

## Environmental Research, Technology Demonstration and Conference Project

<b>ECF Project:</b>	ECF 2018-20
<b>Project Title:</b>	Development of a regional urban meteorological modelling system for environmental impact assessment in the Pearl River Delta region
<b>Principal Investigator:</b>	Professor Fung Chi Hung, Jimmy, Division of Environment and Sustainability, The Hong Kong University of Science and Technology
<b>Total Approved Grant:</b>	\$1,478,568
<b>Duration:</b>	1/7/2019 to 30/6/2021
<b>Project Status/Remarks:</b>	Completed
<b>Project Scope:</b>	<p>The impact of urban development is not well represented in the traditional models where the entire urban area is seen as having the same physical characteristics (i.e. without heterogeneity). A more appropriate parameterisation (multi-layer) of the urban effect on meteorology and the air pollutant dispersion mechanism should therefore be used to provide more accurate information for various environmental impact assessments (e.g. air ventilation assessment, regional air quality forecast, etc.), especially in high-density urban areas like the Pearl River Delta region where the urban landscape features are complex.</p> <p>This project will use a high-resolution multi-layer mesoscale meteorological modelling system to study the impact of vertical wind profiles due to complex high rise-buildings. The study employed the best available morphological data sets to represent the current development of Hong Kong and the Pearl River Delta region. The results can be used to improve accuracy for assisting air quality prediction, air ventilation studies and urban climatic studies.</p>
<b>Summary of the Findings/Outcomes:</b>	<p>An automated urban meteorological model was developed in this project to simulate the urban boundary layer in the Pearl River Delta region. A realistic dataset of urban morphological parameters was developed for the model by a fusion of the World Urban Database and Access Portal Tools (WUDAPT), satellite, existing building data, and online map. This data was evaluated and found to simulate better results than the original BULK scheme with the sophisticated multi-layer urban model. Yearly realistic vertical wind profiles were also simulated for an urban area of Pearl River Delta and Hong Kong with different morphological characteristics, which could be in turn used for AVA studies in Hong Kong. Hotspots of low ventilation areas were also identified.</p>