Supplementary Material to the article

# Overview of IGAC/SPARC Chemistry-Climate Model Initiative (CCMI) Community Simulations in Support of Upcoming Ozone and Climate Assessments

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**Table S1**: Potential remote sensing products for evaluating tropospheric trace gases:

| **Instrument** | **Platform** | **Meas. Period** | **Typical Nadir Res. (km)** | **Equator Crossing Time[b]** | **$NO_2$** | **HCHO** | **$SO_2$** | **CO** | **$O_3$[a]** | **$AOT_{550\ nm}$** | **$H_2O$** | **$CH_4$** | **Lightning** | **Clouds[g]** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOMS | Various | 1979- | 38x38 | Various | | | | | $X_c$ | | | | | |
| GOME | ERS-2 | 1995-2003 | 320x40 | 10:30 *d* | X | X | X | | X | | X | | | |
| MOPITT | Terra | 2000- | 22x22 | 10:30 *d* | | | | $X_c$ | | | | | | |
| MISR | Terra | 2000- | 18x18[e] | 10:30 *d* | | | | | | X | | | | |
| MODIS | Terra<br>Aqua | 2000-<br>2002- | 10x10[e] | 10:30 *d*<br>1:30 *a* | | | | | | X<br>X | | | | $X_c$ |
| AIRS | Aqua | 2002- | 14x14 | 1:30 *a* | | | X | $X_{mt}$ | | | X | $X_{ut}$ | | |
| SCIA-MACHY | Envisat | 2002-2011 | 60x30 | 10:00 *d* | $X_c$ | $X_c$ | $X_c$ | X | X | | X | $X_c$ | | |
| OSIRIS | Odin | 2001- | limb | 6:30 | X | | | | X | | | | | |
| MLS | Aura | 2004- | limb | 1:45 *a* | | | | $X_{ut}$ | $X_{ut}$ | | $X_{ut}$ | | | |
| OMI | Aura | 2004- | 24x13 | 1:45 *a* | $X_c$ | $X_c$ | $X_c$ | | $X_c$ | X | | | | |
| TES | Aura | 2004- | 8x5 | 1:45 *a* | | | | X | X | | X | X | | X |
| PARASOL | PARASOL | 2004- | 18x16 | 1:30 *a* | | | | | | X | | | | |
| CALIOP | CALIPSO | 2006- | 40x40 | 1:30 *a* | | | | | | X | | | | |
| GOME-2 | MetOp | 2006- | 80x40 | 9:30 *d* | $X_c$ | $X_c$ | $X_c$ | | X | | X | | | |
| IASI | MetOp | 2006- | 12x12 | 9:30 *d* | | | | X | X | | | | | |
| LIS/OTD[f] | MICROLAB-1/ TRMM | 1998-2010 | 0.5°x0.5° | | | | | | | | | | X | |
| ISCCP | multiple | 1983- | | | | | | | | | | | | $X_c$ |

[a]Including the overhead ozone column.
[b]Crossing time occurs at both AM and PM. Descending orbits are indicated by *d* and ascending orbits by *a*.
[c]Value given for clear-sky conditions. Clouds impede the retrieval.
[d]Number of discrete wavelengths
[e]Radiances for MISR and MODIS are acquired at between 205m and 1.1km, depending on channel. Resolutions reported here are for the standard operational aerosol product.
[f]Flash rates to help evaluate distribution of $NO_x$ emissions from lightning – 0.5° x0.5° latitude x longitude.
[g]Initally focus on cloud optical depth; ISCCP website: http://isccp.giss.nasa.gov/overStatPg.html; for the future, vertical information is available through the combined CloudSat/Calipso data.
$X_c$=column data; $X_{ut}$=upper tropospheric data; $X_{mt}$=middle tropospheric data.

**Table S2**: Remote sensing products from limb-viewing satellite instruments for potential use in evaluations of stratospheric trace gases. Orbit and sampling characteristics important for instrument-specific climatology construction are extracted from a preliminary version of *Table 3.1* of the SPARC-DataInitiative (2013) report (in preparation):

| Instrument | Latitudinal coverage | Local time[1] | Local time measurement time[2] | Inclination |
|---|---|---|---|---|
| **SAGE I** | 75°S–75°N<br>(~over one season) | N/A | N/A | 56° |
| **SAGE II** | 75°S–75°N<br>(~over one season) | N/A | N/A | 57° |
| **HALOE** | 75°S–75°N<br>(~over one season) | N/A | N/A | 57° |
| **MLS** | 80°S–80°N<br>(~over two months) | N/A | N/A | 57° |
| **OSIRIS** | 82°S–82°N<br>(daily, no winter hemisphere) | a: 6:30 pm<br>d: 6:30 am | a: 6:30 pm<br>d: 6:30 am | 97.8° |
| **SMR** | 82°S–82°N<br>(daily) | a: 6:30 pm<br>d: 6:30 am | a: 6:30 pm<br>d: 6:30 am | 97.8° |
| **GOMOS** | 90°S–90°N<br>(daily, no summer<br>poles for night measurements) | a: 10 pm<br>d: 10 am | a: 10-12 pm<br>d: 8-10.30 am | 98.55° |
| **MIPAS** | 90°S–90°N<br>(daily) | a: 10 pm<br>d: 10 am | a: 10 pm<br>d: 10 am | 98.55° |
| **SCIAMACHY** | 85°S–85°N<br>(65° for winter hemisphere) | a: 10 pm<br>d: 10 am | d: 10 am | 98.55° |
| **ACE-FTS** | 85°S–85°N<br>(~over one season) | N/A | N/A | 74° |
| **HIRDLS** | 65°S–82°N<br>(daily) | a: 1:43 pm<br>d: 1:43 am | a: 2:57 pm<br>d: 0:30 am | 98.21° |
| **MLS** | 82°S–82°N<br>(daily) | a: 1:43 pm<br>d: 1:43 am | a: 1:25 am<br>d: 1:25 pm | 98.21° |
| **TES** | 82°S–82°N (daily)<br>(50°S-70°N for<br>2008/09; 30°S-50°N for 2010) | a: 1:43 pm<br>d: 1:43 am | a: 1:43 pm<br>d: 1:43 am | 98.21° |
| **SMILES** | 38°S–65°N<br>(daily) | N/A | N/A | 51.6° |

[1] Local time of equator crossing for satellites with sun-synchronous orbit (a=ascending, d= descending)
[2] Local time of measurement made at equator crossing for satellites with sun-synchronous orbit (a=ascending, d= descending)

**Table S3**: Atmospheric constituent climatologies from limb-viewing satellite instruments submitted to the SPARC Data Initiative archive, listed by instrument. Preliminary version of Table 1.1 of the SPARC-DataInitiative (2013) report (in preparation):

| | $O_3$ | $H_2O$ | $CH_4$ | $N_2O$ | $CCl_3F$ | $CCl_2F_2$ | CO | HF | $SF_6$ | NO | $NO_2$ | $NO_x$ | $HNO_3$ | $HNO_4$ | $N_2O_5$ | $ClONO_2$ | $NO_y$ | HCl | ClO | HOCl | BrO | OH | $HO_2$ | $CH_2O$ | $CH_3CN$ | aerosol |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ACE-FTS** | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | | | x | | |
| **Aura-MLS** | x | x | | x | | | x | | | | | | x | | | | | x | x | x | | x | x | | | |
| **GOMOS** | x | | | | | | | | | | x | | | | | | | | | | | | | | | x |
| **HALOE** | x | x | x | | | | | x | | x | x | x | | | | | | x | | | | | | | | |
| **HIRDLS** | x | | | | x | x | | | | | x | | x | | | | | | | | | | | | | |
| **LIMS** | x | x | | | | | | | | | x | | x | | | | | | | | | | | | | |
| **MAESTRO** | x | | | | | | | | | | | | | | | | | | | | | | | | | |
| **MIPAS** | x | x | x | x | x | x | x | | x | x | x | x | x | x | x | x | x | | x | x | | | | x | | |
| **OSIRIS** | x | | | | | | | | | | x | x$_d$ | | | | | x$_m$ | | | | x | | | | | x |
| **POAM II** | x | | | | | | | | | | x | | | | | | | | | | | | | | | x |
| **POAM III** | x | x | | | | | | | | | x | | | | | | | | | | | | | | | x |
| **SAGE I** | x | | | | | | | | | | | | | | | | | | | | | | | | | |
| **SAGE II** | x | x | | | | | | | | | x | | | | | | | | | | | | | | | x |
| **SAGE III** | x | x | | | | | | | | | x | | | | | | | | | | | | | | | x |
| **SCIAMACHY** | x | x | | | | | | | | | x | x$_d$ | | | | | | | | | x | | | | | x |
| **SMILES** | x | | | | | | | | | | | | x | | | | | x | x | x | x | | x | | x | |
| **Odin/SMR** | x | x | | x | | | x | | | x | | | x | | | | x$_m$ | | x | | | | | x | | |
| **TES** | x$_t$ | | | | | | x$_t$ | | | | | | | | | | | | | | | | | | | |
| **UARS-MLS** | x | x | | | | | | | | | | | x | | | | | | x | | | | | | | |

*Legend:*
x available
$x_d$ climatology derived with the help of a chemical box model
$x_m$ merged and derived $NO_y$ climatology using OSIRIS $NO_2$ and Odin/SMR $HNO_3$ data
$x_t$ Climatologies from Nadir-viewing satellites (TES)