

CHIA-LUN TSAI (蔡嘉倫)

Atmospheric Precipitation Processes (APP) Laboratory
Department of Atmospheric Sciences, Chinese Culture University
55, Hwa-Kang Rd., Taipei, Taiwan 11114
CJL10@ulive.pccu.edu.tw
<https://sites.google.com/view/applab-ccu>

EDUCATION

2013 Ph. D., Atmospheric Sciences, Chinese Culture University, Taiwan

2005 B. S., Atmospheric Sciences, Chinese Culture University, Taiwan

EXPERIENCE

Assistant Professor [Feb. 2023 – Present]

Department of Atmospheric Sciences, Chinese Culture University, Taiwan

Senior Researcher [Jan. 2020- Jan. 2023]

Department of Astronomy and Atmospheric Sciences/ Center for Atmospheric REmote Sensing (CARE), Kyungpook National University, South Korea

Visiting Scientist [Jan.-Apr. 2020]

Mesoscale and Microscale Meteorology Lab. (MMM), National Center for Atmospheric Research (NCAR), USA

Postdoctoral Researcher [Jun. 2018- Dec. 2019]

Laboratoire de l'Atmosphère et des Cyclones (LACy, UMR-8105)/ Centre National de la Recherche Scientifique (CNRS)/ Meteo France/ Université de La Réunion, France

Contract Professor [Sep. 2016- Apr. 2018]

Department of Astronomy and Atmospheric Sciences/ Center for Atmospheric REmote Sensing (CARE), Kyungpook National University, South Korea

Postdoctoral Researcher [Aug. 2014- Jul. 2016]

Department of Atmospheric Sciences, National Taiwan University, Taiwan

Postdoctoral Researcher [Aug. 2013- Jul. 2014]

Department of Atmospheric Sciences, Chinese Culture University, Taiwan

JOURNAL ARTICLES

1. **Tsai, C.- L.**, K. Kim, Y.- C. Liou, and G. Lee, 2023: High Resolution 3D Winds Derived from a Modified WISSDOM Synthesis Scheme using Multiple Doppler Lidars and Observations. *Atmos. Measure. Tech.*, **16**, 845-869. <https://doi.org/10.5194/amt-16-845-2023>.
2. **Tsai, C.- L.**, K. Kim, Y.- C. Liou, J.- H. Kim, Y. Lee, and G. Lee, 2022: Orographic-induced strong wind associated with a low-pressure system under clear-air condition during ICE-POP 2018. *Journal of Geophysical Research: Atmospheres*, **127**, e2021JD036418.
3. Park, J.- R., J.- H., Kim, Y. Shin, S.- H. Kim, H.- Y. Chun W. Jang, **C.- L. Tsai**, G. Lee, 2022: A numerical simulation of a strong windstorm event in the Taebaek Mountain Region in Korea during the ICE-POP 2018. *Atmos. Res.* **272**. 106158.
4. Kim, K., W. Bang, E.- C. Chang, F. J. Tapiador, **C.- L. Tsai**, E. Jung, and G. Lee, 2021: impact of wind pattern and complex topography on snow microphysics during ICE-POP 2018. *Atmos. Chem. Phys.*, **21**, 11955-11978.
5. Barthe, C., O. Bousquet, S. Bielli, P. Tulet, J. Pianezze, M. Claeys, **C.- L. Tsai**, C. Thompson, F. Bonnardot, F. Chauvin, J. Cattiaux, M.-N. Bouin, V. Amelie, G. Barruol, R. Calmer, S. Ciccione, E. Cordier, Q.-P. Duong, J. Durand, F.; Husson, R. Fleischer-Dogley, E. Lees, S. Malardel, N. Marquestaut, A. Mavume, D. Mékiès, A. Mouche, N.M. Ravoson, B. Razafindradina, E. Rindraharisaona, G. Roberts, M. Singh, L. Zakariasy, J. Zucule, 2021: Impact of Tropical Cyclones on Inhabited Areas of the SWIO Basin at Present and Future Horizons. Part 2: Modeling Component of the Research Program RENOVRISK-CYCLONE. *Atmosphere*, **12**, 689. <https://doi.org/10.3390/atmos12060689>
6. Bousquet, O. G. Barruol, E. Cordier, C. Barthe, S. Bielli, R. Calmer, E. Rindraharisaona, G. Roberts, P. Tulet, V. Amelie, F. Fleischer-Dogley, A. Mavume, J. Zucule, L. Zakariasy, B. Razafindradina, F. Bonnardot, M. Singh, E. Lees, J. Durand, D. Mekies, M. Claeys, J. Pianezze, C. Thompson, **C.- L. Tsai**, R. Husson, A. Mouche, S. Ciccione, J. Cattiaux, F. Chauvin, N. Marquestaut, 2021: Impact of Tropical Cyclones on Inhabited Areas of the SWIO Basin at Present and Future Horizons. Part 1: Overview and Observing Component of the Research Project RENOVRISK-CYCLONE. *Atmosphere*, **12**, 544, <http://dx.doi.org/10.3390/atmos12050544>.
7. Yu, C.- K., L.- W. Cheng, C.- C. Wu, **C.- L. Tsai**, 2020: Outer Tropical Cyclone Rainbands Associated with Typhoon Matmo (2014). *Mon. Wea. Rev.*, **148**, 2935-2952.
8. Cattiaux J., F. Chauvin, O. Bousquet, S. Malardel, **C.- L. Tsai**, 2019: Projected changes in the Southern Indian Ocean cyclone activity assessed from high-

- resolution experiments and CMIP5 models. *J. Clim.*, **33**, 4975-4991.
9. **Tsai, C.- L.**, K. Kim, Y.- C. Liou, G. Lee, and C.- K. Yu, 2018: Impacts of Topography on Airflow and Precipitation in the Pyeongchang Area Seen from Multiple-Doppler Radar Observations. *Mon. Wea. Rev.*, **146**, 3401-3024.
 10. Yu, C.- K., and **C.- L. Tsai**, 2017: Structural changes of an outer tropical cyclone rainband encountering the topography of northern Taiwan. *Q. J. R. Meteorol. Soc.*, **143**, 1107-1122.
 11. Yu, C. -K., P. -R. Hsieh, S. E. Yuter, L. -W. Cheng, **C.- L. Tsai**, C. -Y. Lin, and Y. Chen, 2016: Measuring droplet fall speed with a high-speed camera: indoor accuracy and potential outdoor applications, *Atmos. Meas. Tech.*, **9**, 1755-1766, doi:10.5194/amt-9-1755-2016.
 12. Yu, C. -K., and **C.- L. Tsai**, 2013: Structural and surface features of arc-shaped radar echoes along an outer tropical cyclone rainband. *J. Atmos. Sci.*, **70**, 56-72.
 13. **Tsai, C.- L.**, and C. -K. Yu, 2012: Intercomparison analysis for Micro Rain Radar observations. *Atmos. Sci.*, **40**, 109-134. (In Chinese with English abstract, The Best Article Award)
 14. **Tsai, C.- L.**, and C. -K. Yu, 2012: Structures of a typhoon rainband documented by dual-Doppler observations. *Quart. J. Meteor.*, **211**, 9-21. (In Chinese with English abstract)
 15. Yu, C. -K., and **C.- L. Tsai**, 2010: Surface pressure features of landfalling typhoon rainbands and their possible causes. *J. Atmos. Sci.*, **67**, 2893-2911. (SCI)
 16. **Tsai, C.- L.**, and C. -K. Yu, 2006: Preliminary analysis and application of the Micro Rain Radar observations. *Quart. J. Meteor.*, **188**, 29-37. (In Chinese with English abstract)

DISSERTATION

Tsai, C.- L., 2013: Observational study of structures and surface fluctuations of typhoon rainbands of Longwang (2005). Ph. D. dissertation, Chinese Culture University. 124 pp.

RESEARCH INTERESTS

Structure and Dynamics of Typhoon and Rainbands

Severe and Mesoscale Weather Systems

Orographic Precipitation (solid and liquid)

Microphysics process of droplets and snow

Radar Remote Sensing and Applications

PROFESSIONAL AFFILIATION

Member, ROC (Taiwan) Meteorological Society

Member, American Meteorological Society (AMS)

COMPUTER AND PROGRAMMING SKILL

FORTRAN, C++, NCL (NCAR Command Language), NCAR graphic, GRADs, Matlab

UNIX, Linux, Shell Script

VDRAS (Variational Doppler Radar Analysis System)

EXPERIENCE OF EXPERIMENT

2008 Southwest Monsoon Experiment/Terrain-influenced Monsoon Rainfall Experiment (SoWMEX/ TiMREX).

2018 ICE-POP

2022 PRECIP

EXPERIENCE OF OBSERVATIONAL INSTRUMENT

- **Radar**-Ground-based Weather Radar, Micro Rain Radar (Ka-band vertical pointing), Verti-X (X-band vertical pointing)
- **Disdrometer**-2DVD, JWD, POSS, LPM, Parsivel
- **Surface observation**- Vaisala WXT520, 3D-Ultrasonic anemometer, Rain Gauge
- **Lidar**-Doppler scanning lidar
- **Others**- Vaisala GPS sounding, FastCamera

HONORS AND AWARD

The Best Article Award (Second Place), 2013 ROC (Taiwan) Meteorological Society

Excellent Work, 2012 International Workshop on Typhoon and Flood - APEC Typhoon Symposium

Excellent Work, 2010 International Workshop on Typhoon and Flood - APEC Typhoon Symposium

The Best Paper Award, 2008 Conference of Atmospheric Graduate Student, Taiwan

CONFERENCE PAPERS

1. Chia-Lun TSAI, Kwonil KIM, Yu-Chieng LIOU, Gyu Won LEE, 2023: High-resolution 3D wind fields in Seoul City: Discrepancy with observations and potentially scientific applications. 15th International Conference on Mesoscale Convective Systems (ICMCS-XV), 22 - 25 May 2023. Fort Collins, CO. U.S.A.
2. Chia-Lun TSAI, Kwonil KIM, Yu-Chieng LIOU, Gyu Won LEE, 2023: Orographic-induced Winds Seen from WISSDOM Under the Clear-air Condition: A Case

Study on 14 February 2018. AOGS 20th Annual Meeting, 30 July- 4 August 2023, Singapore.

3. Chia-Lun TSAI, Olivier BOUSQUET, Sylvie MALARDEL, Julien CATTIAUX, Fabrice CHAUVIN, 2023: Impact of Global Warming on the Characteristics of Tropical Depression in Southwest Indian Ocean Investigating by ARPEGE Simulations. AOGS 20th Annual Meeting, 30 July- 4 August 2023, Singapore.
4. Chia-Lun TSAI, Hung-Chi KUO, Shih-Hao SU, Geunsu LYU, Gyu Won LEE, 2023: The Intercomparisons Between Various Sounding Systems Launching at Jeju Island in Summer Experiment 2021. AOGS 20th Annual Meeting, 30 July- 4 August 2023, Singapore.
5. Kwonil KIM, Chia-Lun TSAI, Gyu Won LEE, 2023: Microphysical Responses of Snow Clouds to Kelvin-Helmholtz Wave During ICE-POP 2018. AOGS 20th Annual Meeting, 30 July- 4 August 2023, Singapore.
6. Choeng-Lyong LEE, Wonbae BANG, Chia-Lun TSAI, Ji-Hye JUNG, 2023: The Study of Overall Physical Characteristics for Precipitation Types Using Observation Datasets. AOGS 20th Annual Meeting, 30 July- 4 August 2023, Singapore.
7. Kwonil KIM, Chia-Lun TSAI, Gyu Won LEE, 2023: Radar-based Precipitation Growth and Decay Patterns During the Summer Season in South Korea. AOGS 20th Annual Meeting, 30 July- 4 August 2023, Singapore.
8. Tsai, C.- L., K. Kim, Y.- C. Liou, J.- H. Kim, Y. Lee, and G. Lee, 2022: The analysis of an orographically strong wind case under clear-air condition during ICE-POP 2018. 11th European Conference on Radar in Meteorology and Hydrology. 29 Aug- 2 Sep 2022. Locarno, Switzerland.
9. Kim, K., C.- L. Tsai, H. Park, and G. Lee, 2022: Investigating General Characteristics of Precipitation Development over South Korea. AOGS 19th Annual Meeting, 1-5 Aug 2022, Virtual.
10. Tsai, C.- L., K. Kim, H. Park, H.- M. Park, W. Bang, and G. Lee, 2022: The Relations Between Upstream Conditions and the Intensity of Orographic Precipitation on Main Mountain Ranges Inland of South Korea. AOGS 19th Annual Meeting, 1-5 Aug 2022, Virtual.
11. Tsai, C.- L., K. Kim, H. Park, W. Bang, and G. Lee, 2021: What are the critical factors dominating orographic precipitation in South Korea? International Conference on Weather Forecast and Hydrological Application of Radar 2021, 10-12 Nov. 2021, South Korea.
12. Kim, K., C.- L. Tsai, H. Park, and G. Lee, 2021: Radar-based precipitation growth and decay pattern in South Korea. International Conference on Weather Forecast and Hydrological Application of Radar 2021, 10-12 Nov 2021, South Korea.

13. Tsai, C.- L., K. Kim, Y.- C. Liou, and G. Lee, 2021: High resolution of 3D winds retrieved from novel WISSDOM synthesis scheme by using Doppler lidars and observations. 2021 ICMCS-XI, 28-30 Apr. 2021, Nanjing, China.
14. Tsai, C.- L., K. Kim, Y.- C. Liou, J.- H. Kim, Y. Lee, and G. Lee, 2021: Possible mechanisms of orographic-induced strong wind under clear-air condition investigating by Doppler lidars and various observations. AOGS 18th Annual Meeting, 1-6 Aug 2021, Virtual.
15. Tsai, C.- L., K. Kim, Y.- C. Liou, and G. Lee, 2019: Variability of Microphysical Characteristics Associated with Orographic Airflow in the mountainous Pyeongchang region. AOGS 16th Annual Meeting, 28 Jul-2 Aug 2019, Singapore.
16. Tsai, C.- L., K. Kim, Y.- C. Liou, G. Lee, and C.- K Yu, 2018: Role of Topography in the Distributions of Precipitation over the Pyeongchang Area Seen from Multiple-Doppler Radar Observations. AOGS 15th Annual Meeting, 3-8 Jun 2018, Honolulu, Hawaii, U.S.
17. Tsai, C.- L., K. Kim, Y.- C. Liou, G. Lee, and C.- K Yu, 2018: Variances in Microphysics Characteristics Associated with Orographic Airflow in the Pyeongchang. AOGS 15th Annual Meeting, 3-8 Jun 2018, Honolulu, Hawaii, U.S.
18. Tsai, C.- L., K. Kim, Y.- C. Liou, and G. Lee, 2017: Preliminary Analysis of Three-Dimensional Wind over Complex Terrain. 38th Conference on Radar Meteorology, 28 August - 1 September 2017 Chicago, IL, U.S.
19. Tsai, C.- L., K. Kim, Y.- C. Liou, and G. Lee, 2017: Topographic Effect on Modification of Airflow and Precipitation Structures in Pyeongchang Area. AOGS 14th Annual Meeting, 6-11 August 2017, Singapore.
20. Tsai, C.- L., and C.- K. Yu, 2017: Topographic effects on structural changes of outer tropical cyclone in northern Taiwan. AOGS 14th Annual Meeting, 6-11 August 2017, Singapore.
21. Tsai, C.- L., and C.- K. Yu, 2016: Radar observation of arc-shaped radar echoes along outer tropical cyclone rainbands of typhoon Matmo (2014). Submitted to AOGS 13th Annual Meeting, 31 July-5 August 2016, Beijing, China.
22. Tsai, C. -L., and C. -K. Yu, 2016: Precipitation and airflow structures of Arc-Shaped Radar Echoes along tropical cyclone rainbands seen from single Doppler radar observations. 2016 ICMCS-XI, 25-28 Apr. 2016, Busan, Korea, 35.
23. Tsai, C. -L., and C. -K. Yu, 2015: Evaluation and analysis of micro rain radar observations of subtropical. 7th Straits Forum, Xiamen, China, 73-93.
24. Tsai, C. -L., and C. -K. Yu, 2015: Observational structures of a landfalling tropical cyclone rainband as it passed over topography of northern Taiwan. 2015 US-Taiwan Extreme Precipitation and Weather Workshop, 29-30 May 2015, Taipei, Taiwan.

25. Tsai, C. -L., and C. -K. Yu, 2014: Precipitation and airflow features of a tropical cyclone rainband associated with topography modifications. International Conference on Mesoscale Meteorology and Tropical Cyclones, 15-18 September 2014, Boulder, Colorado, USA.
26. Tsai, C. -L., and C. -K. Yu, 2014: Structural changes of a tropical cyclone rainband as it passed over topography of northern Taiwan. AOGS 11th Annual Meeting, 28 July-1 August 2014, Sapporo, Japan.
27. Tsai, C. -L., and C. -K. Yu, 2013: Dual-Doppler observations of structural evolution of a tropical cyclone rainband as it encountered topography of northern Taiwan. 1st Asian Conference on Radar Meteorology, 6-9 November 2013, Jeju, Korea, 28.
28. Tsai, C. -L., and C. -K. Yu, 2013: Intercomparison study to evaluate Micro Rain Radar observations in the subtropical environment. 1st Asian Conference on Radar Meteorology, 6-9 November 2013, Jeju, Korea, 73.
29. Tsai, C. -L., and C. -K. Yu, 2013: Precipitation and air flow structures changes of a tropical cyclone rainband observed by dual-Doppler observations. 2013 Cross-strait Young Scientist Conference on Atmospheric Sciences, 14-15 October 2013, Taipei, Taiwan, 17.
30. Yu, C. -K., and C. -L. Tsai, 2012: Dual-Doppler and surface observations of arc-shaped radar echoes along an outer tropical cyclone rainband. AOGS-AGU (WPGM) Joint Assembly, 13-17 August 2012, Sentosa, Singapore.
31. Tsai, C. -L., and C. -K. Yu, 2012: Structural changes of a tropical cyclone rainband observed by dual-Doppler observations. AOGS-AGU (WPGM) Joint Assembly, 13-17 August 2012, Sentosa, Singapore.
32. Tsai, C. -L., and C. -K. Yu, 2012: Structural changes of a tropical cyclone rainband observed by dual-Doppler observations. Asia-Pacific Natural Hazard Conference-2012, 27-29 June 2012, Honolulu, Hawaii.
33. Tsai, C. -L., and C. -K. Yu, 2012: Structural changes of a tropical cyclone rainband observed by dual-Doppler observations. 2012 APEC Typhoon Symposium (APTS), 5-6 June 2012, Taipei, Taiwan.
34. Tsai, C. -L., and C. -K. Yu, 2011: Finescale Surface Features of the Outer typhoon rainbands in Longwang (2005). Cross-strait Young Scientist Conference, 29-30 October 2011, Taipei, Taiwan, 13.
35. Tsai, C. -L., and C. -K. Yu, 2011: Finescale surface features of the outer typhoon rainbands in Longwang (2005). AOGS 8th Annual Meeting, 8-12 August 2011, Taipei, Taiwan.
36. Tsai, C. -L., and C. -K. Yu, 2011: Surface pressure features of landing typhoon rainbands and their possible causes. International Workshop on Typhoon and

Flood, 23-24 June 2011, Taipei, Taiwan.

37. Tsai, C. -L., and C. -K. Yu, 2010: Rainband Characteristics of Intense Landfalling Typhoons near Taiwan. International Workshop on Typhoon Morakot (2009), 25-26 March 2010, Taipei, Taiwan, 32-33.
38. Tsai, C. -L., and C. -K. Yu, 2008: Near-surface characteristics of typhoon rainbands associated with Longwang (2005). Conference on Weather Analysis and Forecasting, Central Weather Bureau, 9-11 September 2008, Taipei, Taiwan, 107-110.
39. Tsai, C. -L., and C. -K. Yu, 2008: Near-surface characteristics of precipitation, kinematic, and thermodynamic associated with the rainbands of typhoon near Taiwan. AOGS 5th Annual Meeting, 16-20 June 2008, Busan, Korea.
40. Tsai, C. -L., and C. -K. Yu, 2007: The introduction of micro rain radar (MRR). 4th SoWMEX/TIMREX Planning Workshop, 8-10 November 2007, Tainan, Taiwan.
41. Tsai, C. -L., and C. -K. Yu, 2007: Near-surface structural characteristics of typhoon rainbands. 2007 Cross-strait Conference on Atmospheric Sciences: Climate Change and Cross-strait Atmospheric Sciences Graduate Student Conference, 2 October 2007, Taipei, Taiwan, 16.
42. Tsai, C. -L., and C. -K. Yu, 2007: Analysis of fine-scale structure of typhoon rainbands impacting Taiwan. 2007 Cross-strait Conference on Meteorological Sciences, 13-14 September 2007, Ssu-Chuan, China, 162-166.
43. Tsai, C. -L., and C. -K. Yu, 2007: Near-surface characteristics of the typhoon rainbands as seen from micro rain radar. 2007 Taiwan Geosciences Assembly, 15-18 May 2007, Taoyuan, Taiwan, A3-3A-04.
44. Tsai, C. -L., and C. -K. Yu, 2006: Radar observations of winter-time orographic precipitation over northern Taiwan. Proceedings, Conference on Weather Analysis and Forecasting, Central Weather Bureau, 18-20 October 2006, Taipei, Taiwan, 1-14~1-17.
45. Tsai, C. -L., and C. -K. Yu, 2006: A case study of winter-time precipitation distribution over Taiwan. Proceedings, 6th Workshop on Recent Development of Radar Meteorology, 23 October 2006, Taipei, Taiwan, 33-38.
46. Tsai, C. -L., and C. -K. Yu, 2006 : Evaluation and application of micro rain radar observations. 9th Graduate Student of Chinese Academy of Sciences and Cross-strait Atmospheric Sciences Conference, 29 July - August 3 2006, Yun-Na, China, 1.
47. Yu, C. -K., and C. -L. Tsai, 2006: Preliminary analyses of micro rain radar observations. Proceedings, Conference on Meteorology and Aviation safety, 17-18 April 2006, Taipei, Taiwan, 73-76.