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Education

Ph.D. in Physical Oceanography, Johns Hopkins University, 2005.

B.Sc. in Atmospheric Science, University of Science and Technology of China, 1993.

Professional Experience

Data Scientist Jet Propulsion Laboratory, California Institute of Technology, 2019–present.

Associate Project Scientist Joint Institute for Regional Earth System Science and Enginerring, UCLA, 2016–present.

Assistant Researcher Joint Institute for Regional Earth System Science and Enginerring, UCLA, 2009–2016.

Research Associate Jet Propulsion Laboratory, California Institute of Technology, 2006–2009.

Research Associate Johns Hopkins University, 2005–2006.

Research Assistant Johns Hopkins University, 2000–2005.

Lecturer and Research Associate University of Science and Technology of China, 1997–2000.

Publications

Suselj, K., Carroll, D., Whitt, D., Samuels,B., Menemenlis, D., **Zhang, H.**, et al. (2025). Quantifying marine carbon dioxide removal via alkalinity enhancement across circulation regimes using ECCO-Darwin and 1D models. *Journal of Advances in Modeling Earth Systems*. https://doi.org/10.1029/

Bertin, C, D. Carroll, D. Menemenlis, S. Dutkiewicz, **H. Zhang**, M. Schwab, R. Savelli, A. Matsuoka, M. Manizza, C. Miller, S. Bowring, B. Guenet, & V. Le Fouest (2025). Paving the Way for Improved Representation of Coupled Physical and Biogeochemical Processes in Arctic River Plumes: A Case Study of the Mackenzie Shelf. *Permafrost & Periglacial Processe*. https://doi.org/10.1002/ppp.2271

Nakayama, Y., Malyarenko, A., **Zhang, H.**, Wang, O., Auger, M., Nie, Y., Fenty, I., Mazloff, M., Khl, A., & Menemenlis, D. (2024). Evaluation of MITgcm-based ocean reanalyses for the Southern Ocean. *Geosci. Model Dev.*, **17**, https://doi.org/10.5194/gmd-17-8613-2024

Fay, A., Carroll, D., McKinley, G., Menemenlis, D. & **Zhang** H. (2024). Scale-Dependent Drivers of Air-Sea CO2 Flux Variability. *Geophysical Research Letters*, **51**. https://doi.org/10.1029/2024GL111911

Wood, M., Khazendar, A., Fenty, I., Mankoff, K., Nguyen, A. T., Schulz, K., Willis, J. & **Zhang** H. (2024). Decadal evolution of ice-ocean interactions at a large East Greenland glacier resolved at fjord scale with downscaled ocean models and observations. *Geophysical Research Letters*, **51**. https://doi.org/10.1029/2023GL107983

Wang, J., Torres, S., Klein, P.;,Wineteer, A., **Zhang H.**, Menemenlis, D., Ubelmann, C., & Rodriguez, E. (2023). Increasing the Observability of Near Inertial Oscillations by a Future ODYSEA Satellite Mission. *Remote Sensing*, **15**, 4526. https:// doi.org/10.3390/rs15184526

Volkov, D.L., Zhang, K., Johns, W.E. ..., **Zhang, H.**, & Menemenlis, D. (2023). Atlantic meridional overturning circulation increases flood risk along the United States southeast coast. *Nat. Commun.*, **14**. https://doi.org/10.1038/s41467-023-40848-z

Torres H., Wineteer A., Klein P., Lee T., Wang J., Rodriguez E., Menemenlis D., & **Zhang H.** (2023). Anticipated Capabilities of the ODYSEA Wind and Current Mission Concept to Estimate Wind Work at the Air-Sea Interface. *Remote Sensing*, **15(13)**, 3337. https://doi.org/10.3390/rs15133337

Manizza, M., Carroll, D., Menemenlis, D., **Zhang, H.**, & Miller, C. (2023). Modeling the recent changes of phytoplankton blooms dynamics in the Arctic Ocean. *Journal of Geophysical Research: Oceans*, **128**. https://doi.org/10.1029/2022JC019152

Bertin, C., Carroll, D., Menemenlis, D., Dutkiewicz, S., **Zhang**, H., Matsuoka, A., et al. (2023). Biogeochemical River Runoff Drives Intense Coastal Arctic Ocean CO_2 Outgassing. *Geophysical Research Letters*, **50**. https://doi. org/10.1029/2022GL102377

Torres, H., Klein P., ..., **Zhang, H.**, Flexas, M.,& Perkovic-Martin, D. (2022). Wind work at the air-sea interface: a modeling study in anticipation of future space missions. *Geosci. Model Dev.*, **15(21)**, 8041-8058. https://doi.org/10.5194/gmd-15-8041-2022

Flexas, M., Thompson, A., Schodlok, M., **Zhang, H.**, & Speer K. (2022). Antarctic Peninsula warming triggers enhanced basal melt rates throughout West Antarctica. *Science Advances*, **8(31)**, eabj9134. https://doi.org/10.1126/sciadv.abj9134

Wang, O., Lee, T., Piecuch, C. G., Fukumori, I., Fenty, I., Frederikse, T., Menemenlis, D., Ponte, R., & **Zhang, H.** (2022). Local and remote forcing of interannual sea-level variability at Nantucket Island. *Journal of Geophysical Research: Oceans*, **127**. https://doi.org/10.1029/2021JC018275

Carroll, D., Menemenlis, D., Dutkiewicz, S., ... **Zhang, H.** (2022). Attribution of space-time variability in global-ocean dissolved inorganic carbon. *Global Biogeo-chemical Cycles*, **36**. https://doi.org/10.1029/2021GB007162

Kersalé, M., Volkov, D. L., Pujiana, K., & **Zhang, H.** (2022). Interannual variability of sea level in the southern Indian Ocean: local vs. remote forcing mechanisms. *Ocean Science*, **18(1)**. https://os.copernicus.org/articles/18/193/2022/

Chandanpurkar, H. A., Lee, T., Wang, X., **Zhang, H.**, Fournier, S., Fenty, I., et al. (2022). Influence of nonseasonal river discharge on sea surface salinity and height. *Journal of Advances in Modeling Earth Systems*. https://doi.org/10.1029/2021MS002715

Bingham FM, Brodnitz S, Fournier S, Ulfsax K, Hayashi A, & **Zhang H.** (2021). Sea Surface Salinity Subfootprint Variability from a Global High-Resolution Model. *Remote Sensing*, **13(21)**, 4410. https://doi.org/10.3390/rs13214410

Nakayama, Y., Greene, C. A., Paolo, F. S., Mensah, V., **Zhang, H.**, Kashiwase, H., Simizu, D., Greenbaum, J., Blankenship, D., Abe-Ouchi, A., Aoki, S. (2021). Antarctic Slope Current modulates ocean heat intrusions towards Totten Glacier. *Geophysical Research Letters*, **48**. https://doi.org/10.1029/2021GL094149

Nakayama, Y., Menemenlis, D., Wang, O., **Zhang, H.**, Fenty, I., & Nguyen, A. T. (2021). Development of adjoint-based ocean state estimation for the Amundsen and Bellingshausen seas and ice shelf cavities using MITgcm-ECCO (66j). *Geosci. Model Dev.*, **14(8)**, 4909-4924. https://doi.org/10.5194/gmd-14-4909-2021

Bingham FM, Fournier S, Brodnitz S, Ulfsax K, & **Zhang H.** (2021). Matchup Characteristics of Sea Surface Salinity Using a High-Resolution Ocean Model. *Remote Sensing*,**13(15)**, 2995. https://doi.org/10.3390/rs13152995

Feng, Y., Menemenlis, D., Xue, H., **Zhang, H.**, Carroll, D., Du, Y., & Wu, H. (2021). Improved representation of river runoff in Estimating the Circulation and Climate of the Ocean Version 4 (ECCOv4) simulations: implementation, evaluation, and impacts to coastal plume regions. *Geosci. Model Dev.*, **14(3)**, 1801-1819. https://doi.org/10.5194/gmd-14-1801-2021

Vazquez-Cuervo, J., Gentemann, C., Tang, W., Carroll, D., **Zhang, H.**, Menemenlis, D., & Steele, M. (2021). Using Saildrones to Validate Arctic Sea-Surface Salinity from the SMAP Satellite and from Ocean Models. *Remote Sensing*, **13(5)**, 831. https://doi.org/10.3390/rs13050831

Wood, M., Rignot, E., Fenty, I., An, L., Bjrk, A., van den Broeke, M., ... **Zhang, H.** (2021). Ocean forcing drives glacier retreat in Greenland. *Science Advances*, **7(1)**, eaba7282. https://doi.org/10.1126/sciadv.aba7282

Yurganov, L., D. Carrol, A. Pnyushkov, I. Polyakov, & **H. Zhang**. (2021). Ocean stratification and sea-ice cover in Barents and Kara seas modulate sea-air methane flux: satellite data. *Advances in Polar Science*, **32(2)**, 118-140. https://doi.org/http://dx.doi.org/10.13679/j.advps.2021.0006

Carroll, D., Menemenlis, D., Adkins, J. F., Bowman, K. W., Brix, H., Dutkiewicz, S., ... **Zhang, H.** (2020). The ECCO-Darwin Data-assimilative Global Ocean Biogeochemistry Model: Estimates of Seasonal to Multi-decadal Surface Ocean pCO_2 and Air-sea CO_2 Flux. *Journal of Advances in Modeling Earth Systems*. https://doi.org/10.1029/2019MS001888

Nakayama, Y., Manucharyan, G., **Zhang, H.**, Dutrieux, P., Torres, H., Klein P., Seroussi, H., Schodlok, M., Rignot E. & Menemenlis D. (2019). Pathways of ocean heat towards Pine Island and Thwaites grounding lines. *Sci. Rep.*, **9(1)**. https://doi.org/10.1038/s41598-019-53190-6

Flexas, M. M., Thompson, A. F., Torres, H. S., Klein, P., Farrar, J. T., **Zhang, H.**, & Menemenlis, D. (2019). Global Estimates of the Energy Transfer From the Wind to the Ocean, With Emphasis on Near-Inertial Oscillations. *Journal of Geophysical Research: Oceans*, **124**. https://doi.org/10.1029/2018JC014453

Volkov, D. L., Lee, S. K., Domingues, R., **Zhang, H.**, & Goes, M. (2019). Interannual sea level variability along the southeastern seaboard of the United States in relation to the gyre scale heat divergence in the North Atlantic. *Geophysical Research Letters*, **46**. https://doi.org/10.1029/2019GL083596

Manizza, M., Menemenlis, D., **Zhang, H.**, & Miller, C. E. (2019). Modeling the recent changes in the Arctic Ocean CO_2 sink(2006–2013). *Global Biogeo-chemical Cycles*, **33**. https://doi.org/10.1029/2018GB00607

Heimbach P., I. Fukumori, C. Hill, R. Ponte, D. Stammer, C. Wunsch, J-M Campin, B. Cornuelle, I. Fenty, G. Forget, A. Kohl, M. Mazloff, D. Menemenlis, A. Nguyen, C. Piecuch, D. Trossman, A. Verdy, O. Wang, & **H. Zhang** (2019). Putting It All Together: Adding Value to the Global Ocean and Climate Observing Systems With Complete Self-Consistent Ocean State and Parameter Estimates. *Front. Mar. Sci.*, **6(55)**, https://doi:.org/10.3389/fmars.2019.00055

Khazendar A., I. Fenty, D. Carroll, A. Gardner, I. Fukumori, O. Wang, **H. Zhang**, H. Seroussi, D. Moller, B. Nol, M. Broeke, S. Dinardo, & J. Willis (2019). Interruption of two decades of Jakobshavn Isbrae acceleration and thinning as regional ocean cools, *Nature Geoscience*, **12(4)**. https://doi:.org/10.1038/s41561-019-0329-3

Peng, Q., Xie, S.-P., Wang, D., Zheng, X.-T., & **Zhang, H.** (2019). Coupled ocean-atmosphere dynamics of the 2017 extreme coastal El Nino. *Nat. Commun.*, **10(1)**. https://doi.org/10.1038/s41467-018-08258-8

Nakayama, Y., Menemenlis, D., **Zhang, H.**, Schodlok, M., & Rignot, E. (2018). Origin of Circumpolar Deep Water intruding onto the Amundsen and Bellingshausen Sea continental shelves. *Nat. Commun.*, **9(1)**. https://doi.org/10.1038/s41467-018-05813-1

Zhang, H., Menemenlis, D., and Fenty, I. (2018). ECCO LLC270 Ocean-Ice State Estimate. https://doi.org/1721.1/119821 also avaialble at https://ecco.jpl.nasa.gov/drive/files/Version5/Alpha/RELEASE/ECCO_LLC270.pdf

Fenty, I., Menemenlis, D., and **Zhang, H.** (2017). Global coupled sea ice-ocean state estimation. *Climate Dynamics*, **49(3)**. https://doi.org/10.1007/s00382-015-2796-6

Brix, H., Menemenlis, D., Hill, C. N., Dutkiewicz, S., Jahn, O., Wang, D., Bowman, K., & **Zhang, H.** (2015). Using Greens Functions to initialize and adjust a global, eddying ocean biogeochemistry general circulation model. *Ocean Modelling*, **95**. https://doi.org/10.1016/j.ocemod.2015.07.008

Menemenlis, D., **H. Zhang** et al. (2008). ECCO2: High resolution global ocean and sea ice data synthesis, *Mercator Ocean Quarterly Newsletter*, **31**.

Haine, T. W. N., **H. Zhang** and D. W. Waugh (2008). On transit-time distributions in unsteady circulation models, *Ocean Modelling*, **21**.

Zhang, H., T. W. N. Haine and D. W. Waugh (2005). Relationships between tracer ages and potential vorticity in unsteady wind-driven circulation, *J. Phys. Oceanogr.*, **35(11)**.

Presentations

Zhang, H., D. Menemenlis, Model-Observation Comparison in Recent ECCOs: Sea-ice Fields in Southern Ocean ECCO Meeting, UTexas/Austin, TX, 2024.

Zhang, H., T. Lee et al., Studying atmospheric forcing mechanisms for sea level change using ECCO adjoint, Ocean Science Meeting, San Diego, CA, 2020/02.

Zhang, H., D. Menemenlis, I. Fenty, and D. Carroll, Eddying global ocean, ice, and carbon reanalysis for ECCO, The 8th COAA International Conference on Atmosphere, Ocean, and Climate Change, Nanjing, China, 2019/07.

Zhang, H., I. Fenty, and D. Menemenlis, Update of ECCO LLC270 Ocea-Ice State Estimate for 1992-2017, ECCO Meeting, UTexas/Austin, TX, 2018.

Zhang, H. and D. Menemenlis, Global ocean air-sea flux in atmospheric re-analysis and ECCO state estimates, ECCO Meeting, Caltech/Pasadena, CA, 2017.

Zhang, H., I. Fenty, and D. Menemenlis, Fifteen-year (2001-2015) dynamical oceanic climatology: temperature and salinity, ECCO Meeting, Caltech/Pasadena, CA, 2017.

Zhang, H., D. Halkides, and D. Menemenlis, Impact of simulated mixed layer depth observations on an ocean state estimate, Clivar2016, Qingdao, China, 2016.

Zhang, H., I. Fenty, and D. Menemenlis, Progress on ocean and sea-ice state estimation at 25 km resolution (LLC270), ECCO Meeting, MIT/Cambridge, MA, 2016.

Zhang, H., D. Menemenlis et al., Assessment of CS510 adjoint optimization, ECCO Meeting, MIT/Cambridge, MA, 2014.

Zhang, H., D. Menemenlis et al., CS510 adjoint solutions for CO_2 flux estimates, ECCO Meeting, Caltech/Pasadena, CA, 2012.

Zhang, H., D. Menemenlis et al., A global, dynamically-consistent, eddy-permitting ocean and sea ice state estimate (2009-2010) obtained using the adjoint method, Ocean Science Meeting, Salt Lake City, UT, 2012.

Zhang, H. and D. Menemenlis, Status of CS510 ocean and seaice state estimate, ECCO2 Meeting, MIT/Cambridge, MA, 2011.

Zhang, H., D. Menemenlis et al., A global, dynamically-consistent, eddy-admitting ocean and sea ice state estimate (2004-2005) obtained using the adjoint method, Ocean Science Meeting, Portland, OR, 2010.

Zhang, H. and D. Menemenlis et al., Progress towards a 16-month CS510 adjoint state estimate, ECCO2 Meeting, Caltech/Pasadena, CA, 2009.

Zhang, H., D. Volkov, and D. Menemenlis, Variability of the Meridional Overturning Circulation (MOC) in the 1992-2007 ECCO2 Synthesis, AGU Fall Meeting, San Francisco, CA, 2008.

Zhang, H. and D. Menemenlis, Assessment of the ECCO2 high-resolution global-ocean and sea-ice data synthesis, ECCO2 Meeting, MIT/Cambridge, MA, 2008.

Zhang, H. and D. Menemenlis, Sea Level Rise and the Warming of Oceans over 1992-2002 in ECCO2 Synthesis, JPL PostDoc Research Day, Pasadena, CA, 2008.

Zhang, H., D. Menemenlis et al., Assessment of the ECCO2 high resolution global-ocean and sea-ice data synthesis using the CLIVAR/GODAE global synthesis and observations panel metrics, Ocean Science Meeting, Orlando, FL, 2008.

Zhang, H. and D. Menemenlis, Calibrating ECCO2 OGCM in Green's funcion approach, JPL PostDoc Research Day, Pasadena, CA, 2007.

Zhang, H. and D. Menemenlis, Progress towards a version-0 ECCO2 release, ECCO2 (Estimating the Circulation and Climate of the Ocean, Phase II) Meeting, Caltech/Pasadena, CA, 2007.

Zhang, H., T. W. N. Haine, and D. W. Waugh, Transit time distributions in chaotic flow, EGU General Assembly, Vienna, Austria, 2005.

Zhang, H., T. W. N. Haine, and D. W. Waugh, Diagnosing transport timescales in unsteady double-gyre circulation, 14^{th} Conference on Atmospheric and Oceanic Fluid Dynamics, San Antonio, TX, 2003.

Zhang, H., T. W. N. Haine, and D. W. Waugh, Diagnosing transport and mixing in unsteady flows using transit-time distributions, EGS-AGU-EUG Joint Assembly, Nice, France, 2003.