Kuo-Cheng Lo (羅國誠)

Research Center for Environmental Changes (RCEC), Academia Sinica
No. 128, Sec. 2, Academia Rd., Nankang, Taipei, Taiwan 115
Office Tel: +886-2-2787-5933
Email: a0989985335@gate.sinica.edu.tw

EDUCATION

1996/09 – 2015/07 Ph.D. Ph.D. program in Engineering Science and Technology, National Kaohsiung University of Science and Technology., Taiwan
2004/09 – 2007/08 M.S. Depart. of Atmospheric Sciences, Chinese Culture University., Taiwan
2000/09 – 2004/18 B.A. Depart. of Atmospheric Sciences, Chinese Culture University., Taiwan

EMPLOYMENT

2024/10 - present Postdoctoral Researcher RCEC, Academia Sinica, Taiwan
2005/07 - 2023/07 Assistant Professor Depart. of Military Meteorologyics, Air Force Institute Of Technology, Taiwan
2001/09 - 2005/06 Lecturer Depart. Of Military Meteorologyics, Air Force Institute Of Technology, Taiwan

HONORS & AWARDS

2009 Excellent instructor of Air Force Institute Of Technology, Taiwan.

PROFESSIONAL SERVICE

- Served as an instructor at Depart. Of Military Meteorologyics, Air Force Institute Of Technology member 2001 – 2023.

RESEARCH INTEREST

My research lies in environmental modeling, particularly with the Weather Research & Forecasting Model (WRF) and its variants like WRF-Chem and WRF-Solar. I am proficient in processing systems like SMOKE and emission models like CAMx, CMAQ, and CALPUFF. In addition, I have experience using advanced atmospheric dispersion models like AERMOD and The Model for Prediction Across Scales (MPAS). My knowledge extends to hydrodynamic modeling systems like ADCIRC for simulating coastal and oceanic circulation.

RESEARCH HIGHLIGHTS

1. **Elevated surface ozone concentration caused by subtropical cyclones and topographical effect**

The study evaluated the spatiotemporal variation of typhoon tracks, and correlated them with suface O_3 concentrations. Elevated surface O_3 levels preceding typhoon arrival were significantly influenced by the typhoon tracks. Meanwhile, a surge observed approximately 1–2 days prior to sea warnings was associated with the weakened West Pacific Subtropical High (WPSH) and intensified leeward effects. Atmospheric subsidence in both scenarios contributed to declining air quality. Typhoon invasions raised surface O_3 concentrations 1–3 times higher than normal in summer and fall.

2. **Forming Highly Polluted PMs Caused by the Invasion of Transboundary Air Pollutants:**
   The mechanisms for forming high-concentrated PM in the ambient air of Taiwan and its surrounding area were investigated. Based on the monitored pollutant concentrations and the simulation results with the Weather Research and Forecasting-Chemistry (WRF-Chem) model, both the meteorological conditions and the mechanisms for forming highconcentrated PMs were analyzed. The long-range transported-in air pollutants, travelling with the movement of a strong continental cold high-pressure system originating in northern China, contributed to the poor ambient air quality. Two important mechanisms for forming this highly concentrated PM were proposed, including the transported-in transboundary air pollutants (or their precursors) from China and the leeward side effects on the western side of the Taiwan Island

REPRESENTATIVE PUBLICATIONS (*: corresponding author)

1. **Lo, Kuo-Cheng,*** et al. "Elevated surface ozone concentration caused by subtropical cyclones and topographical effect: Model simulation and field measurement." Urban Climate 57 (2024): 102093.
2. Shen, H., Yang, T. M., Lu, C. C., Yuan, C. S., Hung, C. H., Lin, C. T., ... & **Lo, K. C.** (2020). Chemical fingerprint and source apportionment of PM 2.5 in highly polluted events of southern Taiwan. Environmental Science and Pollution Research, 27, 6918-6935.
3. Hung, Chung-Hsuang, **Lo, Kuo-Cheng,*** and Chung-Shin Yuan. "Forming highly polluted PMs caused by the invasion of transboundary air pollutants: Model simulation and discussion." Aerosol and Air Quality Research 18.7 (2018): 1698-1719.