Sensitivity studies with new ozone data sets in CAM

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Background

• Want to have improved/consistent ozone data set for AR5
• New data sets include more observational data than (e.g.) Randel & Wu [2005]
• Data sets still being worked on….
• Starting to look at new data via sensitivity studies in CAM – i.e. not much to report yet!
Motivation

E.g. ozone-climate links and Antarctic trends?

30 yr geopotential height trends [Thompson & Solomon, 2002]
Model set up

- CAM v3.1 (running at NOAA)
- Climatological sea-ice/SSTs and fixed GHGs (~2000 levels)
- 20 member ensemble (years) for each ozone climatology
- Ozone data only change between simulations
  - Bodeker versus Randel & Wu
Data sets versus obs

Time series of 70hPa October ozone at 90S

*NOTE* This is an early version of the Bodeker ozone
Data sets versus obs

Time series of 70hPa October ozone at 70S

*NOTE* This is an early version of the Bodeker ozone
Simulations – Time periods chosen

Fig 4-7, WMO [2006]
Simulations – Time periods chosen

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979-1980</td>
<td>BASE</td>
</tr>
<tr>
<td>1981-1986</td>
<td>Early ozone hole</td>
</tr>
<tr>
<td>1995-1999</td>
<td>Large ozone losses</td>
</tr>
<tr>
<td>2000-2005</td>
<td>Stabilization??</td>
</tr>
</tbody>
</table>
Bodeker – Randel & Wu at 70 hPa

1979-1980 avg

1981-1986 avg

1995-1999 avg

2000-2005 avg
Input data preparation
Some results
ΔZ 60-90S: Stabilized - BASE


ΔZ SH – cf trends in model & obs…

30 yr geopotential height trends (m)

Gillett & Thompson [2003]
$\Delta Z_{500}$: Dec-May avg, SH

Bodeker ozone simulations – +ve phase of SAM

Shading indicates where difference is greater than 1 SD of perturbed run
ΔT 60-90S: Stabilized - BASE


ΔT SH – cf trends in model & obs…

30 yr temperature trends (K)

Gillett & Thompson [2003]
Still to do…

- Run in with slab ocean model
  - see tropospheric/near surface changes
- New data
  - Latest Bodeker data
  - Data set from NOAA-ESRL (K. Rosenlof)
- Time-slice runs and comparison with obs and chem/clim CAM
- Couple with improved strat water vapor data