

Rong-Hua Zhang

Professor

Research Field: Physical oceanography and climate dynamics

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Research Interests:

Research interests include ocean modeling, tropical ocean-atmosphere coupling, data assimilation, interannual and decadal ocean variability, the interactions between the tropics and subtropics in the ocean, and ocean-related feedback parameterizations. A suite of coupled tropical ocean-atmosphere models developed for El Nino-Southern Oscillation (ENSO) in the tropical Pacific; novel approaches to use satellite data for climate modeling; an intermediate coupled ocean-atmosphere model (known as IOCAS ICM) which has been used for routine ENSO prediction; and a hybrid coupled model (HCM) of atmosphere and ocean physics and biogeochemistry to represent biogeophysical feedback effects in the tropical Pacific.

Education:

B. S. in Meteorology from Zhejiang University, 1983;

M. S. in Atmospheric dynamics from Institute of Atmospheric Physics, Chinese Academy of Sciences, 1986;

Ph. D. in Climate Dynamics from Institute of Atmospheric Physics, Chinese Academy of Sciences, 1989.

Work Experience:

1990-1992: Meteorological Research Institute/Japan Meteorology Agency (Japan) ,
Postdoc Scientist;

1992-1994: Institute of Atmospheric Physics, Chinese Academy of Sciences (China),
Associate Scientist;

1994 -1995: The National Oceanographic Data Center/NOAA (USA), Visiting Scientist;

1995-1999: University of Rhode Island (USA) , Postdoc and Assistant Scientist;

1999 -2003: Columbia University (USA) , Associate Scientist;

2003-2013: University of Maryland (USA), Associate and Senior Scientist, and Affiliate Professor;

2014-present: Institute of Oceanology/Chinese Academy of Sciences (IOCAS, China), Professor.

Professional Memberships:

Editor: Atmospheric and Oceanic Science Letters (AOSL), 2010-present;

Assistant Editor in Chief: Journal of Oceanology and Limnology, 2014-present;

Assistant Editor in Chief: Acta Oceanologica Sinica, 2017-present;

Editor: Global Meteorology, 2011-2012;

NASA Sea Surface Temperature (SST) Science Team ; 2009-2013;

NASA Altimetry science team , 2009-2013;

NASA Ocean Salinity science team , 2010-2013;

Board member of Chinese-American Atmosphere and Ocean Association (COAA), 2008-2010;

AGU Board Committees/Teller committee , 2010-2012;

Member of AGU, 1994-present.

Honors and Awards:

Excellence in graduate mentoring, Chinese Academy of Sciences, 2017;

Best Research Scientist Paper Award, Earth System Science Interdisciplinary Center (ESSIC) , University of Maryland, USA, 2010.

Selected Publications: (only in 2008 and 2019) :

1.Zhang, R.-H., F. Tian, and H. Zhi and X. Kang, 2019: Observed structural relationships between ocean chlorophyll variability and its heating effects on the ENSO, Climate Dynamics, in press , DOI: 10.1007/s00382-019-04844-8.

2. Zhi, H., P. Lin, R.-H. Zhang, F. Chai and Hailong Liu, 2019: Salinity Effects on the 2014 Warm ‘Blob’ in the Northeast Pacific, *Acta Oceanologica Sinica*, in press.
3. Tian, F., R.-H. Zhang, and X. Wang, 2019: Factors affecting interdecadal variability of air-sea CO₂ fluxes in the tropical Pacific, revealed by an ocean physical-biogeochemical model, *Climate Dynamics*, in press. DOI: 10.1007/s00382-019-04766-5
4. Wei, Y., H. Wang, and R.-H. Zhang, 2019: Mesoscale wind stress-SST coupled perturbations in the Kuroshio Extension. *Progress in Oceanography*. 172: 108-123.
5. Hu, Junya, Zhang, R.-H. and Chuan Gao, 2019: A Hybrid Coupled Ocean-atmosphere Model and its Simulation of ENSO and Atmospheric Responses, *Adv. Atmos. Sci.*, 36: 643-657. doi: 10.1007/s00376-019-8197-8
6. Zhang, R.-H., F. Tian, A. J. Busalacchi, and X. Wang, 2019: Freshwater flux and ocean chlorophyll produce nonlinear feedbacks in the tropical Pacific, *J. Climate*, 32(7), 2037–2055. DOI: 10.1175/JCLI-D-18-0430.1
7. Tian, F., R.-H. Zhang, and X. Wang, 2019: A positive feedback onto ENSO due to tropical instability wave (TIW)-induced chlorophyll effects in the Pacific, *Geophys. Res. Lett.*, in press. DOI: 10.1029/2018GL081275
8. Zhu, Y. & R.-H. Zhang, 2019: A modified vertical mixing parameterization for its improved ocean and coupled simulations in the tropical Pacific, *J. Phys. Oceanogr.*, in press. DOI: 10.1175/JPO-D-18-0100.1.
9. Zhi, H., R.-H. Zhang, P. Lin, and P. Yu, 2018: Interannual salinity variability in the tropical Pacific in CMIP5 simulations, *Adv. Atmos. Sci.*, 36(4): 378-396. DOI: 10.1007/s00376-018-7309-1.
10. Pei, Y., R.-H. Zhang, and D. Chen. 2018: Quantifying the roles of different physical processes in upper ocean responses to typhoon-induced wind forcing, *Science China: Earth Sciences*, 62(4): 684-692. <https://doi.org/10.1007/s11430-018-9313-8>
11. Tang, Youmin Tang, Rong-Hua Zhang, Ting Liu, Wansuo Duan, Dejian Yan, Fei Zheng, Hongli Ren, Tao Lian, Chuan Gao, Dake Chen and Mu Mu, 2018: Progress in ENSO prediction and predictability study, *National Science Review*, 5(6):826-839. DOI: 10.1093/nsr/nwy105.
12. Tian, F., R.-H. Zhang, and X. Wang, 2018: A coupled

ocean physics-biology modeling study for tropical instability wave-induced chlorophyll impacts in the Pacific, *J. Geo. Res.*, 123,5160-5179.

DOI:10.1029/2018JC013992

13.Gao, Jiaxiang, Rong-Hua Zhang, and Hongna Wang, 2018: Mesoscale SST Perturbation-induced Impacts on Climatological Precipitation in the Kuroshio-Oyashio Extension Region, as Revealed by the WRF Simulations, *J. Oceanology and Limnology*, in press.

14.Zhang, R.-H. , F. Tian and X. Wang, 2018: A new hybrid coupled model (HCM) of atmosphere and ocean physics and biology (AOPB) in the tropical Pacific. *J. Adv. Model. Earth Syst.*, 10,1901-1923. DOI: 10.1029/2017MS001250

15.Li, Shan, Shaoqing Zhang, Zhengyu Liu, Lv Lu, Jiang Zhu, Xuefeng Zhang, Xinrong Wu, Ming Zhao, Gabriel. A. Vecchi, Rong-Hua Zhang, and Xiaopei Lin, 2018: Estimating Convection Parameters in the GFDL CM2.1 Model using Ensemble Data Assimilation, *J. Adv. Model. Earth Syst.*, in press. DOI: 10.1002/2017MS001222.

16.Tao, L., C. Gao, and R.-H., Zhang, 2018: Model parameter-related optimal perturbations and their contributions to El Nino prediction errors, *Climate Dynamics*, in press. DOI: 10.1007/s00382-018-4202-7

17.Zhu, Y. & R.-H. Zhang, 2018: An Argo-derived background diffusivity parameterization for improved ocean simulations in the tropical Pacific, *Geophys. Res. Lett.*, 45:1509-1517, DOI: 10.1002/2017GL076269.

18.Tao, L., R.-H., Zhang, and C. Gao, 2018: ENSO predictions in an ICM influenced by removing initial condition errors in the sensitive areas: A target observation perspective, *Adv. Atmos. Sci.*, 35 (7) : 853-867.

19.Zhang, R.-H. , F. Tian and X. Wang, 2018: Ocean chlorophyll-induced heating feedbacks on ENSO in a coupled ocean physics-biology model forced by prescribed wind anomalies, *J. Climate*, 31:1811-1832, <https://doi.org/10.1175/JCLI-D-17-0505.1> .

20.Gao, C., R.-H. Zhang, Xinrong Wu and Jichang Sun, 2018: Idealized experiments for optimizing model parameters using a 4D-Variational method in an intermediate coupled model of ENSO, *Adv. Atmos. Sci.*, 35: 410-422, doi: 10.1007/s00376-017-

7109-z.

21.Zhu, Y. & R.-H. Zhang, 2018: Scaling wind stirring effects in an oceanic bulk mixed layer model with application to an OGCM of the tropical Pacific, *Climate Dynamics*, 51,1927-1946. DOI: 10.1007/s10872-017-0432-2

22.Zhang, R.-H. , L. Tao and C. Gao, 2018: An improved simulation of the 2015 El Nino event by optimally correcting the initial conditions and model parameters in an intermediate coupled model, *Climate Dynamics*, in press. DOI:10.1007/s00382-017-3919-z.