkinen, S., G. L. Mellor and L. H. Kantha, 1992. Modeling deep convection in the Greenland Sea. *J. Geophys. Res.*, 97, 5389 - 5408.
- Muench, R. D., K. Jezek and L. H. Kantha, 1991. Introduction: Third marginal ice zone research collection. *J. Geophys. Res.*, 96, 4529 -4530.
- Kantha, L.H. and A. Rosati, 1990. On the effect of curvature on turbulence in stratified fluids. *J. Geophys. Res.*, 95, 20313 - 20330.
- Kantha, L.H., A.F. Blumberg and G.L. Mellor, 1990. Computing phase speeds at an open boundary. *J. Hydraulic Engineering*, 116, 592 - 597.
- Mellor, G.L. and L.H. Kantha, 1989. An ice-ocean coupled model. *J. Geophys. Res.*, 94, 10937-10954.
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- Galperin, B., A. Rosati, L.H. Kantha and G.L. Mellor, 1989. Modelling rotating stratified turbulent flows with application to oceanic mixed layers. *J. Phys. Oceanogr.*, 19, 901-916.
- Galperin, B. and L.H. Kantha, 1989. A turbulence model for rotating flows. *AIAA J.*, 27, 750-757.
- Kantha, L.H. and G.L. Mellor, 1989. A numerical model of the atmospheric boundary layer over a marginal ice zone. *J. Geophys. Res.*, 94, 4959-4970.
- Kantha, L.H., A. Rosati and B. Galperin, 1989. Effect of rotation on vertical mixing and associated turbulence in stratified fluids. *J. Geophys. Res.*, 94, 4843-4854.
- McPhee, M.G. and L.H. Kantha, 1989. Generation of internal waves by sea ice. *J. Geophys. Res.*, 94, 3287-3302.
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- Blumberg, A.F. and L.H. Kantha, 1985. Open boundary condition for circulation models. *J. of Hydraulic Engineering, ASCE*, 111, 237-255.
- Kantha, L.H. G.L. Mellor and A.F. Blumberg, 1982. A diagnostic calculation of the general circulation in the South Atlantic Bight. *J. Phys. Oceanogr.*, 12, 805-819.
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- Kantha, L.H., 1980. Experimental simulation of the 'retreat' of the seasonal thermocline by surface heating. In *Fjord Oceanography*, edited by H.J. Freeland, D.M. Farmer and C.D. Levings, Plenum Press, 197-204.
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- Kantha, L.H., 1979. Drift currents induced by reflection of propagating inertial and internal waves at a rigid boundary. *Dynamics of Atmospheres and Oceans* 4, 15-20.
- Marsh, B.D. and L.H. Kantha, 1978. On the heat and mass transfer from an ascending magma. *Earth and Planetary Science Letters* 39, 435-443.
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PUBLICATIONS (NOT YET PUBLISHED)

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