結合全球海氣偶合系統發展高解析度台灣區域海洋模式之長期預報

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摘　要

複雜的海氣交互作用是執行長期預報及模擬所要面對的重要挑戰之一，尤其在面對30天以上的預報需求時，單一的大氣模式或海洋模式無法反應出交互作用的回饋機制，使得模式的可預報度大幅降低，因此在針對長期預報發展區域海洋模式時，須結合全球海氣偶合模式系統的預報結果，作為海表面的大氣通量與海洋側邊界通量使用，使區域海洋模式能在包含海氣交互作用效應的邊界通量驅動下，提高目標區域預報的準確度。本研究以自主開發的高解析度台灣區域海洋模式TIMCOM，分析與比較使用美國第二代氣候預報系統(CFSv2)之預報資料及氣象局TCo383-TIMCOM全球海氣偶合系統之預報資料，對解析度0.125度台灣區域海洋模式90天預報結果的影響。研究結果顯示受限於CFSv2預報資料之空間解析度非常粗糙（1度），高解析度台灣區域海洋模式無法解析出小尺度的海洋渦旋，並會高估輻射熱通量對海水的增溫作用；而使用解析度提高至0.23度的TCo383-TIMCOM全球偶合系統，則能讓高解析度台灣區域海洋模式有較好的長期預報結果。

關鍵字：偶合系統模式、區域海洋模式、長期預報、海氣交互作用

Incorporating Global Air-Sea Coupled System to a High Resolution Regional Ocean Model for Long-Range Forecast in the vicinity of Taiwan

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Abstract

Air-sea interaction is one of the important issues for long-range forecast. The independent atmospheric or oceanic model could not resolve the completed processes of air-sea interaction, resulting in the degrading of model predictability. To appropriately drive the high resolution regional ocean forecast model in the vicinity of Taiwan, a global air-sea coupled forecast system should be involved to provide the consistent sea surface fluxes and lateral boundary conditions at the same time. Here, we use the TaIwan Multi-scale Community Ocean Model (TIMCOM) to develop a high resolution regional ocean model in the western North Pacific. The 90 days forecast products from the CFSv2 and TCo383-TIMCOM global coupled forecast systems are used to force the 0.125° high resolution regional TIMCOM. Due to the coarse resolution (1°) CFSv2 forecast products, the meso-scale eddies could not be fully resolved in the regional TIMCOM. Also, the sea surface temperature is overestimated generally. Using the TCo383-TIMCOM forecast product suggests a better performance than the CFSv2, which is attributed to the higher forecast products resolution (0.23°).

Keywords: air-sea coupled system, reginal ocean model, long-range forecast, air-sea interaction