Abstract Submitted
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Efficient Dynamical Downscaling of General Circulation Models Using Continuous Data Assimilation[1] OMAR KNIO, SRINIVAS DESAMSETTI, HARI DASARI, SABIQUE LANGODAN, IBRAHIM HOTEIT, King Abdullah University of Science and Technology, EDRISS TITI, University of Cambridge — Continuous data assimilation (CDA) is implemented for efficient dynamical downscaling of a global atmospheric reanalysis. A comparison of the performance of CDA with grid and spectral nudging techniques is conducted, using the Weather Research and Forecast model. The model is configured at $0.25^\circ \times 0.25^\circ$ horizontal resolution and is driven by $2.5^\circ \times 2.5^\circ$ initial and boundary conditions from NCEP/NCAR reanalysis fields. Downscaling experiments are performed over a one-month period. Results are compared for the outputs of the WRF model with different downscaling techniques, NCEP/NCAR reanalysis, and NCEP Final Analysis. Both spectral nudging and CDA describe better the small-scale features compared to grid nudging. CDA maintains the balance of large- and small-scale features similar to that of the best simulation achieved using spectral nudging, without the need of a spectral decomposition. The results indicate that different atmospheric variables downscaled with CDA are most consistent with observations, and that CDA consequently provides an attractive approach for dynamical downscaling.

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