GLOBAL EMISSIONS INVENTORY ACTIVITY (GEIA)

The goal of the GEIA (Global Emissions Inventory Activity) of AIMES is to quantify the anthropogenic emissions and natural exchanges of trace gases and aerosols that drive Earth system changes.

GEIA was created in 1990 as part of the IGAC/IGBP project. At that time, only a very limited number of inventories existed, and GEIA developed a database providing a single inventory for a specific year (in general 1985 or 1990) for a large number of species. In 2002, GEIA organized a review of the state of the knowledge on emissions for each of the compounds in the database. These activities have been included in the GEIA website at http://geiacenter.org/ with the help of the GEIA center, which has been supported by NASA and NSF since 1992. The center is directed by P. Middleton, who has been responsible for the GEIA web site, and the development of the GEIA network, which currently includes about 500 people around the globe.

GEIA was reorganized as a fast track IGBP initiative, and became in 2005 a sub-project of AIMES. During this reorganization of GEIA, several themes were proposed, within which activities have/will be identified that are related to integrated or international projects, and/or driven by scientific or societal issues. GEIA is currently chaired by C. Granier and A. Guenther.

In 2004, a network of scientific institutions called ACCENT (Atmospheric Composition Change: A European Network) was established by the European Commission. The network is coordinated by S. Fuzzi, who is also the IGAC chairman. Within this network, the activity on emissions is coordinated by C. Granier. The network has provided limited funding, since the Spring of 2004, for the organization of joint GEIA and ACCENT-emissions workshops and for the development of a new emissions database.

The activities organized within each GEIA theme are summarized below.

Theme 1: New inventories

With the help of the ACCENT network, a new GEIA database has been developed, and is available since the summer of 2005. This new database of global and regional emissions, called GEIA-2, aims at including the most recent emissions inventories for the past (since 1900), the present and the future (up to 2000). Up to now, 2 global inventories (POET for the 1990-2000 period, and RETRO for the 1960-2000 period) have been included, and more will be available soon (IIASA, EDGAR.4, ABBI, …). The inventories are available for 2 formats and tools will be very soon available for format conversion and regridding. Other tools such as interactive graphics will also be developed. The inventories are available both from the GEIA and ACCENT web sites. A forum has recently been established on the GEIA web site, so that people wanting to ask questions, make comments or share experience with the inventories can give inputs.

Theme 2: Intercomparisons and evaluations

The goal of this theme is to identify the main uncertainties remaining in emissions inventories to provide input for improvements. Workshops will be organized in the coming months in relation to this theme. A first workshop (organized by C. Liousse and J.M.

Gregoire) will be held in Toulouse, France on December 14-15, to discuss biomass burning datasets. The goal of this workshop is to identify a first set of data to be used for detailed intercomparisons. An other workshop will be held early 2006 in Ispra, Italy, in which emission factors used in anthropogenic emissions will be discussed and compared. This workshop is organized by J. Olivier and J. VanAardenne.

Theme 3: Prioritize observations

Within this theme, the plan is to identify and prioritize measurements needed to improve emissions and deposition estimates, in collaboration with other IGBP projects. No significant work has been yet carried out within this theme.

Theme 4: Database of driving variables

The development of such a database will provide a set of data that are needed for the construction of inventories, as well as for emissions algorithms or emission models. A workshop partially funded by the ACCENT network was held in Paris in April 2005 for better defining the database. Pilot projects were identified, and a proposal, endorsed by AIMES and by IGBP, was sent to the French CNES, which was accepted in the summer of 2005. One person has started to work on this project in October 2005. The development of the database will also be achieved in collaboration with the Atlas project of AIMES.

Theme 5: Temporal variations

Within this theme, temporal variations emissions will be quantified for different scales (i.e., diurnal, weekly and seasonal), in order to help the analysis of observations. No specific work can yet be reported for this theme, though contacts have been made with the participants to the GEMS “chemical weather” project of the European Commission, in which temporal profiles of emissions will be developed.

Theme 6: Chemical exchange models

This activity has to be developed in collaboration with other AIMES and IGBP projects. A joint workshop with the “Biosphere-Atmosphere interactions” of the ACCENT network is planned for the Spring of 2006. Planning for this workshop will benefit from the discussions at the AIMES steering committee meeting

Theme 7: Validation using global/regional chemistry-transport models

Discussions on inverse modeling results took place during different workshops over the past few years, but specific activities need to be defined within GEIA.

Organization:

A GEIA open meeting was organized in June 2004 in Paris, where about 100 people attended. The next GEIA meeting will take place in June/July 2006. Due to funding limitations, the full GEIA steering committee has not met yet, and we hope that a SC meeting can be organized together with the GEIA meeting. The composition of the SC will be submitted to AIMES during the SC meeting.