

Comparison of meteorological impacts between expanding urban area and increasing building height in Hong Kong

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ABSTRACT:

Hong Kong has a very high population density. With the expectation on further increase in population, it is necessary to urbanise so as to accommodate the increasing population. Urban planners may either increase urbanisation area with decrease in building heights, or vice versa in order to accommodate the same amount of people. However, different compromises will lead to different changes in urban weather. Therefore, with the assumption of 30% increase in Hong Kong population, this study will investigate the meteorological impacts in Hong Kong from two scenarios: urban area expanded by 30% more and height of all existing buildings increase by 30%.

In order to perform simulation between these scenarios, the Weather Research and Forecasting (WRF) Model (Skamarock et al., 2008) is run with the Building Environment Parameterization (Martilli, 2002) and the Building Energy Model (Salamanca et al., 2010) (BEP-BEM). The simulation period is chosen to be summer season with sunny and weak wind condition in Hong Kong, which allows urban effect like urban heat island effect to occur. Other than two scenarios, a control run is also performed for comparison. One of the major results showed that the urban expansion scenario has brought a more significant impact towards temperature than the building height increases scenario. More other meteorological impacts like wind will also be analysed and discussed in this study.

KEYWORDS: WRF, urbanisation, urban climate, urban heat island, thermal comfort

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