Emission Database for Global Atmospheric Research (EDGAR):

- [http://www.mnp.nl/edgar/model/](http://www.mnp.nl/edgar/model/)
- emphasis on anthropogenic sources
- annual CO$_2$, CO, CH$_4$, SO$_2$, NOx, NH$_3$, VOC for 2000 (version 32FT)
- auxiliary inventory contains aircraft annual NOx and VOC

Precursors of Ozone and their Effects in the Troposphere (POET):

- [http://www.aero.jussieu.fr/project/ACCENT/POET.php](http://www.aero.jussieu.fr/project/ACCENT/POET.php)
- roots in GEIA and EDGAR inventories
- CO, NOx, and speciated VOCs (15) for 1990 - 2000
- annual values for anthropogenic sources and monthly for biomass sources

Aerosol Intercomparison (Aeroicom):

- [http://nansen.ipsl.jussieu.fr/AEROCOM/emissions.html](http://nansen.ipsl.jussieu.fr/AEROCOM/emissions.html)
- SO$_2$ (industries, power plants, volcanoes), POM, EC (fossil fuels and biomass burning), sea-salt, dust, DMS, and “effective” SOA for 2000
- daily (sea-salt, dust, DMS), monthly (biomass burning, SOA), and annual (others) values
- log-normal aerosol size distribution parameters, injection altitudes
• **Bond**: annual black carbon and primary organic carbon for 1996
• **Guenther**: monthly biogenic VOCs generated using MEGAN
• **Lavoue**: monthly black carbon and primary organic carbon for 1995 - 1997
• **Andres & Kasgnoc**: 25-year averaged of volcanic SO\textsubscript{2}
• **Price et al.**: monthly lightning NO\textsubscript{x} averaged between 1983-1990
• **Kettle et al.**: monthly DMS based on 1972-1998 oceanic measurements
Can these emissions be used for regional models?
Emission Inventories: Regional Modeling
Jerome Fast and Laura Gallardo Klenner

Marcelo Mena currently developing regional emissions based on population & other proxies

CO, $\Delta x = 45$ km

POA, $\Delta x = 45$ km

DMS, $\Delta x = 45$ km

Values interpolated from ship measurements

CO, $\Delta x = 15$ km

POA, $\Delta x = 15$ km

DMS, $\Delta x = 15$ km

emissions “smeared over many smaller model cells

$\square = \sim 7 \times 7$ cells
## Emission Inventories: Partial Wish List
*Jerome Fast and Laura Gallardo Klenner*

<table>
<thead>
<tr>
<th>Property</th>
<th>What Modelers Need</th>
<th>What Modelers Get</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal Spatial Resolution</td>
<td>4 - 10 km² preferred</td>
<td>1 x 1° at best</td>
</tr>
<tr>
<td>Vertical Spatial Resolution</td>
<td>Point source stack heights, converted to model vertical level</td>
<td>None. (Exception: Volcano heights usually available, but vertical extent/location of emissions must still be estimated)</td>
</tr>
<tr>
<td>Temporal Resolution</td>
<td>Hourly, with a diurnal cycle</td>
<td>Annual totals for anthropogenic species; seasonal (sometimes monthly) totals for biogenic and biomass burning species</td>
</tr>
<tr>
<td>VOC Emission Speciation Profile</td>
<td>VOC emissions speciated according to surrogate hydrocarbon compounds used in a given model’s chemical mechanism.</td>
<td>Total amount of VOCs. Units often unclear (e.g., moles—of what? Carbon? CO? CO₂?; tons [metric or English?]—again of what?)</td>
</tr>
<tr>
<td>Emission Type</td>
<td>Total (Anthropogenic + Biogenic) Emissions for a Given Species</td>
<td>Often separate inventories exist for different source types (Examples: anthropogenic SO₂, oceanic ship track SO₂, volcanic SO₂; anthropogenic NOx, soil NOx, lightning NOx, oceanic ship track NOx, aircraft NOx). Usually in different formats with different spatial &amp; temporal scales.</td>
</tr>
<tr>
<td>Aerosol Composition</td>
<td>Particle emissions segregated into chemical components corresponding to the aerosol chemical mechanism used in a given model</td>
<td>Some estimates of black carbon and organic carbon emissions available; common assumption that 2.5% of sulfur emissions are aerosol sulfate (remaining 97.5% is gaseous SO₂)</td>
</tr>
<tr>
<td>Aerosol Size Distribution</td>
<td>Particle emissions segregated into bins or modes used in a given model</td>
<td>“You’re not serious, are you?” (Actual quote from an inventory developer)</td>
</tr>
</tbody>
</table>

*from Elaine Chapman (PNNL)*
Compiled from Chilean National Commission for the Environment (CONAMA) Annual Emission Estimates of SO$_2$ for 2005

Latest information (SO$_2$, NOx, etc.) for power plants available
• **What inventories are most appropriate for VOCALS modeling?**
  - Do current $1^\circ \times 1^\circ$ inventories need to be adjusted to 2008? What assumptions are required?
  - Do we need SeaWiFS derived DMS for field campaign period?

• **Should modelers use the same emission inventories?**
  - Easier said than done.
  - Would 2008 (most appropriate for field campaign period) be available in a short period of time when modelers will start to perform their research, or should we rely on 2007 or older estimates?
  - Issues of consistency between regional and global models. Emissions used for regional models would need to be “aggregated” to scales compatible for global models, but then this would depart from standard global $1^\circ \times 1^\circ$ inventories.