

# Curriculum Vitae

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Assistant Research Fellow

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## EMPLOYMENT

2016-Aug – present	Assistant Research Fellow	RCEC, Academia Sinica, Taiwan
2016-Apr – 2016-Jul	Post-Doctoral Researcher	National Central Univ., Taiwan
2015-Aug – 2016-Mar	Post-Doctoral Researcher	National Univ. of Singapore, Singapore
2014-Jan – 2015-Jul	Post-Doctoral Researcher	LSCE/IPSL, CEA, France
2012-Aug – 2013-Dec	Post-Doctoral Researcher	National Central Univ., Taiwan

## EDUCATION

2007-Sep – 2012-Aug	Ph.D.	Graduate Institute of Hydrological and Oceanic Sciences, National Central Univ., Taiwan
2002-Sep – 2004-Aug	M.S.	Institute of Hydrological Sciences, National Central Univ., Taiwan
1998-Sep – 2002-Aug	B.S.	Department of Hydraulic Engineering, Feng-Chia Univ., Taiwan

## HONORS & AWARDS

Nominations for TWAS Young Affiliates (2020)

Annual Research Highlight (2019), RCEC, AS

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

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

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

International Conference Travel Grant (2009 & 2011), National Science Council

Doctoral Degree Scholarship (2007), National Central Univ.

## ACADEMIC SERVICE

### Editorial board/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* · *Biogeosciences* · *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**

**Reconstructing Taiwan's land cover changes:** A new reconstitution of Taiwan's land cover changes and its uncertainty between 1904 and 2015 is presented <sup>[14]</sup>. The reconstruction which integrates geographical information from historical maps and satellite images from SPOT is spatially explicit with a 500 x 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 <sup>[12]</sup>, which is also in line with the large scale land cover reconstruction in Europe <sup>[5]</sup>. 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 <sup>[17]</sup>, regional climate, urban heat islands, and air and water pollution at the national level.

**Simulating the storm damage to forests:** Abrupt increases in tree mortality due to wind disturbance have been added into an Earth system model <sup>[13]</sup>. A new module calculated the critical wind speeds for stem-break and overturning by developing numerically efficient solutions to deal with (1) landscape heterogeneity, i.e. account 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 km<sup>2</sup> 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 <sup>[15]</sup>. The new model is also used to study atmospheric feedbacks due to land management and environmental disturbances in a changing climate.

**PUBLICATIONS (\*: corresponding author, underline: three representative articles: 12<sup>th</sup> – 14<sup>th</sup>)**

### **Manuscripts**

[18]. **Chen, Yi-Ying\*** & S. Luyssaert, Vegetation responses to typhoon activities in East Asia (draft)

[17]. **Chen, Yi-Ying\***, Huang, W., Cheng, C.-T., and J.-S. Hong, and S. Luyssaert, Taiwan forest ecosystem responses to environmental disturbances (to be submitted)

**Peer-reviewed papers (Total Citations ▲ : 582 & H-index=9)**

- [16]. 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*, in press (IF=4.767, Q1) ▲:0
- [15]. Forzieri, G\*, Pecchi, M., Girardello, M., Mauri, A., Klaus, M., Nikolov, C., Rüetschi C., Gardiner, B., Tomaštk, 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**, Luysaert, 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. (IF: 9.612; SCI ranking: Q1) ▲: 2
- [14]. **Chen, Yi-Ying\***, Huang, W., Wang, W.-H., Juang, J.-Y., Hong, J.-S., Kato, T., Luysaert, S., 2019, “Reconstructing Taiwan’s land cover changes between 1904 and 2015 from historical maps and SPOT images”, *Scientific Reports*, 3643. (IF: 4.576; SCI ranking: Q1) ▲:9
- [13]. **Chen, Yi-Ying\***, Gardiner, B., Pasztor, F., Blennow, K., Ryder, J., Valade, A., Naudts, K., Otto, J., McGrath, J. M., Planque, C., Luysaert, S., 2018, “Simulating damage for wind storms in the land surface model ORCHIDEE-CAN (revision 4262)”, *Geoscientific Model Development*, 11, 771-791. (IF: 5.768; SCI ranking: Q1) ▲:6
- [12]. Luysaert, 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. (IF: 46.486; SCI ranking: Q1) ▲:53
- 2012-2016 (Postdoctoral Researcher)**
- [11]. **Chen, Yi-Ying\***, Ryder, J., Bastrikov, V., McGrath, M. J., Naudts, K., Otto, J., Otlé, 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., Luysaert, 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. (IF: 5.768; SCI ranking: Q1) ▲:10
- [10]. McGrath, J. M.\*, Ryder, J., Pinty, B., Otto, J., Naudts, K., Valade, A., **Chen, Yi-Ying**, Weedon, J., Luysaert, 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. ▲:6
- [9]. Naudts, K.\*, **Chen, Yi-Ying**, McGrath, M., Ryder, J., Aude, V., Juliane, O., Luysaert, S., 2016, “Europe’s forest management did not mitigate climate warming”, *Science*, 351(6273), 597-600. (IF: 44.372; SCI ranking: Q1) ▲:226
- [8]. Ryder, J.\*, Polcher, J., Peylin, P., Otlé, C., **Chen, Yi-Ying**, van Gorsel, E., Haverd, V., McGrath, M. J., Naudts, K., Otto, J., Valade, A., Luysaert, S., 2016, “A multi-layer land surface energy

budget model for implicit coupling with global atmospheric simulations”, *Geoscientific Model Development*, 9, 223-245. (IF: 5.768; SCI ranking: Q1) ▲:25

- [7]. **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 (IF: 2.709; SCI ranking: Q1) ▲:15
- [6]. 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 Groot, 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., Luysaert, 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. (IF: 5.768; SCI ranking: Q1) ▲:51
- [5]. McGrath, J. M.\*, Luysaert, 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. (IF: 4.194; SCI ranking: Q1) ▲:94

#### **Before 2012 (PhD Study)**

- [4]. **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. (IF: 0.78; SCI ranking: Q3) ▲:5
- [3]. **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. (IF: 5.080; SCI ranking: Q1) ▲:19
- [2]. 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. (IF: 4.349, SCI ranking: Q1) ▲:9
- [1]. 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. (IF: 5.080; SCI ranking: Q1) ▲:32

#### **Book Chapter/Dissertation/Thesis:**

Matthew, J. M.\*, Lansø, A.S., Marie, G., **Chen, Yi-Ying**, Kalliofski, T., Luysaert, 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*. ▲:1

**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. ▲:2

**Chen, Yi-Ying\***, *The Research of Developing the Retrieval Algorithm of Sensible and Latent Heat Fluxes from Remote Sensing Dataset*, 2004, Thesis (Master), Supervisor: Prof. Yuei-An Liou.  
▲:17

**RESEARCH PROJECTS** (papers associated with the project [number]):

- 2020-Aug – 2023-Jul **PI** (MOST 109WIA0110450, **approved**) *Coupling a new generation land surface model to a high-resolution atmospheric model (1/3).*
- 2020-Aug – 2023-Jul **PI** (MOST 109WIA0110451, **approved**) *Reconstructing the dynamics of land cover change between agriculture land and built-up land for accessing the surface carbon stock and water storage (1/3).*
- 2021-Jan – 2023-Dec **Subproject-PI** (AS thematic research program, **under review**) *Scales of climate response to volcanic eruptions, Subproject #3 simulating the impact of volcanic eruptions on terrestrial C-budget.*
- 2019-Aug – 2020-Jul **PI** (MOST 108-2111-M-001-001) *Applications of HiRAM in the studies of understanding the forest area affected by wind disturbance and the atmospheric feedback introduced by storms. [17, 18]*
- 2017-Jan – 2019-Jul **PI** (MOST 106-2111-M-001-001-MY3) *Consequences of extreme events (Typhoons and Droughts) on terrestrial hydrological cycles and carbon sequestration of the forest ecosystem. [12, 13, 14, 15]*
- 2019-Jan – 2021-Dec **Co-PI** (AS-SS-108-01) *Emissions of reactive nitrogen species due to fertilization and its impacts to air quality, Subproject #1: Flux of reactive N-species from N-fertilized soil to the atmosphere.*
- 2019-Aug – 2020-Jul **Co-PI** (MOST 108-2116-M-008-003) *Studying effects of evapotranspiration and precipitation on hydrological cycles of forest and grassland.*
- 2018-Aug – 2019-Jul **Co-PI** (MOST 107-2116-M-0 08-002) *On the complementary theory to estimate actual evapotranspiration over grass and forest with different temporal scales. [7]*
- 2010-Feb – 2015-Otc **Post-Doctoral Researcher** (ERC-242564) *Do forests cool the Earth? [5, 6, 8, 9, 10, 11, 12]*

**Seminar/Conference/Invited Talk/Keynote Speech** (from 2016 ~ present):

1. 2020-Mar, “Emissions of reactive nitrogen species due to fertilization: the experimental design and the result of N-fluxes”, short discussions, TARI, Taiwan
2. 2020-Feb, “Forest vegetation response to typhoon activities in Eastern Asia”, IUFRO 9<sup>th</sup> International Conference on Wind and Trees, Rotorua, New Zealand (**Invited talk**)

3. 2019-Dec, “A journey of finding atlas of Taiwan”, NCU, Taiwan (in Chinese)
4. 2019-Nov, “Wind risk in a changing climate: modeling and observation”, Conference for the 10<sup>th</sup> anniversary of NCAM, Seoul, South Korea (**Keynote speech**)
5. 2019-Aug, “Land surface model development in the Earth system model”, AS, Taiwan
6. 2019-Otc, “Emissions of reactive nitrogen species due to fertilization and its impacts to air quality Flux Observation System”, NTHU, Taiwan
7. 2019-Otc, “Introduction of Taiwan land cover reconstruction, biomass evaluation & vegetation responses to extremes (Typhoon/Frost/ENSO)”, NTU, Taiwan
8. 2019-Sept, “Numerical schemes for solving surface temperature in the land surface model”, NTU, Taiwan
9. 2019-Mar, “Taiwan land cover reconstruction & applications”, NTOU, Taiwan
10. 2018-Dec, “Simulating damage for wind storms in the land surface model”, NTU, Taiwan
11. 2018-Sept, “Land surface model development in the Earth system model”, AS, Taiwan
12. 2018-May, “Simulating the storm damage to forests in Earth System Models”, NCU, Taiwan
13. 2018-May, “Taiwan land cover map reconstruction & estimation of above-ground biomass in Taiwanese forest stands”, NTU, Taiwan
14. 2018-Apr, “Land surface temperature responses to the wind disturbance in Europe from 1950 to 2010”, EGU 2018, Vienna, Austria
15. 2017-Oct, “Wind-throw module development in the land surface model ORCHIDEE”, NCU, Taiwan (in Chinese)
16. 2017-Oct, “Surface fluxes observation and simulation of surface fluxes at LHC”, NTHU, Taiwan
17. 2017-Aug, “Joint conference of AsiaFlux workshop 2017 and the 15th-anniversary celebration of ChinaFLUX”, Beijing, China
18. 2017-Jul, “Incorporating ForestGALES in the large-scale land surface model ORCHIDEE to quantify the interactions between forest management, climate change, and storm damage”, IUFRO 8th International Conference on Wind and Trees, Boulder, USA (Invited talk)
19. 2017-Apr, “Incorporating wind damage to forests in the land surface model ORCHIDEE”, NTNU, Taiwan
20. 2016-Nov, “Representation of storm damage in an advanced land surface model ORCHIDEE-CAN”, AS, Taiwan
21. 2016-Jan, “Developing a new generation land surface model, ORCHIDEE-CAN, featuring dynamic canopy structure for regional climate research”, CWB/NTU/NCU, Taiwan

## **OTHERS**

**Patents:** Li, M.H. and **Yi-Ying Chen**, 2012, Automatic chamber sampling system for soil respiration rate (with National Central University in Taiwan No. M428351)

**Dataset:** Taiwan land cover data from 1904 to 2015, 2019, spatial explicit grid at 500m,

<http://doi.org/10.5281/zenodo.1256484>