AeroCom for HTAP

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Background:

The Unite Nations' Task Force on Hemispheric Transport of Air Pollution (TF HTAP) is an international scientific cooperative effort to improve the understanding of the intercontinental transport of air pollution across the Northern Hemisphere. TF HTAP was organized in 2005 under the auspices of the UNECE Convention on Long-range Transboundary Air Pollution (LRTAP Convention). In 2010, TF HTAP produced the first comprehensive assessment of the intercontinental transport of air pollution in the Northern Hemisphere, in which the AeroCom community had made important contributions. In 2012, TF HTAP launched a new phase of cooperative experiments and analysis that is intended to inform the LRTAP Convention and other multi-lateral cooperative efforts, as well as national actions to decrease air pollution and its impacts. HTAP will rely heavily on the AeroCom community to provide assessment of hemispheric transport of aerosols and their impacts (HTAP Work Package 3.5). Therefore AeroCom participation in the HTAP model experiment is crucial (More information at http://htap.org).

Objectives:

- Estimate the relative contributions of regional and extra-regional sources of aerosols, including anthropogenic, dust, and biomass burning aerosols, in different regions
- Define source/receptor relationships in the context of surface air quality and vertical amount
- Evaluate the model simulations to characterize the uncertainty in the estimates of regional and extra-regional contributions and understand the differences between models
- Assess the emission and transport impacts on regional and global air quality, ecosystems, human health, and climate

Model experiments:

Years: 2008-2010

Emissions:

- Anthropogenic (by sectors): HTAPv2, available at http://edgar.jrc.ec.europa.eu/htap_v2/index.php?SECURE=123
- Biomass burning: recommended – GFED3 daily; option – GFED3 monthly or hourly. Available links/information at http://www.globalfiredata.org/Data/index.html
- Natural: dust and sea salt – model calculated; volcano – Thomas Diehl at http://aerocom.met.no/download/emissions/HTAP/

Regions:

- Two-tiered set of regional definitions (**Figure 1**)
- Tier 1 regions: Both source and receptor regions. There are 17 regions including the whole globe, the oceans, Arctic, Antarctic, and 13 land mass regions

- Tier 2 regions: The Tier 1 regions are divided into 60 subregions that can be used individually or as groups in particular cases as source or receptor regions
- Region masks at http://iek8wikis.iek.fz-juelich.de/HTAPWiki/WP2.1

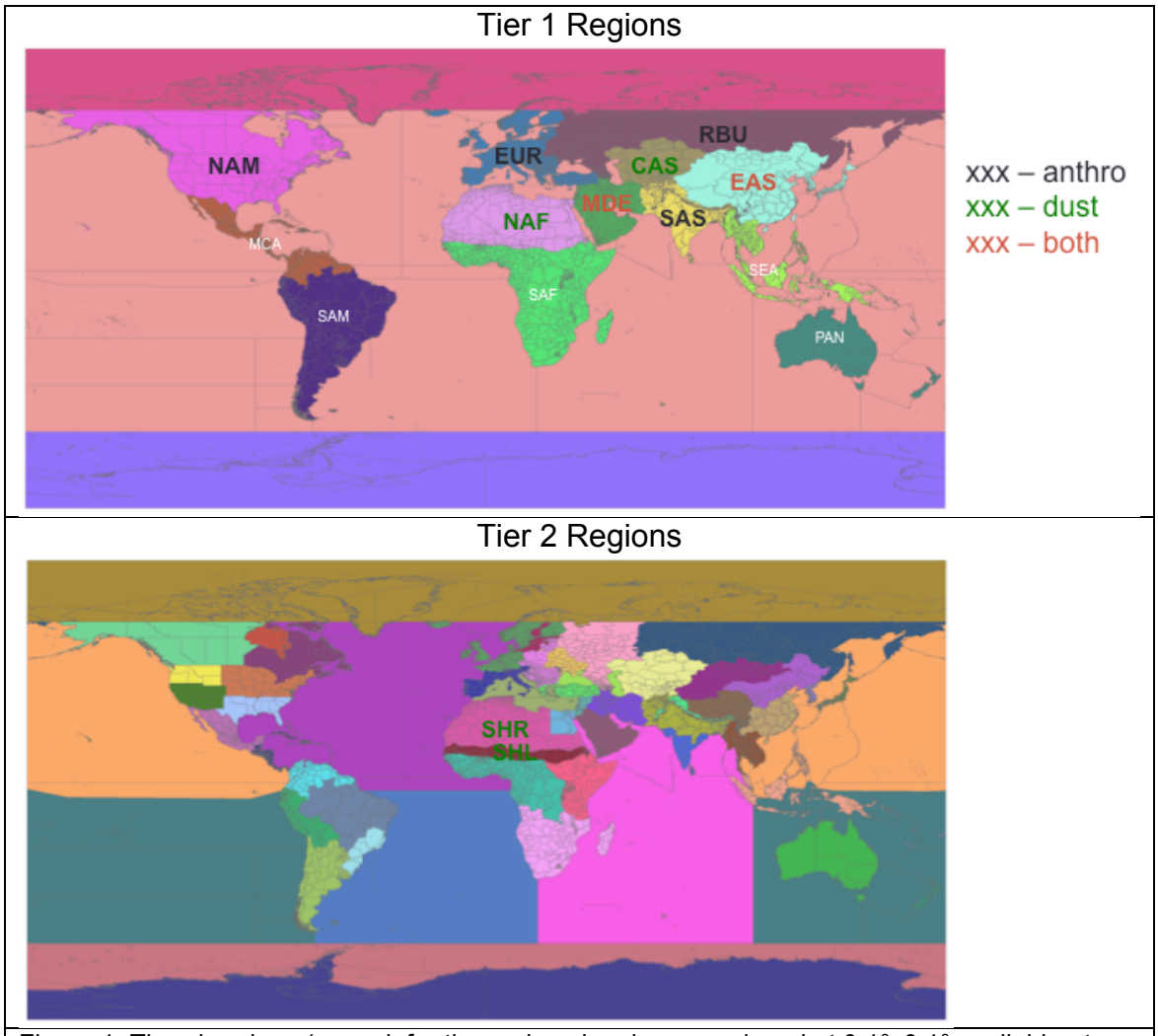

Figure 1. Tiered regions (a mask for the regions has been produced at 0.1°x0.1° available at http://iek8wikis.iek.fz-juelich.de/HTAPWiki/WP2.1).

Simulations: (Also see the AeroCom wiki page experiments table for regions, perturbations, and priorities.)

High priority (H):

1. 2008-2010: Base simulation (global, all emissions; use 2010 anthropogenic emission for 2009 run)
2. 2010: 20% reduction by land-based pollutant emissions in GLO, NAM, EUR, EAS, SAS, RBU, MDE (leave aircraft and shipping emission as in H1)
3. 2010: zero-out dust emissions in EAS, CAS, MDE, NAF (or separate NAF by SHR and SHL use Tier-2 mask)
4. 2010: zero-out fire emissions in GLO (will also be used for A3-BB experiment)
5. 2010: 20% reduction by sector emissions of TRN, PIN, and RES globally

Medium priority (M):

1. 2010: zero-out fire emissions in NAM, RBU, SEA, SAF, SAM
2. 2010: zero-out dust emissions separately in Sahara and Sahel if not done in the High Priority runs
3. 2010: 20% reduction by sector emissions in NAM, EUR, EAS, SAS, RBU, MDE
4. 2010: Other regions
5. 2010: Reduce GLO fire emission by 50% (GFED3 emission × 0.5), increase by a factor of 2 (GFED3 × 2), increase by a factor of 5 (GFED3 × 5) (will be used for A3-BB experiment)

Model output specification: See http://iek8wikis.iek.fz-juelich.de/HTAPWiki/WP2.2

Timeline:

- Start model simulations in February 2014
- Simulation of H1 by March-April 2014 (report initial results at HTAP workshop in May 2014)
- Simulation of H2 by May-June 2014 (reportable at HTAP workshop in May 2014 for limited number of models that finished the H2 runs)
- Other H simulations by August 2014 (report results at the AeroCom workshop in September 2014)