Regional Climate Research using WRF and MPAS: Overview and Future Development.

Cindy Bruyère

Greg Holland, James Done, Brian Bonnlander, Sherrie Fredrick, Tom Galarneau, Ming Ge, Abby Jaye, Mari Jones, Heather Lazrus, Rebecca Morss, Debasish PaiMazumder, Erin Towler

Bill Skamarock, Michael Duda, Laura Fowler
Introduction

• Past Dynamical Downscaling
  – What we have done and what is available for the community

• Future

• Tutorials and Community support
- Downscaling CCSM – A2 scenario (AR4)
- 36 & 12 km model runs (some select 4 km runs)
- Single realization (Noah; KF; WSM6; YSU; CAM)
Publications

Publications


Data Availability

http://rda.ucar.edu/datasets/ds601.0/

http://www.mmm.ucar.edu/ prod2/nrcm/RCPP/RCPP.html
• Next NRCM model runs
  – Ensembles
• Coupling runs
• MPAS
The Need for Ensembles
18 Ensembles (Reanalysis) ; 4 (CESM) – RCP 8.5

Cumulus ; Microphysics ; PBL ; Radiation
Preliminary Results

PSFC

T2
### COAWST Modeling System

<table>
<thead>
<tr>
<th>Component</th>
<th>Model</th>
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</thead>
<tbody>
<tr>
<td>Coupled Ocean</td>
<td>MCT</td>
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<tr>
<td>Atmosphere</td>
<td>ROMS</td>
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<tr>
<td>Wave</td>
<td>WRF</td>
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<tr>
<td>Sediment Transport</td>
<td>CSTMS</td>
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</tbody>
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[Logos of institutions involved in COAWST project]
Model Setup

WRF Grid

ROMS and SWAN Grid(s)

Grid (Wpoints) Section at ETA = 30

Distance (km)

Depth (m)

Bathymetry

WRF Workshop – June 2013
Poster 37: Modeling extreme events with a coupled WRF-ROMS modeling system. Mooney, Priscilla A., Frank Mulligan, Brian Bonnlander, and Cindy Bruyère
C-grid centroidal Voronoi mesh

Selective Grid Refinement

Session 10: MPAS: The model for prediction across scales. Skamarock, Bill, Michael Duda, Laura Fowler, Joe Klemp, and Sang-Hun Park
Poster 39: Regional climate simulations using variable-resolution meshes. Fowler, Laura D., William C. Skamarock, and Cindy Bruyère
Tutorials and Support

• Regional Climate Tutorial
  – July 26, 2013
  – Boulder

• Community Support
  – [http://www2.cisl.ucar.edu/easm-support](http://www2.cisl.ucar.edu/easm-support)