

Bibliography

- Adcroft, A., and J.-M. Campin, 2004: Rescaled height coordinates for accurate representation of free-surface flows in ocean circulation models. *Ocean Modell.*, **7**, 269–284, doi:10.1016/j.ocemod.2003.09.003.
- Arakawa, A., 1972: Design of the ucla general circulation model. Tech. Rep. 7, Dep. of Meteorology, University of California, Los Angeles, 116 pp. <https://ntrs.nasa.gov/search.jsp?R=19730012781>.
- Barker, H. W., and Z. Li, 1995: Improved simulation of clear-sky shortwave radiative transfer in the ccc-gcm. *J. Clim.*, **8**, 2213–2223, doi:10.1175/1520-0442(1995)008<2213:ISOCSS>2.0.CO;2.
- Bentzen, M., G. Evensen, H. Drange, and A. D. Jenkins, 1999: Coordinate transformation on a sphere using conformal mapping. *Mon. Wea. Rev.*, **127**, 2733–2740, doi:10.1175/1520-0493(1999)127<2733:CTOASU>2.0.CO;2.
- Bleck, R., and D. B. Boudra, 1986: Wind-driven spin up in eddy-resolving ocean models formulated in isopycnic and isobaric coordinates. *J. Geophys. Res.*, **91**, 7611–7621, doi:10.1029/JC091iC06p07611.
- Bleck, R., G. Halliwell, A. Wallcraft, S. Carroll, K. Kelly, and K. Rushing, 2002: *Hybrid Coordinate Ocean Model (HYCOM) User's Manual*. <http://hycom.rsmas.miami.edu/hycom-model/documentation.html>.
- Briegleb, B. P., P. Minnis, V. Ramanathan, and E. Harrison, 1986: Comparison of regional clear-sky albedos inferred from satellite observations and model computations. *J. Climate Appl. Meteor.*, **25**, 214–226, doi:10.1175/1520-0450(1986)025<0214:CORCSA>2.0.CO;2.
- Bryan, K., 1969: A numerical method for the study of the circulation of the world ocean. *J. Comput. Phys.*, **4**, 347–376, doi:10.1016/0021-9991(69)90004-7.
- Bryan, K., 1984: Accelerating the convergence to equilibrium of ocean-climate models. *J. Phys. Oceanogr.*, **14**, 666–673, doi:10.1175/1520-0485(1984)014<0666:ATCTEO>2.0.CO;2.
- Burchard, H., 2002: Energy-conserving discretization of turbulent shear and buoyancy production. *Ocean Modell.*, **4**, 347–361, doi:10.1016/S1463-5003(02)00009-4.
- Burchard, H., and K. Bolding, 2001: Comparative analysis of four second-moment turbulence closure models for the oceanic mixed layer. *J. Phys. Oceanogr.*, **31**, 1943–1968, doi:10.1175/1520-0485(2001)031<1943:CAOFSM>2.0.CO;2.
- Cailleau, S., V. Fedorenko, B. Barnier, E. Blayo, and L. Debreu, 2008: Comparison of different numerical methods used to handle the open boundary of a regional ocean circulation model of the bay of biscay. *Ocean Modell.*, **25**, 1–16, doi:10.1016/j.ocemod.2008.05.009.
- Campin, J. M., J. Marshall, and D. Ferreira, 2008: Sea ice-ocean coupling using a rescaled vertical coordinate z^* . *Ocean Modell.*, **24**, 1–14, doi:10.1016/j.ocemod.2008.05.005.
- Canuto, A., A. Howard, Y. Cheng, and M. S. Dubovikov, 2001: Ocean turbulence. part i: One-point closure model momentum and heat vertical diffusivities. *J. Phys. Oceanogr.*, **31**, 1413–1426, doi:10.1175/1520-0485(2001)031<1413:OTPIOP>2.0.CO;2.
- Chen, C., and Coauthors, 2011: *An unstructured grid, finite-volume community ocean model FVCOM user manual*. http://fvcom.smast.umassd.edu/wp-content/uploads/2013/11/MITSG_12-25.pdf.
- Colella, P., and P. R. Woodward, 1984: The piecewise parabolic method (ppm) for gas-dynamical simulations. *J. Comp. Phys.*, **54**, 174–201, doi:10.1016/0021-9991(84)90143-8.
- Cox, M. D., 1987: Isopycnal diffusion in a z-coordinate ocean model, (Unpublished manuscript).
- Danabasoglu, G., R. Ferrari, and J. C. McWilliams, 2008: Sensitivity of an ocean general circulation model to a parameterization of near-surface eddy fluxes. *J. Clim.*, 1192–1208, doi:10.1175/2007JCLI1508.1.
- Danabasoglu, G., and J. Marshall, 2007: Effects of vertical variations of thickness diffusivity in an ocean general circulation model. *Ocean Modell.*, **18**, 122–141, doi:10.1016/j.ocemod.2007.03.006.
- Danabasoglu, G., and J. C. McWilliams, 1995: Sensitivity of the global ocean circulation to parameterizations of mesoscale tracer transports. *J. Clim.*, **8**, 2967–2987, doi:10.1175/1520-0442(1995)008<2967:SOTGOC>2.0.CO;2.
- Danilov, S., 2013: Ocean modeling on unstructured meshes. *Ocean Modell.*, **69**, 195–210, doi:10.1016/j.ocemod.2013.05.005.
- Debreu, L., P. Marchesiello, P. Penven, and G. Cambon, 2012: Two-way nesting in split-explicit ocean models: Algorithms, implementation and validation. *Ocean Modell.*, **49–50**, 1–21, doi:10.1016/j.ocemod.2012.03.003.
- Delhez, E. J. M., and E. Deleersnijder, 2007: Overshootings and spurious oscillations caused by biharmonic mixing. *Ocean Modell.*, **17**, 183–198, doi:10.1016/j.ocemod.2007.01.002.

- Dugdale, R. C., 1967: Nutrient limitation in the sea: dynamics, identification, and significance. *Limnol. Oceanogr.*, **12**, 685–695, doi:10.4319/lo.1967.12.4.0685.
- Durran, D. R., 2010: *Numerical methods for fluid dynamics: with applications to geophysics*. Springer-Verlag, 532 pp., doi:10.1007/978-1-4419-6412-0.
- ECMWF, 2016a: *IFS Documentation CY43R1 - Part III: Dynamics and Numerical Procedures*. No. 3, IFS Documentation, ECMWF, doi:10.21957/m1u2yxwrl, URL <https://www.ecmwf.int/node/17116>.
- ECMWF, 2016b: *IFS Documentation CY43R1 - Part IV: Physical Processes*. No. 4, IFS Documentation, ECMWF, doi:10.21957/sqvo5yxja, URL <https://www.ecmwf.int/node/17117>.
- Eden, C., 2007: Eddy length scales in the north atlantic. *J. Geophys. Res.*, doi:10.1029/2006JC003901.
- Eden, C., and R. J. Greatbatch, 2008: Towards a mesoscale eddy closure. *Ocean Modell.*, 223–239, doi:10.1016/j.ocemod.2007.09.002.
- Eden, C., M. Jochum, and G. Danabasoglu, 2009: Effects of different closures for thickness diffusivity. *Ocean Modell.*, 47–59, doi:10.1016/j.ocemod.2008.08.004.
- England, M. H., 1995: The age of water and ventilation timescales in a global ocean model. *J. Phys. Oceanogr.*, 2756–2777, doi:10.1175/1520-0485(1995)025<2756:TAOWAV>2.0.CO;2.
- Eppley, R., 1972: Temperature and phytoplankton growth in the sea. *Fish. Bull.*, **70**, 1063–1085, <http://fishbull.noaa.gov/70-4/eppley.pdf>.
- Ferrari, R., J. C. McWilliams, V. M. Canuto, and M. Dubovikov, 2008: Parameterization of eddy fluxes near oceanic boundaries. *J. Clim.*, 2770–2789, doi:10.1175/2007JCLI1510.1.
- Ferreira, D., and J. Marshall, 2006: Formulation and implementation of a “residual-mean” ocean circulation model. *Ocean Modell.*, **13**, 86–107, doi:10.1016/j.ocemod.2005.12.001.
- Ferreira, D., J. Marshall, and P. Heimbach, 2005: Estimating eddy stresses by fitting dynamics to observations using a residual-mean ocean circulation model and its adjoint. *J. Phys. Oceanogr.*, **35**, 1891–1910, doi:10.1175/JPO2785.1.
- Gent, P. R., and J. C. McWilliams, 1990: Isopycnal mixing in ocean circulation models. *J. Phys. Oceanogr.*, 150–155, doi:10.1175/1520-0485(1990)020<0150:MIOCM>2.0.CO;2.
- Gent, P. R., J. Willebrand, T. J. McDougall, and J. C. McWilliams, 1995: Parameterizing eddy-induced tracer transports in ocean circulation models. *J. Phys. Oceanogr.*, **25**, 463–474, doi:10.1175/1520-0485(1995)025<0463:PEITTI>2.0.CO;2.
- Gill, A. E., 1982: *Atmosphere-Ocean Dynamics*. Academic Press, 662 pp., doi:10.1002/qj.49711046322.
- Griffies, S. M., 1998: The gent-mcwilliams skew flux. *J. Phys. Oceanogr.*, **28**, 831–841, doi:10.1175/1520-0485(1998)028<0831:TGMSF>2.0.CO;2.
- Griffies, S. M., 2004: *Fundamentals of ocean climate models*. Princeton University Press, 518 pp., <http://press.princeton.edu/titles/7797.html>.
- Griffies, S. M., 2012: Elements of the modular ocean model (mom) (2012 release with updates). GFDL Ocean Group Technical Report 7, NOAA/Geophysical Fluid Dynamics Laboratory, 632 + xiii pages pp. http://mom-ocean.science/web/docs/project/MOM5_manual.pdf.
- Griffies, S. M., and A. J. Adcroft, 2008: Formulating the equations of ocean models. *Ocean modeling in an eddying regime*, M. Hecht and H. Hasumi, 281–317, doi:10.1029/177GM18.
- Griffies, S. M., A. Gnanadesikan, R. C. Pacanowski, V. D. Larichev, J. K. Dukowicz, and R. D. Smith, 1998: Isonutral diffusion in a z-coordinate ocean model. *J. Phys. Oceanogr.*, 805–830, doi:10.1175/1520-0485(1998)028<0805:IDIAZC>2.0.CO;2.
- Griffies, S. M., and R. Hallberg, 2000: Biharmonic friction with a smagorinsky-like viscosity for use in large-scale eddy-permitting ocean models. *Mon. Wea. Rev.*, **128**, 2935–2946, doi:10.1175/1520-0493(2000)128<2935:BFWASL>2.0.CO;2.
- Griffies, S. M., M. Levy, A. J. Adcroft, G. Danabasoglu, R. W. Hallberg, D. Jacobsen, W. Large, and T. Ringler, 2015: Theory and numerics of the community ocean vertical mixing (cvmix) project. Technical report, CVMix project, 98 pp. <https://github.com/CVMix/CVMix-description/blob/master/cvmix.pdf>.
- Hasumi, H., 2006: Ccsr ocean component model (coco) version 4.0. Tech. Rep. 25, CCSR, 103 pp. <http://csr.aori.u-tokyo.ac.jp/~hasumi/COCO/coco4.pdf>.
- Hibler, I., W. D., 1979: A dynamic thermodynamic sea ice model. *J. Phys. Oceanogr.*, **9**, 815–846, doi:10.1175/1520-0485(1979)009<0815:ADTSIM>2.0.CO;2.
- Hirabara, M., H. Ishizaki, G. Yamanaka, H. Tsujino, and I. Ishikawa, 2010: Additional flux arising from unresolved scales in eddying ocean models. *J. Oceanogr.*, **66**, 633–647, doi:10.1007/s10872-010-0052-6.
- Holland, W. R., J. C. Chow, and F. O. Bryan, 1998: Application of a third-order upwind scheme in the NCAR ocean model. *J. Clim.*, **11**, 1487–1493, doi:10.1175/1520-0442(1998)011<1487:AOATOU>2.0.CO;2.
- Hunke, E. C., and J. K. Dukowicz, 1997: An elastic-viscous-plastic model for sea ice dynamics. *J. Phys. Oceanogr.*, **94**, 1849–1867, doi:10.1175/1520-0485(1997)027<1849:AEVPMF>2.0.CO;2.
- Hunke, E. C., and J. K. Dukowicz, 2002: The elastic-viscous-plastic sea ice dynamics model in general orthogonal

BIBLIOGRAPHY

- curvilinear coordinates on a sphere – incorporation of metric terms. *Mon. Wea. Rev.*, **130**, 1848–1865, doi:10.1175/1520-0493(2002)130<1848:TEVPSI>2.0.CO;2.
- Hunke, E. C., and W. H. Lipscomb, 2006: *CICE: the Los Alamos Sea Ice Model Documentation and Software User's Manual*. <http://oceans11.lanl.gov/trac/CICE>.
- IOC, SCOR, and IAPSO, 2010: The international thermodynamic equation of seawater - 2010: Calculation and use of thermodynamic properties. Manuals and Guides 56, Intergovernmental Oceanographic Commission, 196 pp. http://www.teos-10.org/pubs/TEOS-10_Manual.pdf.
- Ishikawa, I., H. Tsujino, M. Hirabara, H. Nakano, T. Yasuda, and H. Ishizaki, 2005: Meteorological research institute community ocean model (mri.com) manual. Technical Reports of the Meteorological Research Institute 47, the Meteorological Research Institute, 189 pp. doi:10.11483/mritechrepo.47.
- Ishizaki, H., 1994: A simulation of the abyssal circulation in the north pacific ocean. part ii: Theoretical rationale. *J. Phys. Oceanogr.*, **24**, 1941–1954, doi:10.1175/1520-0485(1994)024<1941:ASOTAC>2.0.CO;2.
- Ishizaki, H., 1997: A massive treatment scheme of complete convection for ocean models, unpublished manuscript.
- Ishizaki, H., and I. Ishikawa, 2006: High parallelization efficiency in barotropic-mode computation of ocean models based on multi-grid boundary ghost area. *Ocean Modell.*, **13**, 238–254, doi:10.1016/j.ocemod.2006.02.001.
- Ishizaki, H., and T. Motoi, 1999: Reevaluation of the takano-oonishi scheme for momentum advection on bottom relief in ocean models. *J. Atmos. Oceanic Technol.*, **16**, 1994–2010, doi:10.1175/1520-0426(1999)016<1994:ROTTOS>2.0.CO;2.
- Ishizaki, H., and G. Yamanaka, 2010: Impact of explicit sun altitude in solar radiation on an ocean model simulation. *Ocean Modell.*, 52–69, doi:10.1016/j.ocemod.2009.12.002.
- Jerlov, N. G., 1976: *Marine Optics*. Elsevier, 231 pp.
- Jiang, L., and R. W. Garwood, Jr., 1996: Three-dimensional simulations of overflows on continental slopes. *J. Phys. Oceanogr.*, **26**, 1214–1233, doi:10.1175/1520-0485(1996)026<1214:TDSOOO>2.0.CO;2.
- Kantha, L. H., and C. A. Clayson, 2000: *Small Scale Processes in Geophysical Fluid Flows*. Academic Press, 888 pp., doi:10.1063/1.1420560.
- Killworth, P. D., D. Stainforth, D. J. Webb, and S. M. Paterson, 1991: The development of a free-surface bryan-cox-semtner ocean model. *J. Phys. Oceanogr.*, **31**, 1333–1348, doi:10.1175/1520-0485(1991)021<1333:TDOAFS>2.0.CO;2.
- Kishi, M. J., H. Motono, M. Kashiwai, and A. Tsuda, 2001: An ecological-physical coupled model with ontogenetic vertical migration of zooplankton in the northwestern pacific. *J. Oceanogr.*, **57**, 499–507, doi:10.1023/A:1021517129545.
- Large, W. G., G. Danabasoglu, S. C. Doney, and J. C. McWilliams, 1997: Sensitivity to surface forcing and boundary layer mixing in a global ocean model: annual-mean climatology. *J. Phys. Oceanogr.*, 2418–2447, doi:10.1175/1520-0485(1997)027<2418:STSFOB>2.0.CO;2.
- Large, W. G., J. C. McWilliams, and S. C. Doney, 1994: Oceanic vertical mixing: a review and a model with a nonlocal boundary layer parameterization. *Rev. Geophys.*, **32**, 363–403, doi:10.1029/94RG01872.
- Large, W. G., and S. Yeager, 2004: Diurnal to decadal global forcing for ocean and sea-ice models: the data sets and flux climatologies. Technical Note NCAR/TN-460+STR., CGD Division of the National Center for Atmospheric Research. doi:10.5065/D6KK98Q6.
- Large, W. G., and S. Yeager, 2009: The global climatology of an interannually varying air-sea flux data set. *Clim. Dyn.*, **33**, 341–364, doi:10.1007/s00382-008-0441-3.
- Leclair, M., and G. Madec, 2009: A conservative leapfrog time stepping method. *Ocean Modell.*, **30**, 88–94, doi:10.1016/j.ocemod.2009.06.006.
- Lemariè, F., L. Debreu, G. Madec, J. Demange, J. M. Molines, and H. M., 2015: Stability constraints for oceanic numerical models: implications for the formulation of time and space discretizations. *Ocean Modell.*, **92**, 124–148, doi:10.1016/j.ocemod.2015.06.006.
- Leonard, B. P., 1979: A stable and accurate convective modeling procedure based upon quadratic upstream interpolation. *J. Comput. Methods Appl. Mech. Eng.*, **19**, 59–98, doi:10.1016/0045-7825(79)90034-3.
- Leonard, B. P., M. K. MacVean, and A. P. Lock, 1993: Positivity-preserving numerical schemes for multidimensional advection. Tech. Memo 106055, ICOMP-93-05, NASA, 62 pp. <https://ntrs.nasa.gov/search.jsp?R=19930017902>.
- Leonard, B. P., M. K. MacVean, and A. P. Lock, 1994: The flux integral method for multidimensional convection and diffusion. NASA Tech. Memo. 106679, ICOMP-94-13, NASA, 27 pp. doi:10.1016/0307-904X(95)00017-E.
- Lepparanta, M., 2011: *The Drift of Sea Ice*. Springer-Verlag, 347 pp., doi:10.1007/978-3-642-04683-4.
- Lin, S.-J., W. C. Chao, Y. C. Sud, and G. K. Walther, 1994: A class of the van Leer-type transport schemes and its application to the moisture transport in a general circulation model. *Mon. Wea. Rev.*, **122**, 1575–1593, doi:10.1175/1520-0493(1994)122<1575:ACOTVL>2.0.CO;2.
- Madec, G., and the NEMO team, 2008: Nemo ocean engine. Note du Pôle de modélisation 27, Institut Pierre-Simon Laplace (IPSL), France. http://www.nemo-ocean.eu/About-NEMO/Reference-manuals/NEMO_book_3.6_STABLE.
- Marshall, J., C. Hill, L. Perelman, and A. Adcroft, 1997: Hydrostatic, quasi-hydrostatic, and nonhydrostatic ocean

- modeling. *J. Geophys. Res.*, **102**, 5733–5752, doi:10.1029/96JC02776.
- Martin, J. H., G. A. Knauer, D. M. Karl, and W. W. Broenkow, 1987: Vertex: Carbon, cycling in the northeast pacific. *Deep-Sea Res.*, **34**, 267–285, doi:10.1016/0198-0149(87)90086-0.
- Matsumoto, K., T. Takanezawa, and N. Ooe, 2000: Ocean tide models developed by assimilating topex/poseidon altimeter data into hydrodynamical model: A global model and a regional model around japan. *J. Oceanogr.*, **56**, 567–581, doi:10.1023/A:1011157212596.
- McDougall, T., D. Jackett, D. Wright, and R. Feistel, 2003: Accurate and computationally efficient algorithms for potential temperature and density of sea water. *J. Atmos. Oceanic Technol.*, **20**, 730–741, doi:10.1175/1520-0426(2003)20<730:ACEAF>2.0.CO;2.
- McWilliams, J. C., 2016: Submesoscale currents in the ocean. *Proc. R. Soc. A.*, **472**, doi:10.1098/rspa.2016.0117.
- Mellor, G. L., 2004: *Users guide for a three-dimensional, primitive equation, numerical ocean model*. Prog. in Atmos. and Ocean. Sci, Princeton University, 53 pp.
- Mellor, G. L., and A. Blumberg, 2004: Wave breaking and ocean surface layer thermal response. *J. Phys. Oceanogr.*, **693**–698, doi:10.1175/2517.1.
- Mellor, G. L., and L. Kantha, 1989: An ice-ocean coupled model. *J. Geophys. Res.*, **94**, 10937–10954, doi:10.1029/JC094iC08p10937.
- Mellor, G. L., and T. Yamada, 1982: Development of a turbulence closure model for geophysical fluid problems. *Rev. Geophys. Space Phys.*, **20**, 851–875, doi:10.1029/RG020i004p00851.
- Merryfield, W. J., and G. Holloway, 2003: Application of an accurate advection algorithm to sea-ice modelling. *Ocean Modell.*, **5**, 1–15, doi:10.1016/S1463-5003(02)00011-2.
- Mesinger, F., and A. Arakawa, 1976: Numerical methods used in atmospheric models. 65 pp.
- Morales Maqueda, M. A., and G. Holloway, 2006: Second-order moment advection scheme applied to arctic ocean simulation. *Ocean Modell.*, **14**, 197–221, doi:10.1016/j.ocemod.2006.05.003.
- Morel, A., and D. Antoine, 1994: Heating rate within the upper ocean in relation to its bio-optical state. *J. Phys. Oceanogr.*, **24**, 1652–1665, doi:10.1175/1520-0485(1994)024<1652:HRWTUO>2.0.CO;2.
- Nakano, H., and N. Suginohara, 2002: Effects of Bottom Boundary Layer parameterization on reproducing deep and bottom waters in a world ocean model. *J. Phys. Oceanogr.*, **32**, 1209–1227, doi:10.1175/1520-0485(2002)032<1209:EOBBLP>2.0.CO;2.
- Noh, Y., Y. J. Kang, T. Matsuura, and S. Iizuka, 2005: Effect of the prandtl number in the parameterization of vertical mixing in an ogcm of the tropical pacific. *Geophys. Res. Lett.*, L23609, doi:10.1029/2005GL024540.
- Noh, Y., and H. J. Kim, 1999: Simulations of temperature and turbulence structure of the oceanic boundary layer with the improved near-surface process. *J. Geophys. Res.*, **104**, 15 621–15 634, doi:10.1029/1999JC900068.
- Notz, D., A. Jahn, M. Holland, E. Hunke, F. Massonnet, J. Stroeve, B. Tremblay, and M. Vancoppenolle, 2016: Sea ice model intercomparison project (simip): Understanding sea ice through climate-model simulations. *Geosci. Model Dev.*, **9**, 3427–3446, doi:10.5194/gmd-9-3427-2016.
- Obata, A., and Y. Kitamura, 2003: Interannual variability of the sea-air exchange of co₂ from 1961 to 1998 simulated with a global ocean circulation-biogeochemistry model. *J. Geophys. Res.*, **108**, 3377, doi:10.1029/2001JC001088.
- Orr, J., R. Najjar, C. Sabine, and F. Joos, 1999: Abiotic-howto. Internal OCMIP Report LSCE/CEA Saclay, OCMIP, Gif-sur-Yvette, France, 25 pp. <http://ocmip5.ipsl.jussieu.fr/OCMIP/phase2/simulations/Abiotic/HOWTO-Abiotic.html>.
- Orr, J., and Coauthors, 2017: Biogeochemical protocols and diagnostics for the cmip6 ocean model intercomparison project (omip). *Geosci. Model Dev.*, 2169–2199, doi:10.5194/gmd-10-2169-2017.
- Orr, J. C., and J. M. Epitalon, 2015: Improved routines to model the ocean carbonate system:mocsy 2.0. *Geosci. Model Dev.*, **8**, 485–499, doi:10.5194/gmd-8-485-2015.
- Oschlies, A., 2001: Model-derived estimates of new production: New results point toward lower values. *Deep-Sea Res. II*, **48**, 2173–2197, doi:10.1016/S0967-0645(00)00184-3.
- Paulson, C. A., and J. J. Simpson, 1977: Irradiance measurements in the upper ocean. *J. Phys. Oceanogr.*, **7**, 952–956, doi:10.1175/1520-0485(1977)007<0952:IMITUO>2.0.CO;2.
- Phillips, N., 1966: The equation of motion for a shallow rotating atmosphere and the “traditional approximation”. *J. Atmos. Sci.*, **23**, 626–628, doi:10.1175/1520-0469(1966)023<0626:TEOMFA>2.0.CO;2.
- Prather, M. J., 1986: Numerical advection by conservation of second-order moments. *J. Geophys. Res.*, **91**, 6671–6681, doi:10.1029/JD091iD06p06671.
- Redfield, A. C., B. H. Ketchum, and F. A. Richards, 1963: The influence of organisms on the composition of sea water. *The sea*, M. N. Hill, Ed., Vol. vol. 2, Wiley-Intersci. New York., 26–77.
- Redi, M. H., 1982: Oceanic isopycnal mixing by coordinate rotation. *J. Phys. Oceanogr.*, 1154–1158, doi:10.1175/1520-0485(1982)012<1154:OIMBCR>2.0.CO;2.
- Rotta, J. C., 1951a: Statistische theorie nichthomogener turbulenz. *Z. Phys.*, **129**, 547–572, doi:10.1007/BF01330059.
- Rotta, J. C., 1951b: Statistische theorie nichthomogener turbulenz. *Z. Phys.*, **131**, 51–77, doi:10.1007/BF01329645.

BIBLIOGRAPHY

- Sakamoto, K., H. Tsujino, H. Nakano, M. Hirabara, and G. Yamanaka, 2013: A practical scheme to introduce explicit tidal forcing into an ogcm. *Ocean Sci.*, **9**, 1089–1108, doi:10.5194/os-9-1089-2013.
- Sakamoto, K., H. Tsujino, H. Nakano, S. Urakawa, and G. Yamanaka, 2018: Development management of meteorological research institute community ocean model (mri.com) using git and redmine. *Oceanography in Japan*, **27**, 175–188, doi:10.5928/kaiyou.27.5_175, (in Japanese).
- Saunders, P., 1990: The international temperature scale of 1990, its-90. *WOCE Neweletter*, **10**, 10, <https://www.nodc.noaa.gov/woce/wdiu/wocedocs/newsltr/news10/news10.pdf>.
- Schiller, A., 2004: Effects of explicit tidal forcing in an ogcm on the water-mass structure and circulation in the indonesian throughflow region. *Ocean Modell.*, **6**, 31–49, doi:10.1016/S1463-5003(02)00057-4.
- Schmittner, A., A. Oschlies, H. Matthews, and E. Galbraith, 2008: Future changes in climate, ocean circulation, ecosystems, and biogeochemical cycling simulated for a business-as-usual CO₂ emission scenario until year 4000 ad. *Global Biogeochem. Cycles*, **22**, GB1013, doi:10.1029/2007GB002953.
- Schwiderski, E. W., 1980: On charting global ocean tides. *Rev. Geophys. Space Phys.*, 243–268, doi:10.1029/RG018i001p00243.
- Shchepetkin, A. F., and J. C. McWilliams, 2003: A method for computing horizontal pressure-gradient force in an oceanic model with a non-aligned vertical coordinate. *J. Geophys. Res.*, **108**, 3090–3124, doi:10.1029/2001JC001047.
- Shchepetkin, A. F., and J. C. McWilliams, 2005: The regional ocean modeling system: A split-explicit, free-surface, topography-following-coordinate oceanic model. *Ocean Modell.*, **9**, 347–404, doi:10.1016/j.ocemod.2004.08.002.
- Shchepetkin, A. F., and J. C. McWilliams, 2009: Computational kernel algorithms for fine-scale, multi-process, long-term oceanic simulations. *Handbook of Numerical Analysis, Computational Methods for the Ocean and the Atmosphere*, J. T. P.G. Ciarlet, R. Temam, Ed., Vol. XIV, Elsevier Science, 119–182, doi:10.1016/S1570-8659(08)01202-0.
- Skamarock, W. C., 2006: Positive-definite and monotonic limiters for unrestricted-time-step transport schemes. *Mon. Wea. Rev.*, **134**, 2241–2250, doi:10.1175/MWR3170.1.
- Smagorinsky, J., 1963: General circulation experiments with the primitive equations: I. the basic experiment. *Mon. Wea. Rev.*, **91**, 99–164, doi:10.1175/1520-0493(1963)091<0099:GCEWTP>2.3.CO;2.
- Smith, L., Y. Yamanaka, M. Pahlow, and A. Oschlies, 2009: Optimal uptake kinetics: physiological acclimation explains the pattern of nitrate uptake by phytoplankton in the ocean. *Mar., Ecol. Prog. Ser.*, **384**, 1–12, doi:10.3354/meps08022.
- Smith, R. D., and P. R. Gent, 2004: Anisotropic gent-mcwilliams parameterization for ocean models. *J. Phys. Oceanogr.*, 2541–2564, doi:10.1175/JPO2613.1.
- Smith, R. D., and J. C. McWilliams, 2003: Anisotropic horizontal viscosity for ocean models. *Ocean Modell.*, **5**, 129–156, doi:10.1016/S1463-5003(02)00016-1.
- Smolarkiewicz, P. K., 1984: A fully multidimensional positive definite advection transport algorithm with small implicit diffusion. *J. Comput. Phys.*, **54**, 325–362, doi:10.1016/0021-9991(84)90121-9.
- Smolarkiewicz, P. K., and W. W. Grabowski, 1990: The multidimensional positive definite advection transport algorithm: nonoscillatory option. *J. Comp. Phys.*, **86**, 335–375, doi:10.1016/0021-9991(90)90105-A.
- Smolarkiewicz, P. K., and L. G. Margolin, 1998: Mpdata: A finite-difference solver for geophysical flows. *J. Comp. Phys.*, **140**, 459–480, doi:10.1006/jcph.1998.5901.
- St. Laurent, L. C., H. L. Simmons, and S. R. Jayne, 2002: Estimating tidally driven mixing in the deep ocean. *Geophys. Res. Lett.*, **29**, 2106–2110, doi:10.1029/2002GL015633.
- Steele, M., 1992: Sea ice melting and floe geometry in a simple ice-ocean model. *J. Geophys. Res.*, **97**, 17,729–17,738, doi:10.1029/92JC01755.
- Sueyoshi, M., and T. Yasuda, 2009: Reproducibility and future projection of the ocean first baroclinic rossby radius based on the cmip3 multi-model dataset. *J. Meteorol. Soc. Japan*, 821–827, doi:10.2151/jmsj.87.821.
- Suginohara, N., and S. Aoki, 1991: Buoyancy-driven circulation as horizontal convection on β -plane. *J. Marine Res.*, **49**, 295–320, doi:10.1357/002224091784995891.
- Taylor, J. P., J. M. Edwards, M. D. Glew, P. Hignett, and A. Slingo, 1996: Studies with a flexible new radiation code. II: Comparisons with aircraft short-wave observations. *Q. J. R. Meteorol. Soc.*, **122**, 839–861, doi:10.1256/smsqj.53203.
- Theiss, J., 2004: Equatorward energy cascade, critical latitude, and the predominance of cyclonic vortices in geostrophic turbulence. *J. Phys. Oceanogr.*, **34**, 1663–1678, doi:10.1175/1520-0485(2004)034<1663:EECCLA>2.0.CO;2.
- Thorndike, A. S., D. A. Rothrock, M. G. A., and R. Colony, 1975: The thickness distribution of sea ice. *J. Geophys. Res.*, **80**, 4,501–4,513, doi:10.1029/JC080i033p04501.
- Tsujino, H., T. Motoi, I. Ishikawa, M. Hirabara, H. Nakano, G. Yamanaka, T. Yasuda, and H. Ishizaki, 2010: Reference manual for the meteorological research institute community ocean model(mri.com) version 3. Technical Reports of the Meteorological Research Institute 59, Meteorological Research Institute, 241 pp. doi:10.11483/mritechrepo.59.
- Tsujino, H., H. Nakano, K. Sakamoto, S. Urakawa, M. Hirabara, H. Ishizaki, and G. Yamanaka, 2017: Reference manual for the meteorological research institute community ocean model version 4 (mri.comv4). Technical Reports of the Meteorological Research Institute 80, Meteorological Research Institute, 284 pp. doi:10.11483/mritechrepo.80.

- Umlauf, L., and H. Burchard, 2003: A generic length-scale equation for geophysical turbulence models. *J. Marine Res.*, **61**, 235–265, doi:10.1357/002224003322005087.
- UNESCO, 1981: Tenth report of the Joint Panel on Oceanographic Tables and Standards, Sidney, B. C., September 1980. Unesco Technical papers in marine science 36, UNESCO, 25 pp. <http://unesdoc.unesco.org/images/0004/000461/046148eb.pdf>.
- UNESCO, 1983: Algorithms for computation of fundamental properties of seawater. Unesco Technical papers in marine science 44, UNESCO, 53 pp. <http://unesdoc.unesco.org/images/0005/000598/059832eb.pdf>.
- Visbeck, M., J. Marshall, T. Haine, and M. Spall, 1997: Specification of eddy transfer coefficients in coarse-resolution ocean circulation models. *J. Phys. Oceanogr.*, **27**, 381–402, doi:10.1175/1520-0485(1997)027<0381:SOETCI>2.0.CO;2.
- von Storch, H., and F. Zwiers, 2001: *Statistical Analysis in climate research*. Cambridge university press, 484 pp., doi:10.1017/CBO9780511612336.
- Wanninkhof, R., 2014: Relationship between wind speed and gas exchange over the ocean revisited. *Limnol. oceanogr. Methods*, 351–362, doi:10.4319/lom.2014.12.351.
- Weatherly, G. L., 1972: A study of the bottom boundary layer of the florida current. *J. Phys. Oceanogr.*, **2**, 54–72.
- Weatherly, G. L., S. L. Blumsack, and A. A. Bird, 1980: On the effect of diurnal tidal currents in determining the thickness of the turbulent ekman bottom boundary layer. *J. Phys. Oceanogr.*, **10**, 297–300, doi:10.1175/1520-0485(1980)010<0297:OTEODT>2.0.CO;2.
- Webb, D. J., 1995: The vertical advection of momentum in bryan-cox-semtner ocean general circulation models. *J. Phys. Oceanogr.*, 3186–3195, doi:10.1175/1520-0485(1995)025<3186:TVAOMI>2.0.CO;2.
- Weiss, R. F., 1970: The solubility of nitrogen, oxygen and argon in water and seawater. *Deep-Sea Res.*, **17**, 721–735, doi:10.1016/0011-7471(70)90037-9.
- WGASF, 2000: Intercomparison and validation of ocean-atmosphere energy flux fields. Final report of the joint wrp/scor working group on air-sea fluxes (wgasf), WGASF, 306 pp. <http://eprints.soton.ac.uk/69522/>.
- Winton, M., R. Hallberg, and A. Gnanadesikan, 1998: Simulation of density-driven frictional down-lope flow in z-coordinate ocean models. *J. Phys. Oceanogr.*, **28**, 2163–2174, doi:10.1175/1520-0485(1998)028<2163:SODDFD>2.0.CO;2.
- Yamanaka, Y., R. Furue, H. Hasumi, and N. Sugimoto, 2000: Comparison of two classical advection schemes in a general circulation model. *J. Phys. Oceanogr.*, **30**, 2439–2451, doi:10.1175/1520-0485(2000)030<2439:COTCAS>2.0.CO;2.
- Yamanaka, Y., and E. Tajika, 1996: The role of the vertical fluxes of particulate organic matter and calcite in the oceanic carbon cycle: Studies using an ocean biogeochemical general circulation model. *Global Biogeochem. Cycles*, **10**, 361–382, doi:10.1029/96GB00634.
- Yoshimura, H., and S. Yukimoto, 2008: Development of simple coupler (scup) for earth system modeling. *Pap. Meteor. Geophys.*, **59**, 19–29, doi:10.2467/mripapers.59.19.
- Yukimoto, S., and Coauthors, 2011: Meteorological research institute-earth system model v1 (mri-esm1) - model description -. Technical Reports of the Meteorological Research Institute 64, Meteorological Research Institute, 88 pp. doi:10.11483/mritechrepo.64.
- Yukimoto, S., and Coauthors, 2019: The Meteorological Research Institute Earth System Model Version 2.0, MRI-ESM2.0: Description and Basic Evaluation of the Physical Component. *Journal of the Meteorological Society of Japan. Ser. II*, **97** (5), 931–965, doi:10.2151/jmsj.2019-051.