

SHUWEN TAN

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EDUCATION

Ph.D., Physical Oceanography

September 2014 - September 2020

Institute of Oceanology, Chinese Academy of Sciences (IOCAS), Qingdao, China
& University of Chinese Academy of Sciences (UCAS), Beijing, China

B.S., Marine Science

September 2010 - July 2014

Ocean University of China, Qingdao, China

RESEARCH INTERESTS

- Theory and application of the rotating internal hydraulics
- Flow-topography interaction in the deep ocean & in a changing climate
(*e.g., flow hydraulics, internal wave, instability, turbulent mixing*)
- Data-driven analysis & machine learning for interpreting physics from the accumulating mass of ocean data

RESEARCH EXPERIENCE

Postdoctoral Fellow

April 2021 - Ongoing

Supervised by Dr. Andreas Thurnherr

GO-SHIP Postdoctoral fellow at Lamont-Doherty Earth Observatory, USA

- “Decadal changes in stratification of the abyssal oceans and implications for hydraulic control of abyssal channel flow”
- “Clustering & interpreting Bottom Boundary Layer families using a hierarchical approach & machine learning”

Graduate Research Assistant

September 2015 - September 2020

Supervised by Dr. Dongliang Yuan

Key Laboratory of Ocean Circulation and Waves, IOCAS, China

- Assisted with cruise planning and instruments preparation
- Served on cruises and assisted with collection of field measurements
- Participated in proposal and report writing for collaborative projects and trained master’s students

Guest student

September 2017 - September 2019

Supervised by Dr. Larry Pratt

Physical Oceanography Department, Woods Hole Oceanographic Institution, USA

- Audited nine graduate courses
- Audited Geophysical Fluid Dynamics Program, WHOI, summer 2019
- Conducted projects: “Hydraulics and mixing in the deep branch of the Indonesian Throughflow” and “Hydraulic control and adjustment in a channel+plateau system”

Guest student

April 2019 - May 2019

Multiscale Ocean Dynamics Group, Scripps Institution of Oceanography, UC San Diego, USA

- Collaborated on the “Samoan Passage Project” with Dr. Gunnar Voet, Dr. Matthew Alford, etc.

TEACHING EXPERIENCE

Mentor of an undergraduate

summer 2021 - spring 2022

LEDO, Columbia University in the City of New York, USA

- “Different flavors of bottom boundary layer stratification profiles”.

Teaching Assistant of Graduate Summer School Course

summer 2017

University of Chinese Academy of Sciences, Beijing, China

- “Up-to-data Ocean Thermohaline Processes” by Dr. William Dewar and Dr. Dongliang Yuan
Led discussion sessions. Graded exams.

Teaching Assistant of Graduate Course

spring 2016, 2017

University of Chinese Academy of Sciences, Beijing, China

- “Dynamic Processes of the Tropical Ocean Circulation” by Dr. Fan Wang, Dr. Dongliang Yuan, and Dr. Yan Du
Assisted with writing the class notes and syllabus. Led tutorial sessions. Graded and prepared answer keys for homework and exams.

FIELD EXPERIENCE

R/V Revelle

44 days at sea, April –June 2022

- Co-chief scientist: station planning, logistics and admins, coordinations.

R/V Kexue

31 days, August–October 2015

- Participated in mooring deployment and recovery. Winch driver. Assisted with surface drifters deployment, CTD, LADCP and XCTD operation. Demonstrated shipboard processing of CTD and ADCP data.

TECHNICAL SKILLS

Data Analysis and Modeling Experience

- Collected and analyzed in-situ physical oceanographic data (eg. CTD, SADC, LADCP, Mooring)
- Analyzed large climate & ocean model datasets
- Developed a linear reduced gravity model for planetary ocean wave studies
- Implemented a one-layer, nonlinear, nonhydrostatic model for hydraulic adjustments

Scientific Programming

- Python, MATLAB, Fortran, L^AT_EX

SEMINAR AND CONFERENCE PRESENTATIONS

Tan, S. and A. Thurnherr, (2022), Decadal changes in stratification of the abyssal oceans and implications for hydraulic control of abyssal channel flow. **Oral**, Ocean Science Meeting, virtual.

Tan, S., A. Thurnherr, et al., (2022), Hydraulically Controlled Flow in Abyssal Ocean Passages. **Invited talk**, Atmospheres and Oceans Seminar at Johns Hopkins University, virtual.

Tan, S., L.J. Pratt, et al., (2020), Hydraulic control and wave adjustment in a channel+plateau system: Deep Western Boundary Current passing through the Samoan Passage. **Poster**, AGU Fall Meeting, virtual.

Tan, S., L.J. Pratt, D. Yuan, and C. Corvianawatie (2019), Hydraulics and mixing in the deep branch of the Indonesian Throughflow. **Oral**, Woods Hole Oceanographic Institution PO Seminar, Woods Hole, USA.

Tan, S., D. Yuan, and H. Zhou (2018), Significant Cooling in the Deep Philippine Sea during the recent Global Warming Hiatus. **Poster**, AGU Fall Meeting, Washington, D.C., USA.

Tan, S., B. Li and D. Yuan (2016), Interannual Variations of Low Latitude Western Boundary Currents in the Tropical Western Pacific Ocean. **Poster**, CLIVAR Open Science Conference, Qingdao, China.

PUBLICATIONS

Peer-reviewed articles

Yuan, D., X. Yin, X. Li, C. Corvianawatie, Z. Wang, Y. Li, Y. Yang, X. Hu, J. Wang, **S. Tan**, et al., 2022: A Maluku Sea intermediate western boundary current connecting Pacific Ocean circulation to the Indonesian Throughflow. *Nat Commun*, 13, 2093.

Tan, S., L.J. Pratt, G. Voet, J.M. Cusack, K.R. Helfrich, M.H. Alford, J.B. Girton, G.S. Carter, 2022: Hydraulic control of flow in a multi-passage system connecting two basins. *Journal of Fluid Mechanics*, 940, A8.

Zhou, H., H. Liu, **S. Tan**, W. Yang, Y. Li, X. Liu, Q. Ren, and W. K. Dewar, 2021: The Observed North Equatorial Countercurrent in the Far Western Pacific Ocean during the 2014/16 El Niño. *Journal of Physical Oceanography*, 51 (6).

Tan, S., L.J. Pratt, D. Yuan, C. Corvianawatie, Dewi Surinati, Asep S. Budiman, Ahmad Bayhaqi, 2020: Hydraulics and Mixing of the Deep Overflow in the Lifamatola Passage of the Indonesian Seas. *Journal of Physical Oceanography*, 50, 2797–2814.

Zhang, Z., L.J. Pratt, J. Wang, F. Wang, and **S. Tan**, 2020: Intermediate Intraseasonal Variability in the Western Tropical Pacific Ocean: Meridional Distribution of Equatorial Rossby Waves Influenced by a Tilted Boundary. *Journal of Physical Oceanography*, 50(4), 921–933.

Cusack, J.M., G. Voet, M.H. Alford, J.B. Girton, G.S. Carter, L.J. Pratt, K.A. Pearson-Potts, and **S. Tan**, 2019: Persistent Turbulence in the Samoan Passage. *Journal of Physical Oceanography*, 49(12), 3179–3197

Carter, G.S., G. Voet, M.H. Alford, J.B. Girton, J.B. Mickett, J.M. Klymak, L.J. Pratt, K.A. Pearson-Potts, J.M. Cusack, and **S. Tan**, 2019: A spatial geography of abyssal turbulent mixing in the Samoan Passage. *Oceanography*, 32(4), 194–203.

Girton, J.B., J.B. Mickett, Z. Zhao, M.H. Alford, G. Voet, J.M. Cusack, G.S. Carter, K.A. Pearson-Potts, L.J. Pratt, **S. Tan**, and J.M. Klymak, 2019: Flow–topography interactions in the Samoan Passage. *Oceanography*, 32(4), 184–193.

Pratt, L.J., G. Voet, A. Pacini, **S. Tan**, M.H. Alford, G.S. Carter, J.B. Girton, and D. Menemenlis, 2019: Pacific Abyssal Transport and Mixing: Through the Samoan Passage versus around the Manihiki Plateau. *Journal of Physical Oceanography*, 49, 1577–1592.

Tan, S. and Zhou, H., 2018: The observed impacts of the two types of El Niño on the North Equatorial Countercurrent in the Pacific Ocean. *Geophysical Research Letters*, 45, 10,493–10,500.

Yuan, D., X. Li, Z. Wang, Y. Li, J. Wang, Y. Yang, X. Hu, **S. Tan**, H. Zhou, A.K. Wardana, D. Surinati, A. Purwandana, M.F. Azis Ismail, P. Avianto, D. Dirhamsyah, Z. Arifin, and J.v. Storch, 2018: Observed Transport Variations in the Maluku Channel of the Indonesian Seas Associated with Western Boundary Current Changes. *Journal of Physical Oceanography*, 48, 1803–1813.