



Emissions of Air Pollutants for HTAP

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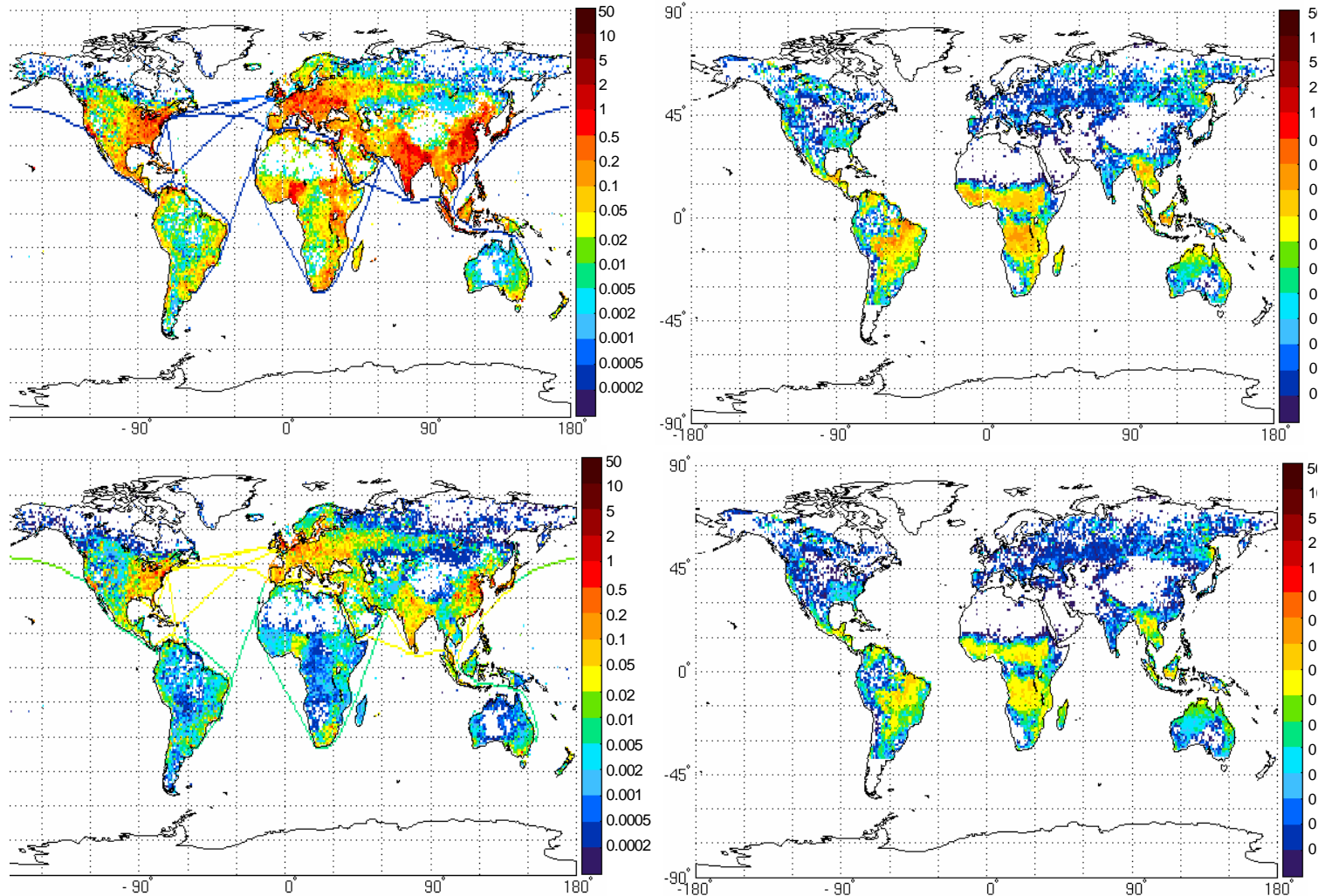


Figure 4-2. Geographical distribution of global emissions. Global emissions of carbon monoxide (top panels) and nitrogen oxides (bottom panels) from anthropogenic sources (left panels) and biomass burning (right panels), gridded at $1^\circ \times 1^\circ$ resolution, taken from the EDGARv32FT2000 dataset (units $10^9 \text{ kg m}^{-2} \text{ s}^{-1}$).

Assessment for hemispheric transport of air pollution requires global gridded emission inventories of (SO₂, NO_x, NMVOC, NH₃, CH₄, OC, BC, PM, and CO)

- The quality of emission inventories varies widely
- For developed countries, some sector inventories are of high quality, as they have been crosschecked by field studies and laboratory tests and through air quality modeling (e.g. emissions power plants)
- For developing and newly industrializing countries, the quality of emission inventories is lower and sometimes poor:
 - lack of actual emissions measurements and intensive ambient observations, incompleteness of the activity data, and absence of test-based emission factors.
 - A shorter history of inventory development lack of expertise and capable institutions.
 - Fast changes in socio-economic system

Recommendations of Emission workshop (Beijing, 2006) and Interim Assessment report 2007.

Improve the quality of emission methodology and inventories for sources that are poorly known:

- biomass burning (agricultural waste, biomass for heating and cooking, and forest fires)
 - small and medium scale industry and energy production,
 - transport
 - domestic use of coal
- A. Improvements can only be achieved through improved data capture in cooperation with experts from different countries bringing in knowledge of the local conditions
- B. There is thus a strong need to update any emission data base to hold as recent data as possible due to rapidly changing emissions in emerging economies

A. Gathering knowledge on local conditions

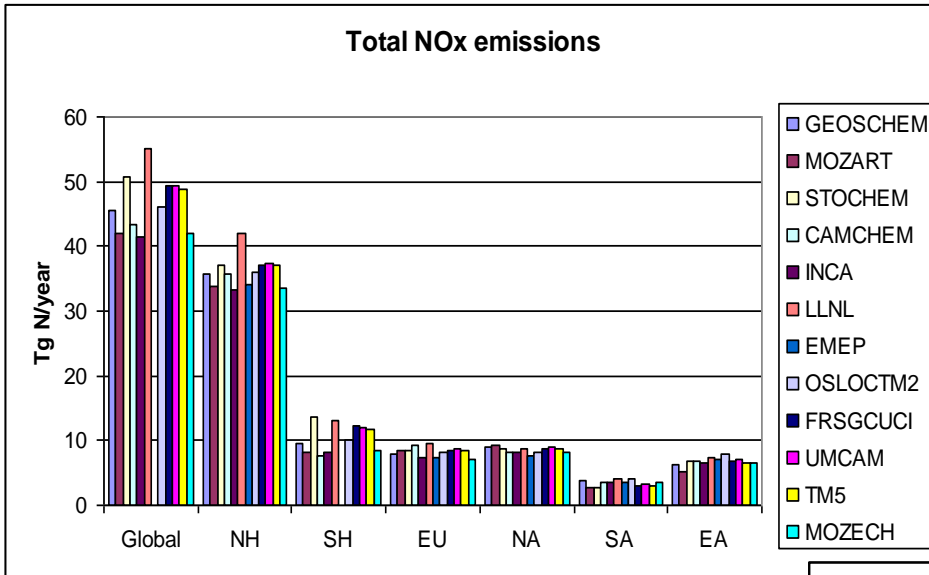
- RAPIDC program:
Contribution to Malé Declaration meeting (AP in South Asia).
 - Voluntary EI program with as base year 2000.
 - Status of capacity building,
 - exchange of information used in global inventories (e.g. EDGAR)
- Gathered information on national emissions inventories in N-Africa and part of Middle East (as part of CIRCE project) through direct contact with Ministries and Commission Delegations.
 - most inventories prior to 2000 or no inventory made
- Capacity building:
 - not foreseen in HTAP at the moment
 - collaboration between HTAP and GAPF/RAPIDC would facilitate capacity building (requires some funding)

B. Update emissions data to hold as recent data as possible.

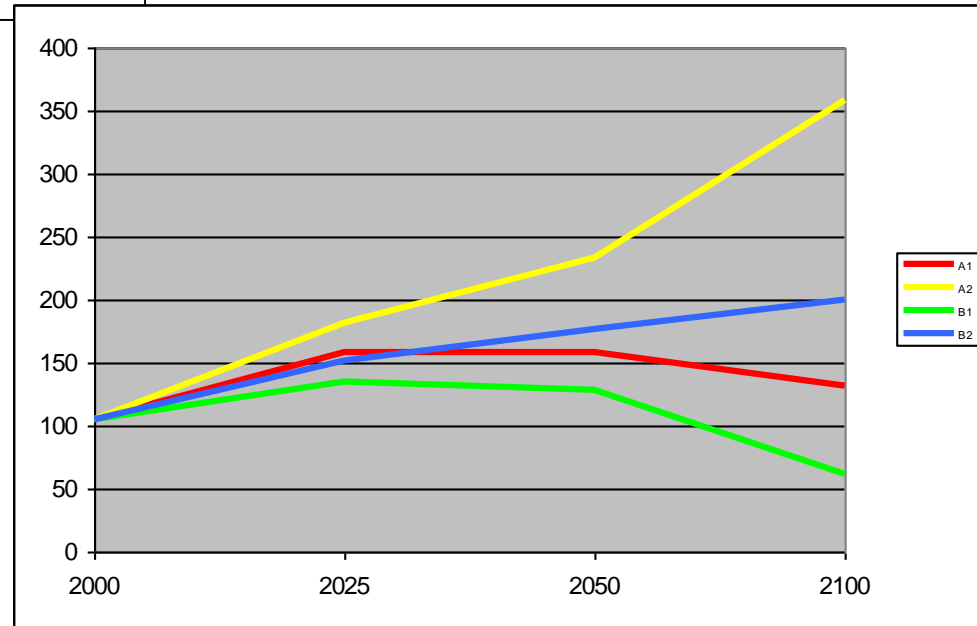
- Checked data availability for period 2000-2005 from National emissions inventories.
- USA EPA: exchange of NEI data for the HTAP
- ENV. Canada: exchange of
- EOLO system: exchange of information via online access to EDGAR and option to provide uniform grid allocation to variety of emission inventories

Recent: 2001 and 2004 (used by model activity)

I. Choices: harmonization or learn from variety?



Learn from variety in emission budgets



Scenario interpretation require consistent starting point.

II. Emission inventories: what's out there and what to select?

Year 2000-2005 country inventory data

North America: USA, Canada, (Mexico) emission inventories (info on grid/season)

W-Europe: CLRTAP EMEP inventories (info on grid/season)

EURAsia: partly CRLTAP EMEP inventories (large adjustments made by EMEP)

South-America: NatCom Annex I (CO, NO_x, NMVOC, SO₂)

Africa: GAPF inventories and individual studies, project inventories (AMMA)

Asia: GAPF inventories and individual studies (REAS, trace-p)

Oceania: NatCom Annex I (CO, NO_x, NMVOC, SO₂)

Global inventories (2000-200?)

BC/OC default: Bond (SPEW), Lioussé, IIASA + individual countries from above

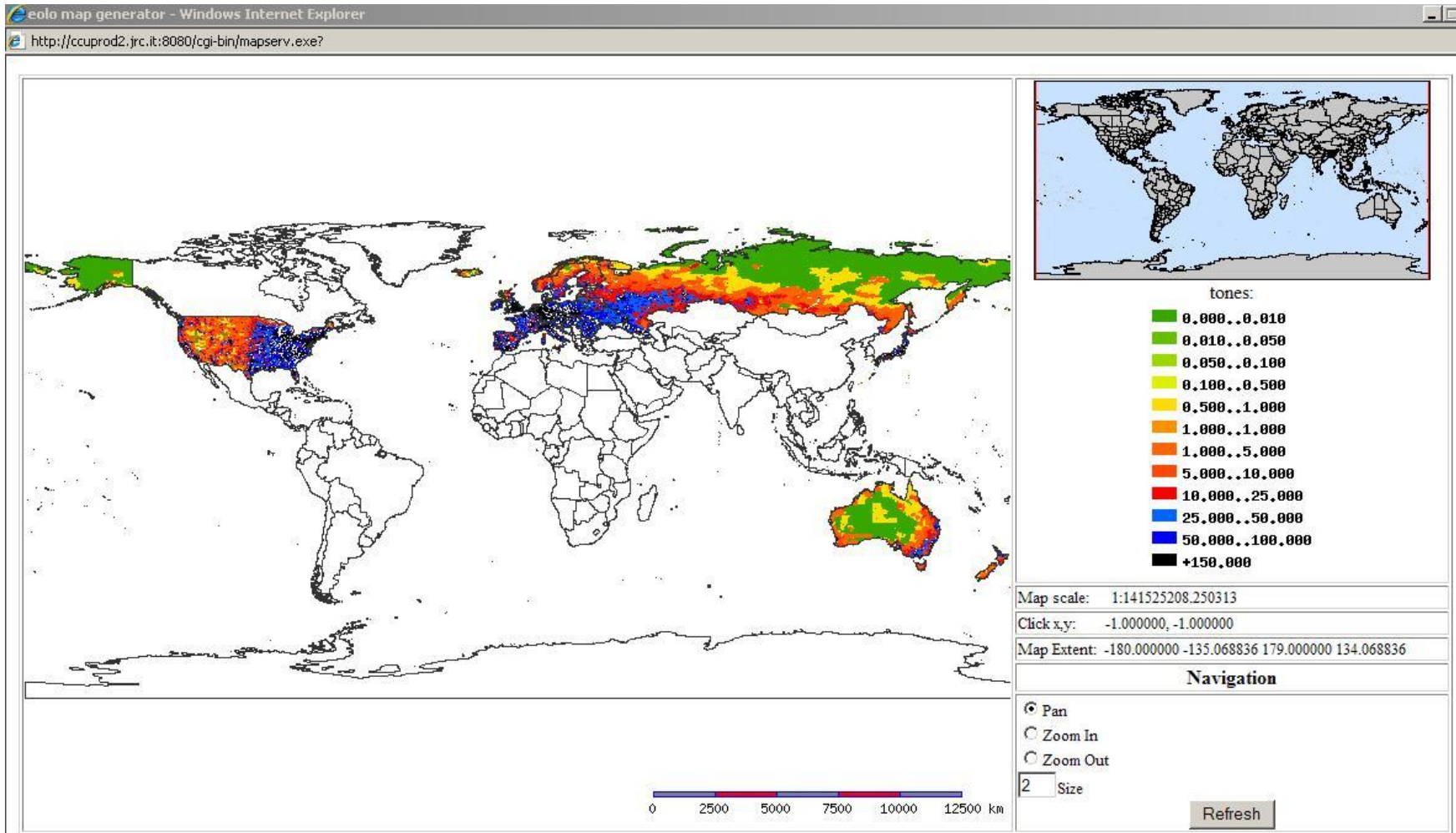
Default all other: EDGAR (1970-2005 dataset?)

Many activities aiming at harmonized datasets: IPCC, Spark, GEIA, HTAP.

Join forces to make combined dataset?

Source: United Nations Framework Convention on Climate Change
Data from National Communications NO_x, SO₂, NMVOC, CO, CH₄ for latest year 2005 (not on grid)

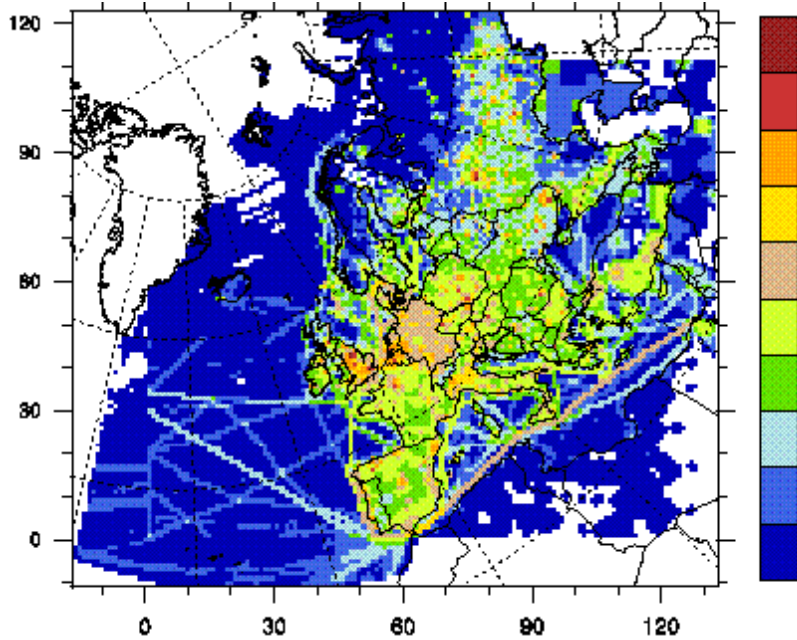
Joint Research Centre



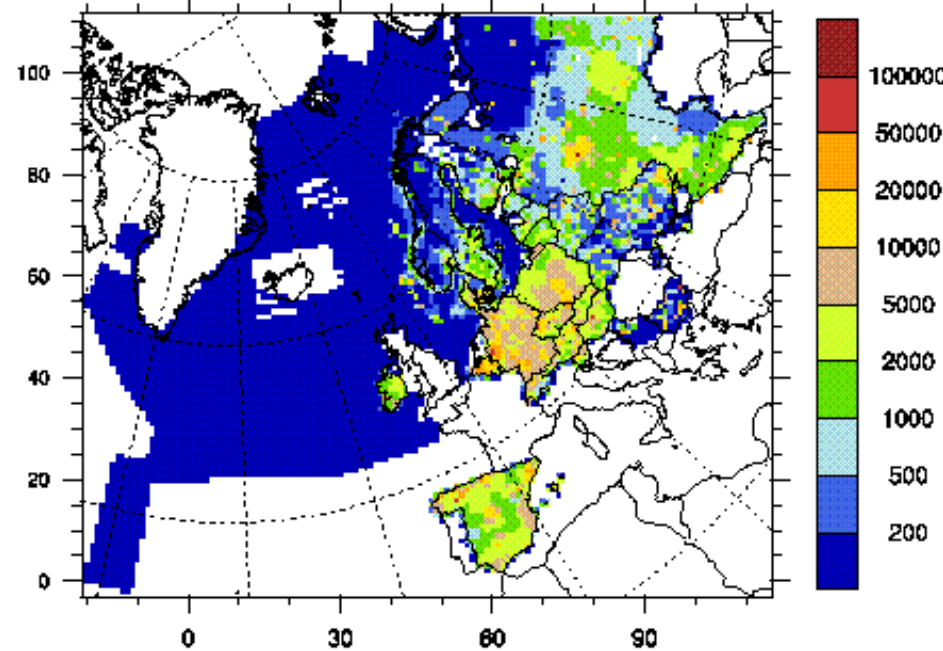
NatCom NO_x emissions distributed on 0.1x0.1 grid using pop. density as proxy (ton/cell)

UN ECE LRTAP:

Country reports: SO₂, NO_x, NMVOC, NH₃, CH₄, PM, and CO for latest year 2005



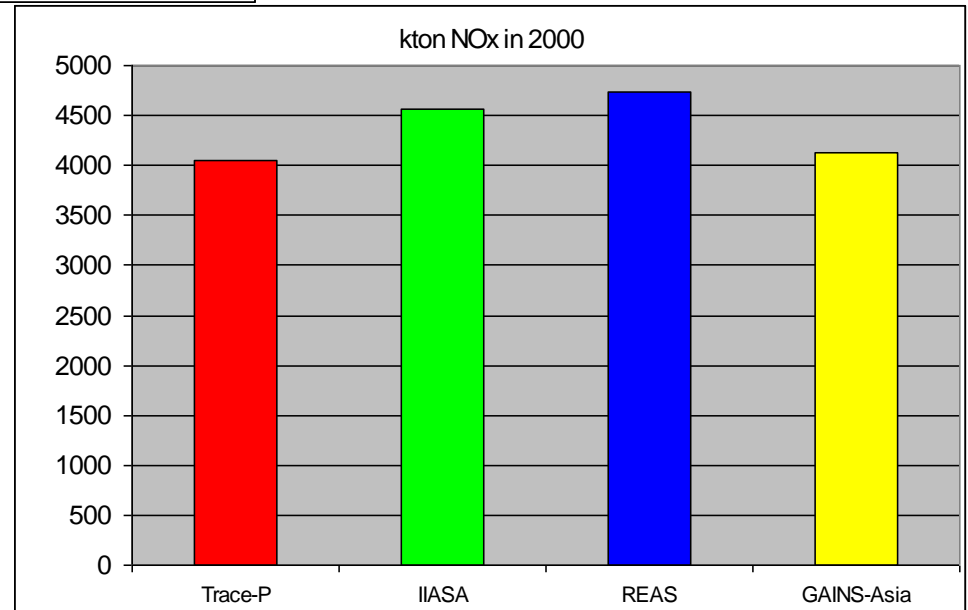
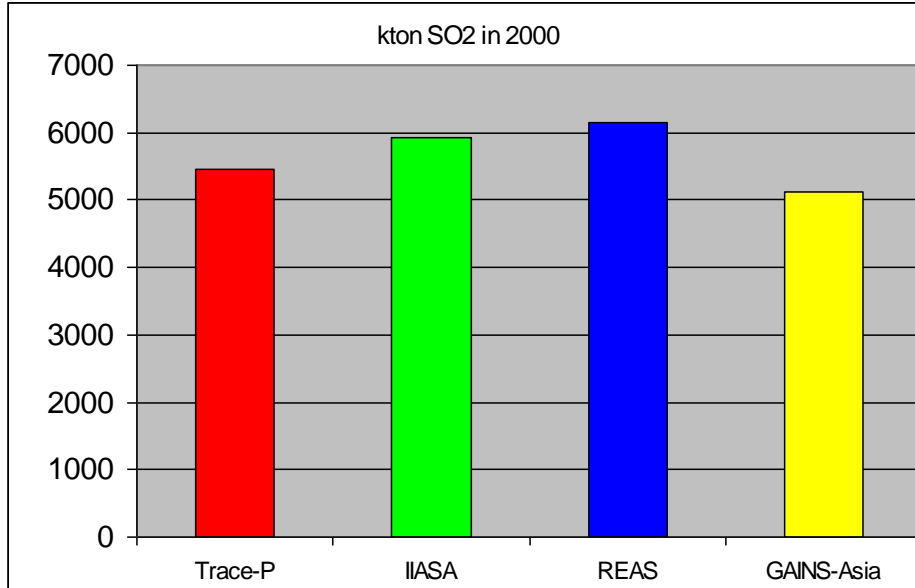
Expert estimate of NO_x on 50x50 km grid (year 2005)
Unit: Mg/cell.



Official grid data NO_x on 50x50 km grid (year 2005)
Unit: Mg/cell.

HTAP choice:

consistent grid data provided by e.g. EDGAR using National Inventories or use national grid data where possible

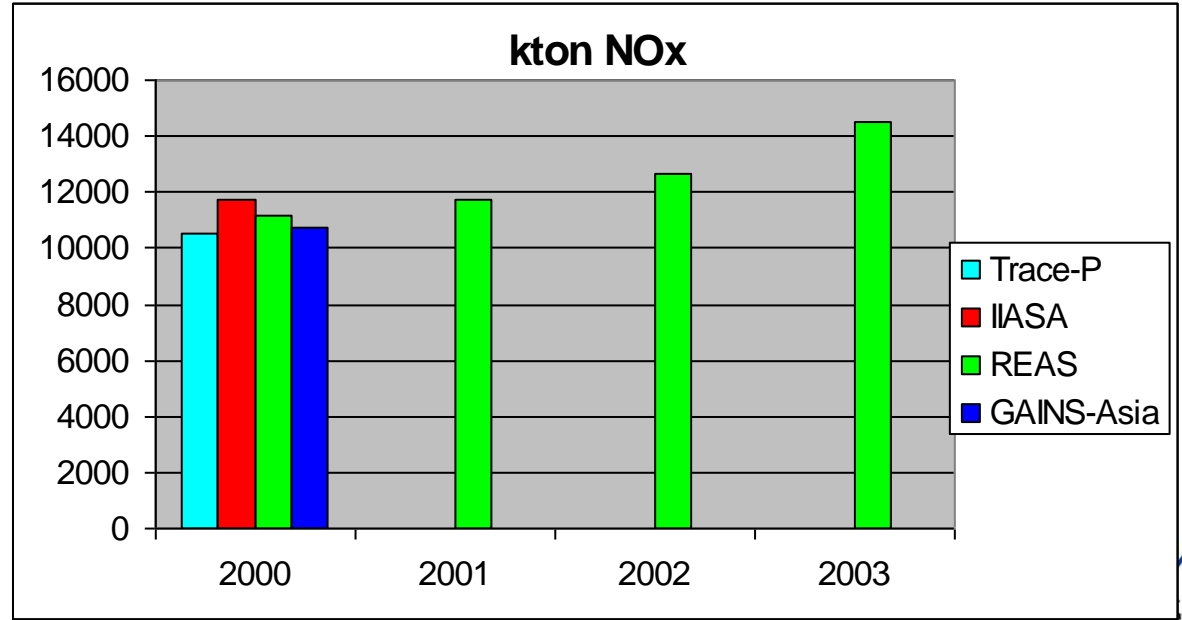
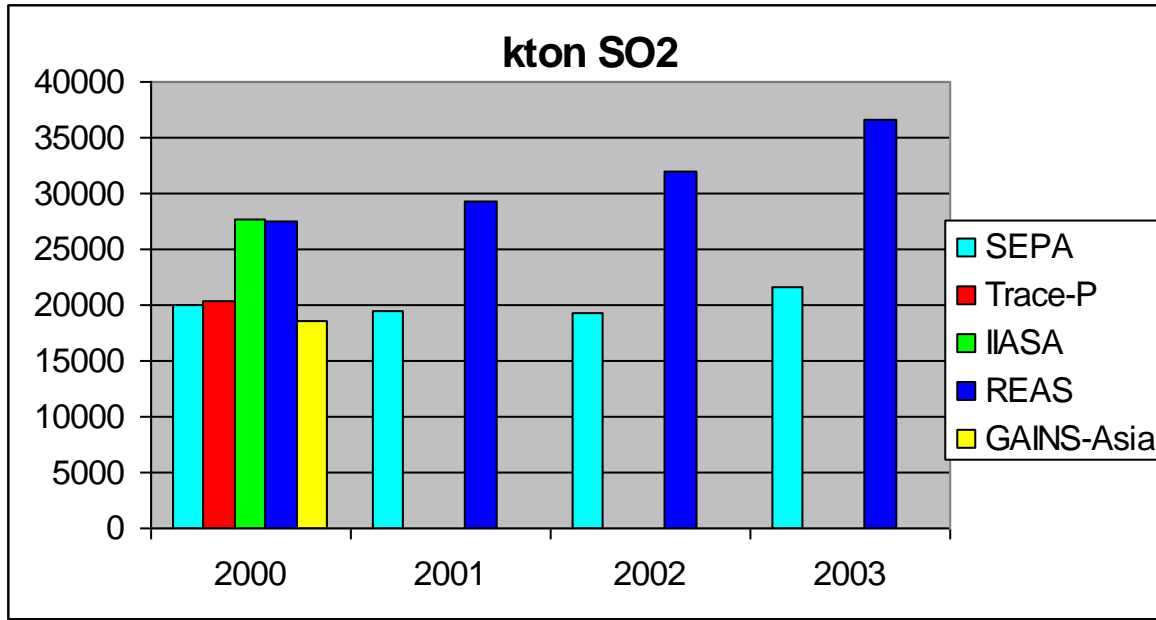


Trace-P: Streets et al (2003)

IIASA: Photocom/Aerocom

REAS (Ohara et al. 2007)

GAINS-Asia: perc. comm. 03-2008



Discussion point

Inventories for policy making and inventories for scientific research

When HTAP is aiming at information for policy making should we

-select the best science inventories (even if they prove policy inventories are wrong (risk of non-acceptance of outcome HTAP work)

- seek “endorsement” of country information going into the HTAP assessment

When selecting is needed (e.g. India, China), JRC will contact selected experts to evaluate inventories and make a recommendation to HTAP

Many activities aiming at harmonized datasets: IPCC, Spark, GEIA, HTAP. with different time-lines.

Capacity building: currently we focus on point B of recommendations (see above). How to address point A. Suggestion HTAP could link more with GAPF/Rapidc program or would support call for funding for these kind of outreach programs.

Phase 1 (mid-2008):

Gridded emission inventory relevant for modeling studies for year 2001 and (optional) 2004 will be delivered to HTAP model intercomparison activity.

Method:

Combination of national emission totals by sector with EDGARv4 calculations for those countries and sectors for which no national data has been found.

National inventories: US EPA, Environment Canada and EMEP inventories, other inventories under discussion (RAPIDC inventories). Workshops planned for evaluating India and China inventories.

Phase 2 (end-2008):

Evaluate uncertainties in existing inventories based on inventory comparisons and results of model results using phase 1 inventory. Define possible improvements for phase 3 inventory.

Phase 3 (mid-2009):

Improved gridded emission data including inventory parameters like activity data and emission factors (2000-2007?). Review of EDGAR-HTAP inventory.