Update on progress of the 2024-2025 work plan

Co-Chairs   Terry Keating (United States)   Tim Butler (Germany)

Vice Chairs   Rosa Wu (Canada)   Jacek Kaminski (Poland)

10th Joint Session of the EMEP Steering Body and the Working Group on Effects
Geneva, September 9-13, 2024

www.htap.org

TF HTAP 2024-25 Work Plan

HTAP3 Modelling Experiments

Global Emissions Mosaics
Continue to explore the extension and expansion of global emissions mosaics, building on HTAPv3 (2000-2018).

O3, PM, S/N Deposition Under Future Scenarios
Organize new global model simulations of future scenarios developed by CIAM, including examination of the role of methane, source attribution methods, link to regional scale (TFMM, MSCW), links to impacts (ICP Veg, ICP Forests?).

Mercury Trends and Source Attribution
Organize new global model simulations, initially to contribute to the Minamata Convention's effectiveness evaluation.

Multi-Pollutant Impacts of Fires
Design a multi-model intercomparison of the multi-pollutant (PM, POPs, metals, O3) impacts of fires to be conducted over the next two work plans.
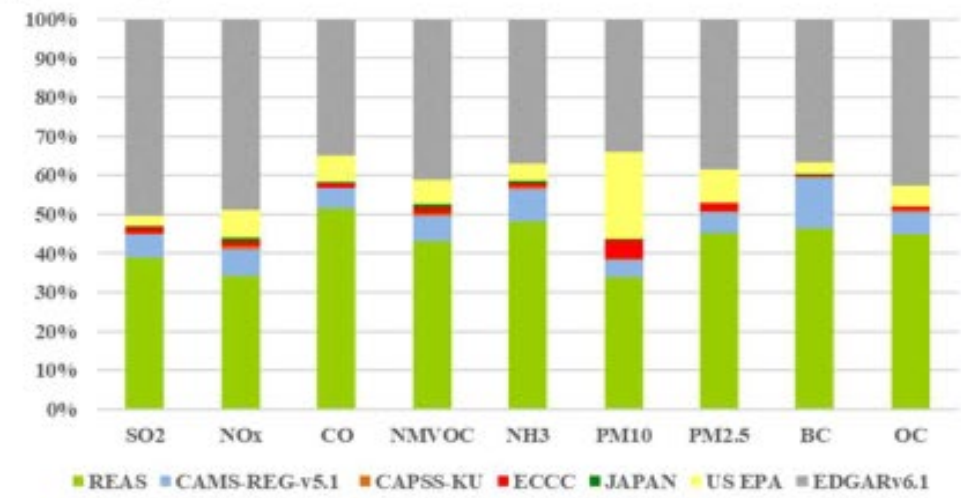
Input to Decision Support Tools
Continue to produce emulators for our multi-model ensembles and incorporate these into screening models and decision support tools (e.g. building on openFASST concept).

The HTAPv3 global mosaic emission inventory
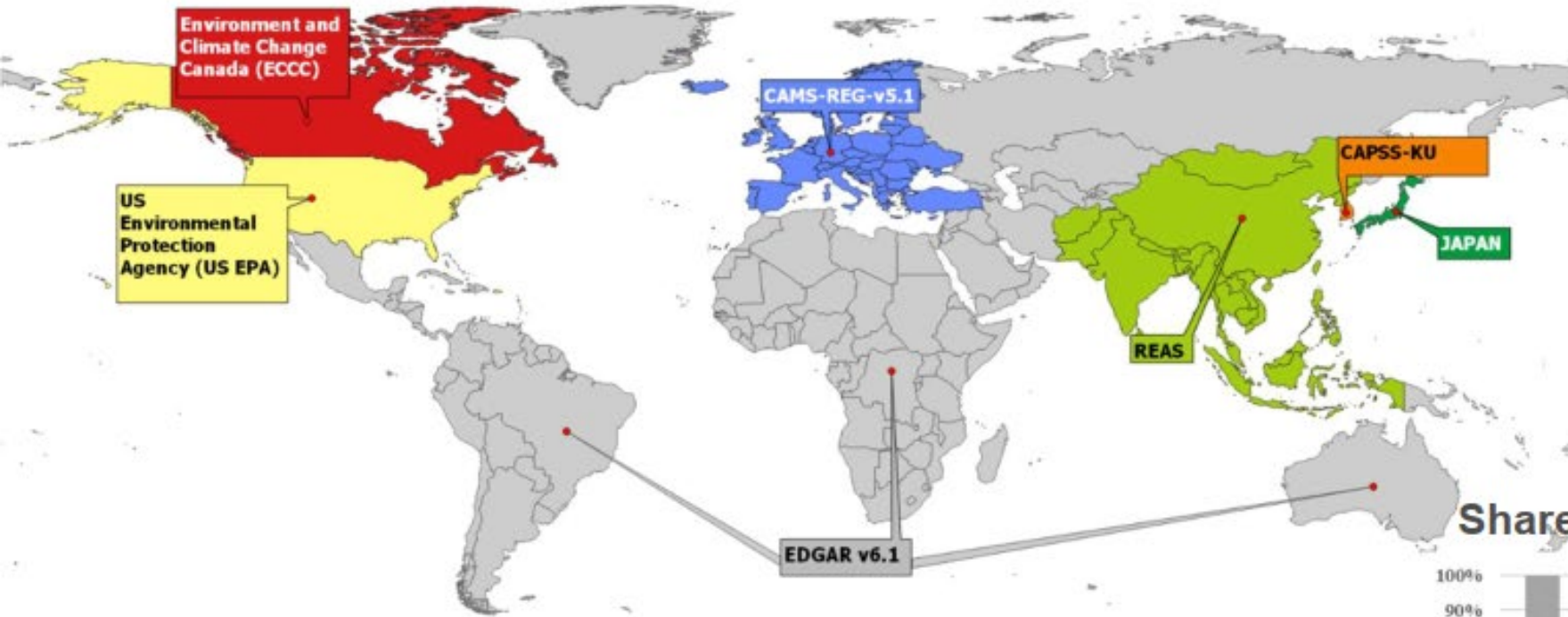
- Explicit spatial distribution with gap filling
- Timeseries 2000-2018
- High number of emission sectors (16)
- Dataset released April 2022
- Available at https://edgar.jrc.ec.europa.eu/dataset_htap_v3
- Description paper: https://doi.org/10.5194/essd-15-2667-2023
  - 31 citations
  - FWCI of 4.9

Slide from Monica Crippa, JRC

Updated global mosaic emissions: HTAPv3.1

- Bugfixes

- New global base inventory: EDGARv8

- Updated emissions from most regions

- New: inclusion of Chinese emissions from MEICv1.4

- Extension of the time series to 2020

- Release expected by Q4 2024

- Will be used as the anthropogenic emission inventory for HTAP historical simulations

Multi-Compartment Hg Modeling and Analysis Project (MCHgMAP)

- Organizing new global model simulations, linking atmosphere, soil, ocean, and multi-compartment models, to contribute initially to the Minamata Convention's effectiveness evaluation.

- In 2024, focus has been on 2010-2020 baseline simulations. Additional sensitivity analyses to follow in 2025.

- Multi-journal special issue with experiment description paper: https://doi.org/10.5194/gmd-2024-65

- Joint MCHgMAP/GMOS-Train Workshop, 9-11 October, Portorož, Slovenia (organized by MSC-E/JSI)

- Coordinator: Ashu Dastoor, Environment and Climate Change Canada

HTAP3:
Three Sets of Experiments With A Common Base

Fires Multi-Pollutant Modelling

- Comparing the impact of wildfires and agricultural burning on PM, O_3, metals, and POPs. Simulations to be conducted in 2025-2027.

- Experiment description paper: https://doi.org/10.5194/gmd-2024-126

- Coordinator: Cyndi Whaley, Environment and Climate Change Canada

- Email List: https://www.listserv.dfn.de/sympa/subscribe/htap-fires?previous_action=review

HTAP3-OPNS: supporting the revision of the Gothenburg Protocol

- Focus on ozone, particles, and the deposition of N and S
  - Assessment of GAINS scenarios
    - Base year 2015
    - Target years 2040/2050
  - Impacts of ozone on health and vegetation
  - How to include methane in the revised Gothenburg Protocol?

- Robust ensemble of models
  - Quantification of inter-model uncertainty

- Seeking input from different modelling systems
  - Traditional CTMs and ensemble emulators (as for previous HTAP assessments)
  - Coupled chemistry-climate models
  - Global-regional downscaling

- White paper: https://nextcloud.gfz-potsdam.de/s/NqgxtQb6ELJw76S

HTAP3-OPNS White Paper

1. Motivation
2. Science-Policy Questions
3. Experimental Design
4. Input Data Sets
5. Requested Output Data
6. Timelines
7. Links with Other Multi-Model Activities

HTAP3-OPNS work streams

- Future scenario simulations
  - Transient Global Chemistry-Climate simulations
  - GAINS LRTAP future scenarios for 2010-2050
  - Assessment of future air quality and climate including the role of methane
- Source/receptor (perturbation) simulations
  - Global CTM simulations
  - Source-receptor relationships based on GAINS LRTAP scenarios
  - Ensemble emulator for rapid scenario assessment
- Regional modelling of GAINS scenarios
  - Improving the robustness of projections for Europe and North America

- Historical transient simulations
  - Specified dynamics / CTM simulations
  - 2000-2020 using the HTAPv3.1 global emission mosaic
 - Baseline simulations for HTAP-Fires

Supporting the revision of the Gothenburg Protocol

Supporting ongoing HTAP work

Methane in HTAP3-OPNS

- HTAP3-OPNS will focus on the CLE and MTFR scenarios

- Global hybrid scenario "HILO"
  - Methane from CLE, other pollutants from MTFR
  - **A scenario representing high global ambition on NOx/NMVOC but low global ambition on methane**

- Regional hybrid scenario
  - CLE-global with MTFR in Europe
  - **How much ozone reduction can Europe achieve on its own with only NOx and NMVOC control?**

- Source/receptor simulations will deliver additional information on the sensitivity of global and regional ozone to varying methane emissions

GAINS LRTAP global CH4

GAINS LRTAP global NMVOC

GAINS LRTAP global NOx
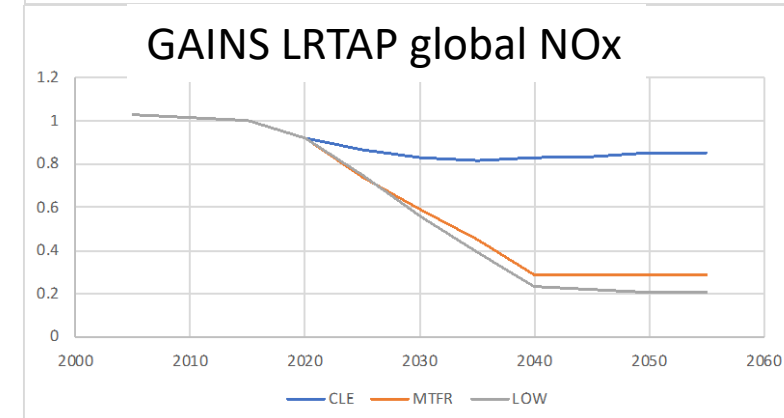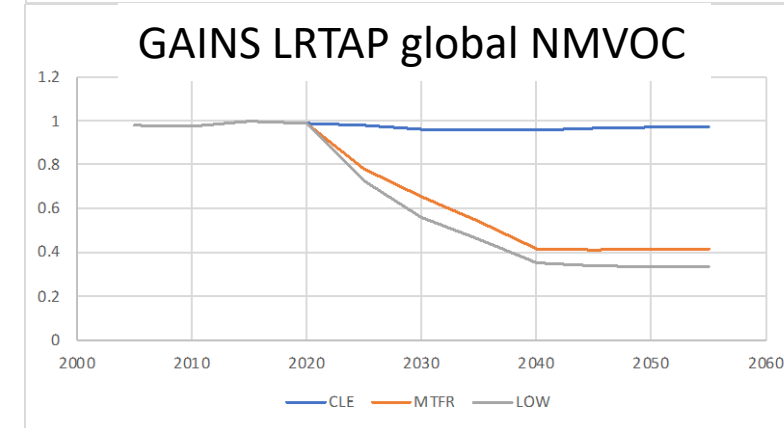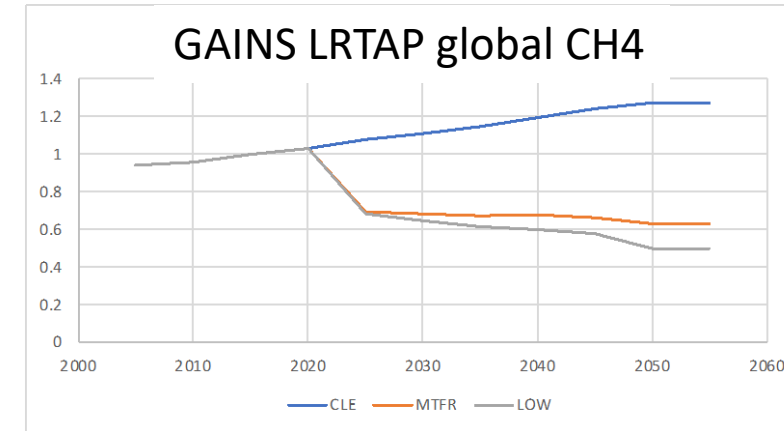
HTAP3-OPNS current status (GP revision)

- Number of participating models
  - 7 global chemistry-climate models
  - 12 global chemical transport models
  - Regional models: still collecting expressions of interest
  - EMEP model is included in the ensemble

- Awaiting final emission data
  - Wildfire emissions
  - GAINS LRTAP scenarios

- Timeline
  - Experiments to start in 2024
  - Initial results from early models September 2025
  - Results in support of the GP revision in mid 2026
  - Data to be published on the AeroCom server

- Significant amount of work from a large number of partners

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