

Yi-Chia Hsin 辛宜佳

Research Center for Environmental Changes (RCEC), Academia Sinica

No. 128, Sec. 2, Academia Rd., Nankang, Taipei, Taiwan, R.O.C.

Office Tel: [+886-2-2787-5857](tel:+886-2-2787-5857)

Email: yhsin@gate.sinica.edu.tw

Last update: 2020/04/05

EDUCATION

- 2003-Sep ~ 2008-Jun Ph.D. Department of Earth Sciences,
National Taiwan Normal University, Taiwan
- 2001-Sep ~ 2003-Jun M.S. Department of Earth Sciences,
National Taiwan Normal University, Taiwan
- 1997-Sep ~ 2001-Jun B.S. Department of Oceanography,
National Taiwan Ocean University, Taiwan

EMPLOYMENT

- 2018-Jun ~ present Associate Research Fellow
RCEC, Academia Sinica, Taiwan
- 2012-Nov ~ 2018-Jun Assistant Research Fellow
RCEC, Academia Sinica, Taiwan
- 2010-Oct ~ 2012-Aug Postdoctoral Fellow
Department of Oceanography, University of Hawaii, USA
- 2009-Oct ~ 2010-Sep Postdoctoral Fellow
Department of Earth Sciences, National Taiwan Normal University,
Taiwan
- 2007-Mar ~ 2008-Feb Visiting Scholar
IPRC/SOEST, University of Hawaii at Manoa, USA

HONORS & AWARDS

- 2017 Finalist of the Annual Ta-You Wu Memorial Award at Ministry of Science
and Technology (MOST)
- 2015 Finalist of the Annual Ta-You Wu Memorial Award at MOST
- 2012-Nov ~ 2015-Nov Awarded Merit Bonus Program for Recruitment and Retention of
Exceptional Talent at Institutions of Higher Education by MOST
- 2008 Awarded Excellent Research Paper Award of the Academic Year
2007-2008 by National Taiwan Normal University
- 2007-Mar ~ 2008-Feb Awarded Graduate Student Study Abroad Program (GSSAP) by National
Science Council

ACADEMIC SERVICE & RESEARCH PROJECTS

Journal reviewer:

Atmosphere-Ocean, Chinese Journal of Oceanology and Limnology, Deep-Sea Research I, Deep-Sea Research II, Egyptian Journal of Aquatic Research, Journal of Climate, Journal of Geophysical Research, Journal of Marine Science and Technology, Journal of Marine Systems, Journal of Mechanics, Journal of Oceanology and Limnology, Journal of Physical Oceanography, Ocean and Coastal Management, Ocean Dynamics, Ocean Modelling, Progress in Oceanography, Scientific Reports, Terrestrial, Atmospheric and Oceanic Sciences, Water Research

Review Panel:

2018-present Popular Science Activity Project, Department of International Cooperation and Science Education, MOST

Research Projects:

RESEARCH INTERESTS

Physical Oceanography, Multi-scale Numerical Ocean Modelling, Dynamics of Kuroshio and Equatorial Currents

RESEARCH HIGHLIGHTS

➤ **The Kuroshio around Taiwan:** The Kuroshio is the most important current in the northwestern Pacific Ocean. Variability and dynamics of the Kuroshio in the vicinity of Taiwan on multiple timescales were investigated in combined use of satellite remote-sensed images, in-situ hydrographic measurements, Argo-drifter observations, ocean reanalysis products, and numerical modelling [2-8, 10, 12, 14, 16, 20]. In the east of Taiwan, the Kuroshio, on average, transports water to the north on the order of 30 Sv ($1\text{Sv} \equiv 10^6 \text{ m}^3/\text{s}$) with a width of 100-200km and a depth of 800-1000m [3]. The intraseasonal change of Kuroshio off the southeastern Taiwan has different dominant frequency and leading factor between summer and winter [6]. Seasonally, the Kuroshio is stronger in summer and weaker in winter [3, 12]. In summer, it moves offshore in the northeast of Taiwan, but inward in the southeast of Taiwan [5, 7, 12, 14]. Interannually, the Kuroshio throughout the eastern Taiwan intensifies with an offshore pathway during the Pacific Decadal Oscillation warm phase [14]. The decadal change of Kuroshio east of Taiwan are out of phase with that of Kuroshio east of Luzon, except 1980s, and it intensified in the end of 1960s, the beginning of 1980s, and the end of 1990s [16]. Further, Coral $\delta^{18}\text{O}$ recorded for 1953-2006 at Nanwan in the southern Taiwan reflects the temperature change on interannual to decadal timescales and is proved to be controlled by the Kuroshio transport [20]. The impacts of Kuroshio on the paleo circulation of South China Sea and East China Sea were explored by an ocean circulation model designed for paleo oceanic environment [2, 19]. The dynamics relevant to the above-mentioned variability of Kuroshio were given in the cited references.

- **Pacific equatorial surface current and its impact:** The equatorial current system plays a very important role in regulating the climate system in the ocean and atmosphere. Its influence can be spread to the global scale via the atmospheric and oceanic circulations. The seasonality of surface North Equatorial Countercurrent (NECC) across the entire Pacific Ocean was re-explored in detailed, and its dynamics were further clarified by a first-mode baroclinic Rossby wave model [9]. The NECC in the western/eastern Pacific moves northward in the first/latter half of a year, where the whole NECC intensifies in the first half of a year. Interannually, the impacts of Eastern-Pacific and Central-Pacific El Niño on the NECC were compared [11]. Eastern-Pacific El Niños exert a significant impact on the interannual changes of the NECC, whereas Central-Pacific El Niños have little influence. From the developing to mature phase of Eastern-Pacific El Niño, the NECC tends to intensify and shift southward. The weaker and shorter fluctuations of wind stress curl forcing during the Central-Pacific El Niño events induce irregular and insignificant changes of the NECC. Centennial tendencies of the North Equatorial Current (NEC), NECC, and the northern branch of South Equatorial Current were estimated for the past hundred years based on an ensemble of multiple ocean reanalysis products [18]. Except for the NEC in the western Pacific, the three currents have weakened; the entire surface equatorial current system tend to move southward in the western Pacific, but northward in the eastern Pacific. Because of the continuous meridional shift of NEC and NECC system in the western Pacific, large warming in the subsurface ocean is evidenced [22].
- **Biogeochemistry modelling:** By off-line or on-line trajectory simulation with an ocean circulation model, specific biogeochemistry problems are able to be addressed. Waters originated from the Pearl River was evidenced to be able to be transported eastward to the Penghu Channel and further northward to the Taiwan Strait [15]. Observed high-concentration of sediment off the northeastern Taiwan was proved to be originated from the Chinese coasts and middle Taiwan Strait [13]. Connectivity between two deep-sea corals in the northern South China Sea were explored [26]. Sources of macro litter collected at Dongsha Island were identified [21]. Furthermore, global distribution of macro litter from coastal areas and open oceans were explored [27].

PUBLICATIONS

Book chapter (*: corresponding author):

[1] Chao-Yang Kuo, Shashank Keshavmurthy, Ya-Yi Huang, Min-Jay Ho, Heryni Justin Hsieh, An-Tzi Hsiao, Wei-Cheng Lo, Yi-Chia Hsin*, Chaolun Allen Chen*, 2023, “Transitional coral ecosystem of Taiwan in the era of changing climate”, editor(s): Takeuchi I, Coral Reef of the World: Transitional coral ecosystem in the East Asia, pp. 7-35, Cham: Springer.

Peer-reviewed papers (*: corresponding author, #: equal contribution):

- [32] Yi-Chia Hsin*, Tzu-Ling Chiang, Huang-Hsiung Hsu, 2024, “Projected North Equatorial Current/Countercurrent Towards an El Niño-Like Condition in the Western Pacific under Moderate and Worst-case CO₂ Emission Scenarios”, *JOURNAL OF CLIMATE*, 37(24), 6781-6796. (SCIE) (IF: 4.9; SCI ranking: 24.5%)
- [31] Mai-Han Ngo, Yi-Chia Hsin*, 2024, “Three-dimensional structure of temperature, salinity, and Velocity of the summertime Vietnamese upwelling system in the South China Sea on the interannual timescale”, *PROGRESS IN OCEANOGRAPHY*, 229, 103354. (SCIE) (IF: 4.1; SCI ranking: 11.1%)
- [30] Ya-Yi Huang, Ting-Ru Chen, Kim Phuong Lai, Chao-Yang Kuo, Ming-Jay Ho, Hernyi Justin Hsieh, Yi-Chia Hsin*, Chaolun A. Chen*, 2024, “Poleward migration of tropical corals inhibited by future trends of seawater temperature and calcium carbonate (CaCO₃) saturation”, *SCIENCE OF THE TOTAL ENVIRONMENT*, 929, 172562. (SCIE) (IF: 9.8; SCI ranking: 9.5%)
- [29]. Mai-Han Ngo, Yi-Chia Hsin*, 2021, “Impacts of Wind and Current on the Interannual Variation of the Summertime Upwelling Off Southern Vietnam in the South China Sea”, *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*, 126(6), e2020JC016892. (SCIE) (IF: 3.938; SCI ranking: 18.2%)
- [28]. Chia-Ying Ko*[#], Yi-Chia Hsin[#], Ming-Shiou Jeng*, 2020, “Global distribution and cleanup opportunities for macro ocean litter: a quarter century of accumulation dynamics under windage effects”, *Environmental Research Letters*, 15(10) 104063. (SCIE) (IF: 6.947; SCI ranking: 19.7%,13.8%).
- [27] Hon-Kit Lui*, Chen-Tung Arthur Chen, Wei-Ping Hou, Jian-Ming Liao, Wen-Chen Chou, You-Lin Wang, Chau-Ron Wu, Jay Lee, Yi-Chia Hsin, Yan-Yu Choi, 2020, “Intrusion of Kuroshio Helps to Diminish Coastal Hypoxia in the Coast of Northern South China Sea”, *Frontiers in Marine Science*, 7, 565952. (SCIE) (IF: 5.247; SCI ranking: 5.3%)
- [26]. Shang-Yin Vanson Liu*, Yi-Chia Hsin, Yu-Rong Cheng, 2020, “Using particle tracking and genetic approaches to infer population connectivity in the deep-sea scleractinian coral *Deltocyathus magnificus* in the South China Sea”, *Deep-Sea Research Part I*, 161, 103297. (SCI) (IF: 2.384; SCI ranking: 23.4%).
- [25]. Meng-Hua Yen*, Ding-Wei Liu, Yi-Chia Hsin, Chu-En Lin, Chii-Chang Chen*, 2019, “Application of the deep learning for the prediction of rainfall in Southern Taiwan”, *SCIENTIFIC REPORTS*, 9(1) , 12774. (SCI) (IF: 4.122; SCI ranking: 18.8%)
- [24]. Chau-Ron Wu*, Li-Chiao Wang, You-Lin Wang, Yong-Fu Lin, Tzu-Ling Chiang, Yi-Chia Hsin, 2019, “Coherent Response of Vietnam and Sumatra-Java Upwellings to Cross-Equatorial Winds”, *SCIENTIFIC REPORTS*, 9(1), 9650. (SCI) (IF: 4.122; SCI ranking: 18.8%)
- [23]. Chung-Che Wu, Chuan-Chou Shen*, Li Lo, Yi-Chia Hsin, Kefu Yu, Ching-Chih Chang, Doan Dinh Lam, Yu-Min Chou, Yi Liu, John Pallister, Sheng-Rong Song, Hong-Wei Chiang, George

- S. Burr, 2018, “Pinatubo Volcanic Eruption Exacerbated an Abrupt Coral Mortality Event in 1991 Summer”, *GEOPHYSICAL RESEARCH LETTERS*, 45, 12396-12402. (SCI) (IF: 4.253; SCI ranking: 7.4%)
- [22]. Tzu-Ling Chiang, Yi-Chia Hsin, Chau-Ron Wu*, 2018, “Multidecadal Changes of Upper-ocean Thermal Conditions in the Tropical Northwest Pacific Ocean versus South China Sea during 1960-2015”, *JOURNAL OF CLIMATE*, 31, 3999-4016. (SCI) (IF: 4.161; SCI ranking: 11.8%)
- [21]. Chia-Ying Ko*[#], Yi-Chia Hsin[#], Teng-Lang Yu, Kuo-Lieh Liu, Fuh-Kwo Shiah, Ming-Shiou Jeng*, 2018, “Monitoring multi-year macro ocean litter dynamics and backward-tracking simulation of litter origins on a remote island in the South China Sea”, *ENVIRONMENTAL RESEARCH LETTERS*, 13, 044021. (SCI) (IF: 4.404; SCI ranking: 10.9%)
- [20]. Xiaohua Li, Yi Liu*, Yi-Chia Hsin, Weiguo Liu, Zhengguo Shi, Hong-Wei Chiang, Chuan-Chou Shen, 2017, “Coral record of variability in the upstream Kuroshio Current during 1953-2004”, *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*, 122(8), 6936-6946. (SCI) (IF: 2.939; SCI ranking: 17.5%)
- [19]. Dawei Li, Tzu-Ling Chiang, Shuh-Ji Kao*, Yi-Chia Hsin, Li-Wei Zheng, Jin-Yu Terence Yang, Shih-Chieh Hsu, Chau-Ron Wu, Minhan Dai, 2017, “Circulation and oxygenation of the glacial South China Sea”, *JOURNAL OF ASIAN EARTH SCIENCES*, 138, 387-398. (SCI) (IF: 2.335; SCI ranking: 36.2%)
- [18]. Yi-Chia Hsin*, 2016, “Trends of the Pathways and Intensities of Surface Equatorial Current System in the North Pacific Ocean”, *JOURNAL OF CLIMATE*, 29(18), 6693-6710. (SCI) (IF: 4.161; SCI ranking: 11.8%)
- [17]. Tzu-Ling Chiang*, Chau-Ron Wu, Tangdong Qu, Yi-Chia Hsin, 2015, “Activities of 50–80 day subthermocline eddies near the Philippine coast”, *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*, 120, 3606-3623. (SCI) (IF: 2.711; SCI ranking: 17.2%)
- [16]. Yi-Chia Hsin*, 2015, “Multidecadal variations of the surface Kuroshio between 1950s and 2000s and its impacts on surrounding waters”, *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*, 120, 1792-1808. (SCI) (IF: 2.711; SCI ranking: 17.2%)
- [15]. Yan Bai*, Ting-Hsuan Huang, Xianqiang He, Shu-Lun Wang, Yi-Chia Hsin, Chau-Ron Wu, Weidong Zhai, Hon-Kit Lui, Chen-Tung Arthur Chen, 2015, “Intrusion of the Pearl River plume into the main channel of the Taiwan”, *JOURNAL OF SEA RESEARCH*, 95, 1-15. (SCI, SSCI) (IF: 2.921; SCI ranking: 53.1%)
- [14]. Chau-Ron Wu*, Yi-Chia Hsin, Tzu-Ling Chiang, Yong-Fu Lin, I-Fong Tsui, 2014, “Seasonal and interannual changes of the Kuroshio intrusion onto the East China Sea Shelf”, *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*, 119, 5039-5051. (SCI) (IF: 2.711; SCI ranking: 17.2%)

- [13]. Xianqiang He, Yan Bai, Chen-Tung Arthur Chen*, Yi-Chia Hsin, Chau-Ron Wu, Weidong Zhai, Zhiliang Liu, and Fang Gong, 2014, “Satellite views of the episodic terrestrial material transport to the southern Okinawa Trough driven by typhoon”, *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*, 119, 4490-4504. (SCI) (IF: 2.711; SCI ranking: 17.2%)
- [12]. Yi-Chia Hsin*, Bo Qiu, Tzu-Ling Chiang, Chau-Ron Wu, 2013, “Seasonal to interannual variations in the intensity and central position of the surface Kuroshio east of Taiwan”, *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*, 118, 4305-4316. (SCI) (IF: 2.711; SCI ranking: 17.2%)
- [11]. Yi-Chia Hsin*, Bo Qiu, 2012, “The impact of Eastern-Pacific versus Central-Pacific El Niños on the North Equatorial Countercurrent in the Pacific Ocean”, *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*, 117, C11017. (SCI) (IF: 2.711; SCI ranking: 17.2%)
- [10]. Chau-Ron Wu*, Yi-Chia Hsin, 2012, “The forcing mechanism leading to the Kuroshio intrusion into the South China Sea”, *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*, 117, C07015. (SCI) (IF: 2.711; SCI ranking: 17.2%)
- [9]. Yi-Chia Hsin*, Bo Qiu, 2012, “Seasonal fluctuations of the surface North Equatorial Countercurrent (NECC) across the Pacific basin”, *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*, 117, C06001. (SCI) (IF: 2.711; SCI ranking: 17.2%)
- [8]. Yi-Chia Hsin, Chau-Ron Wu*, Shenn-Yu Chao, 2012, “An updated examination of the Luzon Strait transport”, *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*, 117, C03022. (SCI) (IF: 2.711; SCI ranking: 17.2%)
- [7]. Yi-Chia Hsin, Tzu-Ling Chiang, Chau-Ron Wu*, 2011, “Fluctuations of the thermal fronts off northeastern Taiwan”, *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*, 116, C10005. (SCI) (IF: 2.711; SCI ranking: 17.2%)
- [6]. Yi-Chia Hsin, Tangdong Qu, Chau-Ron Wu*, 2010, “Intra-seasonal Variation of the Kuroshio southeast of Taiwan and its possible forcing mechanism”, *OCEAN DYNAMICS*, 60, 1293-1306. (SCI) (IF: 1.575; SCI ranking: 59.4%)
- [5]. Lie-Yauw Oey, Yi-Chia Hsin, Chau-Ron Wu*, 2010, “Why does the Kuroshio northeast of Taiwan shift shelfward in winter?”, *OCEAN DYNAMICS*, 60, 413-426. (SCI) (IF: 1.575; SCI ranking: 59.4%)
- [4]. Chau-Ron Wu*, Yu-Lin Chang, Lie-Yauw Oey, C.-W. June Chang, Yi-Chia Hsin, 2008, “Air-sea interaction between Tropical Cyclone Nari and Kuroshio”, *GEOPHYSICAL RESEARCH LETTERS*, 35, L12605. (SCI) (IF: 4.339; SCI ranking: 5.8%)
- [3]. Yi-Chia Hsin, Chau-Ron Wu*, Ping-Tung Shaw, 2008, “Spatial and Temporal Variations of the Kuroshio East of Taiwan, 1982-2005: A numerical study”, *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*, 113, C04002. (SCI) (IF: 2.711; SCI ranking: 17.2%)

- [2]. Shuh Ji Kao*, Chau-Ron Wu, Yi-Chia Hsin, Minhan Dai, 2006, "Effects of sea level change on the upstream Kuroshio Current through the Okinawa Trough", *GEOPHYSICAL RESEARCH LETTERS*, 33, L16604. (SCI) (IF: 4.339; SCI ranking: 5.8%)
- [1]. Chau-Ron Wu*, Yi-Chia Hsin, 2005, "Volume transport through the Taiwan Strait: a numerical study", *TERRESTRIAL ATMOSPHERIC AND OCEANIC SCIENCES*, 16(2), 377-391. (SCI) (IF: 0.543; SCI ranking: 90.6%)