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EDUCATION

- **Ph.D.**: Environmental Engineering, National Central University, Taiwan, 1996
- **B.S.**: Environmental Science, Tung-Hai University, Taiwan, 1990

EMPLOYMENT

- **Deputy Director,** Research Center for Environmental Changes, Academia Sinica **(2024 – present)**
- **Coordinator of Earth System Science (ESS)**, Taiwan International Graduate Program (TIGP), Academia Sinica **(2023 – 2024)**
- **CEO of Air Quality Research Center**, Research Center for Environmental Changes, Academia Sinica **(2021 – 2024)**
- **Research Fellow**, Research Center for Environmental Changes, Academia Sinica **(2012 – present)**
- **Adjunct Professor**, Department of Atmospheric Sciences, National Central University **(2013 – present)**
- **Deputy Director,** Research Center for Environmental Changes, Academia Sinica **(2016 – 2020)**
- **Associate Research Fellow,** Research Center for Environmental Changes, Academia Sinica **(2007 - 2012)**
- **Assistant Research Fellow,** Institute of Earth Sciences / Research Center for Environmental Changes, Academia Sinica **(2001- 2007)**
- **Research Scientist,** Center for Environmental Safety & Health Technology Development, Industrial Technology Research Institute **(1996 – 2001)**

HONORS & AWARDS

- **Fellow**, Meteorological Society of the Republic of China, 2024
- **Academia Sinica Presidential Scholar**, 2021-2023
- **Significant Research Achievement of Academia Sinica**, 2023
- **Best Paper Award**, Taiwan Association for Aerosol Research, 2022.
- **Invited Speaker**, 2022 Asian Aerosol Conference, Taipei, Taiwan, 2022
- **Session Convener and Speaker**, 18th Asian Chemical Congress. Taipei, Taiwan, 2019.
- **Invited Speaker**, 2017 Joint IAPSO-IAMAS-IAGA Assembly, Cape Town, South Africa 2017.

- **Significant Research Achievement of Academia Sinica**, 2015
- **Significant Research Achievement of Academia Sinica**, 2013
- **Significant Research Achievement of Academia Sinica**, 2011
- **Invited Speaker**, 6th Annual Meeting of AOGS, Singapore, 2009
- **TAO Most Cited Article Award**, Chinese Geoscience Union, 2009
- **TAAR Chiu-Sen Award**, Taiwan Aerosol Research Association, 2008
- **Significant Research Achievement of Academia Sinica**, 2005

PROFESSIONAL SERVICE

- **Coordinator,** Review Panel of Atmospheric Sciences, National Science and Technology Council (NSTC), Taiwan **(2023 – present)**
- **Member,** National Advisory Committee of Environmental Quality, Environmental Protection Administration (EPA), Taiwan **(2023 – present)**
- **Member,** National Committee of the Pacific Science Association (PSA), China-Taipei **(2023 – present)**
- **Member,** National Committee of the Scientific Committee on Problems of the Environment (SCOPE, a committee of ISU), China-Taipei, **(2021 – present)**
- **Member,** Scientific Steering Committee of the International Commission on Atmospheric Chemistry and Global Pollution (iCACGP, a Commissions of IAMAS/IUGG, http://icacgp.org/), **(2019 – present)**
- **Member,** Panel of Earth Science Research Promotion Center, National Science and Technology Council (NSTC), Taiwan **(2016 – 2020, 2023 - present)**
- **Associate Editor,** Atmospheric Research (https://www.journals.elsevier.com/atmospheric-research/), **(2013 – 2024)**

RESEARCH INTEREST

- Photochemistry for production of aerosols and ozone in troposphere
- Long-term trends in the regional air quality of East Asia
- Urban air pollution and control strategy
- Flux of greenhouse gases from urban and agricultural systems

RESEARCH HIGHLIGHTS

- **Long-term study on the East-Asian pollution outflows and background air quality around Taiwan**

  The East-Asia (EA), in particular the eastern and northern China, is one of the major source regions of air pollutants in the world. The pollutants transported on the EA continental outflows could have significant impacts to the air quality and radiation budget in this region. Thus, I have started investigation on the physico-chemical properties of EA outflow aerosols since I joined RCEC in 2001. One of the major tasks was to establish a long-term research station at a representative site. Cape Fuguei locates exactly at the northern tip of Taiwan (25°17’52.8” N,

121°32’16.8” E). This advantage allows the Cape Fuguei Research Station (CAFÉ) to be representative for investigation of Asian outflow air-mass under northeasterly monsoons without contamination of local pollution. I setup research facilities and started regular measurement of aerosol concentration and composition at CAFÉ Station since 2003. Observation of air pollutants have been performed at the CAFÉ research station for ~ 20 years, which is essential to studies on the changes of regional atmospheric composition. Moreover, this station is now serving as the national monitoring station of background air quality.

Recent research outcomes of this research station include: 1.) Cheung et al. (2020) indicated that gas-to-particle conversion processes could have played a significant role in the budget of aerosols in the study area. Based on our observation, this study raised hypothesis to elucidate how the newly formed nano-particles influence the activity of CCN, which has further evidenced the scientific argument of aerosol-cloud interaction. 2.) Droste et al., (2020) revealed that surface PFCs levels were enhanced around Taiwan, which evidenced the special climate impacts of electronic industry in the East Asia. This is the first publication showing this impact with high quality data. 3.) Adcock et al. (2020) assessed the emission of CFC-11 in China. We estimated CFC-11 emissions from China to have increased by 7 ± 5 Gg year^{-1} from the 2008–2011 average to the 2014–2018 average, which was 50 ± 40% of the estimated increase in global CFC-11 emission.

- **Physico-chemical characterization of urban aerosols with implications for air pollution control strategies**

Fine particulate matter (PM2.5) and ozone (O_3) are the major air pollutants in not only Taiwan but also most of the urban areas in the world. Formulation of an effective control strategy for the ambient levels of PM2.5 and O_3 is thereby a great challenge. In the context, physico-chemical studies are critically important to air quality improvement because both O_3 and a large fraction of PM2.5 are known as secondary pollutants, which are products of atmospheric chemical reactions among the gaseous precursors emitted from respective pollution sources. I have been dedicated to studies on the formation of ozone and PM2.5 since I joined RCEC, and the research outcomes have helped elucidating the key processes governing the photochemical production of surface ozone and warned the issue of PM2.5 in Central/Southern Taiwan caused by photochemical production of secondary aerosols. Recent major outcomes include: 1.) Salvador et al. (2016) revealed that low molecular weight carboxylic acids (LMWCA, phthalic acid and glutaric acid for instance) constituted a major fraction of secondary organic aerosols in Taipei. This study demonstrated the substantial influences of photochemical oxidation of gaseous hydrocarbons and fatty acids in urban air quality with evidences of fundamental molecular chemistry. 2.) Cheung et al. (2016) revealed that the condensable organic molecules produced from photochemical reactions could have played critical roles in stabilization of the clusters of sulfuric acid and, consequently, formation of new particles in urban environment. This study provided new experimental data to explain the occurrence of new particle burst events in a

polluted urban area, which was thought confined in remote clean atmosphere. 3.) Salvador et al. (2020) found that the submicron particles in a forested area contained a significant amount of organonitrate, which were characterized by the molecular skeletons of either isoprene or monoterpenes. This finding evidenced the intrusion of urban air pollution into the forest ecosystem in the downwind area of a major city in Taiwan.

REPRESENTATIVE PUBLICATIONS (*: corresponding author)

1. **Chou, C. C.-K.***, Lung, S.-C. C., Hsiao, T.-C., Lee, C.-T. (2022). Regional and Urban Air Quality in East Asia: Taiwan. In: Akimoto, H., Tanimoto, H. (eds) Handbook of Air Quality and Climate Change. Springer, Singapore. https://doi.org/10.1007/978-981-15-2527-8_71-1.

2. Salvador, C. M., **Chou, C. C.-K.***, Ho, T.-T., Ku, I-T., Tsai, C.-Y., Tsao, T.-M., Tsai, M.-J., Su, T.-C. (2022). Extensive urban air pollution footprint evidenced by submicron organic aerosols molecular composition. *npj Clim Atmos Sci,* 5, 96. https://doi.org/10.1038/s41612-022-00314-x
3. Jhang S.-R., Chen, Y.-Y., Shiau, Y.-J., Lee, C.-W., Chen, W.-N., Chang, C.-C., Chiang, C.-F., Guo, H.-Y., Wang, P.-K., **Chou, C. C.-K.*** (2022). Denitrifiers and nitrous oxide emissions from a subtropical vegetable cropland. *ACS Earth and Space Chemistry*, Article ASAP, https://doi.org/10.1021/acsearthspacechem.2c00106
4. Jung, C.-C., **Chou, C. C.-K.***, Huang, Y.-T., Chang, S.-Y., Lee, C.-T., Lin, C.-Y., Cheung, H.-C., Kuo, W.-C., Chang, C.-W., Chang, S.-C. (2022). Isotopic signatures and source apportionment of Pb in ambient $PM_{2.5}$. *Scientific Reports,*12,4343. https://doi.org/10.1038/S41598-022-08096-1

5. Salvador, C. M., **Chou, C. C.-K**.*, Cheung, H.-C., Ho, T.-T., Tsai, C.-Y., Tsao, T. -M., Tsai, M.-J., Su, T.-C. (2020). Measurements of submicron organonitrate particles: Implications for the impacts of NOx pollution in a subtropical forest. *Atmospheric Research,* 245, 105080. https://doi.org/10.1016/j.atmosres.2020.105080
6. Cheung, H. C., **Chou, C. C.-K.***, Lee, C. S. L., Kuo, W.-C., Chang, S.-C. (2020). Hygroscopic properties and cloud condensation nuclei activity of atmospheric aerosols under the influences of Asian continental outflow and new particle formation at a coastal site in eastern Asia. *Atmos. Chem. Phys.*, 20, 5911–5922. https://doi.org/10.5194/acp-20-5911-2020
7. Droste, E. S., Adcock, K. E., Ashfold, M. J., **Chou, C. C.-K.**, Fleming, Z., Fraser, P. J., Gooch, L. J., Hind, A. J., Langenfelds, R. L., Leedham Elvidge, E., Mohd Hanif, N., O'Doherty, S., Oram, D. E., Ou-Yang, C.-F., Panagi, M., Reeves, C. E., Sturges, W. T., and Laube, J. C. (2020). Trends and emissions of six perfluorocarbons in the northern hemisphere and southern hemisphere. *Atmos. Chem. Phys.*, 20, 4787–4807, https://doi.org/10.5194/acp-20-4787-2020.
8. Adcock, K. E.*, Ashfold, M. J., **Chou, C. C.-K.**, Gooch, L. J., Hanif, N., Laube, J. C., Oram, D. E., .Ou-Yang, C.-F., Panagi, M., Surges, W. T., Reeves, C. E. (2020). Investigation of East Asian Emissions of CFC-11 Using Atmospheric Observations in Taiwan. *Environmental Science & Technology*, 54, 3814-3822. https://pubs.acs.org/doi/10.1021/acs.est.9b06433

9. Lee, C. S. L., **Chou, C. C.-K.***, Cheung, H. C., Tsai, C.-Y., Huang, W.-R., Huang, S.-H., Chen, M.-J., Liao, H.-T., Wu, C.-F., Tsao, T.-M., Tsai, M.-J., Su, T.-C. (2019). Seasonal variation of chemical characteristics of fine particulate matter at a high-elevation subtropical forest in East Asia. *Environmental Pollution*, 246, 668-677. DOI: 10.1016/J.ENVPOL.2018.11.033.
10. Jung, C.-C., **Chou, C. C.-K.***, Lin, C.-Y., Shen, C.-C., Lin, Y.-C., Huang, Y.-T., Tsai, C.-Y., Yao, P.-H., Huang, C.-R., Huang, W.-R., Chen, M.-J., Huang, S.-H., Chang, S.-C. (2019). C-Sr-Pb isotopic characteristics of $PM_{2.5}$ transported on the East-Asian continental outflows. *Atmos. Res.*, 223, 88-97. DOI: 10.1016/J.ATMOSRES.2019.03.011.
11. **Chou, C. C.-K.***, Hsu, W.-C., Chang, S.-Y., Chen, W.-N., Chen, M.-J., Huang, W.-R., Huang, S.-H., Tsai, C.-Y., Chang, S.-C., Lee, C.-T., Liu, S.-C. (2017). Seasonality of the mass concentration and chemical composition of aerosols around an urbanized basin in East Asia. *J. Geophys. Res. Atmos.*, 122, doi:10.1002/ 2016JD025728
12. Salvador, C. M., Ho, T.-T., **Chou, C. C.-K.***, Chen, M.-J., Huang, W.-R., Huang, S.-H. (2016). Characterization of the organic matter in submicron urban aerosols using a Thermo-Desorption Proton-Transfer-Reaction Time-of-Flight Mass Spectrometer (TD-PTR-TOF-MS). *Atmos. Environ.*, 140, 565-575. DOI: 10.1016/J.ATMOSENV.2016.06.029
13. Cheung, H. C., **Chou, C. C.-K.***, Chen, M.-J., Huang, W.-R., Huang, S.-H., Tsai, C.-Y., Lee, C. S. L. (2016). Seasonal variations of ultra-fine and submicron aerosols in Taipei, Taiwan: implications for particle formation processes in a subtropical urban area. *Atmos. Chem. Phys.*, 16, 1317-1330. DOI: 10.5194/ACP-16-1317-2016
14. Salvador, C. M. and **Chou, C. C.-K.*** (2014). Analysis of semi-volatile materials (SVM) in fine particulate matter. Atmos. Environ., 95, 288-295.
15. Cheung, H. C., **Chou, C. C.-K.***, Huang, W.-R., and Tsai, C.-Y. (2013). Characterization of ultrafine particle number concentration and new particle formation in urban environment of Taipei, Taiwan. Atmos. Chem. Phys., 13, 8935-8946. https://doi.org/10.5194/acp-13-8935-2013.
16. Lin, C.-Y.*, **Chou, C. C.-K.**, Wang, Z., Lung, S.-C., Lee, C.-T., Yuan, C.-S., Chen, W.-N., Chang, S.-Y., Hsu, S.-C., Chen, W.-C., Liu, S. C. (2012). Impact of different transport mechanisms of Asian dust and anthropogenic pollutants to Taiwan. Atmos. Environ., 60, 403-418.
17. **Chou, C. C.-K.***, Tsai, C.-Y., Chang, C.-C., Lin, P.-H., Liu, S. C., Zhu, T. (2011). Photochemical production of ozone in Beijing during the 2008 Olympic Games. *Atmos. Chem. Phys.*, 11, 9825-9837. https://doi.org/10.5194/acp-11-9825-2011.
18. **Chou, C. C.-K.***, Lee, C. T., Cheng, M. T., Yuan, C. S., Chen, S. J., Wu, Y. L., Hsu, W. C., Lung, S. C., Hsu, S. C., Lin, C. Y., Liu, S. C. (2010). Seasonal variations and spatial distribution of carbonaceous aerosols in Taiwan, Atmos. Chem. Phys, 10, 9563–9578. https://doi.org/10.5194/acp-10-9563-2010.
19. Lu, K., Zhang, Y., Su, H., Brauers, T., **Chou, C. C.-K.**, Hofzumahaus, A., Liu, S. C., Kondo, Y, Shao, M., Wahner, A., Wang, J., Wang, X., Zhu, T.* (2010). Oxidant (O3 + NO2) production

processes and formation regimes in Beijing, J. Geophys. Res., 115, D07303, doi:10.1029/2009JD012714.

20. **Chou, C. C.-K.***, Tsai, C.-Y., Shiu, C. J., Liu, S. C., Zhu, T. (2009). Measurement of NOy during Campaign of Air Quality Research in Beijing 2006 (CAREBeijing-2006): Implications for the ozone production efficiency of NOx, J. Geophys. Res., 114, D00G01, https://doi.org/10.1029/2008JD010446
21. **Chou, C. C.-K.***, Lee, C.-T., Yuan, C. S., Hsu, W. C., Hsu, S. C., Liu, S. C. (2008). Implications of the chemical transformation of Asian outflow aerosols for the long-range transport of inorganic nitrogen species. Atmospheric Environment, 42, 7508-7519. https://doi.org/10.1016/j.atmosenv.2008.05.049.
22. **Chou, C. C.-K.***, Lee, C.-T., Chen, W.-N., Chang, S.-Y., Chen, T.-K., Lin, C.-Y., Chen, J.-P. (2007). Lidar observations of the diurnal variations in the depth of urban mixing layer: A case study on the air quality deterioration in Taipei, Taiwan. Science of the Total Environment, 374, 156-166.
23. **Chou, C. C.-K.***, Liu, S. C., Lin, C.-Y., Shiu, C.-J., Chang, K.-H. (2006), The trend of surface ozone in Taipei, Taiwan, and its causes: implications for ozone control strategies. Atmospheric Environment, 40, 3898-3908. https://doi.org/10.1016/j.atmosenv.2006.02.018.
24. **Chou, C. C.-K.***, Chen, W. N., Chang, S. Y., Chen, T. K., Huang, S. H. (2005). Specific absorption cross-section and elemental carbon content of urban aerosols. Geophysical Research Letters, 32, L21808, doi:10.1029/2005GL024301.
25. **Chou, C. C.-K.***, Huang, S.-H., Chen, T.-K., Lin, C.-Y., Wang, L.-C. (2005). Size segregated characterization of atmospheric aerosols in Taipei during Asian outflow episodes. Atmospheric Research, 75, 89-109.
26. **Chou, C. C.-K.***, Lin, C.-Y., Chen, T.-K., Hsu, S.-C., Lung, S.-C., Liu, S. C., Young, C.-Y. (2004). Influence of long-range transported dust particles on local air quality: A case study on the Asian dust episodes in Taipei during the spring of 2002. Terrestrial Atmospheric and Oceanic Sciences, 15, 881-899.
27. **Chou, C. C.-K.***, Chen, T.-K., Huang, S.-H., Liu, S. C. (2003). Radiative Absorption Capability of Asian Dust with Black Carbon Contamination. Geophysical Research Letters, 30: 1616-1619, doi:10.1029/2003GL017076.