viCPCMW Convection-Permitting Climate Modeling Workshop
Buenos Aires city, 2022 Sep. 7-9th

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http://www.cima.fcen.uba.ar/cpcmw2022/index.php
7-9th September 2022
C. A. Buenos Aires

Poster.1: . # The 2012 North American Derecho: A testbed for evaluating regional and global climate modeling systems at cloud-resolving scales

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Abstract

In this study, we develop a testbed that can be used to evaluate the representation of severe storm events in regional and global climate models at cloud resolving scales. The simulated case is an exceptional progressive derecho occurring from 29-30 June 2012. The evaluation is performed by focusing on four essential parameters: precipitation, composite radar reflectivity, outgoing longwave radiation, and wind speed, and separately addressing errors in timing and pattern.

The testbed is applied to intercompare regional and regionally-refined global climate models. Specifically, we investigate WRF at 4km, and the regionally refined model (RRM) using the Simple Cloud-Resolving E3SM Atmosphere Model (SCREAM). Tests address RRM grid spacing (6.5-1.625km), differences between hydrostatic and nonhydrostatic dynamics cores, low-resolution and high-resolution model configurations, initialization time, and source for the initial conditions.

As the RRM grid spacing decreases, model performance improves significantly. Results are highly sensitive to the initial conditions; simulations initialized with the Rapid Refresh show best model performance. Despite a two-hour delay in the feature timing, SCREAM better represents the echo shape and the intense wind gusts. Both WRF and SCREAM overestimate the rainfall intensity and underestimate the precipitating area.