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Aviation Model (AVM) – A Fine-scale Numerical Weather
Prediction System for Aviation Applications at the
Hong Kong International Airport

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**Aviation Model (AVM) – A Fine-scale Numerical Weather Prediction
System for Aviation Applications at the
Hong Kong International Airport**

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Abstract

The Hong Kong Observatory (HKO) is planning to implement a fine-resolution numerical weather prediction (NWP) model for supporting the aviation weather applications at the Hong Kong International Airport (HKIA). This new NWP model system, called Aviation Model (AVM), is configured at a horizontal grid spacing of 600 m and 200 m. It is based on the WRF-ARW (Advance Research WRF) model considering its efficient modelling code that makes it possible for real-time run on a future high performance computer system with theoretical peak performance of around 10 TFLOPS. AVM will be operated in hourly update configuration to provide forecasts up to 9 hours ahead, and nested inside the operational mesoscale NWP model (namely RAPIDS-NHM). In this paper, initial numerical experiment results in forecast of windshear events due to sea-breeze and terrain effect are discussed. The simulation of sea-breeze related windshear is quite successful, and the headwind change observed from flight data could be re-produced in the model forecast. Impact of physical processes on generating fine-scale wind circulation and development of significant convection will be illustrated. The paper also discusses the limitations in the current model setup and proposes the future development of AVM.

航空预报模式 (AVM) –
一套为香港国际机场航空应用的精细尺度数值天气预报系统

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摘要

香港天文台正计划实施一套为支援香港国际机场航空天气应用的精细尺度数值天气预报系统。这一套新的数值天气预报模式系统名为「航空预报模式」(AVM)，水平格点距离达 600 米和 200 米，基于 WRF-ARW 模式以考虑其高效率的模式代码，使得可在未来一套理论峰值性能约 10 万亿次的高速电脑上实时运行。AVM 将每小时更新预报，提供未来达 9 小时的预测，并嵌套在业务中尺度数值天气预报模式 (RAPIDS-NHM) 当中。本文将讨论 AVM 于海风和地形效应产生的风切变个案的初步数值试验结果。与海风效应相关的风切变模拟颇为成功，模式预报能够模拟飞机实况观测的逆风转变，文中会说明模式物理过程对精细尺度环流以及强对流发展的影响。本文亦会探讨现时模式的局限和提出将来 AVM 的发展。