

## CURRICULUM VITAE

**Name:** Paola Malanotte Rizzoli

**Place of Birth:** Lonigo (Vicenza), Italy

**Home Address:** 75 Cambridge Parkway, #W502  
Cambridge, MA 02142

**Work Address:** Department of Earth, Atmospheric & Planetary Sciences  
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Cambridge, MA 02139

## EDUCATION

- 1978 Ph.D., Physical Oceanography, Scripps Institution of Oceanography, University of California, Dissertation: "Solitary Rossby Waves Over Variable Relief and Their Stability Properties"
- 1968 Ph.D., Physics, University of Padua, Italy, "summa cum laude"  
Dissertation: "Quantum-mechanical structure of biologically important molecules. Investigation of the complex molecules of nucleic acids"
- 1963 B.S., Physics and Mathematics, Lyceum "Benedetti," Venice, Italy;  
with highest honors

## EMPLOYMENT

- 1997 - 2009 MIT Director of the Joint Program in Oceanography and Ocean Engineering between M.I.T. and the Woods Hole Oceanographic Institution (WHOI)
- 1992- Professor of Physical Oceanography, M.I.T., Cambridge, Massachusetts
- 1987-1992 Associate Professor of Physical Oceanography with tenure, M.I.T., Cambridge, Massachusetts
- 1985-1987 Associate Professor of Oceanography, M.I.T., Cambridge, Massachusetts
- 1981-1985 Assistant Professor of Oceanography, M.I.T., Cambridge, Massachusetts
- 1978-1980 Cecil and Ida Green Scholar at the Institute of Geophysics and Planetary Physics, University of California at San Diego  
(when on leave of absence from Italy)
- 1976-1981 Senior Scientist (tenured) at the "Istituto Dinamica Grande Masse," CNR, Venice, Italy

- 1972-1976 Research Associate at the “Istituto Studio Dinamica Grande Masse,”  
CNR, Venice, Italy
- 1971-1972 Post-doctoral Research Associate at the “Istituto Studio Dinamica Grande  
Masse,” CNR, Venice, Italy
- 1970-1971 Post-doctoral fellowship at the “Istituto Studio Dinamica Grande Masse,”  
Italian National Research Council (CNR), Venice, Italy
- 1969 Post-doctoral fellowship of the Italian National Council at the University

## **PROFESSIONAL OUTSIDE ACTIVITIES**

- 2008 - 2009 Member of the Awards Nomination Committee of the American  
Meteorological Society**
- 2006-2009 Member of the Committee on Strategic Advice to the US “Climate  
Change Science Program Committee” of the National Research  
Council- National Academies**
- 2006-2007 Chair of the Scientific Program Committee of the XXIV General  
Assembly of the International Union of Geodesy and Geophysics**
- 2005-2008 Member of the Advisory Board (CAB) of the Community Climate  
System Model (CCSM) of the National Center for Atmospheric  
Research**
- 2005-2006 Member of the Panel on “Climate Variability and Change” of the  
National Academies**
- Sept. 20-22, 2005 Invited speaker at the 75<sup>th</sup> Anniversary of Woods Hole  
Oceanographic Institution**
- 2005-2008 Affiliate Scientist at the National Center for Atmospheric Research**
- 2002-2004 Member of the Advisory Committee for Geosciences (AC/GEO) of the  
National Science Foundation
- 2000-2003 Editor of the General Circulation and Modeling section of the Journal of  
Geophysical Research-Oceans
- 2000-2001 Chair of the UCAR Member’s Nominating Committee
- 2000 Member of the Nominating Committee for the 2001 positions of  
President and Counselors of the American Meteorological Society
- 1999-2003 President of the International Association for the Physical Sciences of the  
Ocean (IAPSO)

- 1999-2005 Institutional Trustee of the University Corporation for Atmospheric Research (UCAR)
- 1999-2000 Member of the UCAR Committee for the search for new Director of NCAR (National Center for Atmospheric Research)
- 1998 Chair of the UCAR Review Team of the Center for Climate Prediction of the National Centers for the Environmental Prediction (NCEP)
- 1998- 1999 Member of the Advisory Panel of the Scientific Computing Division of the National Center for Atmospheric Research (NCAR)
- 1997 Chair of the External Review Committee of the Laboratory for Hydrospheric Sciences, Goddard Space Flight Center
- 1997 Member of the Nominating Committee for the 1999 positions of President and Counselors of the American Meteorological Society
- 1996-Present Member of the Advisory Panel to the Consorzio Venezia Nuova, Venice, Italy for the construction of the mobile gates in the Venice Lagoon
- 1996-1997 Member of the Panel of Experts nominated by the Department of the Environment, Italian Government, Rome, to advise on the Flood Problem of Venice and the Construction of the Gates to the Venice Lagoon
- 1995-1999 Deputy Secretary General of the International Association for the Physical Sciences of the Ocean (IAPSO)
- 1995-1998 Member of the Advisory Panel for the National Centers for Environmental Prediction (NCEP) of UCAR
- 1993-1998 Member of the Earth Science Council of the Universities Space Research Association (USRA)
- 1989-1998 Member of the Scientific Advisory Committee (SAC) of the Climate Systems Modeling Project (CSMP) of the University Corporation for Atmospheric Research (UCAR)
- 1983-1998 Co-chairperson of the International Program P.O.E.M. (Physical Oceanography of the Eastern Mediterranean), sponsored by UNESCO and IOC.
- 1992-1994 Member of the Outfall Monitoring Task Force for the Boston Harbor-Commonwealth of Massachusetts.
- 1991-1992 Member of the Search Committee for the Director of INO (Institute of Naval Oceanography) and the Navier-Stokes Chair at INO.

- 1991-1992 Member of the Standing Advisory Committee of INO (Institute of Naval Oceanography)
- 1989-1993 Member of the Steering and Advisory Committee for UCAR (University of Corporation for Atmospheric Research) post-doctoral program in oceanographic modelling
- 1989-1992 Member of the Advisory Panel for the Marine Center Project on coastal water quality of the Sea Grant Program of MIT
- 1991-1992 President of the Italian Commission for Competition and Assignment of 11 University Chairs in Physics of the Earth all over Italy
- 1987-1990 Member of the Advisory Panel for Ocean Sciences Research of the National Science Foundation
- 1987-1990 Member of the American Meteorological Society Committee on Atmospheric and Oceanic Waves and Stability
- 1987-1990 Member of the Steering and Advisory Committee for the UCAR (University Corporation for Atmospheric Research) Visiting Scientist Program in Meteorology
- 1985-1989 Member of the “Working Group on Numerical Modelling” of WOCE
- 1984-1988 President of the Committee of Physical Oceanography, Commission Internationale Exploration Scientifique de la Mer Mediterranee (CIESM), Monte Carlo, Monaco.
- 1980 Scientific Secretary of the 1st International Summer School “E. Fermi” in “Topics in Ocean Physics,” Varenna, Italy, of the Italian Physical Society.
- 1980 Organizer and Scientific Coordinator of the COSPAR/SCOR/IUCRM Symposium, “Oceanography from Space,” sponsored by CNR of Italy, In Venice, 26-30 May.
- 1979-1982 Principal Investigator of YINAMG (Yugoslavian-Italian Northern Adriatic Modeling Group) in the International Program of Scientific Cooperation between Italy and Yugoslavia.
- 1977 Scientific Coordinator and Principal Investigator of 1978 Northern Adriatic test-site in the EURASEP program for the calibration of NIMBUS-7 satellite (CZCS sensor).
- 1972-1974 Chief Scientist during oceanographic campaigns in the Adriatic Sea on oceanographic ships of the Italian National Research Council: ADRIATIC I - January-February, 1972, ADRIATIC II - July-August 1973, ADRIATIC III - November 1974.

**M.I.T. ACTIVITIES**

1. **Member of the MIT Committee for the search of the Dean of the School of Science, 2006-2007.**
2. **Member of the Faculty Advisory Committee for the search of the MIT President, 2003-2004.**
3. **Associate Chair of the MIT Faculty, 2003 – 2005**
4. Member of the Committee on the MIT Sea Grant College Program, 1998-2001.
5. Chair of the Committee of Undergraduate Performance (CAP), 1997-2000.
6. **MIT Director of the Joint MIT/WHOI Program, 1997- 2009**
7. Member of “Committee on Women Faculty,” School of Science, MIT-Dean’s appointment, 1995-2000.
8. Chair of JCPO 1995-1997.
9. Member of the Joint Committee for Physical Oceanography, (JCPO), 1985-1997.
10. Undergraduate Committee of Dept. of Earth, Atmospheric & Planetary Sciences, Chair, 1989-1992.
11. Affirmative Action Committee - Dept. of Earth, Atmospheric & Planetary Sciences (chairperson) 1984-1987.
12. Student Research Fund Committee - Dept. of Earth, Atmospheric & Planetary Sciences, 1983-86.
13. Member of the Foreign Scholarship Committee, MIT (Presidential appointment) 1984-1988.

**HONORS**

**Recipient of the Recognition Award from the Prime Minister of the Italian Government for the contribution to the IPCC report winner of the 2007 Nobel Prize for Peace**

**Fellow of the American Geophysical Union, 2006**  
**Fellow of the American Meteorological Society, 2002**

Winner of the 1998 Masi of the Italian government for excellence in environmental sciences

Editor's Award from the American Meteorological Society as best reviewer of the *Journal of Physical Oceanography*, 1992

Cecil and Ida Green Scholar, Institute of Geophysics and Planetary Physics, Scripps Institution of Oceanography, 1978-1980

## PROFESSIONAL SOCIETY MEMBERSHIPS

American Physical Society

American Geophysical Union

American Meteorological Society

Oceanography Society

European Geophysical Society

Commission Internationale Exploration Scientifique Mer Mediterranee  
(President of the Committee of Physical Oceanography, 1984-1988)

Italian Physical Society

## REFEREED PUBLICATIONS IN ENGLISH

126. H.Chen, J.Wei, P.Tkalich and **P.Malanotte-Rizzoli**, “ The various components of the Circulation in the Singapore Strait region: tidal, wind and eddy-driven circulations and their relative importance “, submitted to the Proceedings of the 20<sup>th</sup> *International Offshore and Polar Engineering Conference (ISOPE)*, 2010
125. J.Wei, H.Zheng, H.Chen, B.H.Ooi, M.H.Dao, W.Cho, **P.Malanotte-Rizzoli**,P.Tkalich and N.M. Patrikalakis, “Multi-layer model simulation and data assimilation in the Serangoon Harbor of Singapore”, submitted to the Proceedings of the 20<sup>th</sup> *International Offshore and Polar Engineering Conference ( ISOPE)*, 2010
124. B.H.Ooi, H.Zheng, K.P.Yue, H.Kurniawati, P.Sundarambal, M.H.Dao, K.A.P.Roopsekhar, J.Wei, W.Cho, P.Tkalich, **P.Malanotte-Rizzoli** and N.M.Patrikalakis, “Case study of phytoplankton blooms in Serangoon Harbor of Singapore”, submitted to the Proceedings of the 20<sup>th</sup> *International Offshore and Polar Engineering Conference (ISOPE)*, 2010
123. P.Tkalich, P.Vethamony, M.T.Babu, **P.Malanotte-Rizzoli** , “ Sea level anomalies in the Singapore Strait due to storm surges of the South China Sea: the monsoon regime “, submitted to *J.Marine Systems*, 2010
122. A.Bergamasco and **P.Malanotte-Rizzoli**, “ The circulation of the Mediterranean Sea: a historical review of experimental investigations”, in press in *Advances in Oceanography and Limnology*, 2010
121. J.Wei and **P.Malanotte-Rizzoli**, “Validation and application of an Ensemble Kalman Filter in the Selat Pauh in Singapore”, *Ocean Dynamics*, DOI 10.1007/s10236-009-0253-y, 2009

120. Ooi, B.H., H.Zheng, H.Kurniawati, W.Cho, M.H.Dao, J.Weij, P.Zemskyy, P.Tkalich, **P.Malanotte-Rizzoli**, N.M.Patrikalakis, “ Multi-Vehicle Oceanographic Feature Exploration”, Proceedings of the 19th *International Offshore and Polar Engineering Conference (ISOPE)*, vol.2, 669-676, 2009
119. C.Chen, **P.Malanotte-Rizzoli**, J.Weij, R.C.Beardsley, Z.Lai, P.Xue, S.-J.Lyu,Q.Xu,J.Qi and G.Cowles, “Validation of Kalman filters for coastal ocean problems: an experiment with FVCOM”, *J.Geophys.Res.*, doi:10.1029/2007JC004548, 2009
118. E.Urban,B.Sundby, **P.Malanotte-Rizzoli** and J.Melillo , “Dynamics of Semi-Enclosed Ecosystems: Introduction”, in “*Watersheds, Bays and Bounded Seas*”, Island Press, 1-8, 2008
117. P. M. S. Monteiro, A. K. van Der Plas, G. W. Bailey, **P. Malanotte-Rizzoli**, C. M. Duncombe Rae, D. Byrnes, G. Pitcher, P. Florenchie, P. Penven, J. Fitzpatrick and H. U. Lass, “Low Oxygen Water (LOW) forcing scales amenable to forecasting in the Benguela ecosystem,” in *The Benguela: Predicting a Large Marine Ecosystem*, Elsevier Publishing Company, O’Toole, Shannon, Moloney, **Malanotte-Rizzoli**, Hempel and Woods, eds., 295-308, 2006.
- 116.P.Lionello-, **P. Malanotte-Rizzoli**, R. Boscolo, P. Alpert, V. Artale, L. Li, J.Luterbacher, W. May, R. Trigo, M. Tsimplis, U. Ulbrich, and E. Xoplai, “The Mediterranean climate: an overview of the main characteristics and issues,” in *Mediterranean Climate Variability*, Elsevier Publishing Company Oceanographic Series, P. Lionello, P. Malanotte-Rizzoli and R. Boscolo, eds, 1-25, 2006.
115. M. N. Tsimplis, V. Zervakis, S. A. Josey, E. Peneva, M. V. Struglia, E. Stanev, P. Lionello, **P. Malanotte-Rizzoli**, V. Artale, A. Theocharis, E. Tragou and T. Oguz, “Changes in the oceanography of the Mediterranean Sea and their link to climate variability,” in *Mediterranean Climate Variability*, Elsevier Publishing Company Oceanographic Series, P. Lionello, P. Malanotte-Rizzoli and R. Boscolo, eds, 227-282, 2006.
114. V. Artale, S. Calmanti, **P. Malanotte-Rizzoli**, G. Pisacane, V. Rupolo and M. Tsimplis, “The Atlantic and Mediterranean sea as a connected system,” in *Mediterranean Climate Variability*, Elsevier Publishing Company Oceanographic Series, P. Lionello, **P. Malanotte-Rizzoli**, and R. Boscolo, eds, 283-323, 2006.
113. M. Jochum and **P. Malanotte-Rizzoli**, 2005: “Reply to L. Hua's Comment on ‘A new theory for the generation equatorial subsurface countercurrents’,” *J. Phys. Oceanogr.*, 35, 1497-1500, 2005.
112. J. Kröger, A. J. Busalacchi, J. Ballabrera-Poy, **P. Malanotte-Rizzoli**, “Decadal variability of shallow cells and equatorial sea surface temperature in a numerical model of the Atlantic,” *J. Geophys. Res.*, 110, C12003, doi:10.1029/2004JC002703, 2005.
111. M. Jochum, R. Murtugudde, R. Ferrari and **P. Malanotte-Rizzoli**, “The impact of horizontal resolution on the tropical heat budget in an Atlantic ocean model,” *J. Climate*, 18, 841-851, 2005

110. M. Jochum, R. Murtugudde, **P. Malanotte-Rizzoli**, and A.J. Busalacchi, "Internal Variability of the Tropical Atlantic Ocean," American Geophysical Union for a Geophysical Monograph, "Ocean-Atmosphere Interaction and Climate Variability," edited by C. Wang, S.-P. Xie, and J.A. Carton, 181-188, 2004.
109. M. Jochum and **P. Malanotte-Rizzoli**, "A new theory for the generation of the Equatorial Subsurface Countercurrents," *J. Phys. Oceanogr.*, 34, 755-771, 2004.
108. M. Jochum, **P. Malanotte-Rizzoli** and A. Busalacchi, "Tropical instability waves in the Atlantic Ocean," *Ocean Modeling*, 7, 145-163, 2004.
107. **P. Malanotte-Rizzoli** et al., The LIWEX Group, "The Levantine Intermediate Water Experiment (LIWEX) Group: Levantine Basin – A laboratory for multiple water mass formation processes." *J. Geophys. Res.*, 108, C9, 8101, doi: 10.1029/2002JC001643, 2003.
106. T. Oguz, T. Cokacar, **P. Malanotte-Rizzoli**, and H. Ducklow, "Climate warming and accompanying changes in the ecological regime of the Black Sea during 1990s," *Global Biogeochemical Cycles*, 17, 3, 1088, doi: 10.1029/2003GB002031, 2003.
105. X. Zang and **P. Malanotte-Rizzoli**, "A comparison of assimilation results from the Ensemble Kalman filter and the Reduced-Rank Extended Kalman filter," *Nonlinear Processes in Geophysics*, vol. 10, no. 6, 477-491, 2003.
104. M. Buehner, **P. Malanotte-Rizzoli**, A.J. Busalacchi, and T. Inui, "Estimation of the Tropical Atlantic Circulation from Altimetry data using a Reduced-Rank Stationary Kalman filter," in *Interhemispheric water exchanges in the Atlantic Ocean*, G.G. Goni and P. Malanotte-Rizzoli, eds., Elsevier Oceanographic Series, vol. 68, 49-92, 2003.
103. M. Jochum and **P. Malanotte-Rizzoli**, "The flow of AAIW across the equator," in *Interhemispheric water exchanges in the Atlantic Ocean*, G.G. Goni and P. Malanotte-Rizzoli, eds., Elsevier Oceanographic Series, vol. 68, 193-212, 2003.
102. M. Jochum and **P. Malanotte-Rizzoli**, "On the generation of North Brazil Current Rings," *J. Mar. Res.*, 61, 147-173, 2003.
101. M. Buehner and **P. Malanotte-Rizzoli**, "Reduced-rank Kalman Filters applied to an idealized model of the wind-driven ocean circulation," *J. Geophys. Res.*, 108, no. C6, 3192, 10.1029/2001JC00873, 2003.
100. T. Oguz, **P. Malanotte-Rizzoli**, H.W. Ducklow, and J.W. Murray, "Interdisciplinary studies in integrating the Black Sea Biogeochemistry and Circulation Dynamics," *Oceanography*, 15, 4-11, 2002.
99. Soloviev, M., P.H. Stone, **P. Malanotte-Rizzoli**, "Assessment of mesoscale eddy parameterizations for a single basin coarse resolution ocean model," *J. Geophys. Res.*, 107, C9, DOI 10.1029/2001JC001032, 2002.

98. T. Inui, A. Lazar, **P. Malanotte-Rizzoli**, and A.J. Busalacchi, "Wind stress effects on the Atlantic subtropical-tropical circulation," *J. Phys. Oceanogr.*, 32, 2257-2276, 2002.
97. Lazar, A., T. Inui, A.J. Busalacchi, **P. Malanotte-Rizzoli**, L. Wang, and R. Murtugudde, "Seasonality of the ventilation of the tropical Atlantic," *J. Geophys. Res.*, 107(0), 10.1029/2000JC000667, 2002.
96. A. Mahadevan, J. Lu, S.P. Meacham, and **P. Malanotte-Rizzoli**, "The predictability of large-scale wind-driven flows," *Nonlinear Processes in Geophysics*, 8, 449-465, 2001.
95. M. Jochum and **P. Malanotte-Rizzoli**, "On the influence of the meridional overturning circulation on the tropical-subtropical pathways," *J. Phys. Oceanogr.*, 31, 1313-1323, 2001.
94. T. Oguz, **P. Malanotte-Rizzoli**, and H.W. Ducklow, "Simulations of phytoplankton seasonal cycle with multi-level and multi-layer physical-ecosystem models: the Black Sea example," *Ecological Modelling*, 144, 295-314, 2001.
93. T. Oguz, H.W. Ducklow, J.E. Purcell, and **P. Malanotte-Rizzoli**, "Modeling the response of top-down control exerted by gelatinous carnivores on the Black Sea pelagic food web," *J. Geophys. Res.*, 106, 4543-4564, 2001.
92. T. Oguz, H.W. Ducklow, **P. Malanotte-Rizzoli**, "Modeling distinct vertical biogeochemical structure of the Black Sea: dynamical coupling of the oxic, suboxic and anoxic layers," *Global Biogeochemical Cycles*, 14, 1331-1352, 2000.
91. **P. Malanotte-Rizzoli**, R.E. Young, K. Hedstrom, H. Arango, and D.B. Haidvogel, "Water mass pathways between the subtropical and tropical ocean in a climatological simulation of the North Atlantic ocean circulation," *Dyn. Atmos. Oceans*, 32, 331-372, 2000.
90. D.B. Haidvogel, H. Arango, K. Hedstrom, A. Beckmann, **P. Malanotte-Rizzoli**, and S. Shchepetkin, "Model evaluation experiments in the North Atlantic basin: simulations in non-linear terrain following coordinates," *Dyn. Atmos. Oceans*, 32, 239-282, 2000.
89. E. Napolitano, T. Oguz, **P. Malanotte-Rizzoli**, A. Yilmaz, and E. Sansone, "Simulations of biological production in the Rhodes and Ionian basins of the Eastern Mediterranean," *J. Marine Systems*, 24, 277-298, 2000.
88. S. Jiang, P.H. Stone, and **P. Malanotte-Rizzoli**, "An assessment of the GFDL Ocean Model with Coarse Resolution. Part I. Annual mean climatology," *J. Geophys. Res.*, 104, 25,623-25,645, 1999.
87. S. Jiang and **P. Malanotte-Rizzoli**, "On the predictability of regional oceanic jet stream: the impact of model errors at the inflow boundary," *J. Marine Res.*, 57, 641-669, 1999.
86. **P. Malanotte-Rizzoli**, B.B. Manca, M. Ribera d'Alcalà, A. Theocharis, S. Brenner, G. Budillon, and E. Ozsoy, "The Eastern Mediterranean in the 80's and in the 90's: the big transition in the intermediate and deep circulations," *Dyn. Atmos. Oceans*, 29, 365-395, 1999.

85. T. Oguz, U. Unluata, H.W. Ducklow, and **P. Malanotte-Rizzoli**, "Modeling the Black Sea Pelagic ecosystem and biochemical structure: A synthesis of recent activities". In *Environmental Degradation of the Black Sea: Challenges and Remedies*, S. Besiktepe, U. Unluata, and A. Bologna (eds.), NATO ASI Series, Kluwer Academic Publishers, 197-223, 1999.
84. T. Oguz, H.W. Ducklow, **P. Malanotte-Rizzoli**, J. Murray, V.I. Vedernikov, and U. Unluata, "A physical-biochemical model of plankton productivity and nitrogen cycling in the Black Sea," *Deep-Sea Research I*, 46, 4, 597-636, 1999.
83. Bergamasco, A., T. Oguz and **P. Malanotte-Rizzoli**, "Modeling dense water mass formation and winter circulation in the Northern and Central Adriatic Sea," *J. Mar. Systems*, 20, 1-4, 125-134, 1999.
82. S. Marullo, R. Santoleri, **P. Malanotte-Rizzoli**, and A. Bergamasco, "The sea surface temperature fields in the Eastern Mediterranean from AVHRR data. Part II: Interannual variability," *J. Mar. Systems*, 20, 1-4, 83-112, 1999.
81. S. Marullo, R. Santoleri, **P. Malanotte-Rizzoli**, and A. Bergamasco, "The sea surface temperature fields in the Eastern Mediterranean from AVHRR data. Part I: Seasonal variability," *J. Mar. Systems*, 20, 1-4, 63-81, 1999.
80. T. Oguz, H.W. Ducklow, **P. Malanotte-Rizzoli**, and J. Murray, "Simulations of the Black Sea Pelagic Ecosystem by one-dimensional vertically resolved physical-biochemical models," *Fisheries Oceanography*, GLOBEC Special Issue, 7 (3/4) 300-304, 1998.
79. L. Yu and **P. Malanotte-Rizzoli**, "Inverse modeling of seasonal variability in the North Atlantic Ocean," *J. Phys. Oceanogr.*, 28, 902-922, 1998.
78. **P. Malanotte-Rizzoli** et al., "A synthesis of the Ionian Sea hydrography, circulation and water mass pathways during POEM Phase I," *Progr. in Oceanography*, 39, 153-204, 1997.
77. **P. Malanotte-Rizzoli** and R.E. Young, "Gulf Stream system assimilation experiments: a sensitivity study," *J. Atmos. Ocean. Techn.*, 14, 1392-1408, 1997.
76. T. Oguz, **P. Malanotte-Rizzoli**, and H. Ducklow. "Towards coupling a three-dimensional general circulation model with a biochemical model of nutrient cycling and bacteria-plankton dynamics in the Black Sea," *Sensitivity of North Sea, Baltic Sea and Black Sea Anthropogenic and Climate Changes*, E. Ozsoy and A. Mikaelyan, eds., NATO ASI Series Vol. 27, Kluwer Academic Publishers, 469-485, 1997.
75. J.R. Gunson and **P. Malanotte-Rizzoli**, "Assimilation studies of open-ocean flows, Part II: Error measures with strongly nonlinear dynamics," *J. Geophys. Res.*, 101, 28,473-28, 488, 1996.
74. J.R. Gunson and **P. Malanotte-Rizzoli**, "Assimilation studies of open-ocean flows, Part I: Estimation of initial and boundary conditions," *J. Geophys. Res.*, 101, 28,457-28, 472, 1996.

73. L. Yu and **P. Malanotte-Rizzoli**, "Analysis of the North Atlantic climatologies using a combined OGCM/adjoint approach," *J. Mar. Res.*, 54, 867-913, 1996.
72. T. Oguz, H. Ducklow, **P. Malanotte-Rizzoli**, S. Tugrul, N.P. Nezlin, and U. Unluata, "Simulation of annual plankton productivity cycle in the Black Sea by a one-dimensional physical-biological model," *J. Geophys. Res.*, Vol. 101, 16, 585-16, 599, 1996.
71. T. Oguz and **P. Malanotte-Rizzoli**, "Seasonal variability of wind and thermohaline driven circulation in the Black Sea: Modeling studies," *J. Geophys. Res.*, Vol. 101, 16, 551-16, 569, 1996.
70. **P. Malanotte-Rizzoli**, I. Fukumori, and R.E. Young, "A methodology for the construction of a hierarchy of Kalman filter/smoothers for nonlinear primitive equation models," *Modern Approaches to Data Assimilation in Ocean Modeling*, P. Malanotte-Rizzoli, ed., Elsevier Publishing Co., pp. 297-317, 1996.
69. **P. Malanotte-Rizzoli** and E. Tziperman, "The oceanographic data assimilation problem: overview, motivation and purposes," *Modern Approaches to Data Assimilation in Ocean Modeling*, P. Malanotte-Rizzoli, ed., Elsevier Publishing Co., pp. 3-17, 1996.
68. S.R. Jayne, N.G. Hogg, and **P. Malanotte-Rizzoli**, "Recirculation gyres forced by a beta plane jet," *J. Phys. Oceanogr.*, 26, 492-504, 1996.
67. P. Bogden, **P. Malanotte-Rizzoli**, and R. Signell, "Open-ocean boundary conditions from interior data: local and remote forcing of Massachusetts Bay," *J. Geophys. Res.*, 101, 6,487-6,500, 1996.
66. **P. Malanotte-Rizzoli** and R.E. Young, "Assimilation of global versus local datasets into a regional model of the Gulf Stream system. Part I: Data effectiveness," *J. Geophys. Res.*, 100, 24,773-24,796, 1995.
65. **P. Malanotte-Rizzoli**, N.G. Hogg, and R.E. Young, "Stochastic wave radiation by the Gulf Stream: Numerical Experiments," *Deep Sea Res.*, 42, 389-423, 1995.
64. Capotondi, W.R. Holland, and **P. Malanotte-Rizzoli**, "Assimilation of altimeter data into a quasi-geostrophic model of the Gulf Stream System. Part II. Assimilation results". *J. Phys. Oceanogr.*, 25, 1153-1173, 1995.
63. Capotondi, **P. Malanotte-Rizzoli**, W.R. Holland, "Assimilation of altimeter data into a quasigeostrophic model of the Gulf Stream system. Part I: dynamical considerations," *J. Phys. Oceanogr.*, 25, 1130-1152, 1995.
62. T. Oguz, **P. Malanotte-Rizzoli**, and D. Aubrey, "Wind and thermohaline circulation of the Black Sea driven by yearly climatological forcing," *J. Geophys. Res.*, 100, 6845-6863, 1995.
61. Fukumori and **P. Malanotte-Rizzoli**, "An approximate Kalman filter for ocean data assimilation: a reduced-dimension, static, linearized Kalman filter," *J. Geophys. Res.*, 100, 6777-6793, 1995.

60. **P. Malanotte-Rizzoli**, "The Gulf Stream System: Dynamics and modeling," in *The Oceans: Physiochemical Dynamics and Resources*, S.K. Majumdar, E.W. Miller, G.S. Forbes, R.F. Schmalz, eds., The Pennsylvania Academy of Science, Chapter 7, 108-123, 1994.
59. D. Chester, **P. Malanotte-Rizzoli**, J. Lynch, and C. Wunsch, "The eddy radiation field of the Gulf Stream as measured by ocean acoustic tomography," *Geophys. Res. Lett.*, 21, 181-184, 1994.
58. **P. Malanotte-Rizzoli**, "Data assimilation: Fundamentals, global and Mediterranean examples," in *Ocean Processes in Climate Dynamics: Global and Mediterranean Examples*, P. Malanotte-Rizzoli and A.R. Robinson, eds., Kluwer Publishing Co., 323-354, 1994.
57. **P. Malanotte-Rizzoli**, "Modeling the general circulation of the Mediterranean," in *Ocean Processes in Climate Dynamics: Global and Mediterranean Examples*, NATO/ASI Proceedings, P. Malanotte-Rizzoli and A.R. Robinson, eds., Kluwer Publishing Co., 307-321, 1994.
56. Bergamasco, **P. Malanotte-Rizzoli**, W.C. Thacker, and R.B. Long, "The seasonal steady circulation of the Eastern Mediterranean determined with the adjoint method," in *Topical Studies in Oceanography: Physical Oceanography of the Eastern Mediterranean Sea*, Vol. 40, no. 6, special issue of Deep Sea Research, 1269- 1298, 1993.
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#### **PUBLICATIONS IN ITALIAN AND PROCEEDINGS OF SYMPOSIA**

1. P. Malanotte-Rizzoli, "Un modello matematico della circolazione termalina del mare Adriatico," *A.I.O.L.-I*, 139-142, 1974.
2. P. Malanotte-Rizzoli and L. Alberotanza, "Modelli oceanografico: cosa sono e come possono utilizzare i dati da telerilevamento," *S.I.T.E.*, I, 245-256, 1976.
3. L. Alberotanza and P. Malanotte-Rizzoli, "L'impiego delle immagine immagini telerilevate da satellite per l'oceanografia," *CNR, Convegno dell'Oceanografia*, 33-45, 1979.

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5. P. Malanotte-Rizzoli and A. Bergamasco, "Modellistica ecologica dell'ambiente marino," *Ingegneria Ambientale*, X, 6, 575-590, 1979.
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11. P. Malanotte-Rizzoli and M.C.Hendershott, "A mathematical model of the winter thermohaline circulation in the Adriatic Sea," *Colloques Internationaux du C.N.R.S.: Processus de formation des eaux oceaniques profondes*, Paris, France, 1974.
12. P. Malanotte-Rizzoli, "Wave prediction in shallow water," in *Physics of Oceans and Atmosphere, Part I, Vol. I*, 639-646, International Center for Theoretical Physics, Trieste, Italy, 1977.
13. P. Malanotte-Rizzoli, "Circulation modelling, with special application to the Adriatic Sea," in *Physics of Oceans and Atmosphere, Part I, Vol. II*, 646-656, International Center for Theoretical Physics, Trieste, Italy, 1977.
14. P. Malanotte-Rizzoli and G. Halikas, "Remote sensing and ocean modeling an application to the Adriatic Sea," XVIII International Symposium on Space, pp. 291-300, Rome, Italy, 1978.

**REFEREE FOR:**

*Dynamics of Atmospheres and Oceans*

*Deep-Sea Research*

*Journal of Marine Research*

*Journal of Physical Oceanography*

*Journal of Geophysical Research*

*Journal of the Atmospheric Sciences*

*Tellus*

*National Science Foundation*

*National Oceanic Atmospheric Administration*

*National Aeronautics Space Administration*

## Courses Taught

### Italy:

Physical Oceanography, Istituto Studio Dinamica Grandi Masse, Venice, Italy, and University of Padua, Padua, Italy, 1978, 1979, 1980.

Waves in the Ocean, Fall Semester courses at the Istituto di Fisica Teorica, University of Trieste, Trieste, Italy, 1976-1980.

### M.I.T.

- 19.76 Dynamical Oceanography, 1981-1983 (G)
- 19.71 Waves in the Ocean and Atmosphere, 1983-1985 (G)
- 12.24 Topics in the Physics of Atmospheres and Oceans, 1984-1986 (G)
- 12.21 Physics of the Oceans, 1985-1989 (U)
- 12.93 Numerical Methods in Meteorology & Physical Oceanography, 1986-1988 (G)
- 12.790 Introduction to Observational Physical Oceanography, 1987-1989 (G)
- 12.003 Introduction to Meteorology and Physical Oceanography, 1990- (U)
- 12.S11 Freshman Seminar, Physics of the Oceans, 1990-1992 (U)
- 12.801 Steady Circulation of the Oceans, 1991-1993 (G)
- 12.803 Quasi-balanced Circulation in Oceans and Atmospheres, 1995-1998
- 12.802 Waves in the Ocean and Atmosphere, 1997-2001
- 12.S.54 Freshman Seminar, The role of the ocean in Global Change, 1993-to present (U)
- 12.801 Steady Circulation of the Oceans, 2003-2005 (G)
- 12.950 Equatorial Oceanography, 2003 (G)
- 12.802 Waves in the Ocean and Atmosphere, 2006-2008 (G)

## Student Theses Supervised as Principal Advisor

### Italy - Ph.D. in Physics with Thesis in Physical Oceanography:

- F. Dell'Orto, 1977
- A. Bergamasco, 1978
- V. Barale, 1978
- M. Zicarelli, 1979
- L. Bertotti, 1979

### MIT - Undergraduate:

- Jarelyn Watanabe, Major in Physics/Oceanography, Spring 1990
- Stephen Jayne, Major in Earth Sciences/Mathematics, Spring 1994
- Elise Olson, UROP, Summer 2004
- Chris Follet, UROP, Spring 2005

Christie Wood, Major in Mathematics/Oceanography, Spring 2005  
Nicholas Loyd, 2004 - 2005

MIT - Graduate:

- Piero Malguzzi Ph.D. in Meteorology, finished Fall 1984  
*Coherent structures in a baroclinic atmosphere*
- Kevin Speer, MS in Oceanography, finished December 1985  
*The influence of geothermal sources on deep ocean temperature, salinity, and flow fields*
- Paul Hancock, MS in Meteorology, finished May 1986  
*An observational study of blocking with regard to the theory of coherent structures in a baroclinic atmosphere*
- Elizabeth Welsh, MS in Oceanography, finished May 1986  
*The relationship of topographic waves on the continental rise to Gulf Stream fluctuations*
- M. Ross Vennell, Ph.D. in Oceanography, finished July 1989  
*The influence of a steady baroclinic deep ocean on the shelf*
- David Chester, MS in Oceanography, finished May 1988  
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*Shelf Currents, Ice and Wind: a Numerical Modeling Study.*

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*Eddies and Friction: Removal of Vorticity from the Wind-Driven gyre.*

Jinbo Wang , MS in Oceanography, Finished September 2008  
*On the warm bias along the South-West African coast in coupled models:  
 An oceanic perspective*

Jinbo Wang, started Fall 2005

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