New emission scenarios for air pollutants and methane for Latin America and Caribbean


17th GEIA Conference, 17-19th November, Beijing, China
Developing emissions for the LAC Assessment

• **Background:**
  – Following the UNEP/WMO Black Carbon and Tropospheric Ozone global assessment, the newly founded Climate and Clean Air Coalition (CCAC) called for the improved understanding of regional mitigation potential for key measures. The first regional assessment focuses on LAC region
  – Additional motivation comes from GEIA discussions leading to the WG on LAC emissions where the work will be also continued beyond the current project

• **Approach:**
  – Collect national inventories and background data in a harmonized format,
  – Compare results with the independent model used in the assessment (GAINS),
  – Use local information to improve model parameterization,
  – Develop reference and mitigation scenarios with the model

• **Planned date of publication:** mid 2016.
Regional resolution in the emission model:
Estimated emissions allocated into 0.5°x0.5° longitude-latitude grid

13 regions
• Mexico
• Central America
• Caribbean
• Colombia
• Venezuela
• Ecuador
• Peru
• Brazil
• Bolivia
• Chile
• Paraguay
• Argentina
• Uruguay
Availability and completeness of national emission data* in LAC region

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* Referring to information provided within the LAC Assessment work as of Sept 2015.

Data for various years between 2000 and 2010
Most countries develop national inventories but completeness varies across pollutants and countries

- Key air pollutants and greenhouse gases included, however, particulate matter and black carbon estimates typically not available

- Several inventories miss important sources;
  Number of inventories where particular sector emissions are entirely missing for all species
  - [6] Residential combustion
  - [6] Agricultural waste burning
  - [3] Transport
  - [3] Agriculture
  - [8] Fossil fuel extraction and distribution

- Depending on the regions, provided inventories cover period 2000-2010 but a complete set for any given year not available
Comparison of NOx estimates for countries with near-complete source coverage, kt NO$_2$

**Total NOx**

- Argentina
- Brazil
- Chile
- Colombia
- Ecuador
- Mexico
- Uruguay

**Transport**

- Argentina
- Brazil
- Chile
- Colombia
- Ecuador
- Mexico
- Uruguay

The graphs illustrate the comparison of NOx estimates for countries with near-complete source coverage, showing the total NOx emissions and transport-related emissions.

- Argentina: National (lower), GAINS (higher)
- Brazil: National (lower), GAINS (higher)
- Chile: National (lower), GAINS (higher)
- Colombia: National (lower), GAINS (higher)
- Ecuador: National (lower), GAINS (higher)
- Mexico: National (lower), GAINS (higher)
- Uruguay: National (lower), GAINS (higher)
Sectoral & regional distribution of CH$_4$ emissions in 2010 in LAC; GAINS model – ECLISPE V5a Reference (Klimont et al., in preparation; UNEP, 2016)
Sectoral & regional distribution of BC emissions in 2010 in LAC;
GAINS model – ECLISPE V5a Reference (Klimont et al., in preparation; UNEP, 2016)
Sectoral distribution of emissions in 2010 and future regional changes relative to 2010 (selected pollutants); 
GAINS model – ECLISPE V5a Reference (Klimont et al., in preparation; UNEP, 2016)
Development of regional CH$_4$ & BC emissions for selected sectors, kt

GAINS model, Reference case (Klimont et al., in preparation; UNEP, 2016)

**CH4**

**Coal, oil & gas**

**Agriculture**

**BC**

**Residential combustion**

**Transport**
Development of LAC emissions
CLE vs SLCP mitigation cases
Changes relative to 2010,
GAINS ECLIPSE V5a
(Klimont et al, in preparation; UNEP, 2016)
CH$_4$ mitigation potential for LAC by 2030 and 2050

*Methane emissions in the Reference and Climate scenario and respective mitigation potential in the SLCP mitigation scenarios (UNEP, 2016; draft)*

![Bar chart showing methane emissions and mitigation potential for LAC by 2030 and 2050.](image-url)
Region-specific CH\(_4\) mitigation by 2050, compared to Reference; 
*GAINS model results; Reference -SLCP scenario (UNEP, 2016; draft)*

![Graph showing region-specific CH\(_4\) mitigation by 2050](graph.png)

Legend:
- **Green** (light blue): Agriculture - biogas
- **Red**: Reduction due to non-CH\(_4\) measures
- **Brown**: Industrial waste treatment with gas recovery
- **Beige**: Separation and treatment of biodegradable MSW
- **Blue**: Reduction of gas leakage during distribution
- **Blue shaded**: CH\(_4\) recovery in gas and oil production
- **Purple shaded**: CH\(_4\) recovery in coal mines
Global emission fields developed with the GAINS model available from:

http://www.iiasa.ac.at/web/home/research/researchPrograms/Global_emissions.html
What’s next?

• LAC Assessment publication in 2016 (UNEP, 2016)
  – All collected (and harmonized) emission information and additional data will be in the Annexes
  – Gridded emissions should be also available via ECCAD

• We consider writing a paper summarizing the emission inventory part
  – Starting point is what we have so far
  – Include new information that still should come in the next few months from the network established within the Assessment
  – Extend with the more comprehensive comparison to other global products
  – Extend evaluation part or think of another paper
  – Find new interested contributors

• Contact me here at the meeting or by mail (klimont@iiasa.ac.at) if you want to be part of this, especially if you have:
  – Lots of data,
  – Lots of free time, and
  – Do not need funding