TF HTAP- TF IAM
Global Air Pollution Emission scenarios

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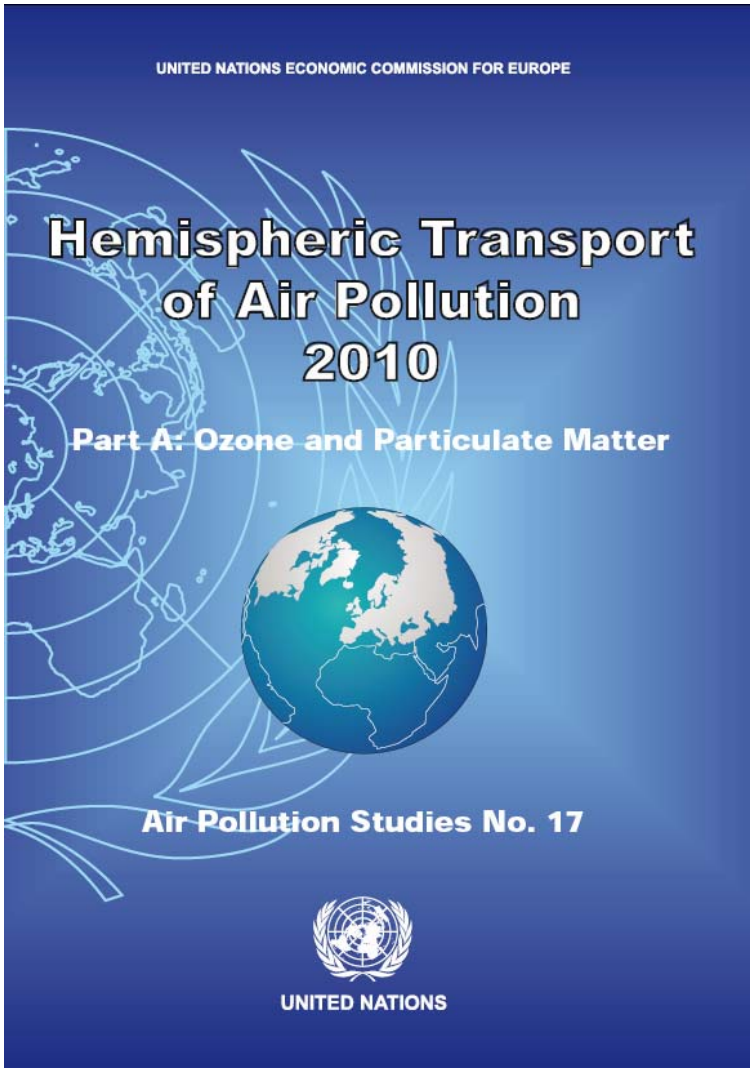
TF IAM meeting, Copenhagen, 22.04.2013

What is HTAP?



- Established in 2004 by the UNECE Convention on Long-Range Transport Air Pollution
- Co-chaired by the European Commission and the U.S. EPA
- An expert group of scientists studying hemispheric transport of air pollution
- HTAP Phase 1: HTAP Assessment report 2010
- HTAP Phase 2: by 2015 targeted briefings, reports and publications

www.htap.org

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Mandate

- Examine transport of air pollution across the Northern Hemisphere, including ozone (precursors) and PM and components (including black carbon), mercury, and persistent organic pollutants.

- Assess potential emission mitigation options available inside and outside the UNECE region

- Assess their impacts on regional and global air quality, public health, ecosystems, near-term climate change

- Collaboration with other groups both inside and outside the Convention

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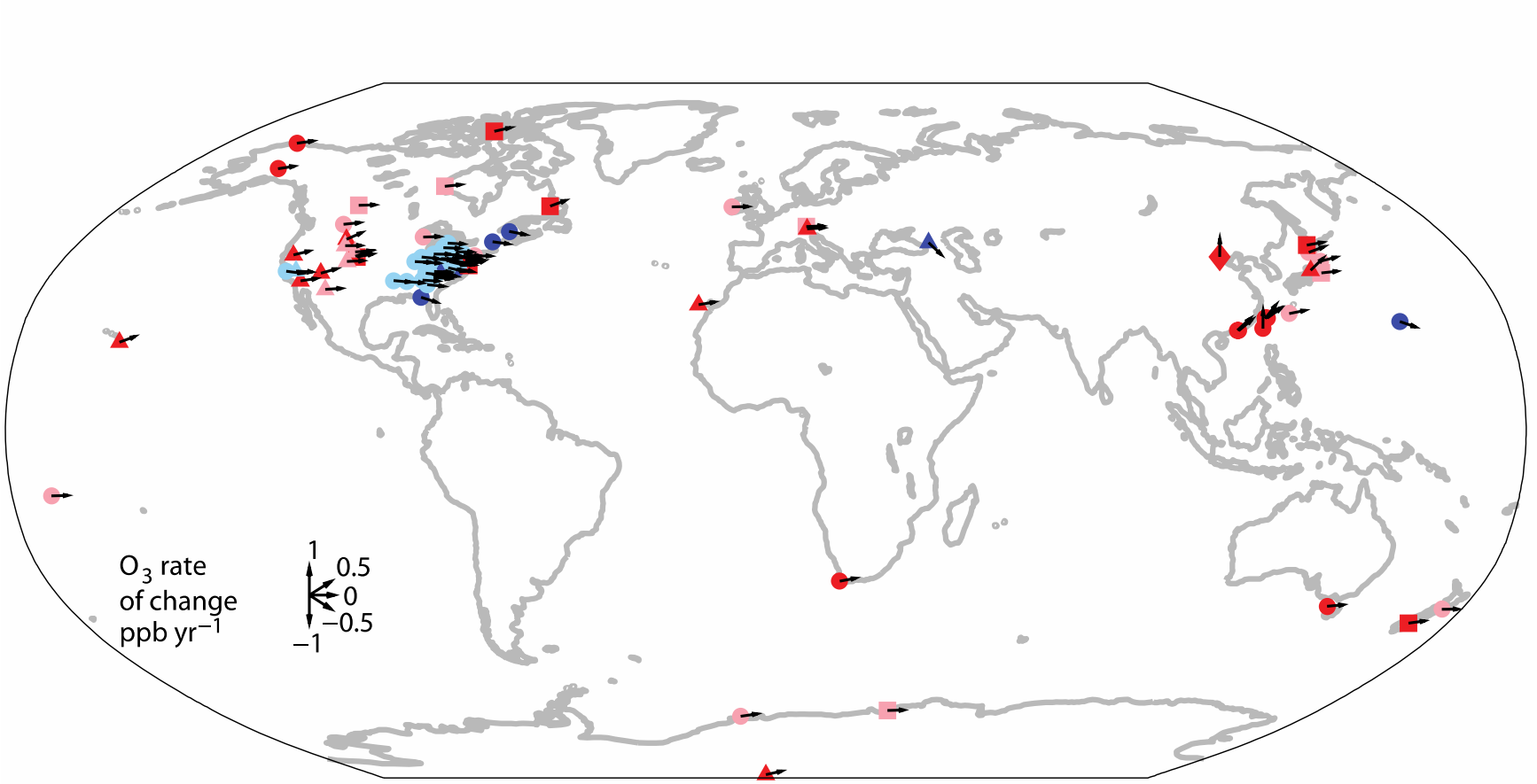
Global baseline ozone changes between 1990s and 2010

European Commission



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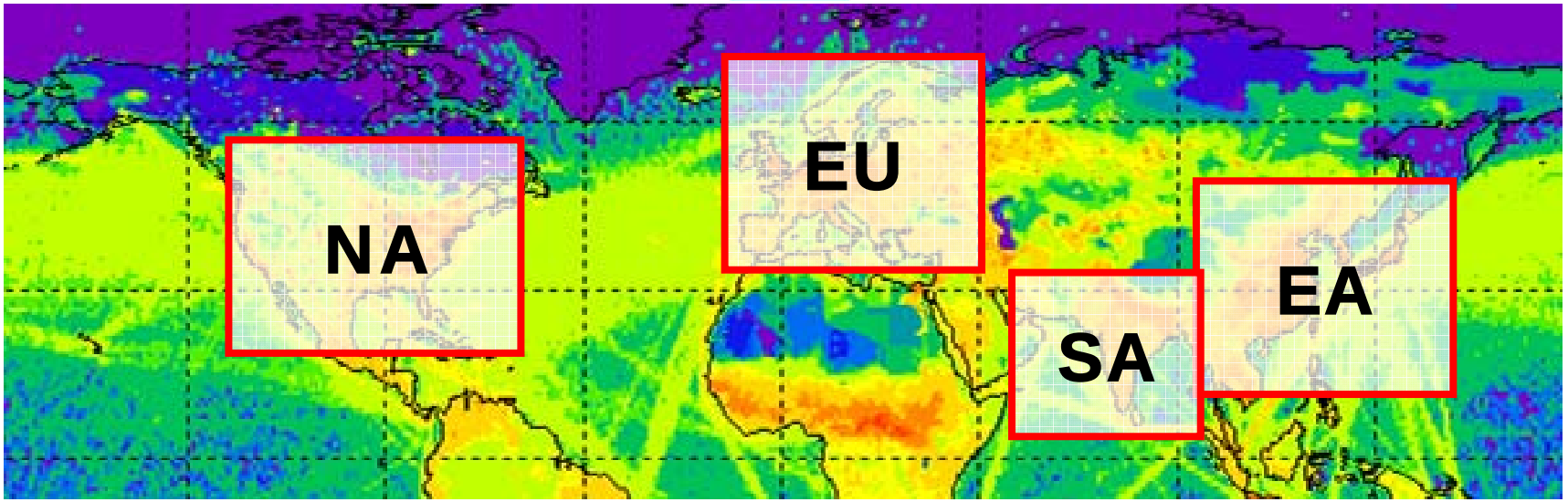
IPCC AR5 courtesy O. Cooper, 2013

HTAP (2010) Multi-Model Experiments

European Commission



Source-Receptor Sensitivity Simulations

- Base Year 2001
- More than 30 global models from Europe, US and Asia
- Decrease emissions of precursors in each region by 20%
- Precursors emission combinations NOx, VOC, CO, CH4, Hg, POPs

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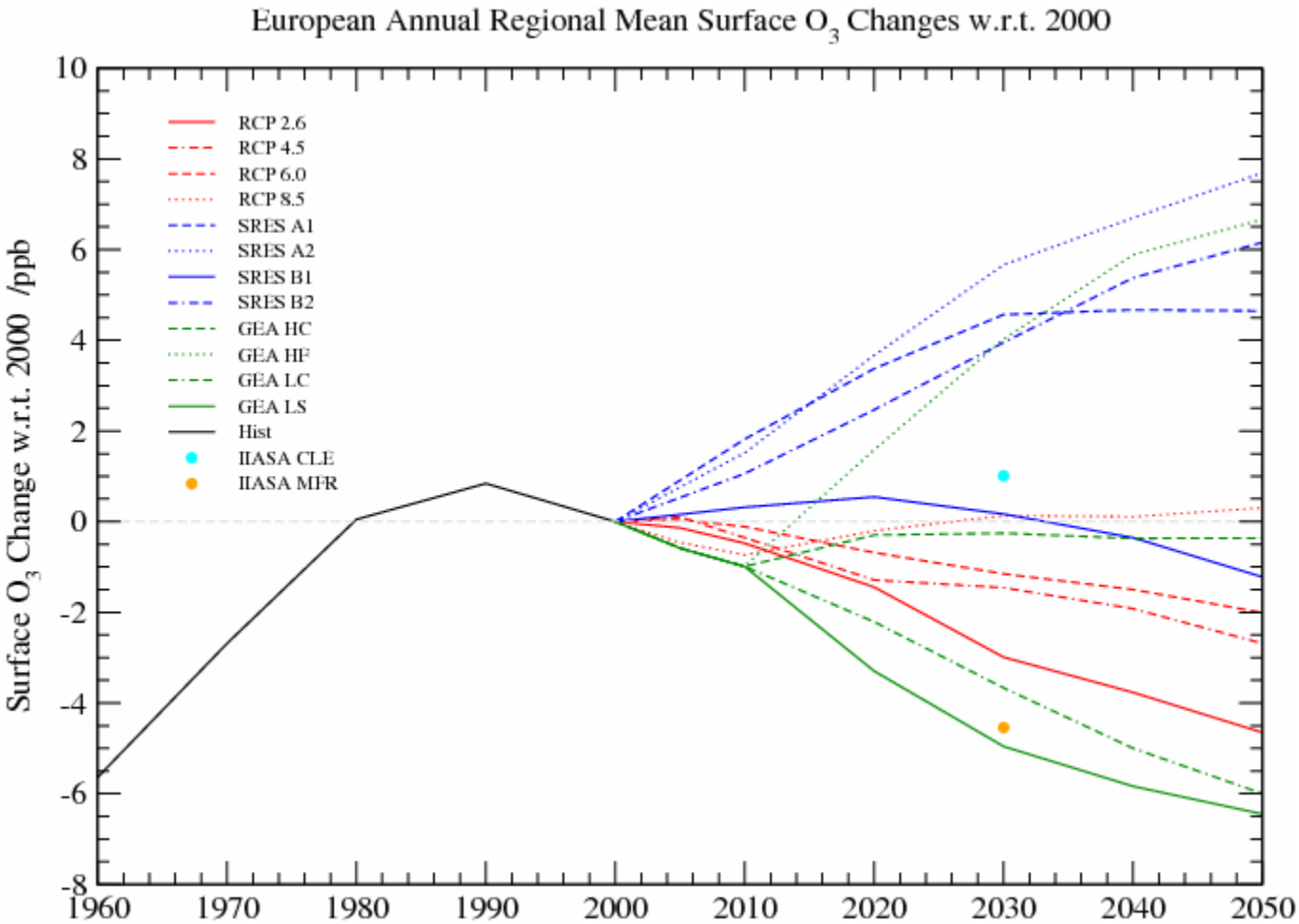
European annual regional mean O_3 changes [ppb] for a range of future global air pollution scenarios

European Commission



SRES A2

RCP 8.5

RCP 2.6

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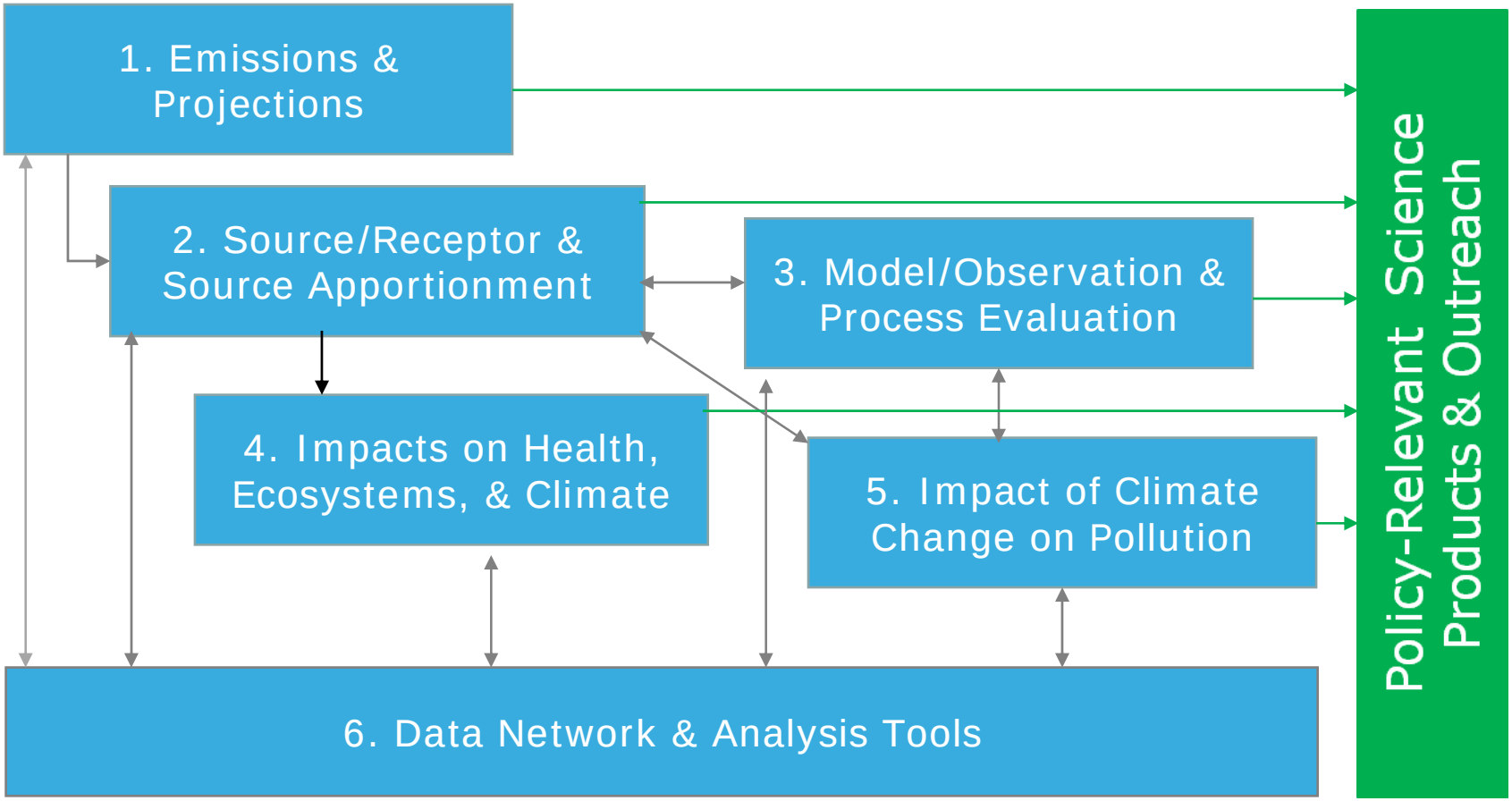
Wild et al, in prep. 2013

TF HTAP: Themes of Cooperative Activities 2012-2016

European Commission



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HTAP Phase 2 experiments

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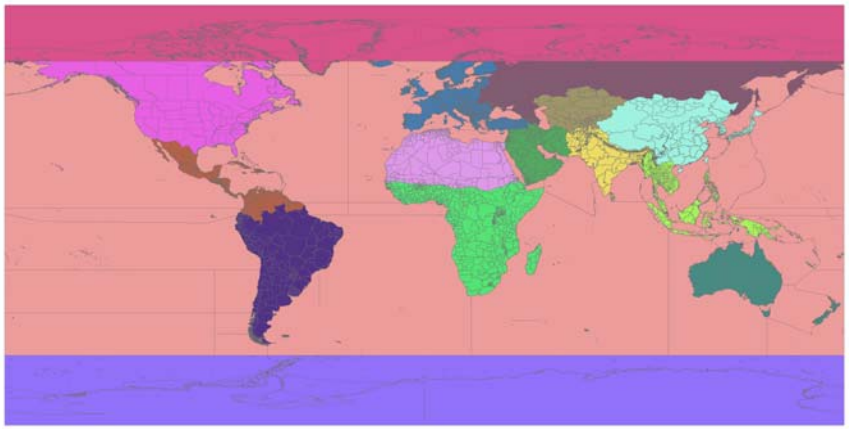
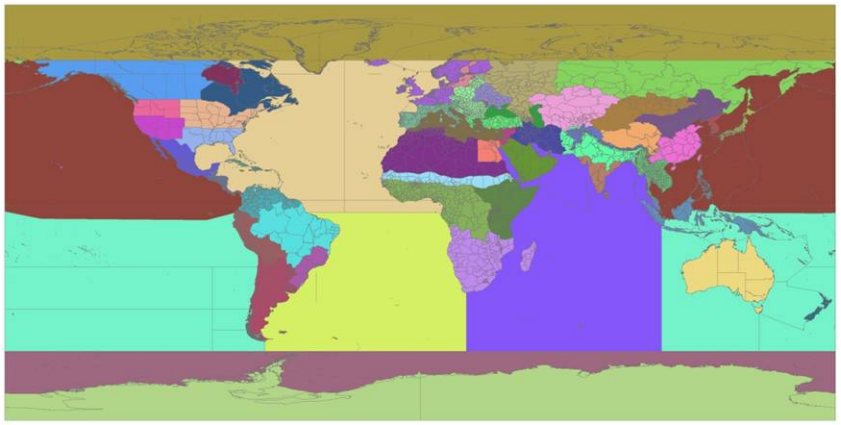
Tier 1 regions (sources)



Tier 2 regions (receptors)



- Overcome earlier issues with region definitions
- Update global HTAP Source Receptor relationships with global + regional analysis
- Based on 2006-2010 compilation of regional inventories (“HTAP inventory”)
- Tier 1 regions: Geo-politically more consistent sources
- Tier 2 regions (receptors) geographical-pollution more consistent
- Use new set of calculations for scenario analysis

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Perspectives for TF HTAP Phase 2: 2015

European Commission

- An improved modeling system based on ensembles of regional and global models that reflect our current best knowledge on the intercontinental transport of air pollution and its impacts on health, ecosystems and climate under past-present and future conditions.

- Enhanced global scientific cooperation to develop models, methods, and measurements to improve our understanding of the role of hemispheric air pollution and its impacts.

- An evaluation of the potential for mitigation of large scale air pollution problems under future emission scenarios, considering various alternatives at the country, regional and global level, anchored by a set of consistent and plausible benchmark scenarios developed by IIASA and an understanding of possible changes in emission drivers.

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Why produce new global scenarios?

European Commission

- Need future scenarios with explicit treatment of air pollution controls.
- Interested in strategies to address traditional air pollution as well as short lived climate forcing
- Interested in comparing how the availability and cost-effectiveness of controls various between regions of the world.
- What are plausible futures up to 2030+?
- What existing or additional air policy measures to assume?
- What surprises might occur?
- Create a benchmark for alternative scenario exploration.

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Joint scenario workshop TF HTAP and TF IAM Laxemburg, October 2012

European Commission

IIASA benchmark (anchor) scenarios for further analysis.

- Existing funding for analysis of IEA energy scenarios.
- In its role as the Center for Integrated Assessment Modeling (CIAM), it is the body within the LRTAP Convention structure to provide pollution scenario analyses.
- IIASA also has extensive experience working with Asian countries.
- Well connected to many of the world's emission inventory and scenario builders

Outcome (Meeting report www.htap.org):

- 2 day meeting
- 35 experts; 15 countries
- Recommendations for 'quick fixes' for problems identified in the GAINS-scenarios, scenario delivery in June 2013.
- Increased understanding what these scenarios are.

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Workshop recommendations for each sector

European Commission

1. Consensus recommendations concerning "problems and quick fixes" for the benchmark scenarios.

2. Alternative assumptions to those in the benchmark scenarios that should be explored, especially in terms of what constitutes reasonably available controls (consensus not necessary, but need to understand the different assumptions).
   a) Technological Issues (e.g., penetration of specific technologies, emission factors, …)
   b) Institutional Issues (e.g., enforcement, behavioral changes)

3. Longer-term research needs.

→ **Changes to Benchmark Scenarios**

→ **2 lists of issues to explore in TFHTAP, TFIAM, and other forums over the next year or two.**

→ **Issues requiring longer term research investments.**

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Scenario envelopes based on IEA's BAU energy scenario

European Commission

- **NFC** includes a hypothetical calculation showing how emissions would develop if implementation of control measures was frozen at the level of 2005
- **CLE** includes cost effective implementation of existing technologies. Past experience shows that CLE scenarios have been slightly too optimistic.
- **MFR** includes implementation of BAT measures considering economic lifetime of technologies and selected other constraints but assuming no institutional and political barriers (not including structural and behavioural changes). No premature scrapping or retrofit is assumed. The BAT measures are based on the measures available in the GAINS model database.

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TF HTAP's Policy-Relevant Questions

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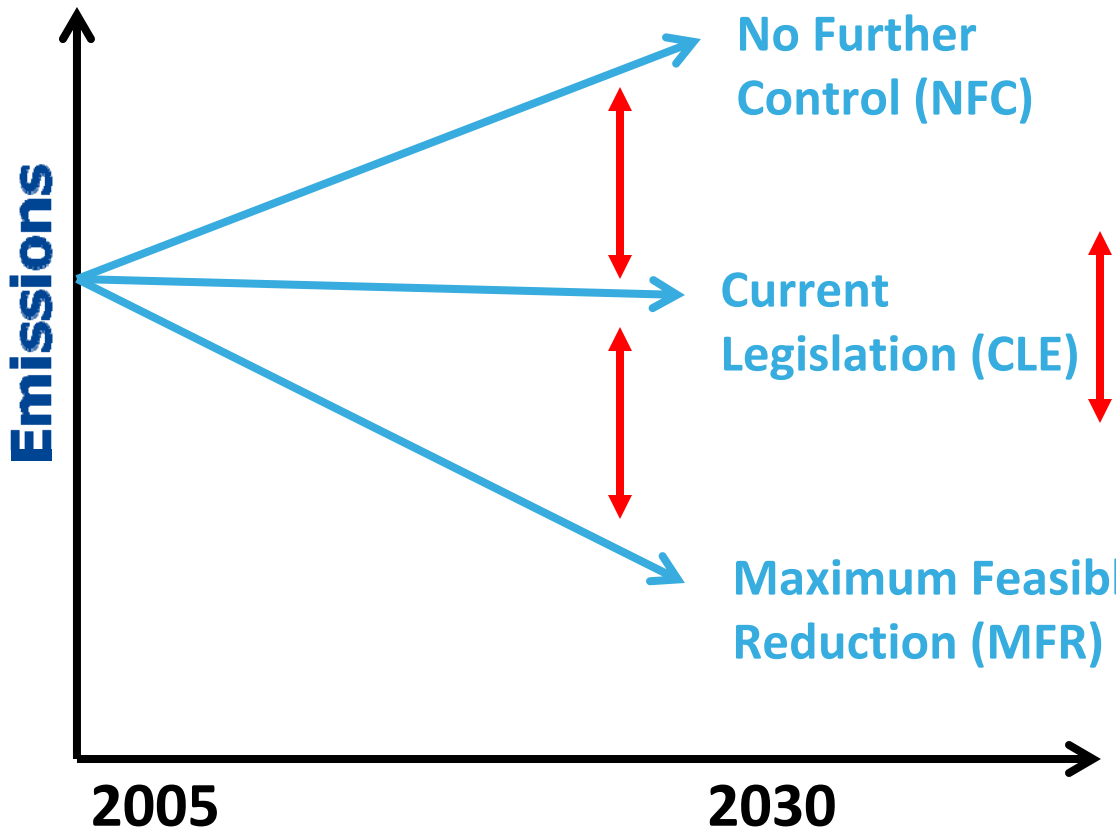
Benchmark Scenarios



What are the benefits of implementing current policies in terms of health, ecosystems, and climate impacts?

Given current policies, what are emissions likely to be in the future? How will source/receptor relationships change?

What technology and policy options will be available (at a reasonable cost) to further mitigate pollution problems in the future?

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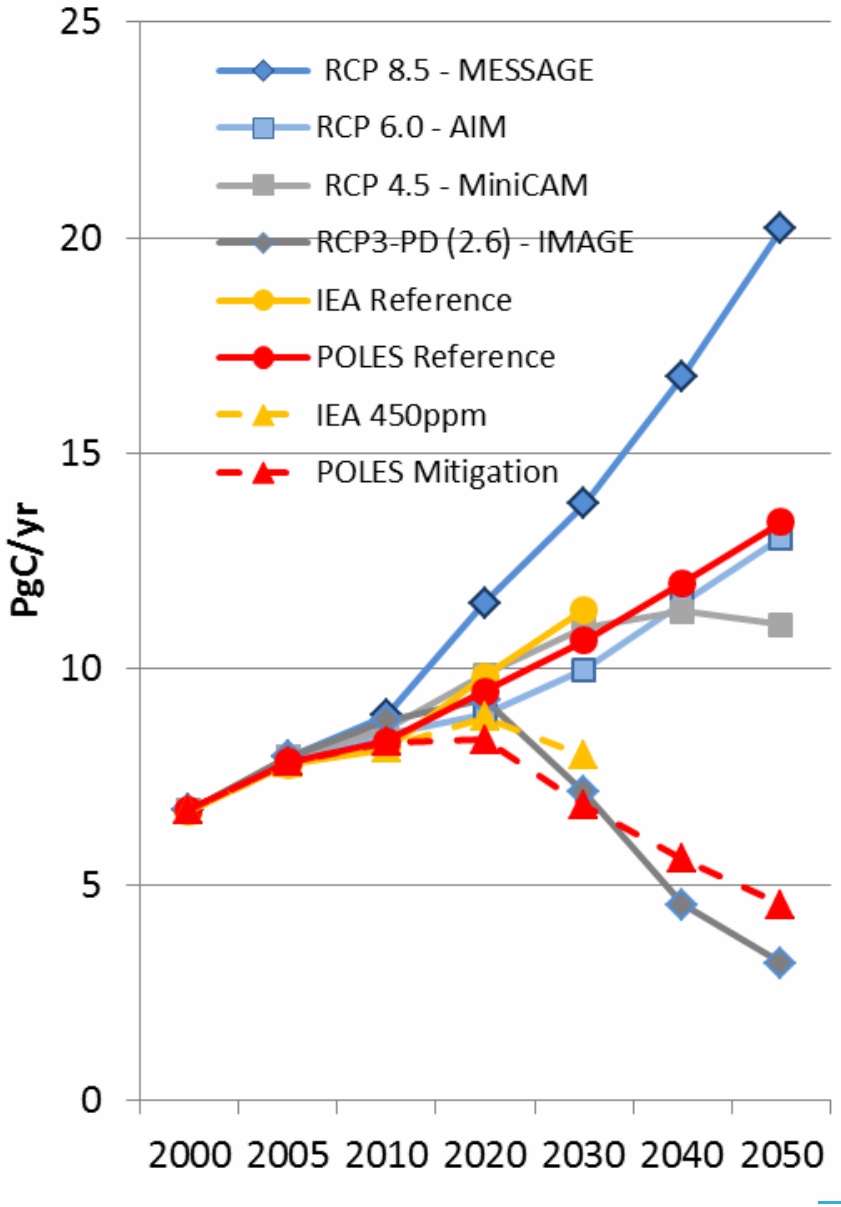
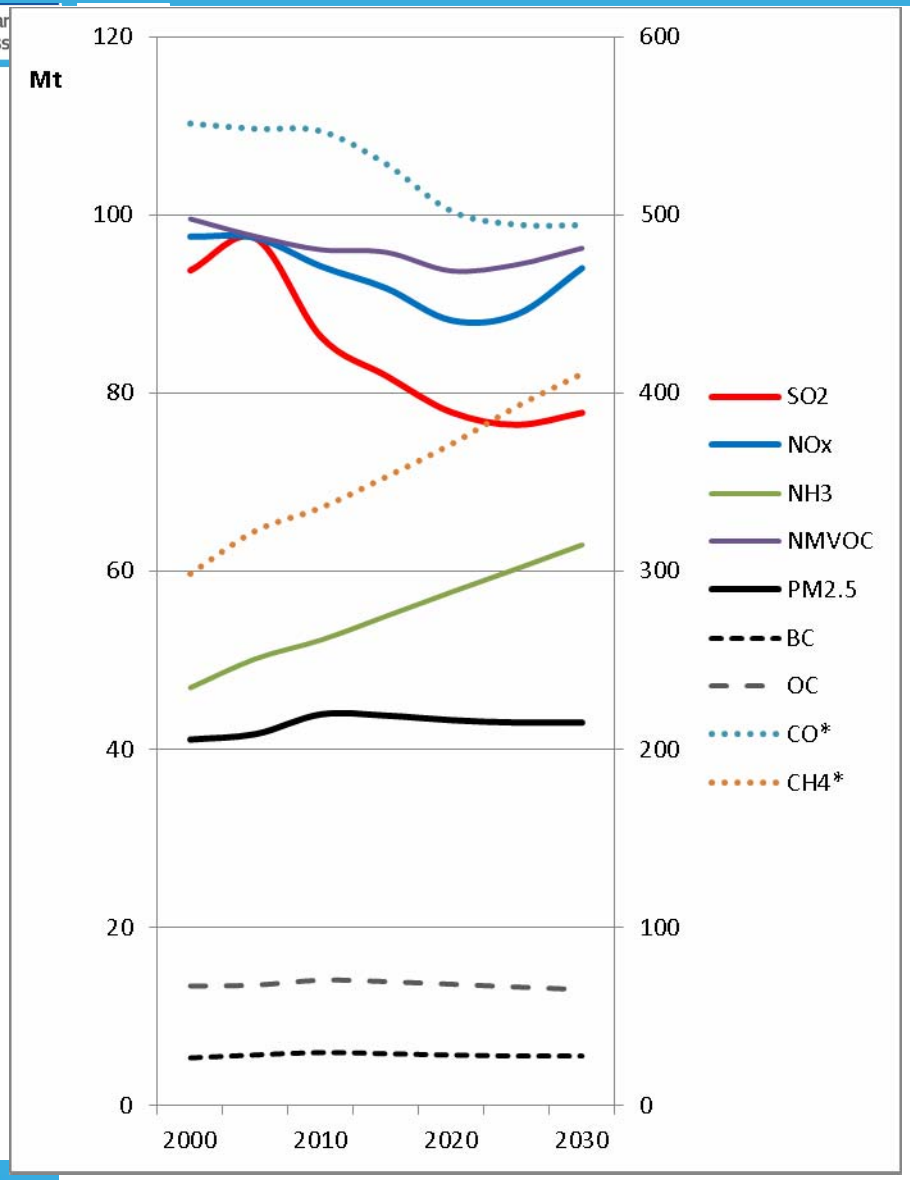
CO_2 in RCP vs IEA/POLES scenarios implemented in GAINS and resulting emissions of air





* CO and CH4 on the right hand axis

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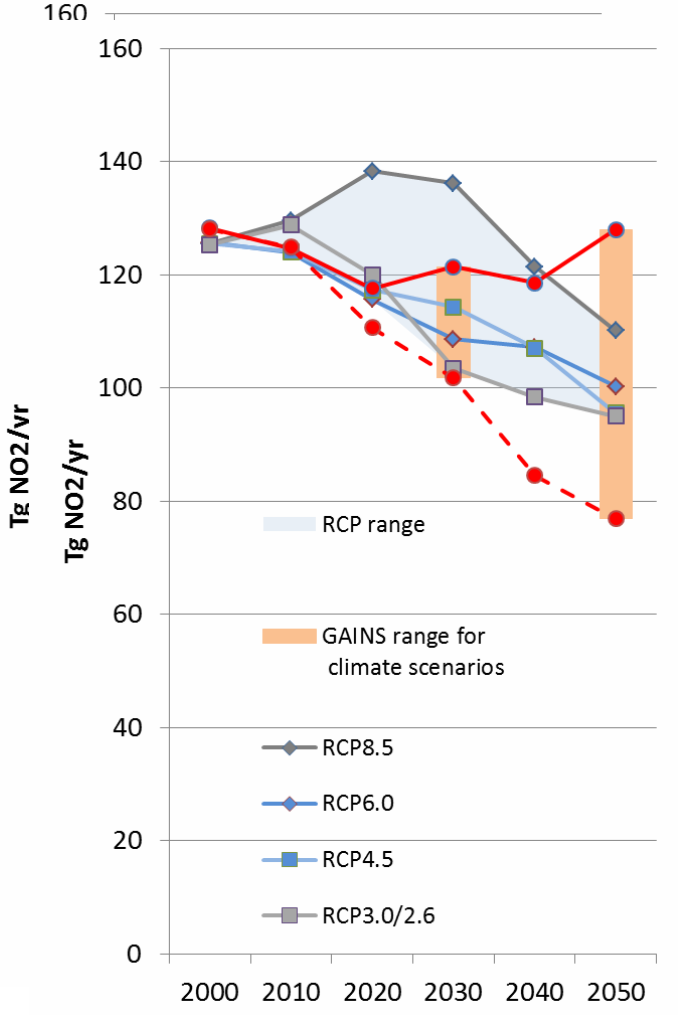
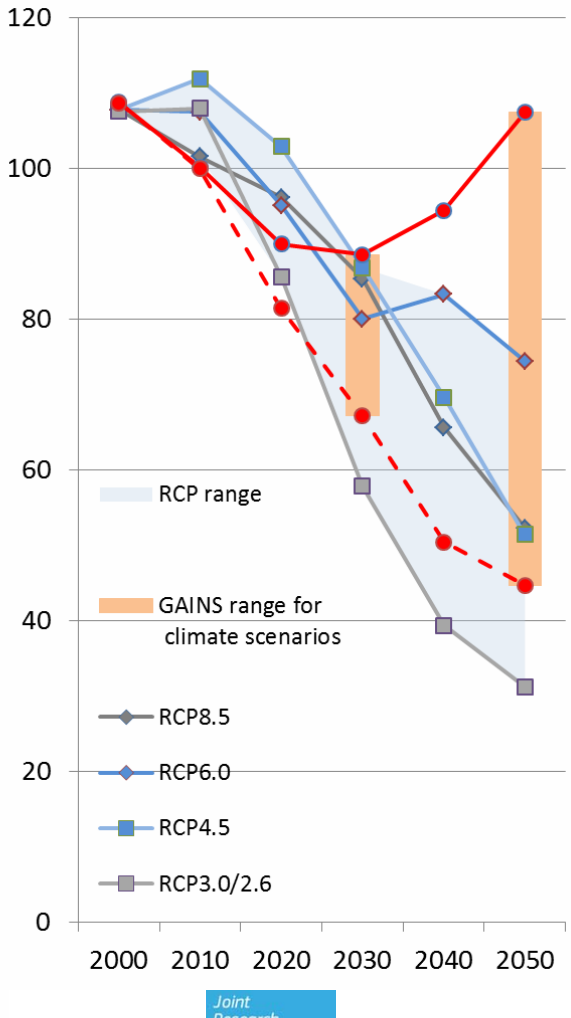
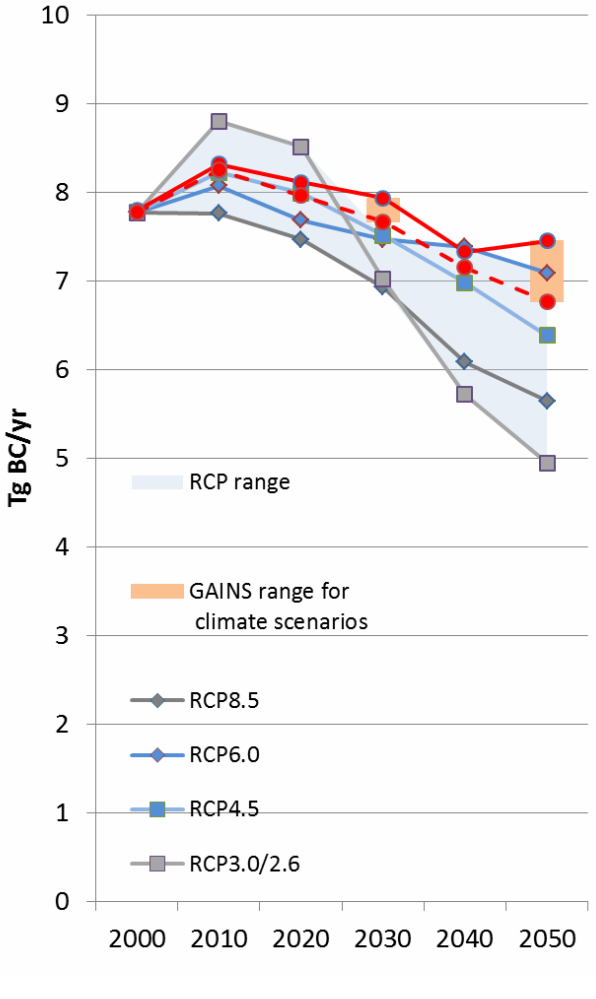
RCP and GAINS (current legislation – CLE)
NO_X ,SO_2 , and BC [DRAFT comparison – do not quote or cite]

Commission







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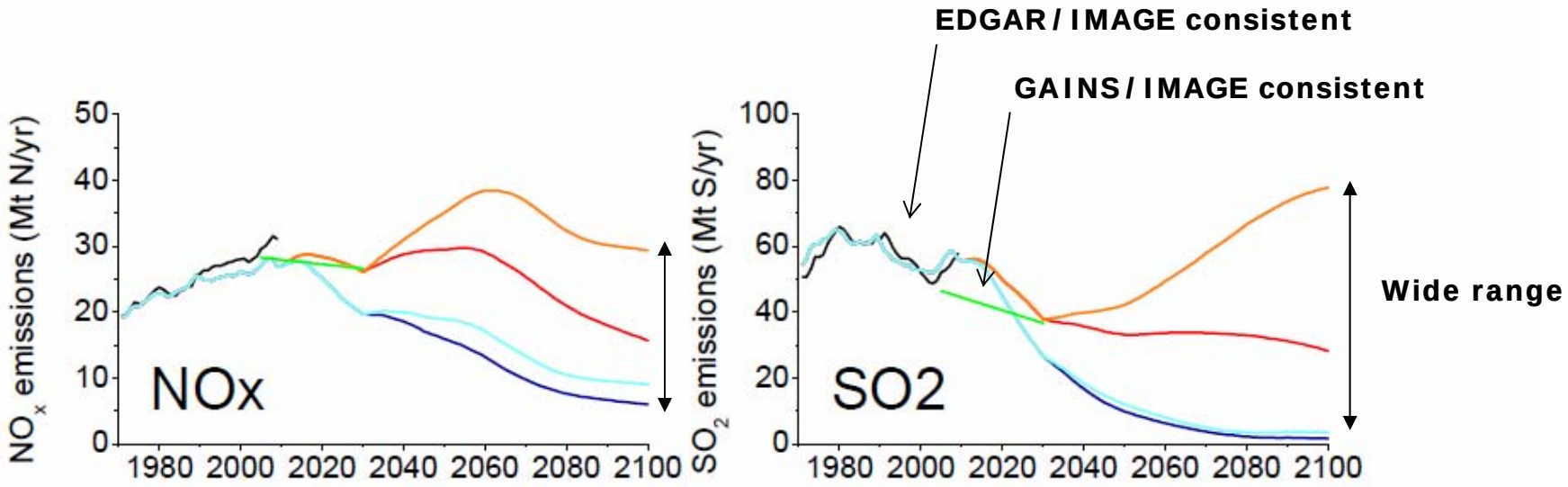
Alternative scenarios IMAGE (air pollutants)

European Commission



- Historical
- OE-BL KNZ
- OE-BL CLE
- OE-450 KNZ
- OE-450 CLE
- GAINS - CLE

OECD-Baseline ClimPol + "2005-2035" AP

OECD-Baseline ClimPol + "2005-2035" AP

KNZ: Kutznets assumption for air pollution, i.e. income-driven continuation of improvement after 2035

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