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耦合 WRF 與 LES 以改善風場的模擬結果
Coupling of WRF and LES is to improve the numerical simulation results

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摘要

天氣預報模式(WRF)是常用於研究和預測天氣的數值工具，而大渦流模型(LES)是計算流體力學(CFD)中計算紊流的方法。本研究首先探討如何將 WRF 預測的風場耦合至 CFD 中，並利用 LES 重新模擬。目的是為了結合 WRF 與 LES 兩者的特性，以得到空間上與時間上高解析度的風場並稱其為 WRF-LES。

之後，針對 WRF 和 WRF-LES 的模擬結果進行評估，發現因計算高度的不同，造成兩者產生不相同的模擬結果。另外，將 WRF、WRF-LES 與實際量測值比較，WRF-LES 會在部分時刻與量測相同，而 WRF 則無明顯改善。

關鍵詞：天氣預報模式、大渦流模型、風場。

Abstract

The Weather Research and Forecasting (WRF) model is a numerical weather prediction system designed to serve both atmospheric research and operational forecasting needs. Large eddy simulation (LES) is a turbulence model of computational fluid dynamic (CFD). In this study, the purpose is to couple the characteristics of WRF and LES and to simulate the wind field with spatial and time high resolutions, which is called WRF-LES.

The results between WRF and WRF-LES are performed and compared, showing that because of the different range of altitudes, the results are different between WRF and WRF-LES. Furthermore, by comparing WRF and WRF-LES with the experimental observation, it reveals that results of WRF-LES at certain time are the same with those of observation, while there is no improvement on those of WRF.

Keywords: WRF; LES; wind field.