Aspects of Tropical Climate Improve with Resolution

Structure of SSTA Variability

SSTA Standard deviation (°C)
ENSO Teleconnections Improve with Resolution

Delworth et al (2012)
Mean Regression to SOI

Cyclone Density: Gale-force days per Year per 5°x5° gridcell

Regression to SOI

Impact of La Niña: Regression of TS Density to SOI (TS-day/5°x5°)

Kim et al. (2012, in prep.)
Coupling appears to improve GFDL high-res model’s MJO

Figure: Daehyun Kim (Columbia U.)
Use GFDL CM2.x series of models with increasing resolution to build experimental high-res assimilation and prediction systems.

<table>
<thead>
<tr>
<th>Year</th>
<th>Model</th>
<th>Resolution</th>
<th>Ocean Resolution</th>
<th>Model Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>CM2.1</td>
<td>200 Km atm</td>
<td>1 degree ocean</td>
<td>MOM 4 (early)</td>
</tr>
<tr>
<td>2013</td>
<td>CM2.5-series</td>
<td>50 Km atms.</td>
<td>0.25 degree ocean</td>
<td>MOM 4/5</td>
</tr>
</tbody>
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High-resolution gives improved representation of processes and phenomena, hypothesize:
- Improved predictions of large-scale
- Improved predictions of regional climate and extremes

High-resolution coupled assimilation remains a scientific challenge, prototype within a year or so…