Environmental Research, Technology Demonstration and Conference Project

ECF Project:	ECF 2021-80
Project Title:	Optimization of a multiscale regional coupled land-atmosphere model for better ozone pollution forecast in Hong Kong and Greater Bay Area
Principal Investigator:	Dr Tai Pui Kuen Amos, Earth System Science Programme, Faculty of Science, The Chinese University of Hong Kong
Total Approved Grant:	$499,000
Duration:	1/7/2022 to 30/6/2024
Project Status/Remarks:	On-going
Project Scope:	Despite sustained efforts to control air pollution, surface ozone (O_3) pollution has been worsening in Hong Kong (HK) over the past decade, reflecting incomplete understanding of not only the nonlinear chemistry of O_3 formation but also the modulating roles of changing emissions, climate and land cover. This project aims to improve the model capability to forecast O_3 pollution on multiple spatiotemporal scales in HK and the Greater Bay Area (GBA). The project team will integrate the latest databases of O_3-relevant quantities, including the natural and anthropogenic emissions of volatile organic compounds (VOCs), into a state-of-the-art air quality modeling system, WRF-GC. New improvements and sensitivity simulations will be conducted to investigate the sensitivity of O_3 pollution to – (a). different schemes of VOC-oxidant chemistry; (b). better characterization of biogenic VOC emissions and dry deposition based on refined vegetation maps, parameters, and processes; (c). different combinations of horizontal resolutions in a nested grid and boundary-layer mixing schemes. Model-observation comparison, as well as cross-model comparison with WRF-Chem and CMAQ, will be made to determine the best modeling options, and the resulting optimized WRF-GC model can be highly valuable for better management of air quality in HK and GBA.
Summary of the Findings/Outcomes:	To be available upon completion of the project