

The Global Emissions Inventory Activity (GEIA)

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Abstract

The objective of the GEIA project is to bring together people, analyses, data, and tools to quantify the anthropogenic emissions and natural exchanges of trace gases and aerosols that drive Earth system changes and to facilitate the use of this information by the research, assessment and policy communities. The presentation will provide an overview of the current activities of GEIA.

We will present the GEIA network, which currently includes over 1000 people around the globe, and the plans to extend this network to different communities working on environmental changes issues. We will also present our plans to develop within the GEIA Center (www.geiacenter.org) a new database of scientific papers as well as national and international reports dealing with emissions issues. We will also present the main conclusion of the GEIA conference, which took place in October 2009.

Given the differences often found among data sets, we will discuss the formation of a GEIA working group composed of emission developers and modelers who will compare data sets and implications for modeling.

It has been recognized that consistent information on emissions at the global and regional scale is required, as well as an accurate quantification of emissions in the different megacities of the world. In order to develop these perspectives, GEIA will begin strengthening links with different key regions: we will discuss the plans for developing regional centers through corporation with other entities and individuals working in these regions.

Introduction

The goal of the GEIA (Global Emissions Inventory Activity) project is to bring together people, analyses, data, and tools (1) to quantify the anthropogenic emissions and natural exchanges of trace gases and aerosols that drive earth system changes and (2) to facilitate use of this information by the research, assessment and policy communities.

GEIA is a sub-project of three international projects of the International Geosphere-Biosphere Program (IGBP, www.igbp.net): it is part of AIMES (Analysis, Integration and Modeling of the Earth System, <http://www.imes.ucar.edu/>), IGAC (International Global Atmospheric Chemistry Project, www.igac.noaa.gov) and iLEAPS (Integrated Land Ecosystem-Atmosphere Processes Study, www.ileaps.org).

During the years 2004-2009, GEIA established also strong links with the European Network called ACCENT (Atmospheric Composition Change: A European Network, www.accent-network.org), which coordinates the European activities on atmospheric composition change. During the presentations, we will provide recent information on the follow-up of the ACCENT network, which will start at the beginning of 2011.

GEIA is currently chaired by Claire Granier (LATMOS/ IPSL, France and CSD/ERSL/NOAA, USA) and Alex Guenther (NCAR, USA). The GEIA steering committee recently appointed two new co-chairs, who will start to coordinate GEIA activities in 2011.

The presentation will highlight recent GEIA activities in support of improving, evaluating and using surface emissions, as well as the GEIA future plans. The paper includes the following sections:

1. Further development of the GEIA/ACCENT emissions web portal,
2. Development of the ECCAD database of driving variables,
3. Intercomparison of biomass burning emissions,
4. Organization of the 2009 GEIA conference
5. GEIA web site updates and communication with the GEIA network.
6. GEIA future plans

GEIA Activities

1. The GEIA/ACCENT data portal

The GEIA/ACCENT data portal has been in operation since 2005. It provides the access to different sets of surface emissions, for both gaseous and particulate species. The data are provided in a common format, either in ASCII or in NetCDF.

The portal can be accessed through the GEIA web site (<http://www.geiacenter.org>), the ACCENT website (<http://www.accent-network.org>), or directly through the portal website: <http://www.aero.jussieu.fr/projet/ACCENT/database.php>.

A new version of the emissions portal will be developed during the next few months: new inventories will be added, and we will improve the documentation and access to the different datasets.

2. The ECCAD database

During the past two years, ECCAD (Emissions of atmospheric Compounds and compilation of ancillary data), a database giving access to the data used in parameterizations of anthropogenic and natural emissions has been developed. This database was recently further extended, so that it includes as well all the emissions data available in the GEIA/ACCENT emissions portal.

ECCAD currently includes data on surface emissions as well as data on population, ecosystems, active fires and burned areas, land-use change, etc. Different sets of tools are available, such as the calculation of emitted totals at the global scale or for different regions. More tools are under development. The database has been tested and can be accessed through the site <http://ether.ipsl.jussieu.fr> and going to ECCAD. Since the access to the website will be changed during the coming weeks, all interested users are invited to contact directly the authors of the paper to obtain an access to ECCAD.

3. Evaluation of emissions inventories

Within GEIA and other international projects, several groups have started to perform detailed evaluations of currently available surface emissions inventories.

As part of the development of an emissions inventory used in the simulations for the next IPCC assessment (AR5: 5th Assessment Report), a group involving several GEIA participants started to systematically compare global and regional inventories of different species. A publication discussing the first set of results will be submitted during the coming weeks. Once published, the results of these evaluation studies will be made available to the community through the GEIA website.

Biomass burning emissions are driving the interannual and seasonal variations of several atmospheric compounds. An intercomparison exercise was organized within GEIA and ACCENT to better characterize the spatial and temporal variations of these emissions. The exercise is called INTERMEDE-BBSO (INTERcomparison of MEthods to DERive global Burned Biomass from Satellite Observations). Two papers discussing these results are currently under open review, i.e. Lioussé et al., 2010 (Western african aerosols modelling with updated biomass burning emission inventories in the frame of the AMMA-IDAF program, *Atmos. Chem. Phys. Discuss.*, 10, 7347–7382, 2010), and Stroppiana et al., 2010 (Comparison of global inventories of monthly CO emissions derived from remotely sensed data, *Atmos. Chem. Phys. Discuss.*, 10, 17657-17697, 2010).

4. Organization of the GEIA 2009 Conference

GEIA organized an international conference on emissions on October 26-28, 2009 in Oslo, Norway. The title of this conference was: “ Emissions of Gases and Aerosols: Progress, Modeling needs and Emerging Issues”. About 100 scientists from 32 countries participated in the GEIA conference. The sessions included (1) Anthropogenic emissions at different scales, (2) Long-term variations in emissions, (3) Biomass burning emissions, (4) Inverse modeling and the

use of observations to quantify emissions, and (5) Natural emissions. Most of the oral presentations and posters presented at the conference are available from the GEIA web site. A report, giving the main issues discussed at the conference, is also available from the GEIA web site.

5. GEIA web site updates and communication with GEIA network

In addition to the workshops and other GEIA-related meetings throughout the year and initiation of projects to enhance data development, GEIA strives to grow a strong international network and keep these colleagues informed of developments in emissions. This communication and outreach effort continues to take place formally through the GEIA web site and email communications with the growing GEIA network. Interested parties are encouraged to visit (<http://www.geiacenter.org>), and join the network.

6. GEIA Future plans

The future plans for GEIA were discussed during the last meeting of the GEIA Steering Committee, which took place in Oslo, just following the GEIA conference. GEIA is planning to support the following activities:

- Expand the GEIA email network
- Update the information available from the GEIA website
- Update the emission reviews available from the GEIA website
- Develop a new database of papers and reports on emissions
- Start to organize a working group on emissions analyses
- Expand the megacities-regional-global connections, for example through the development of a few regional centers
- Strengthen the links between GEIA and AIMES, IGAC and iLEAPS.