Analysis of CMIP3 AMIP simulations

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Author: Alexander Loew
alexander.loew@lmu.de

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1 SHORTWAVE DOWNWARD RADIATION FLUX IN AIR

1.1 ISCCP

![ISCCP Diagram]

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![Diagram showing temporal mean fields and absolute and relative differences for CMIP3 inmcm3 0-amip and ISCCP.]

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![SRBv3.0](image)

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![Image: Temporal mean fields (top) and absolute and relative differences (bottom)]

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![Temporal mean fields (top) and absolute and relative differences (bottom)](image)

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2.2 CERES2.7

![CERES2.7](image)

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2.2.1 CMIP3 iap fgoals1 0 g-amip
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2.2.2 CMIP3 inmcm3 0-amip

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2.3 SRBv3.0

![SRBv3.0 Monthly Mean](image)

Figure 109: Monthly mean SRBv3.0

2.3.1 CMIP3 iap fgoals1 0 g-amip
Figure 110: Temporal mean fields (top) and absolute and relative differences (bottom)
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2.3.3 model mean

Figure 120: Temporal mean fields (top) and absolute and relative differences (bottom)
Figure 121: Monthly mean climatology for mean-model
<table>
<thead>
<tr>
<th>Month</th>
<th>Mean (± Standard Deviation) [W/m²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>$2.38 \pm 8.06$ W/m²</td>
</tr>
<tr>
<td>Feb</td>
<td>$3.41 \pm 9.28$ W/m²</td>
</tr>
<tr>
<td>Mar</td>
<td>$4.09 \pm 10.16$ W/m²</td>
</tr>
<tr>
<td>Apr</td>
<td>$3.75 \pm 10.31$ W/m²</td>
</tr>
<tr>
<td>May</td>
<td>$1.61 \pm 9.11$ W/m²</td>
</tr>
<tr>
<td>Jun</td>
<td>$1.33 \pm 9.08$ W/m²</td>
</tr>
<tr>
<td>Jul</td>
<td>$1.62 \pm 9.76$ W/m²</td>
</tr>
<tr>
<td>Aug</td>
<td>$2.12 \pm 9.47$ W/m²</td>
</tr>
<tr>
<td>Sep</td>
<td>$2.93 \pm 9.05$ W/m²</td>
</tr>
<tr>
<td>Oct</td>
<td>$4.55 \pm 14.62$ W/m²</td>
</tr>
<tr>
<td>Nov</td>
<td>$3.71 \pm 14.09$ W/m²</td>
</tr>
<tr>
<td>Dec</td>
<td>$2.05 \pm 9.64$ W/m²</td>
</tr>
</tbody>
</table>

Figure 122: Monthly mean climatology of difference between MEAN-MODEL and SRBV3.0
Figure 123: Violin plot for ENSMEAN-SURFACE-UPWARD-FLUX
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Pattern correlation: SRBV3.0

Figure 125: Pattern correlation for SRBV3.0
Figure 126: Relative model performance for SURFACE-UPWARD-FLUX
Figure 127: Global means for SHORTWAVE UPWARD RADIATION FLUX IN AIR
Figure 128: Global means for SHORTWAVE UPWARD RADIATION FLUX IN AIR (summary); areas indicate ±1σ as derived from the ensemble of models or observations.
Figure 129: Global means for SHORTWAVE UPWARD RADIATION FLUX IN AIR (summary climatology)
Figure 130: Global means climatology for SHORTWAVE UPWARD RADIATION FLUX IN AIR
3  
NET SURFACE SOLAR RADIATION FLUX IN AIR

3.1  
ISCCP

Figure 131: Monthly mean ISCCP

3.1.1  
CMIP3 iap fgoals1 0 g-amip
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CMIP3_iap_fgoals1_0_g-amip surface solar net radiation

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Figure 134: Monthly mean climatology of difference between IAP-FGOALS1-0-G and ISCCP
3.1.2 CMIP3 inmcm3 0-amip

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Figure 138: Temporal mean fields (top) and absolute and relative differences (bottom)
### Figure 139: Monthly mean climatology for mean-model

<table>
<thead>
<tr>
<th>Month</th>
<th>Mean (W/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAN</td>
<td>100.42 ± 86.95</td>
</tr>
<tr>
<td>FEB</td>
<td>188.6 ± 73.72</td>
</tr>
<tr>
<td>MAR</td>
<td>307.61 ± 72.05</td>
</tr>
<tr>
<td>APR</td>
<td>164.87 ± 79.04</td>
</tr>
<tr>
<td>MAY</td>
<td>154.69 ± 77.72</td>
</tr>
<tr>
<td>JUN</td>
<td>155.73 ± 81.11</td>
</tr>
<tr>
<td>JUL</td>
<td>156.47 ± 76.6</td>
</tr>
<tr>
<td>AUG</td>
<td>188.07 ± 72.45</td>
</tr>
<tr>
<td>SEP</td>
<td>165.45 ± 89.32</td>
</tr>
<tr>
<td>OCT</td>
<td>167.44 ± 74.70</td>
</tr>
<tr>
<td>NOV</td>
<td>166.15 ± 48.20</td>
</tr>
<tr>
<td>DEC</td>
<td>165.5 ± 89.46</td>
</tr>
</tbody>
</table>
Figure 140: Monthly mean climatology of difference between MEAN-MODEL and ISCCP
Figure 141: Relative model performance for NET-RADIATION-SOLAR
3.2 CERES2.7

Figure 142: Monthly mean CERES2.7

3.2.1 CMIP3 iap fgoals1 0 g-amip
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3.2.2 CMIP3 inmcm3 0-amip

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CMIP3_inmcm3_0-amip surface solar net radiation - CERES2.7
3.2.3 model mean

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Figure 151: Monthly mean climatology of difference between MEAN-MODEL and CERES2.7
Figure 152: Relative model performance for NET-RADIATION-SOLAR
3.3 SRBv3.0

Figure 153: Monthly mean SRBv3.0

3.3.1 CMIP3 iap fgoals1 0 g-amip
Figure 154: Temporal mean fields (top) and absolute and relative differences (bottom)
Figure 155: Monthly mean climatology for iap-fgoals1-0-g
Figure 156: Monthly mean climatology of difference between IAP-FGOALS1-0-G and SRBV3.0
### 3.3.2 CMIP3 inmcm3 0-amip

Figure 157: Temporal mean fields (top) and absolute and relative differences (bottom)
Figure 158: Monthly mean climatology for inmcm3-0
### 3. NET SURFACE SOLAR RADIATION FLUX IN AIR

#### CMIP3_inmcm3_0-amip surface solar net radiation - SRBv3.0

<table>
<thead>
<tr>
<th>Month</th>
<th>Mean Value</th>
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<tbody>
<tr>
<td>JAN</td>
<td>-2.25 ± 20.44 [W/m²]</td>
</tr>
<tr>
<td>FEB</td>
<td>-1.81 ± 20.46 [W/m²]</td>
</tr>
<tr>
<td>MAR</td>
<td>-1.19 ± 21.18 [W/m²]</td>
</tr>
<tr>
<td>APR</td>
<td>-1.07 ± 19.54 [W/m²]</td>
</tr>
<tr>
<td>MAY</td>
<td>-0.76 ± 20.32 [W/m²]</td>
</tr>
<tr>
<td>JUN</td>
<td>2.8 ± 22.93 [W/m²]</td>
</tr>
<tr>
<td>JUL</td>
<td>4.11 ± 25.49 [W/m²]</td>
</tr>
<tr>
<td>AUG</td>
<td>2.66 ± 21.23 [W/m²]</td>
</tr>
<tr>
<td>SEP</td>
<td>0.95 ± 21.21 [W/m²]</td>
</tr>
<tr>
<td>OCT</td>
<td>9.28 ± 19.07 [W/m²]</td>
</tr>
<tr>
<td>NOV</td>
<td>0.55 ± 19.6 [W/m²]</td>
</tr>
<tr>
<td>DEC</td>
<td>-0.29 ± 19.73 [W/m²]</td>
</tr>
</tbody>
</table>

Figure 159: Monthly mean climatology of difference between INMCM3-0 and SRBV3.0
3.3.3 model mean

Figure 160: Temporal mean fields (top) and absolute and relative differences (bottom)
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Figure 164: Global means for NET SURFACE SOLAR RADIATION FLUX IN AIR
Figure 165: Global means for NET SURFACE SOLAR RADIATION FLUX IN AIR (summary); areas indicate $\pm 1\sigma$ as derived from the ensemble of models or observations.
Figure 166: Global means for NET SURFACE SOLAR RADIATION FLUX IN AIR (summary climatology)
Figure 167: Global means climatology for NET SURFACE SOLAR RADIATION FLUX IN AIR
4 Summary error statistics

4.1 Gleckler metric

Figure 168: Gleckler et al. (2008) model performance index
4 Summary error statistics
4.2 Model ranking consistency

4.2.1 SIS

![Comparison of model ranking: SIS](image)

Figure 169: Model RANKING for different observational datasets: SIS

<table>
<thead>
<tr>
<th>model</th>
<th>CLARA</th>
<th>CERES2.7</th>
<th>ISCCP</th>
<th>SRBv3.0</th>
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<tbody>
<tr>
<td>CMIP3-iap-fgoals1-0-g-amip</td>
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<td>CMIP3-inmcm3-0-amip</td>
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<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>model-mean</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 1: Model rankings for variable SIS
4 Summary error statistics

Figure 170: Model ERROR for different observational datasets: SIS

4.2.2 SURFACE UPWARD FLUX

Figure 171: Model RANKING for different observational datasets: SURFACE-UPWARD-FLUX
Table 2: Model rankings for variable SURFACE-UPWARD-FLUX

<table>
<thead>
<tr>
<th>model</th>
<th>CERES2.7</th>
<th>SRBv3.0</th>
<th>ISCCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMIP3-iap-fgoals1-0-g-amip</td>
<td>2</td>
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<tr>
<td>CMIP3-inmcm3-0-amip</td>
<td>3</td>
<td>3</td>
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</tr>
<tr>
<td>model-mean</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 172: Model ERROR for different observational datasets: SURFACE-UPWARD-FLUX
4.2.3 NET RADIATION SOLAR

Figure 173: Model RANKING for different observational datasets: NET-RADIATION-SOLAR

Table 3: Model rankings for variable NET-RADIATION-SOLAR
Figure 174: Model ERROR for different observational datasets: NET-RADIATION-SOLAR