VERSITA

Acta Geophysica
vol. 59, no. 6, Dec. 2011, pp. 1158-1167
DOI: 10.2478/s11600-011-0032-2

CAM-EULAG: A Non-Hydrostatic Atmospheric Climate Model with Grid Stretching

Babatunde J. ABIODUN[1], William J. GUTOWSKI[2]
Abayomi A. ABATAN[2], and Joseph M. PRUSA[3]

[1]Department of Environmental and Geographical Sciences, University of Cape Town, South Africa; e-mail: babiodun@csag.uct.ac.za (corresponding author)

[2]Department of Geological and Atmospheric Sciences, Iowa State University, Ames, USA; e-mails: gutowski@iastate.edu, abatanaa@iastate.edu

[3]Teraflux Corporation, Boca Raton, FL, USA; e-mail: jprusa@bellsouth.net

Abstract

This study evaluates the capability of a non-hydrostatic global climate model with grid stretching (CEU) that uses NCAR Community Atmospheric Model (CAM) physics and EULAG dynamics. We compare CEU rainfall with that produced by CAM using finite volume dynamics (CFV). Both models simulated climate from 1996 to 2000, using the same parameterization schemes.

CEU and CFV both simulate well the observed global rainfall pattern. However, with same grid, CEU performs better than CFV in simulating the annual cycles of precipitation over our target region of West Africa. The reason is that it simulates African easterly jet and monsoon circulations better than CFV. CEU simulations with horizontal grid stretching to 0.5° are markedly better than those using CAM's standard 2.0°×2.5° grid.

Key words: global climate model, stretched grid, non-hydrostatic dynamics.