Task Force on Hemispheric Transport of Air Pollution

Hemispheric Transport: Results to Date and Future Work

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Task Force on Hemispheric Transport of Air Pollution
TF HTAP

58th Session of the Working Group on Strategies and Review
Online, 14 December 2020

Trends in baseline ozone and precursors

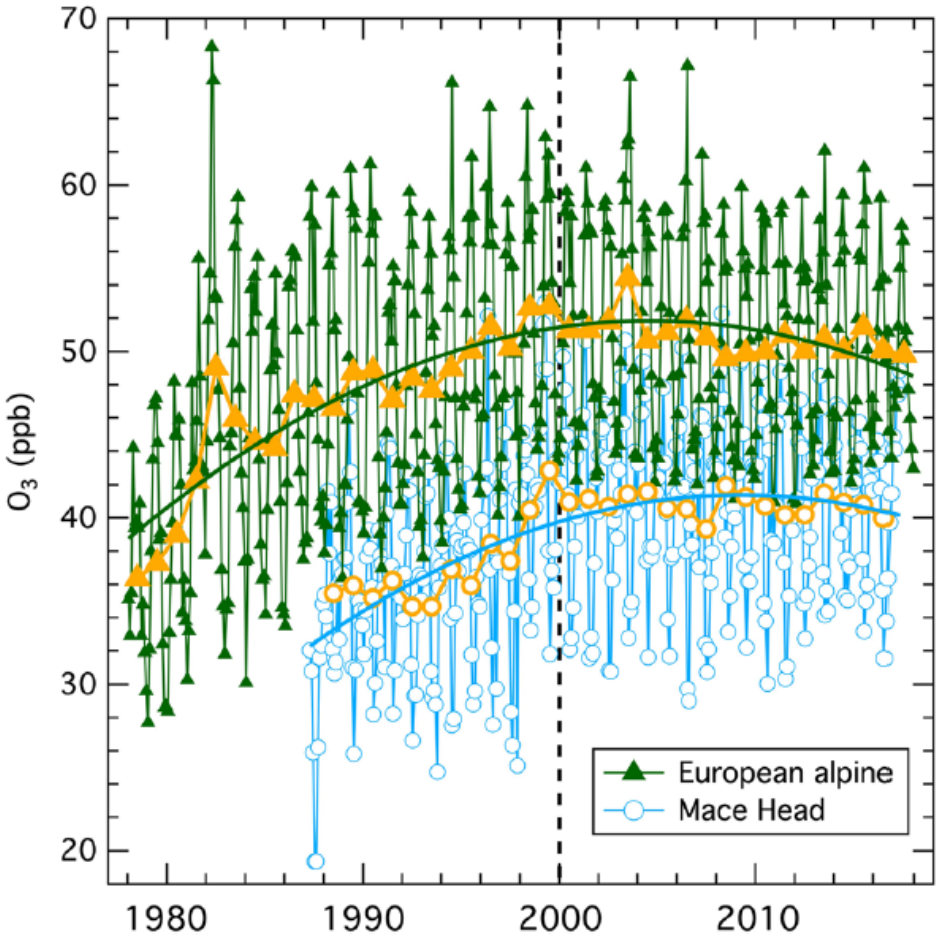
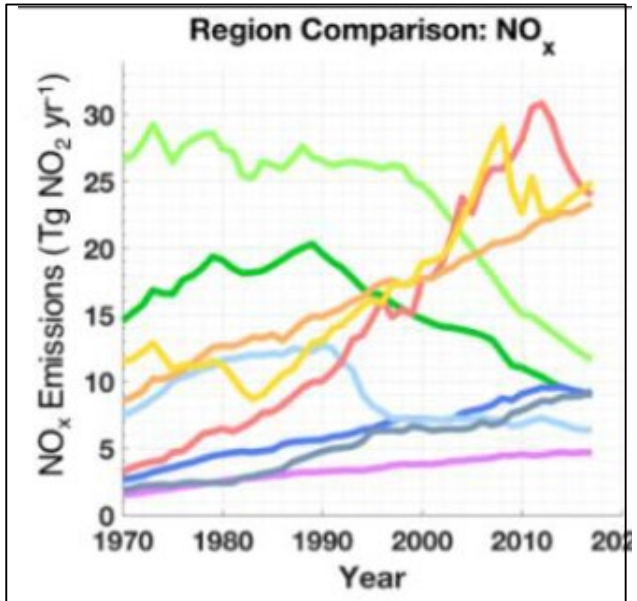
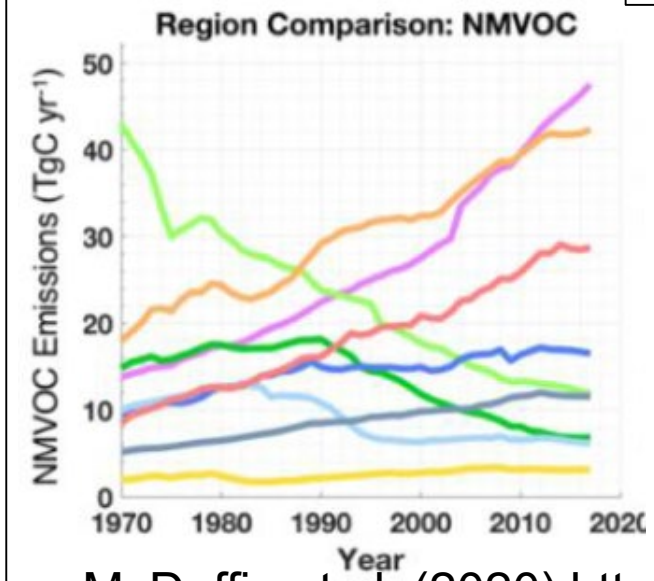
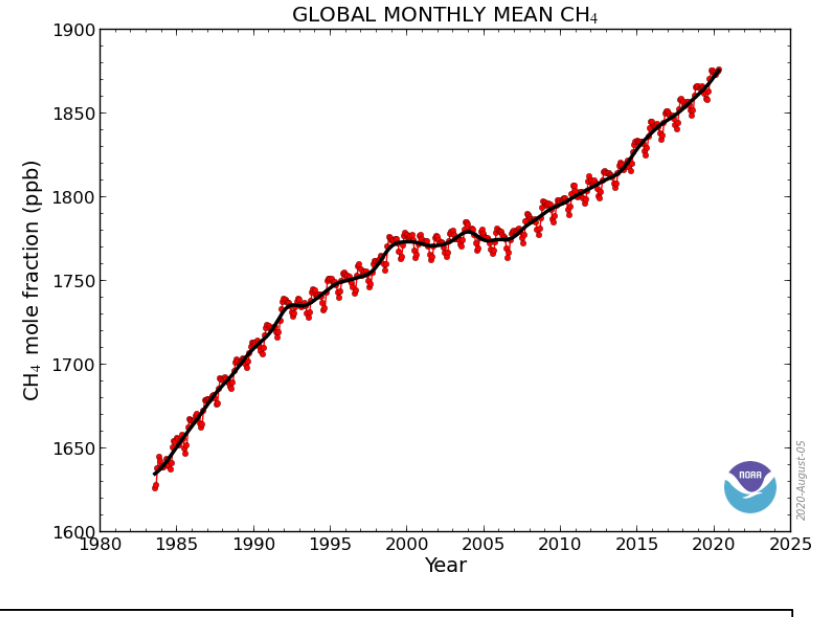


Figure 2. Time series of monthly and annual (orange symbols) mean ozone mixing ratios from two example data sets. The solid curves give the

Parrish et al. (2020) doi: 10.1029/2019JD031908







McDuffie et al. (2020) https://doi.org/10.5194/essd-2020-103

Key Messages from Phase 1 (2004-2010)

- Hemispheric transport is more important for ground-level ozone than for particulate matter or sulfur or nitrogen deposition

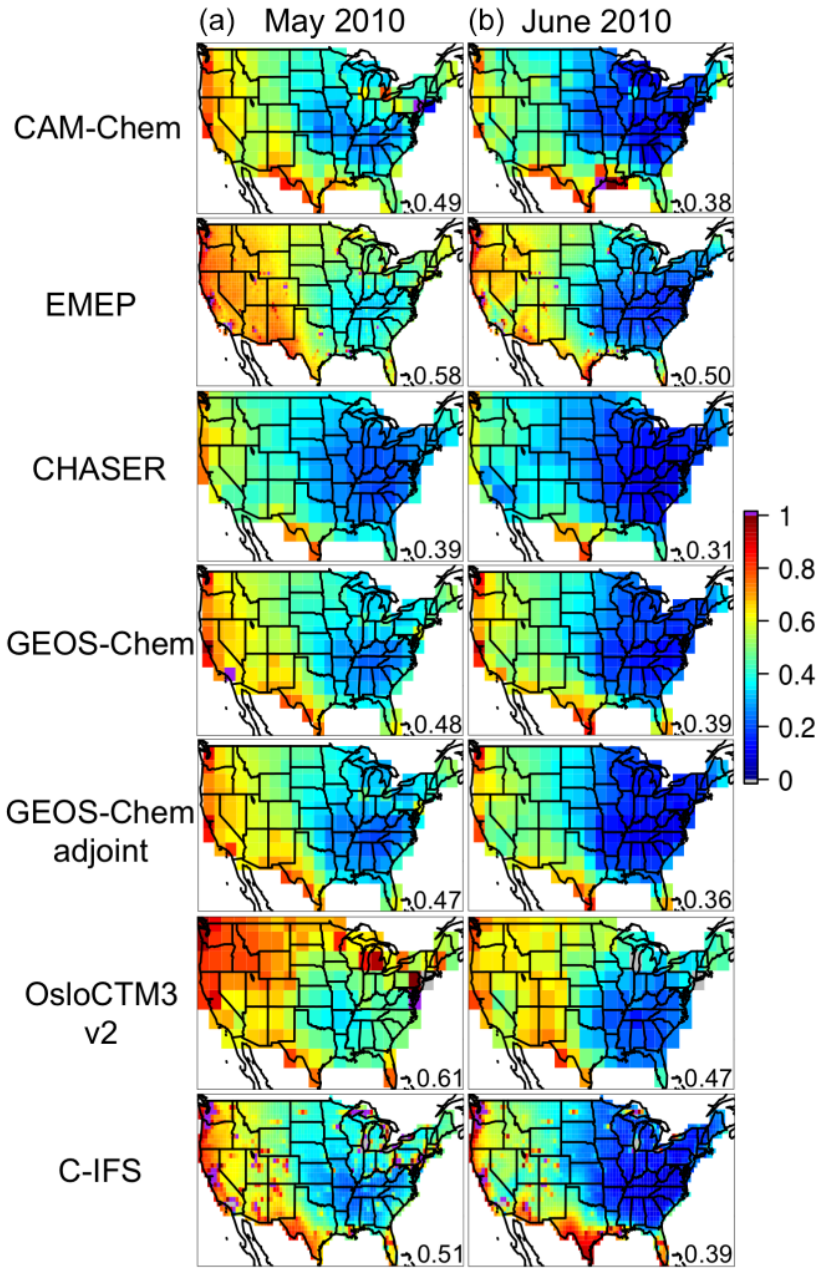
- The impact of hemispheric transport on ground-level ozone is highest in Spring and lowest in Summer

- The impact of hemispheric transport is larger for longer-term average ozone concentrations than for peak concentrations (that tend to be driven by local emissions)

- Projected increases in methane could offset the ozone decreases expected from decreasing emissions of nitrogen oxides (NO_x) and volatile organic compounds (VOCs).

Phase 2 (2010-2020)

O_3 and PM2.5 annual response in North America to 20 % emission changes in anthropogenic precursors (9 papers)



Perturbation simulation	O_3 [ppb]	$PM_{2.5}$ (ugm^{-3})
GLOBAL	-1.39	-1.52
N. America	-0.65	-1.47
East Asia	-0.62	-0.02
RERER regional models	**0.77 [0.54-0.93]**	**0.12 [0.11-0.12]**

- Intercontinental influence largest in western USA, background (transport + biogenics) can be 4-12 ppb higher on high days than average days
- Transport has strong seasonal variation; 2010 was a high transport year (compared to 2008-2009)
- East Asia is a major contributor
- Highest O_3 days are associated with local anthropogenic & biogenic emissions in most regions.

Sources: Im et al; Huang et al , Guo et al, Liang et al.

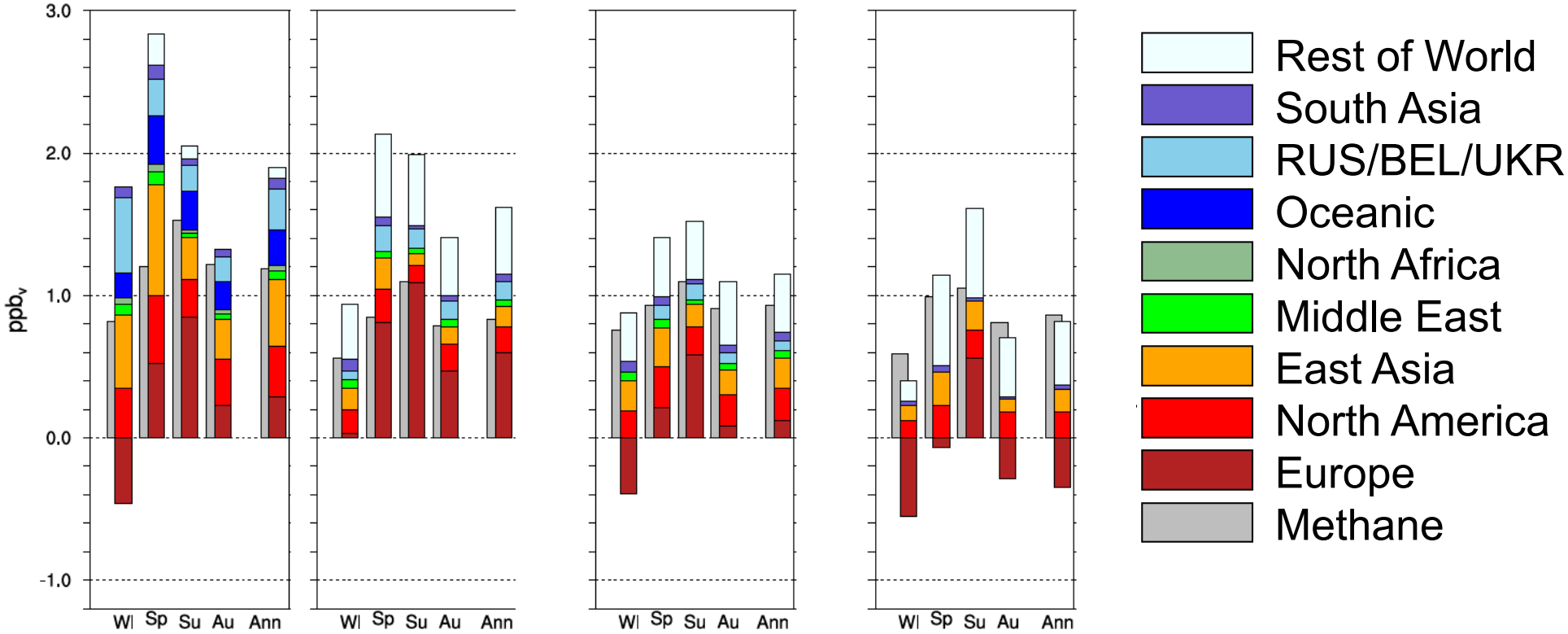
Phase 2 (2010-2020)

Atmos. Chem. Phys., 18, 13655–13672, 2018
https://doi.org/10.5194/acp-18-13655-2018

Atmospheric Chemistry and Physics
Open Access
EGU

The effects of intercontinental emission sources on European air pollution levels

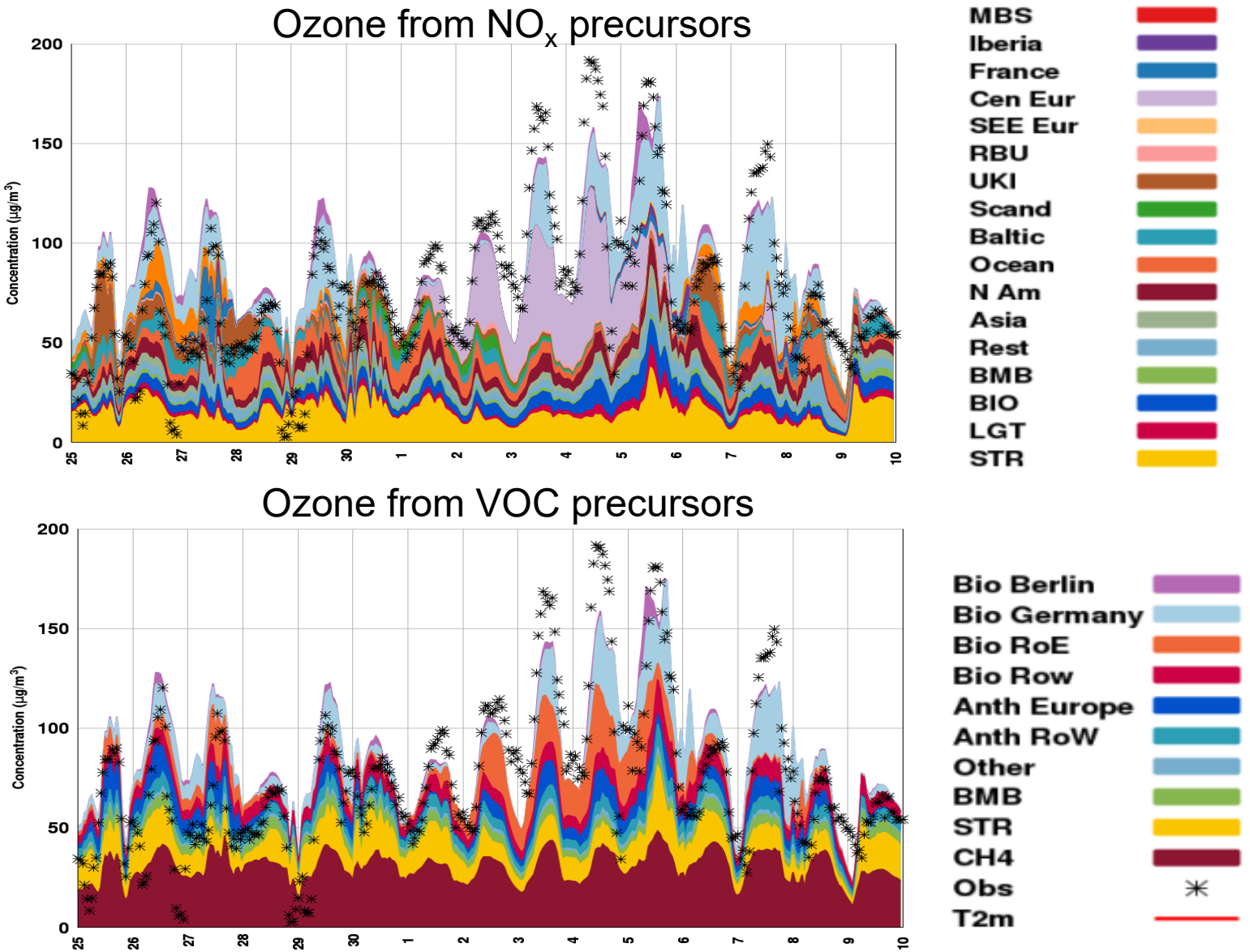
Jan Eiof Jonson[1], Michael Schulz[1], Louisa Emmons[2], Johannes Flemming[3], Daven Henze[4], Kengo Sudo[5], Marianne Tronstad Lund[6], Meiyun Lin[7], Anna Benedictow[1], Brigitte Koffi[8], Frank Dentener[8], Terry Keating[9], Rigel Kivi[10], and Yanko Davila[4]



- Anthropogenic emissions of NO_x and VOCs outside of Europe contribute between 2-12 ppb of seasonal average ozone depending on the season
- Methane drives ozone formation in Europe to the same extent as non-European NO_x and VOCs

Global to urban downscaling: case study Berlin (June-July 2015)

- Local emissions responsible for high ozone episodes
  - Anthropogenic NO_x
  - Biogenic NMVOC
- Hemispheric transport responsible for about 50 µg/m^3 of daily baseline ozone
- Consistent contribution from methane
- Noticeable contribution from ship NO_x



Lupascu et al. (2021) *in preparation (do not cite)*

Phase 2 (2010-2020)

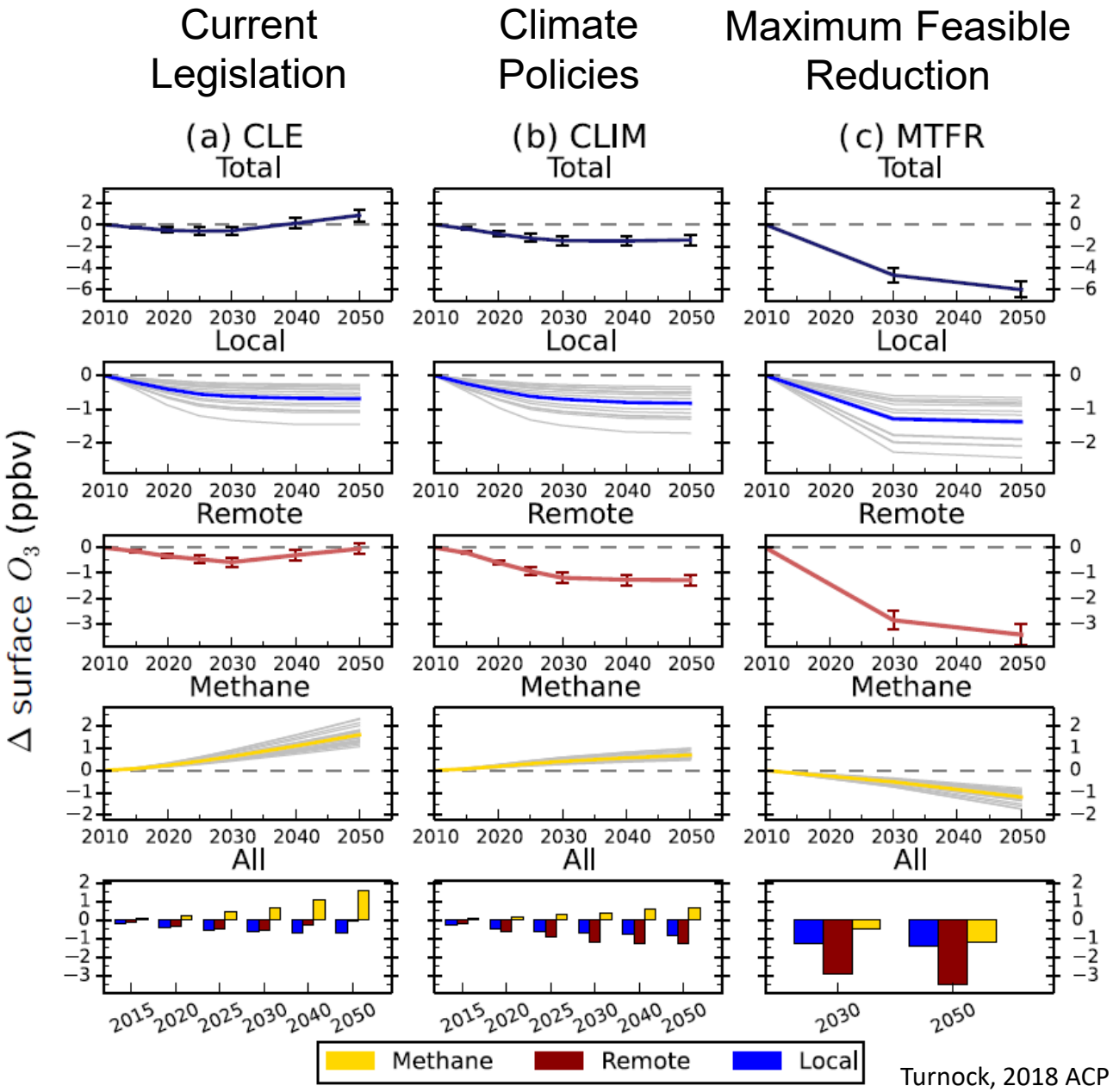
- CLE: O_3 in Europe will decrease as a result of European and (mainly) North American air pollution legislation. Increasing CH_4 will more than offset other emissions decreases after 2030.

- CLIM: Decreased CH_4 emissions and cobenefits from the energy sector will help to stabilize the O_3 concentrations after 2030.

- MTFR: Enhanced technologies inside and outside Europe will decrease emissions of O_3 precursors, including CH_4, and have strong benefits for air quality.

Future Scenarios

Regional and Extra-Regional Components of Change in Europe



Turnock, 2018 ACP Special Issue

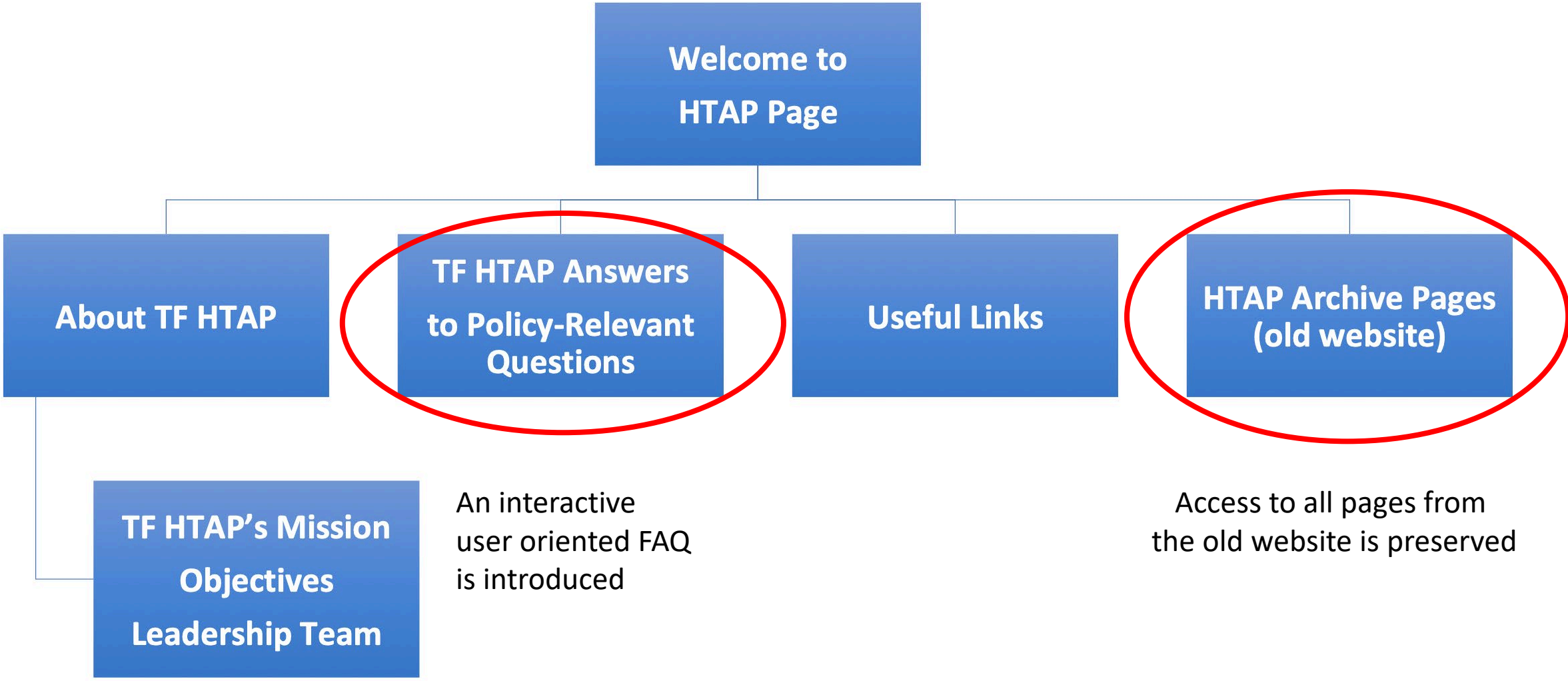
HTAP Phase 3 (2020-)

- **Thematic focus**
  - Focus on trends and projections
  - Understanding sources of differences between models
  - Support review of the Gothenburg Protocol

- **Key ongoing projects**
  - HTAPv3 mosaic emission inventory
    - Expected end of 2021
  - Contribution of methane and shipping to trends in surface ozone
    - Expected end of 2021
  - Development of the OpenFASST tool
    - Ongoing
  - Interactive Q&A website
    - Ready now!

- **Proposed 2021 Virtual Meetings**
  - March 17
    - Reviewing Q&A for Gothenburg Review
  - April 13
    - Attributing Mercury Trends
  - April 15
    - Attributing POPs Trends

www.htap.org



An interactive user oriented FAQ is introduced

Access to all pages from the old website is preserved

Welcome to HTAP page

The Task Force on Hemispheric Transport of Air Pollution (TF HTAP) is an international scientific cooperative effort to improve the understanding of the intercontinental transport of air pollution across the Northern Hemisphere. TF HTAP was organized in 2005 under the auspices of the UNECE Convention on Long-range Transboundary Air Pollution (LRTAP Convention) and reports to the Convention's EMEP Steering Body. However, participation is open to all interested experts, both inside and outside the UNECE region.

TF HTAP organizes scientific cooperation in the areas of emissions inventories and projections, analysis of ambient monitoring and remote sensing, global and regional modeling, and impact assessment to understand the intercontinental flows of ozone and its precursors, fine particles and their components, mercury, and persistent organic pollutants (POPs). The main questions of interest to the TF HTAP relate to the benefits of international cooperation to decrease air pollution emissions:

- How do air pollution concentrations (or deposition) in one region of the world change as emissions change in other regions or the world?
- How do changes in emissions outside a region affect the health, ecosystem, and climate impacts of air pollution within a given region?
- How does the feasibility of further emissions control differ in different regions of the world?

HTAP ARCHIVE PAGE

The previous HTAP pages, events and publications are archived here...

Search … Search

Upcoming Events

There are no upcoming events.

ARCHIVES

Select Month

TF HTAP Answers to Policy-Relevant Questions

Questions and comments can be provided to each section using the comment area below

To contribute to the FAQ, please submit your request in the comment

instructions on how to edit/contribute to the FAQ.

Enter your question: Enter your question...

TF HTAP Answers to Policy-Relevant Questions

Introduction and Objectives

Posted by **Aneta Gienibor** on **9 September 2020**

The Task Force on Hemispheric Transport of Air Pollution (TF HTAP) was created
(LRTAP Convention) in December 2004 to facilitate research to improve the under
across the Northern Hemisphere. Findings from TF HTAP's work have been docum
2010; Pirrone 2010; Dutchak 2010; Keating 2010a], and more recently, a special i

Category: TF HTAP Answers to Policy-Relevant Questions

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Save my name, email, and website in this browser for the next time I comment.

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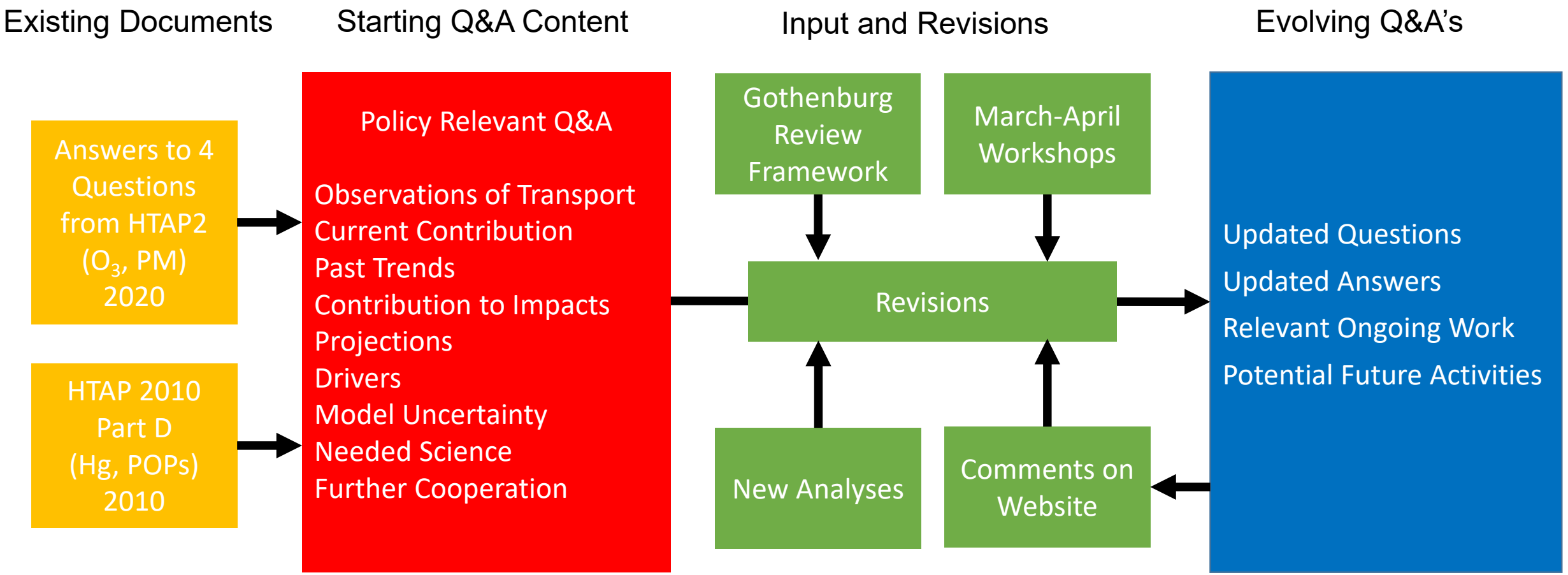
An Interactive Science-Policy Dialogue



We welcome your input: What questions do you have? What answers do you find useful? What answers are unclear? What new results should be considered? What additional analyses should be conducted?

Thank you

TF HTAP welcomes your comments and contributions