

Curriculum Vitae

Last update: Jan., 2025

Yi-Ying Chen 陳奕穎

Associate Research Fellow

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EMPLOYMENT

2024-May ~ Present Associate Research Fellow, RCEC, AS, Taiwan

Adjunct Associate Professor, Dept. Land Economics, NCCU, Taiwan

2016-Aug ~ 2024-Apr Assistant Research Fellow, RCEC, Academia Sinica, Taiwan

2016-Apr ~ 2016-Jul Post-Doc., National Central Univ., Taiwan

2015-Aug ~ 2016-Mar Post-Doc., National Univ. of Singapore, Singapore

2014-Jan ~ 2015-Jul Post-Doc/Research Engineer, IPSL-LSCE, CEA, France

2012-Aug ~ 2013-Dec Post-Doc., National Central Univ., Taiwan

EDUCATION

2007-Sep ~ 2012-Aug Ph.D. Inst. Hydro/Oceanic Sci., National Central Univ., Taiwan

2002-Sep ~ 2004-Aug M.S. Inst. Hydro. Sci., National Central Univ., Taiwan

1998-Sep ~ 2002-Aug B.S. Dept. of Hydraulic Eng., Feng-Chia Univ. Taiwan

HONORS & AWARDS

Annual Research Highlight (2024), RCEC, AS

Outstanding Review Award (2022), *Terrestrial Atmospheric and Oceanic Sciences*

TWAS Young Affiliates Nominations (2020), TWAS

Annual Research Highlight (2019), RCEC, AS

Outstanding Review Award (2018), *Journal of Hydrology*

The Phi Tau Phi Scholastic Honor (2012), R.O.C.

Dean List, College of Earth Science (2012), National Central Univ.

ACADEMIC SERVICE

Committee: AsiaFlux Science Committee Observer (2024 ~ present)

Scientific Committee of 10th IUFRO Wind and Trees Conference, IUFRO (2023)

Editor: IUFRO 10th Wind and Trees Conference, *Forest Ecology and Management* (Guest); Living with Tropical Storms in a Changing Climate, *Frontiers in Forests and Global Change* (Guest)

Reviewer: *Frontiers in Water*, Review Editor in *Water and Climate*, 2020 ~ present

Frontiers in Forests and Global Change, Review Editor in *Forest disturbance*, 2018 ~ present

Geoscientific Model Development · *Biogeoscience* · *Journal of Geophysical Research-Atmos* · *Water* · *Forests* · *Terrestrial, Atmospheric and Oceanic Sciences – Hydro.* · *Nature Communication* · *Journal of Hydrology* · *Theoretical and Applied Climatology* · *Forest Ecology and Management* · *Frontiers in Forests and Global Change*

RESEARCH INTERESTS

Land surface processes, Environmental disturbances, and Climate change

RESEARCH HIGHLIGHTS

Yi-Ying Chen, PI

Forest Responses to Extreme Events: Changes in forest leaf area in East Asia were estimated by analyzing cyclone tracks, climate data, and satellite-based measurements of leaf area. Sixty days after a cyclone, about 15% of them caused a decrease in leaf area, while 50% showed no change. Surprisingly, nearly a third of the cyclones led to an increase (or a smaller decrease) in leaf area. Further analysis showed that cyclones bringing abundant rain towards the end of summer could ease water stress for vegetation within the cyclone's path. Meanwhile, vegetation outside the path might still struggle until the next wet season. This finding challenges the view of cyclones as purely destructive forces, suggesting they can also have minimal or even positive effects on forest growth [9]. Droughts, however, can disrupt forests, turning them from carbon sinks to carbon sources. Monitoring groundwater levels via satellite can give a 1 to 2-month warning for emissions [4]. It is recommended to select drought-resistant tree species for future forest management strategies, to plan firebreaks, and to simultaneously monitor forest net ecosystem exchanges as adaptive measures to cope with climate change.

Simulating the Wind Damage to Forests: Abrupt increases in tree mortality due to wind disturbance have been added to an Earth system model [10, 21]. A new module calculated the critical wind speeds for stem-break and overturning by developing numerically efficient solutions to deal with landscape heterogeneity i.e., accounts for newly established forest edges for the parameterization of gusts; (2) downscaling spatially and temporally aggregated wind fields to obtain more realistic wind speeds that would represent gusts; and (3) downscaling storm damage within the 2,500 km² pixels. This new module was parameterized and was tested over Sweden. The new model version can capture the dynamics of forest structure due to storm disturbance on the regional scale. Model parameters for various tree species are expected to be refined by using a Pan-Europe wind disturbance dataset. The new model is also applied to studying the impact of various environmental disturbances including land management on forest biomass change in Taiwan [14].

Reconstructing Taiwan's land-use/land-cover changes: A new reconstitution of Taiwan's land cover changes and its uncertainty between 1904 and 2015 is presented [20]. The reconstruction which integrates geographical information from historical maps and satellite images from SPOT is spatially explicit with a 500 m by 500 m resolution and distinguishes six land cover classes: forests, grasslands, agriculture land, inland water, built-up, and bare soil. This type of information is essential to quantifying the contribution of climate warming from land cover changes by making use of a modeling approach [27, 28], which is also in line with the large-scale land cover reconstruction in Europe [29]. The new land cover reconstruction is thus expected to contribute to future revisions of global land cover reconstructions as well as to studies of (gross) land cover changes, the carbon budget, regional climate, urban heat islands, and air and water pollution at the national level. Our lab. continuous update of the dataset by using a novel algorithm based on the satellite-derived phenology changes [5].

PUBLICATIONS (*Corresponding author)

1. Shih, Ching-Hung, Lo, Min-Hui*, Anderson, Ray G., Skaggs, Todd. H., Juang, Jehn-Yih, **Chen, Yi-Ying**, Jang, Yi-Shin, Gu, Rong-Yu Gu, and Cho-Ying Huang, 2025, “Challenges and limitations of applying the flux variance similarity (FVS) method to partition evapotranspiration in a montane cloud forest” (*Agricultural and Forest Meteorology*, accepted)
2. Demeke, Girum, Huang*, Jr-Chuan, and **Yi-Ying Chen**, 2024, “Runoff Generation Signaled by Deviations from the Budyko Framework”, (*Water Resources Management*, accepted)
3. Chang, Chih-Yua, Wang, Jia-Lin, Chen, Yen-Chen, Chen, Wei-Nai, Wang, Sheng-Hsiang, Chuang, Ming-Tung, Lin, Neng-Huei, Chou, Charles C.-K., Huang, Wei-Syun, Ke, Li-Jin, Pan, Xiang-Xu, Ho, Yu-Jui, **Chen, Yi-Ying**, and Chih-Chung Chang*, 2024, “Spatiotemporal characterization of PM_{2.5}, O₃, and trace gases associated with East Asian continental outflows via drone sounding”, *Science of The Total Environment*: 172732.
4. Tsai, I-C., Yang, S.-W., Shiu, C.-J.*, **Chen, Yi-Ying**, Lee, W.-L., and H.-H. Hsu, 2024, “Impacts of Aerosols on the East Asia Winter Monsoon in TaiESM Model”, *International Journal of Climatology*, doi: 10.1002/joc.8483
5. Chuang, Ming-Tung*, Chou, Charles C.-K., Lee, Chung-Te, Lee, Ja-Huai, Lin, Wei-Che, Lin, Chuan-Yao, Chen, Wei-Nai, **Chen, Yi-Ying**, and Kai-Hsien Chi, 2024, “Characteristics and impacts of fine particulates from the largest power plant plume in Taiwan”, *Atmospheric Pollution Research*, 102076.
6. **Chen, Yi-Ying**, S.-Y. Simon Wang, Yu, Hong-Wen, and Wan-Yu Liu*, 2024, “When Forests Hold Their Breath: Will Increasing Drought Further Disrupt Carbon Sequestration?” *Environmental Research Letter*, 19, 3. [link](#)
7. Lin, Meng-Hsuan, Lin, Ying-Tong, Tasi, Min-Lin, **Chen, Yi-Ying***, Chen, Yi-Chun, Wang, Hsueh-Ching, and Chi-Kuei Wang, 2024, “Mapping Land-Use and Land-Cover Changes Through the Integration of Satellite and Airborne Remote Sensing Data”, *Environmental Monitoring and Assessment*, [link](#)
8. Getahun, S. Y.*, Li, M.-H., **Chen, Yi-Ying**, and T. A. Yate, 2023, “Drought Characterization and Severity Analysis Using GRACE-TWS and MODIS Datasets: A Case Study from the Awash River Basin (ARB), Ethiopia”, *Journal of Water and Climate Change*, 14 (2): 516–542.
9. Wu, C.-H.*, Lee, S.-Y., Tsai, I-C., Shiu, C.-J., and **Yi-Ying Chen**, 2023, “Volcanic Contribution to the 1990s North Pacific Climate Shift in Winter”, *Scientific Reports*, 5672.
10. Wu, C.-H.*, Shiu, C.-J., **Chen, Yi-Ying**, Tsai, I-C., and S.-Y. Lee, 2023, “Climatological Changes in East Asian Winter Monsoon Circulation in a Warmer Future”, *Atmospheric Research*, 284, 106593.
11. **Chen, Yi-Ying*** and Sebastiaan Luyssaert, 2023, “Tropical Cyclones Facilitate Recovery of Forest Leaf Area from Dry Spells in East Asia”, *Biogeosciences (BG Letters)*, 20, 349–363. **Journal Highlight Paper** [link](#)
12. Gardiner, B.*, **Chen, Yi-Ying**, Ruel, J.-C., and K. Kamimura, 2022, “Editorial: Living with Tropical Storms in a Changing Climate”, *Frontiers in Forests and Global Change*, 5, 988875.
13. Yang, T.-Y., Huang, C.-Y., Juang, J.-Y., **Chen, Yi-Ying**, Cheng, C.-T. and Min-Hui Lo*, 2022, “Responses of Surface Evaporative Fluxes in Montane Cloud Forests to the Climate Change Scenario”, *Journal of Hydrometeorology*, 23(11), 1789–1805.
14. Jhang, S.-R., **Chen, Yi-Ying**, Shiau, Yo-Jin, Lee, Chia-Wei, Chen, Wei-Nai, Chang, C.-C., Chiang, C.-F., Guo, Horng-Yuh, Wang, P-K, Chou, Charles C.-K.*, 2022, “Composition of Denitrifiers and High Nitrous Oxide Emissions from a Typical Subtropical Vegetable Cropland”, *ACS Earth and Space Chemistry*, 6, 8, 2024–2031. **Journal Cover Story** [link](#)
15. Chuang, M.-T.*, Chou, Charles C.-K., Lin, C.-Y., Lee, J.-H., Lin, W.-C., **Chen, Yi-Ying**, Chang, C.-C., Lee, C.-T., Kong, Steven S-K, and Lin, Tang-Huang, 2022, “A Numerical Study of Reducing O₃ and PM_{2.5} Simultaneously in Taiwan”, *Journal of Environmental Management*, 318, 115614.

16. **Chen, Yi-Ying***, Huang, W., Cheng, C-T, Hong, J-S, Yeh, F-L, Luyssaert, S., 2022, “Simulation of the Impact of Environmental Disturbances on Forest Biomass in Taiwan”, *JGR-Biogeosciences*, 127(3), e2021JG006519. [link](#)
17. Gu, R.-Y., Lo, Min-Hui*, Liao, Chi-Ya, Jang, Yi-Shin, Juang, Jehn-Yih, Huang, Cho-Ying, Chang, Shih-Chieh, Hsieh, Cheng-I, **Chen, Yi-Ying**, Chu, Housen, Chang, Kuang-Yu, 2021, “Early Peak of Latent Heat Fluxes Regulates Diurnal Temperature Range in Montane Cloud Forests”, *Journal of Hydrometeorology*, 22(9), 2475–2487.
18. Wu, C.*, Yeh, PJF **Chen, Yi-Ying**, Lv, W, Hu, BX, Huang, G, 2021, “Copula-based Risk Evaluation of Global Meteorological Drought in the 21st Century Based on CMIP5 Multi-model Ensemble Projections”. *Journal of Hydrology*, 126256.
19. Wu, C.*, Yeh, Pat J-F, Ju, Jiali, **Chen, Yi-Ying**, Xu, Kai, Dai, Heng, Niu Jie, Hu, Bill, Huang, Guoru, 2021, “Assessing the Spatiotemporal Uncertainties in Future Meteorological Droughts from CMIP5 Models, Emission Scenarios, and Bias Corrections”, *Journal of Climate*, 1903-1922.
20. Wu, C.*, Yeh, Pat J.-F., **Chen, Yi-Ying**, Hu Bill X., Huang, G., 2020, “Future Precipitation-driven Meteorological Drought Changes in the CMIP5 Multi-model Ensembles under 1.5 °C and 2 °C Global Warming”, *Journal of Hydrometeorology*, 2177-2196.
21. Forzieri, G.*, Pecchi, M., Girardello, M., Mauri, A., Klaus, M., Nikolov, C., Rüetschi C., Gardiner, B., Tomaščík, J., Small, D., Nistor, C., Jonikavicius, D., Spinoni, J., Feyen, L., Giannetti, F., Comino, F., Wolynski, A., Pirotti, F., Maistrelli, F., Ionut, S., Wurpillot-Lucas, S., Stefan, K., Zieba-Kulawik, K., Strejczek-Jazwinska, P., Mokroš, M., Franz, S., Krejci, L., Haidu, I., Nilsson, M., Wezyk, P., Catani, F., **Chen, Yi-Ying**, Luyssaert, S., Chirici, G., Cescatti, A., S.A.Beck, P, 2020, “A Spatially-Explicit Database of Wind Disturbances in European Forests over the Period 2000-2018”, *Earth System Science Data*, 12, 257–276.
22. **Chen, Yi-Ying***, Huang, W., Wang, W.-H., Juang, J.-Y., Hong, J.-S., Kato, T., Luyssaert, S., 2019, “Reconstructing Taiwan’s Land Cover Changes between 1904 and 2015 from Historical maps and SPOT Images”, *Scientific Reports*, 3643. [link](#)
23. **Chen, Yi-Ying***, Gardiner, B., Pasztor, F., Blennow, K., Ryder, J., Valade, A., Naudts, K., Otto, J., McGrath, J. M., Planque, C., Luyssaert, S., 2018, “Simulating Damage for Wind Storms in the Land Surface Model ORCHIDEE-CAN (revision 4262)”, *Geoscientific Model Development*, 11, 771-791. [link](#)
24. Luyssaert, S.*, Marie, G., Valade, A., **Chen, Yi-Ying**, Djomo, S.N., Ryder, J., Otto, J., Naudts, A., Lansø, A.S., Ghattas, J., McGrath, J. M. 2018, “Trade-offs in Using European Forests to Meet Climate Objectives”, *Nature*, 562, 259-262. [link](#)
25. McGrath, J. M.*, Ryder, J., Pinty, B., Otto, J., Naudts, K., Valade, A., **Chen, Yi-Ying**, Weedon, J., Luyssaert, S., 2016, “A Multi-level Canopy Radiative Transfer Scheme for ORCHIDEE (SVN r2566), Based on a Domain-Averaged Structure Factor”, *Geoscientific Model Development Discussions*, 249-2016.
26. Ryder, J.*, Polcher, J., Peylin, P., Ottlé, C., **Chen, Yi-Ying**, van Gorsel, E., Haverd, V., McGrath, M. J., Naudts, K., Otto, J., Valade, A., Luyssaert, S., 2016, “A Multi-layer Land Surface Energy Budget Model for Implicit Coupling with Global Atmospheric Simulations”, *Geoscientific Model Development*, 9, 223-245.
27. Naudts, K.*, **Chen, Yi-Ying**, McGrath, M., Ryder, J., Aude, V., Juliane, O., Luyssaert, S., 2016, “Europe’s Forest Management did not Mitigate Climate Warming”, *Science*, 351(6273), 597-600.
28. **Chen, Yi-Ying*** and Ming-Hsu Li, 2016, “Quantifying Rainfall Interception Loss of a Subtropical Broadleaved Forest in central Taiwan”, *Water*, 8(1), 14, 1-19
29. **Chen, Yi-Ying***, Ryder, J., Bastrikov, V., McGrath, M. J., Naudts, K., Otto, J., Ottlé, C., Peylin, P., Polcher, J., Valade, A., Black, A., Elbers, J. A., Moors, E., Foken, T., van Gorsel, E., Haverd, V., Heinesch, B., Tiedemann, F., Knohl, A., Launiainen, S., Loustau, D., Ogée, J., Vesala, T., Luyssaert, S., 2016, “Evaluating the Performance of the Land Surface Model ORCHIDEE-CAN v1.0 on Water

and Energy Fluxes Estimation with a Single- and Multi-layer Energy Budget Scheme”, *Geoscientific Model Development*, 9, 2951-2972. [link](#)

30. Naudts, K.*, Ryder, J., J. McGrath, M., Otto, J., **Chen, Yi-Ying**, Valade, A., Bellasen, V., Berhongaray, G., Bönisch, G., Campioli, M., Ghattas, J., De Groote, T., Haverd, V., Kattge, J., MacBean, N., Maignan, F., Merilä, P., Penuelas, J., Peylin, P., Pinty, B., Pretzsch, H., Schulze, E. D., Solyga, D., Vuichard, N., Yan, Y., Luyssaert, S., 2015, “A Vertically Discretized Canopy Description for ORCHIDEE (SVN r2290) and the Modifications to the Energy, Water and Carbon Fluxes”, *Geoscientific Model Development*, 8, 2035-2065. [link](#)
31. McGrath, J. M.*, Luyssaert, S., Meyfroidt, P., Kaplan, J. O., Buergi, M., **Chen, Yi-Ying**, Erb, K., Gimmi, U., McInerney, D., Naudts, K., Otto, J., Pasztor, F., Ryder, J., Schelhaas, M.-J., Valade, A., 2015, “Reconstructing European Forest Management from 1600 to 2010”, *Biogeosciences*, 12, 4291-4316. [link](#)
32. **Chen, Yi-Ying** and M.-H. Li*, 2012, “Determining Adequate Averaging Periods and Reference Coordinates for Eddy Covariance Measurements of Surface Heat and Water Vapor Fluxes over Mountainous Terrain”, *Terrestrial Atmospheric and Oceanic Sciences*, 23(6), 685-701.
33. **Chen, Yi-Ying**, Chu, C.-R., Li, M.-H.*, 2012, “A Gap-filling Model for Eddy Covariance Latent Heat Flux: Estimating Evapotranspiration of a Subtropical Seasonal Evergreen Broad-Leaved Forest as an Example”, *Journal of Hydrology*, 468-269, 101-110.
34. Chu, C.-R.*, Li, M.-H., Chang, Y.-F., Liu, T.-C., **Chen, Yi-Ying**, 2012, “Wind-Induced Splash in Class A Evaporation Pan”, *Journal of Geophysical Research*, 117(D11), 2156-2202.
35. Chu, C.-R.*, Li, M.-H., **Chen, Yi-Ying**, Kuo, Y.-H., 2010, “A Wind Tunnel Experiment on the Evaporation Rate of Class A pan”, *Journal of Hydrology*, 381(3-4), 221-224.

Book Chapter/Dissertation/Thesis:

1. Matthew, J. M.*, Lansø, A.S., Marie, G., **Chen, Yi-Ying**, Kalliofski, T., Luyssaert, S., Naudts, K., Peylin, P., Valade, A., 2019, Advances in understanding forestry ecosystem services: role in carbon capture (CH6), editor(s): John Stanturf, *Achieving sustainable management of boreal and temperate forests*.
2. **Chen, Yi-Ying***, *Investigating the Seasonal Variability of Surface Heat and Water Vapor Fluxes with Eddy Covariance Techniques: A Subtropical Evergreen Forest as an example*, 2012, Dissertation (Doctoral), Supervisor: Prof. Min-Hsu Li.

International Forum/Conference/Talks

- 2023-Jun, “Tropical cyclones facilitate recovery of forest leaf area from dry spells in East Asia”, 10th Wind and Trees Conference, Castelfranco Veneto, Italy
- 2022-Oct, “Sensor Deployment and Link Analysis in Satellite IoT Systems for Wildfire Detection”, IEEE GLOBECOM, online Conference
- 2021-Oct, “Sensor-Based Satellite IoT for Early Wildfire Detection”, IEEE GLOBECOM 2021, Online Conference
- 2020-Mar, “Emissions of reactive nitrogen species due to fertilization: the experimental design and the result of N-fluxes”, short discussions, TARI, Taiwan
- 2020-Feb, “Forest vegetation response to typhoon activities in Eastern Asia”, IUFRO 9th International Conference on Wind and Trees, Rotorua, New Zealand (Invited talk)
- 2019-Dec, “A journey of finding atlas of Taiwan”, NCU, Taiwan (in Chinese)
- 2019-Nov, “Wind risk in a changing climate: modeling and observation”, Conference for the 10th anniversary of NCAM, Seoul, South Korea (Keynote speech)
- 2019-Aug, “Land surface model development in the Earth system model”, AS, Taiwan
- 2019-Otc, “Emissions of reactive nitrogen species due to fertilization and its impacts to air quality Flux Observation System”, NTHU, Taiwan
- 2019-Otc, “Introduction of Taiwan land cover reconstruction, biomass evaluation & vegetation responses

to extremes (Typhoon/Frost/ENSO)", NTU, Taiwan
 2019-Sept, "Numerical schemes for solving surface temperature in the land surface model", NTU, Taiwan
 2019-Mar, "Taiwan land cover reconstruction & applications", NTOU, Taiwan
 2018-Dec, "Simulating damage for wind storms in the land surface model", NTU, Taiwan
 2018-Sept, "Land surface model development in the Earth system model", AS, Taiwan
 2018-May, "Simulating the storm damage to forests in Earth System Models", NCU, Taiwan
 2018-May, "Taiwan land cover map reconstruction & estimation of above-ground biomass in Taiwanese forest stands", NTU, Taiwan

TEACHING EXPERIENCE

Human History/Activities and Global Land-Use/Land-Cover Changes
 (Fall 2021, 2022, 2023, 2024, NCCU Campus; Summer 2023, TIGP-AS Campus)
Global Hydrology Cycle (2021, 2022, TIGP-AS Campus, surface hydrology lecture)
Anthroposphere and Sustainability (2022, TIGP-AS Campus, topic lecture)
Seminar (2021, 2022, 2023, 2024 TIGP-AS Campus)

MEMBERSHIP

Global Land Programme/Future Earth, AsiaFlux, AGU, EGU

LAB. MEMBER/STUDENT

Nhut Cong Mai (PhD Student, 2024-present), AS-NTU, TIGP co-supervised with Prof. M.-H. Lo
 Yu-Ting Shih 施郁庭 (PostDoc, 2023-present) co-supervised with Dr./Prof. C.-K. Chou
 Wei-Hung Wang 王偉宏 (RA, 2023-present), Net-zero co-supervised with Dr./Prof. C.-K. Chou
 Yao-Wen Lee 李曜玢 (RA, 2023-present), Bamboo co-supervised with Dr./Prof. S.-Y. Lee
 Amba Shalishe (PhD Student, 2022-present), AS-NCU, TIGP co-supervise with Prof. Y.-A. Liou

ALUMNI

Panithan Frank SW (2024, AS-IIP) now at Univ. of Twente, ITC, the Netherlands, M.Sc.
 Jericho Mascariña (2023, AS-IIP) now at Univ. of the Philippines Baguio, Dept. Physical Sci., M.Sc.
 Yi-Ru Liang 梁奕如 (2022 RCE-IIP) now at Cartography, M.Sc. under Erasmus+ program, EU
 Yang-Ru Lee 李泱儒 (2022 RCEC-IIP) now at NCKU, M.Sc.
 Ping-Yu Chen 陳品妤 (2022 RCEC IIP) now at Dept. of Geography, Univ. College London
 Vivian M.-H. Lin 林孟萱 (2021-2022) now at Georgia Tech, M.Sc.
 Wei-Hung Wang 王偉宏 (2017-2022) now at RCEC, Net-zero Project
 Wei Huang 黃歲 (2017-2022) now at EnSense Tech., Cloud Engineer
 Ying-Tong Lin 林穎東 (2021-2021) now at University of Durham, Ph.D.
 Fang-Li Yeh 葉芳利 (2020-2021) now at TCCIP NCDR, Research Associate