Tropical cyclone research with a global non-hydrostatic model

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Abstract

Recent research highlights on the tropical cyclone (TC) with NICAM (Non-hydrostatic ICosahedral Atmospheric Modeling) are presented. The typical horizontal resolutions of the model are 14, 7, 3.5km meshes, and a higher version on the K-computer. A recent key theme of the research is "seamless climate/weather modeling," which includes two major goals, among other topics: 1) extended-range prediction of TC genesis and the associated physical mechanism of intra-seasonal variability (e.g., MJO), and 2) future global change in the distribution, frequency and intensity of TCs. In the latter approach, we take a time-slice approach including the control experiment and future experiment of multiple years for each. The projected changes in frequency and intensity of future tropical cyclone support the well-known conclusion from the recent hydrostatic global modeling studies suggesting the global reduction in frequency and increase in more intense tropical cyclone. In this context, possible change of the cloud properties related to tropical cyclone and its impact on global climate change has also been investigated to understand the upscale effects of the TC-associated cloud properties on the climate system.