



**JOINT ACCENT/GEIA Workshop on
Anthropogenic emissions for non-OECD countries in global inventories
First Announcement**

8-10 February, at IIASA, Laxenburg, Austria

1 Introduction

Accurate emission inventories are an essential prerequisite for the design of cost-effective mission strategies to improve air quality as well as to control emissions of greenhouse gases. The linkages in the formation and transport of pollution between the local, regional and global scales are receiving increasing recognition and a variety of atmospheric chemistry models address these aspects. This puts new demand on the emission inventories that are used as input to these models. They need to be accurate at the local scale yet cover the entire globe with a consistent approach.

The workshop reviewed, for selected source sectors, the information contained in existing emission inventories for different regions in the world. In particular, the workshop aimed at

- bringing together key information on sector- and region-specific factors that determine emission factors in different regions of the world, especially in developing countries, the former Soviet Union and the Middle East,
- evaluating the assumptions made in present emission inventories on basic emission factors and technology mixes and their historic trends,
- developing a better understanding on appropriate emission factors for key sectors in these countries.

As a first step, the workshop focused on the following sectors

- mobile (road and off-road) land-based sources,
- combustion in the power plant and industrial sectors,
- use of biofuel in the residential sector,
- burning of agricultural waste

for emissions of greenhouse gases CH₄ and N₂O, the air pollutants NO_x, CO, NMVOC, NH₃, SO₂ and primary aerosols (BC/OC; PM_{10-2.5-1}).

The workshop was bringing together experts with proven records on compiling emission inventories for different parts of the world. Participants reviewed information contained in existing global and regional scale emission inventories and discussed in parallel working groups appropriate improvements for key sectors in different world regions. In the interest of efficient discussions, participation was limited to a maximum number of 30 experts.

A background paper was circulated before the workshop.

As an activity of the ACCENT European Network of Excellence on Atmospheric Composition Change, the workshop was jointly organized by the Institute for Environment and Sustainability of the Joint Research Centre of the European Commission (JRC-IES), the International Institute for Applied Systems Analysis (IIASA), and the Netherlands Environmental Assessment Agency (MNP). Limited funds were available to support travel of participants from developing countries.

2 Structure and format of the workshop

As an activity of the ACCENT European Network of Excellence on Atmospheric Composition Change, the workshop was jointly organized by DG-JRC (IES), IIASA and MNP. About 20 experts in the field of emission inventory construction were invited to attend this international workshop. The aim of workshop was to bring experts from different world regions together to discuss key information on constructing emission inventories in non-OECD countries.

Based on overview presentation and groups discussions the workshop resulted in the following:

- Overview of existing approaches for global emission inventories (e.g. RAINS, EDGAR)
- Review of weak elements by world region
- Review of weak elements by sector, for:
 1. Mobile land based transport,
 2. Small stationary combustion sources,
 3. Large scale stationary combustion Possibilities for further collaboration

3 Conclusions

Main conclusions from the sector sessions were:

Land based transport:

1. Countries that require special attention are India and Brazil due special vehicle types and fuel mixing and China and other fast growing economies.
2. Largest uncertainties that were identified are
 - Fraction of 'super-emitters' and their emission factors
 - Unregistered vehicles (missing fuel statistics/mileage data)
 - Mixture of vehicle types and car maintenance

Small scale stationary combustion

1. Use of local knowledge is essential to determine the technologies in use
2. Largest uncertainties are:
 - Biofuel emission factors (to much variations in burning technologies (household stoves)
 - Registration of non-commercial biofuel use and non-registered fossil fuel use

Large scale stationary combustion

1. Principal activity data is readily available through international statistical datasets
2. Exact location of large point important for spatial resolution
3. Large uncertainties are:
 - Assessment of penetration and actual efficiency of abatement measures
 - Data availability of technological splits
 - Industrial processes

A detailed set of conclusions will be developed in the coming month.

3.1 Discussed Issues

Currently a variety of emission inventories covering past and future emissions of greenhouse gases and air pollutants exist. Some inventories provide a world-wide coverage such as RAINS, EDGAR, GEIA, RETRO, other deal with regional estimates (TRACE-P), specific compounds (e.g. Bond dataset on BC/OC) or provide an official government publication on emission trends regarding specific emission reduction scheme's (UNFCCC; LRTAP).

Due to issues of data availability, changes in socio-economic development and limited resources to construct emissions inventories, several questions on the quality of non-OECD emission inventories should be addressed:

Current situation:

- Are the emission trends in non-OECD countries as found in various emission inventory studies a realistic representation of developments in the specific countries or regions?
- Are the absolute emission values an accurate representation of the actual emissions within countries?
- For which sectors do the region or sector experts believe that the available data/information is insufficient to provide a realistic emission estimate?
- What is known about the spatial and temporal resolution of emission in non-OECD countries?

Improvements/future:

- Which datasets on activities, technologies and emission factors are currently available for inventory construction
- To what extent can country specific emission factors be made available from measurement or other studies and to what extent should we rely on "default" emission factors.
- Which programs are in place to improve insight in emissions from OECD countries

JOINT ACCENT/GEIA Workshop on Anthropogenic emissions for non-OECD countries in global inventories Agenda

Time	Topic	Speakers
Wednesday February 8, 2006		
09:30-09:45	Welcome and objectives of the meeting	Dr. M. Amann
09:45-10:00	Introduction round	-
Session 1: general issues in constructing non-OECD emission inventories		
10:00-10:25	Issues in developing emission inventories for non-OECD countries: RAINS	Mr. Z. Klimont
10:25-10:50	Issues in developing emission inventories for non-OECD countries: EDGAR	Dr. J. Olivier
10:50-11:00	Coffee break	-
11:00-11:30	EI development in SE Asia	Dr. D. Streets
11:30-11:45	EI development in Central Asia	Dr. K. Mareckova
11:45-12:15	EI development in countries of the FSU	Dr. V. Tsibulsky Dr. S. Kakareka
12:15-13:45	Lunch break	-
13:45-14:15	EI development in Latin America	Mr. D. Gomez
14:15-14:45	EI development in Africa	Prof. J. Saka
14:45-15:00	Coffee break	-
Session 2: Mobile (road and off-road) land based sources		
15:00-15:30	Overview presentation (IIASA and EDGAR experience)	Dr. J. Cofala Dr. J. Olivier Dr. A. Garg Dr. L. Ntziachristos
15:30-18:00	Discussion round session2	
18:00	Closure, departure to hotel	-

Thursday February 9, 2006

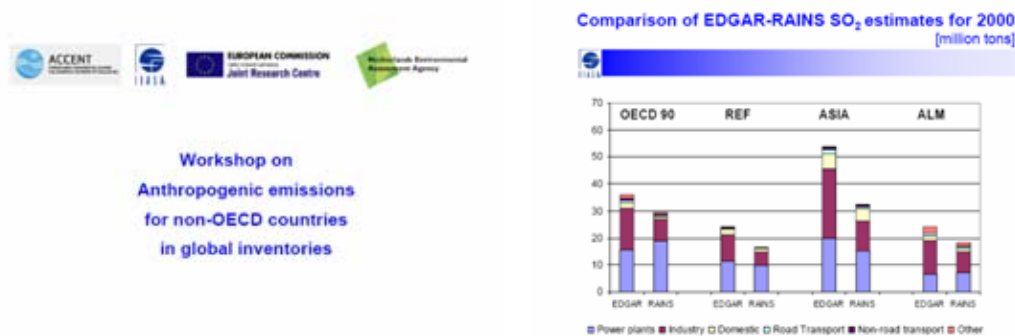
Session 3: Small-scale stationary combustion (incl. agr. waste burning)		
09:30-10:15	Overview presentation	Prof. Dr. Y. Tonooka Dr. C. Junker Prof. Dr. S. Garivait
10:15-10:30	Coffee break	
10:30-12:30	Discussion round session 3	-
12:30-14:00	Lunch break	-
14:00-15:00	Continuation session 3	-
15:00-15:15	Coffee break	-
Session 4: Large-scale combustion		
15:15-15:45	Overview presentation	Dr. J. Cofala
15:45-18:00	Discussion round session 4	-
18:00	Closure and departure for social event	-

Friday February 10, 2006

09:30-11:00	Continuation session 4	-
11:00-11:15	Coffee break	-
11:15-12:00	Links to other activities and arrangements for future work	H. Vallack J. Olivier
12:00-13:30	Lunch	
13:30-14:15	Presentation by rapporteurs	J.Olivier (Mobile) J.v.Aardenne (Small-scale comb) Z.Klimont (Large-scale comb)
14:15-15:30	Discussion on remaining outstanding issues	-
15:30 closure of meeting		

4 Presentations

Dr. M. Amann: Welcome and objectives of the meeting



Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Amann_Intro.pdf

Mr. Z. Klimont: Issues in developing emission inventories for non-OECD countries: RAINS



Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Klimont_session1.pdf

Dr. J. Olivier: Issues in developing emission inventories for non-OECD countries: EDGAR



Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Olivier_session1.pdf

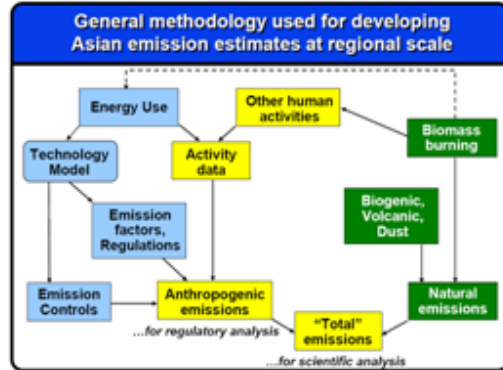
Dr. D. Streets: EI development in SE Asia

Emission Inventory Construction in Asia

David G. Streets
Argonne National Laboratory, USA

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IIASA, Austria
February 8-10, 2006



Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Strees_session1.pdf

Dr. K. Mareckova: EI development in Central Asia



GHG Emission Inventories in ECCA, Mongolia and Balkan countries

Progress achieved in the region within 3 years

UNDP-GEF regional project Capacity building for improving national GHG emission inventory systems, Europe/CIS region

Katarina Mareckova



12 project countries



- Albania
- Armenia
- Azerbaijan
- Croatia
- Georgia
- Macedonia
- Moldova
- Mongolia
- Slovenia
- Tajikistan
- Turkmenistan
- Uzbekistan

Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Mareckova_session1.pdf

Dr. V. Tsubulsky: EI development in countries of the FSU

Emission inventory in Russia

Vladimir Tsubulski

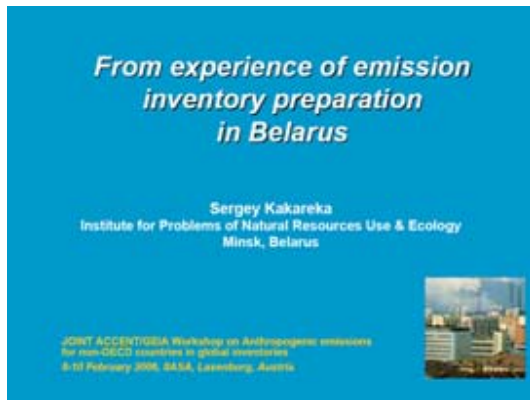
*SRI Atmosphere,
St.-Petersburg, Russia*

The law "On atmospheric air protection" (1999)

1. **technical emission standards** - Ministry of Natural Resources for stationary and mobile pollutant sources, technological processes, equipment per unit material indicators (raw material, manufactured product, run, etc.)
2. **maximum permissible emissions** - territorial bodies of Rostekhnadzor (new federal service for ecological, technological and nuclear supervision) for particular stationary sources of pollutant emissions to the atmosphere and their aggregates (for a plant as a whole)

Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Tsubulsky_session1.pdf

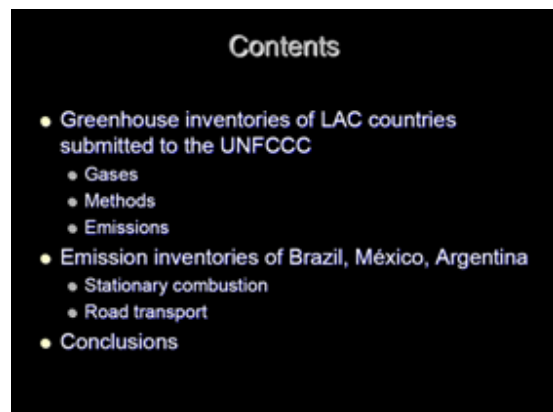
Dr. S. Kakareka: EI development in countries of the FSU



Full presentation:

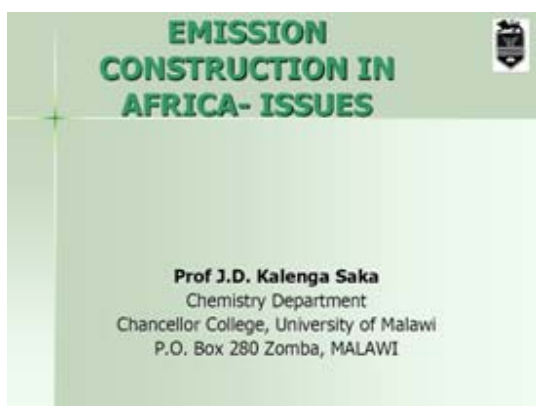
http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Kakareka_session1.pdf

Mr. D. Gomez : EI development in Latin America



Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Gomez_session1.pdf

Prof. J. Saka: EI development in Africa



Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Saka_session1.pdf

Dr. J. Cofala: Mobile (road and off-road) land based sources. Overview presentation (IIASA and EDGAR experience)

Janusz Cofala and Zbigniew Klimont

Assessment of emissions from transport sector

Overview of IIASA's experience

RAINS approach

- Calculate transport emissions at (sub) national level based on
 - Energy consumption and veh-km by source category
 - Emission factors for each vehicle type
 - Efficiencies of emission control technologies
 - Implementation of controls

Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Cofala_session2.pdf

Dr. J. Olivier: Mobile (road and off-road) land based sources. Overview presentation (IIASA and EDGAR experience)

Jos Olivier

Netherlands Environmental Assessment Agency
(MNP, formerly associated with RIVM)

Road transport issues in EDGAR inventory development



Characteristics of Road Transport in EDGAR 3

- One EF per fuel type and source category →
- Road transport 1 EF for gasoline (petrol), diesel and LPG

- No explicit technologies and tech mixes identified in DB, but results of detailed technical studies for ~1990:
 - road transport: Samaras DB developed for GEIA for all countries
 - etc.: 902 own study

FUEL	WORLDWIDE CO2 EMISSIONS (Gt)
UNIFORM	1990.21
GASOLINE	1919.67
PASSENGER CAR	95.72
LEN	45.72
HEV	0.69
MAC < 90 cc	1.69
MAC > 90 cc	1.69
CATERA	139.73
PASSENGER CAR	571.49
LEN	254.62
HEV	483.82
LPG	21.89
PASSENGER CAR	21.89

Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Olivier_session2.pdf


Dr. Garg: Mobile (road and off-road) land based sources. Overview presentation (IIASA and EDGAR experience)

UNEP
RISØ
CENTRE

Transport Sector Emissions

Amit Garg

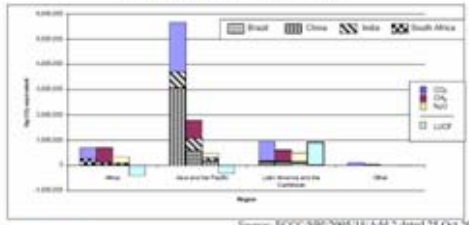
Anthropogenic Emissions for non-OECD Countries in Global Inventories
February 8-10, IIASA, Austria




UNEP
RISØ
CENTRE

Non-Annex I Emissions

Figure 2. Aggregate GHG emissions and removals by region (Gg CO₂ equivalent) for the year 1994 or the closest year reported



Source: IPCC/SRG/2005/18/Ann2 April 25 Oct 2005



Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Garg_session2.pdf

Dr. L. Ntziachristos: Mobile (road and off-road) land based sources. Overview presentation (IIASA and EDGAR experience)

Transport: One slide in response to some of the questions asked

- > Improving the quality
 - Activity Data compared against fuel consumption
 - Using a consistent emission factor dataset
- > Road Transport
 - COPERT Model (Funded by the European Environment Agency)
 - Straightforward, user friendly interface
 - Includes vehicle technologies for years 1970-2010
 - Guarantees "internal" consistency
 - Facilitates a fuel balance check (stat.-calc.)
 - Available at no cost at <http://yergina.eng.auth.gr/mech/lat/copert/copert.htm>
- > Off-road machinery
 - COPERT also includes a (rather old) emission factor dataset for internal combustion engines used in agriculture, forestry, household & gardening, industry, inland waterways, railways



Full presentation:

http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Ntziachristos_session2.pdf

Prof. Dr. Tonooka: Small-scale stationary combustion (incl. agr. waste burning) Overview presentation

Saitama University
Feb.27,2006

Emission Inventory of Aerosols and Their Precursors in China

Yukata Tonooka
Prof. Saitama Univ. Faculty of Economics, Dept. of Social Environmental Planning & Imperial College, Centre for Environmental Policy
e-mail: ytonooka@imfity.com

Emission Inventory of Aerosols and Their Precursors in East Asia

Substances:
Air Pollutants : SO₂, NO_x, CO, NMVOCs, PM₁₀, Hg
Aerosols : BC (Black Carbon), OC (Organic Carbon)
Greenhouse Gases : CO₂, CH₄ (combustion only)
(NH₃ in 2000 by Kannari, Akiyoshi.)

Area : China (by Province)
, Japan, South Korea, North Korea, Mongolia, Taiwan
For Grid Mapping South-East and South Asia area included

Data Year : 2000 – 2001
Grid Size : longitude, latitude, 0.25 deg

Full

http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Tonooka_session3.pdf

presentation:

Prof. Dr. Garivait: Small-scale stationary combustion (incl. agr. waste burning) Overview presentation (IIASA and EDGAR experience)

Development of Inventory of Pollutants Emissions from Open Biomass Burning in the Mekong River Basin Sub-Region

Savitri Garivait, JGSEE

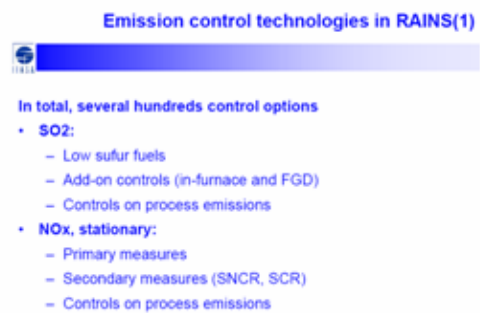
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International Institute for Applied Systems Analysis (IIASA), A-2361 Laxenburg, Austria

Biomass burning – ASEAN countries

[August 2005]

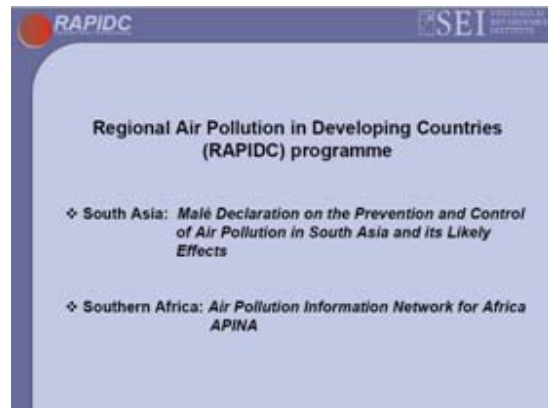
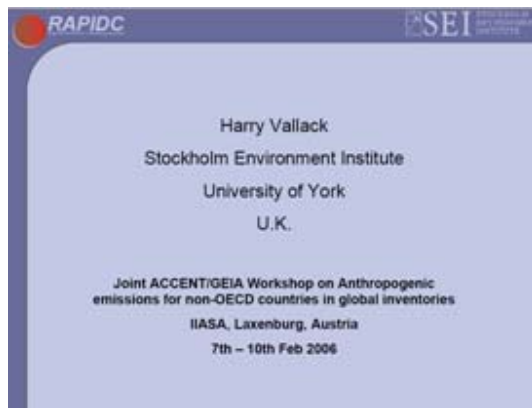
Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Garivait_session3.pdf

Dr. J. Cofala: Large-scale combustion. Overview presentation



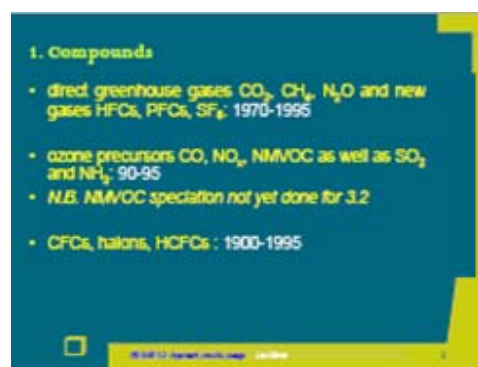
Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Cofala_session4.pdf

H. Vallack: Links to other activities and arrangements for future work



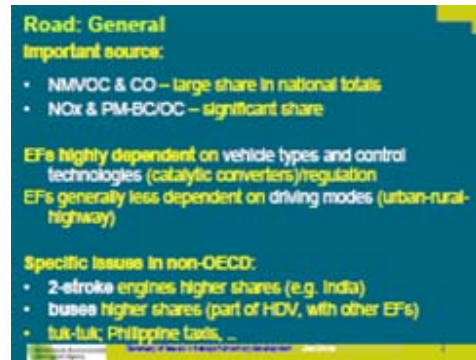
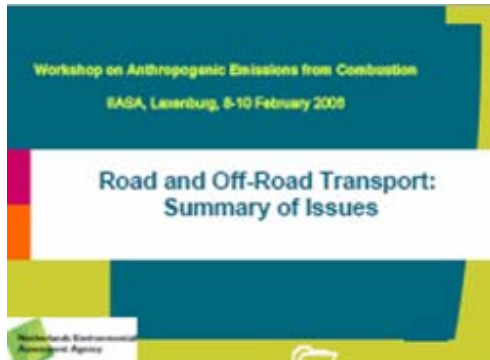
Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Vallack_Friday.pdf

J. Olivier: Links to other activities and arrangements for future work



Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Olivier_Friday1.pdf

J. Olivier: Presentation by rapporteurs



Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Olivier_Friday2.pdf

J.v.Aardenne: Presentation by rapporteurs



Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Aardenne_Friday.pdf

Z. Klimont: Presentation by rapporteurs



Full presentation: http://www.iiasa.ac.at/rains/meetings/ACCENT_GEIA/presentations/Klimont_Friday.pdf