“HTAP_v2: a mosaic of regional and global emission gridmaps for 2008 and 2010 to study hemispheric transport of air pollution” by G. Janssens-Maenhout et al., ACPD 15, C2857–C2864, 2015

The authors are grateful to Referee #2 for his interest and comments on the paper. We tried to improve the paper as requested with more details and data.

The modifications in reply to the comments of referee # 2 are highlighted “green” and “blue” in the paper.

Specific Comments

Page 12870, Lines 5-7 and Page 12890, Line 1-2. Referee # correctly indicates an incomplete wording in the abstract that leads to confusion. The authors meant that the energy and industry emissions of acidifying **gaseous** air pollutants differ strongly between industrialised and developed countries, whereas no such difference is observed in the acidifying gaseous air pollutant emissions from the residential sector. The authors agree that it is needed to mention explicitly SO2 and NOx to avoid confusion. Moreover the authors are happy to take up the suggestion of referee #2 to complete the abstract with the findings on the aerosols, which show almost the opposite effect. Large differences are not present in the energy (and industry) sector, but they are present in the residential sector.
The authors suggest to add in the abstract:
“An analysis of country-specific implied emission factors shows a large difference between industrialised countries and developing countries for acidifying gaseous air pollutant emissions (SO2 and NOx) from the energy and industry sectors. This is not observed for the particulate matter emissions, which show large differences between countries from the residential sector instead.”

Page 12879, Line 13: Raster-resample procedure and country totals in Table S1.1
At the time of compilation of the HTAP_v2.2, only monthly emission gridmaps, as the result, were delivered to the EDGAR team. We then applied the EDGAR table which allocates each grid cell to the country or countries it belongs to. Cells containing borders of countries allocate the area to the different countries with a percentage that reflects the areal coverage in the cell. This table works like a complete set of country masks. With the country masks, the EDGAR team derived also the country totals for the countries, which include a given error because of border issues. However, meanwhile the MICS-Asia team was so kind to deliver the original country totals, which have been compared in Table S1.3. This revealed that applying country masks to obtain country totals (as also done by modellers and e.g. in the ECCAD system) is only valid if the total emission value is larger than 0.2% of each of the country totals of the neighbouring countries. Otherwise a derived country-specific sector total that is 50% larger than the bottom-up one is observed, mainly in the energy sector with many point sources which are typically located on waterways or coastal areas, and end up in cross border cells. The latter caused derived sector totals for Kyrgyzstan, Tajikistan, Afghanistan, Laos, Myanmar,

Bangladesh, which deviated with one order of magnitude from the bottom-up totals. However, China shows good agreement between derived totals and bottom-up totals: within 5% for the energy sector, within 1.4% for Industry and Residential sectors, within 2.6% for the Transport and within 0.4% for the Agriculture sector. India idem: below 3% difference, with the exception of SO2, which differs 6% respectively 14% for the SO2 from the energy and transport sectors. All derived emissions are agreeing within 7% for Indonesia and within 12.5% for Thailand. Japan and South Korea show a bit more deviation of maximum 16.0% and 17.3%.
In Table S1.1: we replaced for the MICS-Asia region the previous values with the country totals received from the MICS-Asia team, to make the dataset more consistent. Now all the country totals are real bottom-up country totals and no longer with one part derived using a mask on a gridmap.
We added a more detailed explanation on the raster-resample procedure on Page 12879, Line 13: "As such, countries within the broad area, spanning from 89.875°N to 20.125°S in latitude and from 40.125°E to 179.875°E in longitude were inserted in the 0.1° x 0.1° emission gridmaps after converting the 0.25° x 0.25° with a raster resample procedure – dividing the cells in 5x5 and then aggregating the 0.05°x0.05° cells with 2x2.
The expertise in comparing the derived totals from the gridmaps with the real country bottom-up totals has been added in section 3.6: "It should be noted that derivation of country totals from the 0.1°x0.1° emission gridmaps (as e.g. done in the ECCAD system) is only valid if the country-specific total is larger than 0.2% of each of the totals of the neighbouring countries. Otherwise the derived country-specific sector total can be 50% larger than the bottom-up one, mainly in the energy sector with many point sources which are typically located on waterways or coastal areas and as such in cross border cells. Table S1.3 illustrates the deviations of derived country-specific sector totals to the bottom-up ones for the Asian region. The latter caused derived sector totals for Kyrgyzstan, Tajikistan, Afghanistan, Laos, Myanmar, Bangladesh, which deviated with one order of magnitude from the bottom-up totals. However, the relative small differences for China (≤5%), India (≤3% for all except for SO2 from energy where it is 14%), Indonesia (≤7%) and Thailand (≤12.5%), Japan (≤16.0%) and South Korea (≤17.3%) show a good agreement for the top 6 Asian emitters." (Table S1.3 is added in the supplementary.)

Table 1: names of the sectors and consistent use throughout the paper.
Referee # 2 correctly indicates an inconsistency in the naming of the sectors throughout the paper, which needs correction. The sectors in Table 1 and used further in the paper and in the figures are the same. The authors opted to shorten the name of the sectors in Table 1, and use the same names as used in the figures: 1_AIR , 2_SHIPS, 3_ENERGY, 4_INDUSTRY, 5_TRANSPORT, 6_RESIDENTIAL and 8_AGRICULTURE.

Page 12887, Lines 3-4: Referee #2 points to a substantial difference between the per capita emission of SO2 of about 20%. This is indeed worth investigating. We downloaded the EUROSTAT data again and recalculated the per capita emissions. The 11.5 kg SO2/cap of Eurostat is valid for 2008 and not for 2010. The 2010 value of EuroSTAT is 8.9 kg SO2/cap, which is very close to our estimate of 9.1 kg SO2/capita – the 0.2 difference can be due to different years of download (as different reporting years

cause small fluctuations) as well as gapfilling by TNO for countries with incomplete timeseries but is less than the range we get from using different reporting years. The large decrease of more than 2kg SO2/cap between 2008 and 2010 is due to the large emission reduction in the (for some countries coal based) power industry (-26%) and a bit in industrial process industry (-16%).
The authors modified the sentence in the paper accordingly as: ”For SO2 the per capita emission in 2010 for EU-28 of 9.1 kg SO2/cap is very close to the reported value of 8.9 kg SO2/cap from EuroSTAT (2014) - the 0.2 difference is much less than the 20% higher per capita SO2 emission in 2008 (11.5 kg SO2/cap). EU’s 9.1 kg SO2/cap is about half the SO2 per capita for China in 2010 and about one third of the SO2 per capita for USA.”

Table 2b: ranking of USA, Germany and China
The list of USA, Germany, China was based on the selection of the top CO2 emitters in 2010 of each of the three continents in the northern hemisphere. The ranking is a combination of the per capita activity and the level of implementation of end-of-pipe measurement technology. The activity level is best reflected by the per capita CO2 emissions, which is highest for USA explaining the high air pollutant emissions per capita. However China with lowest CO2 per capita is not having the lowest per capita air pollutant emissions, because of the level of technology and end-of-pipe implementation. To measure the latter we apply a kind of surrogate variable: the Human Development Indicator (2010) from UNDP(2015). This shows that Germany is more advanced and therefore having lower emissions per capita than China. In order to provide a more complete picture, the authors agreed to include the top 6 world CO2 emitters: China, USA, India, Russia, Germany and Japan.
For the paper we propose an extension of Table 2b with the CO2/cap and the HDI. Moreover we added the countries India, Russia and Japan.

Substance	USA	Germany	China	India	Russia	Japan
ton CO2(long cycle C) /yr/cap	17.6	9.9	6.4	1.5	11.9	9.7
HDI	0.91	0.9	0.7	0.57	0.77	0.88
kg SOx/yr/cap	32.6	5.2	21	8.0	31.9	5.2
kg NOx/yr/cap	43.6	14.2	20.8	7.9	25.1	14.5
kg VOC/yr/cap	43.1	11.9	16.9	14.0	26.9	9.1
kg CO/yr/cap	148.3	35.6	125.6	56.0	52.8	33.1
kg NH3/yr/cap	11.6	7.3	6.7	8.2	6.3	3.7
kg PM2.5/yr/cap	5.25	1.08	8.93	5.19	2.18	0.62
kg BC/yr/cap	0.95	0.20	1.29	0.85	0.29	0.16

In the main text of the paper, the findings of Table 2b are summarized in section 3.2 as follows:

The level of per capita air pollution results from a combination of the per capita activity and the level of implementation of end-of-pipe measurement technology. The activity level can be reflected by the per capita CO2 emissions, which is highest for USA explaining the high air pollutant emissions per capita. However not India with lowest CO2 per capita, but Japan and Germany are having the lowest per capita air pollutant emissions, because of the level of technology and end-of-pipe implementation. To measure the latter we apply a kind of surrogate variable: the Human Development Indicator (2010) from UNDP(2015). This shows that Germany and Japan are more advanced and have therefore lower emissions per capita for all air pollutants (except NH3 for Germany) and for the PM. We observe that the PM emissions per capita of Japan (0.16 kgPM2.5/yr/cap) are only 60% of those of Germany and Germany's one are about one fifth of the per capita emissions of the USA, which are on their turn only 60% of the per capita PM2.5 for China. Table S3 indicates that developing countries, in particular those with emerging economies but not yet fully penetrated clean technologies and end-of-pipe measures, have enhanced PM per capita emissions (China – 8.2 kgPM2.5/yr/cap, India – 5.2 kgPM2.5/yr/cap, Brasil – 3.1 kgPM2.5/yr/cap). Russia has relatively high per capita PM emissions (2.2 kg PM2.5/yr/cap because of fossil fuel production and consumption in the power sector, but much less than Canada (7.4 kg PM2.5/yr/cap), a much less populated country but with important fossil fuel production industry for export. Both countries, with important contribution in the Arctic region, show relatively high NMVOC and SO2 emissions (50.9 kg VOC/yr/cap and 48.7 kg SO2/yr/cap for Canada respectively 26.8 kg NMVOC/yr/cap and 31.9 kg SO2/yr/cap for Russia) due to their significant inland waterway transport using heavy residual fuel oil or diesel.

Air pollutant emissions per unit of GDP: extra Table 2c

Substance	USA	Germany	China	India	Russia	Japan
kg CO2(long cycle C) /yr/USD	339.71	287.79	240.88	136.6	644.58	267.08
GDP/cap	49307	39668	9230	4638	21663	34561
g SOx/yr/USD	0.668	0.132	2.310	1.719	1.482	0.150
g NOx/yr/USD	0.892	0.363	2.295	1.714	1.166	0.419
g VOC/yr/USD	0.882	0.305	1.863	3.013	1.249	0.263
g CO/yr/USD	3.036	0.910	13.830	12.069	2.449	0.957
g NH3/yr/USDP	0.236	0.187	0.735	1.770	0.291	0.108
g PM2.5/yr/USD	0.108	0.028	0.984	1.119	0.101	0.018
g BC/yr/USD	0.019	0.005	0.143	0.183	0.013	0.004

India's carbonaceous particulate matter emissions per unit of GDP are indeed higher than those of China, because of the per capita relative low GDP per capita and the use of less clean technologies. Those countries with relative high GDP per capita and

implementation of clean technology that score lowest are Germany and Japan with only 0.005 g BC per invested unit of GDP (USD PPP corrected in 2010).
This Table 2c and the following explanation are added to the paper: “In analogy with Table 2b, Table 2c provides for the world top 6 CO2 emitters a comparison of the air pollutants per unit of GDP, which are linked to the country’s economic activity (in GDP per capita) and CO2 per unit of GDP (measuring the energy intensive industry). It is directly apparent that again Germany and Japan are having high economic activity, with still important energy intensive industry but low air pollutant emissions per unit of GDP because of the investment in clean technology. On the other side, India has still much lower economic activity but nevertheless a much higher particulate matter emission per unit of GDP.”

More specific comments with the request for supporting information

Page 12882, Line 24-26: Based on the bottom-up inventory of MICS-Asia per sector and country, we observe that although India’s SO2 emissions are only 32% of the Chinese one, the energy sector emits 67% of what the complete energy sector in China emits in SO2. We modified the text as follows: “High annual SO2 emissions are also observed for India, to which the energy sector contributes 59% and the energy-intensive manufacturing industry (iron & steel) 32%, both using also coking and bituminous coal according to IEA (2013).”

Page 12883, Line 8-10: Based on the data in Table S1.1, we observe a relative high contribution of the residential + industry sector for the total NOx in Canada, but also The Netherlands and Norway. All are according to IEA(2013) characterized by a high percentage of natural gas in their fuel consumption for these sectors.
We reformulated the paragraph on NOx with some more quantitative information as follows: “In Central and South America major emissions are attributed to the transportation sector and just to a minor extent to the energy sector (e.g. in Mexico 65% of the NOx emissions originate from road transport). Those industrialised countries with a large share of natural gas as fuel for heating houses and commercial centres and for industry (such as Canada, the Netherlands, Norway) show relatively high emissions of NOx: the share of the residential and industry NOx emissions is around 30% of the total NOx, whereas in USA this is only 20%.”

Page 12884, Line 7-9: Based on the data in Table S1.1 we addressed the observations on NMVOC with a quantification of the share. We also used underlying fuel statistics from IEA(2013), in particular to address the biofuel use and the charcoal production.
For the latter we summarized the data of 2008 and 2010 production for the top 3 charcoal producers in the table underneath, but which we feel that these fuel statistics fall outside the scope of the paper. In the Table underneath referee #2 can see that Brasil, Thailand and Kenya are (with distance from other producers) the world top 3. REAS2.1 however is not modeling charcoal production and therefore this emission source is missing for Thailand in HTAP_v2.2. In addition it is interesting that Brasil reduced considerably (to 46%) its charcoal production activity, whereas the other two countries kept a constant production.

The paragraph on NMVOC has been modified with a more balanced and quantitative description as follows: “In the Middle East NMVOC sources include oil production: the industry sector in Saudi-Arabia contributes 75% to its total NMVOC emissions. In China, particular high emissions are originating from industry (62%) and residential (27%), the latter also associated with the high use of solvents in paints. In Brazil particular high use of biogasoline is present resulting in a 52% NMVOC contribution of the transport sector. Also the production of charcoal is emitting strongly NMVOC and the world top 3 emitters (IEA, 2013) are Brasil, Thailand[1] and Kenya, which explains that their industry sector is contributing to the NMVOC total with respectively 35%, 37% and 80% in 2010.”

Table: TJ charcoal produced by the countries, which contribute more than 1% to the world total charcoal production (IEA, 2013)

TJ charcoal produced	Y_2008	Y_2010		share 2008	share 2010
Brasil	267549	122671.5		22.8%	11.8%
Thailand	137861	133779		11.7%	12.9%
Kenya	91168	96003.5		7.8%	9.2%
Sudan	53116	55135.5		4.5%	5.3%
South Africa	50204	51312		4.3%	4.9%
Tanzania	47340	48324.5		4.0%	4.6%
Ethiopia	35358	37360		3.0%	3.6%
Cote d'Ivoir	33664	35820.5		2.9%	3.4%
Nigeria	33264	34804		2.8%	3.3%
Angola	32894	34604		2.8%	3.3%
Zambia	31160	32708		2.7%	3.1%
Philippines	29221	29785.5		2.5%	2.9%
Ghana	21468	22330.5		1.8%	2.1%
Congo	20975	22391.5		1.8%	2.2%
Paraguay	20945	10659.5		1.8%	1.0%
Indonesia	20451	19911.5		1.7%	1.9%
Vietnam	17648	18079.5		1.5%	1.7%
Togo	16724	17525.5		1.4%	1.7%
Malaysia	15585	16139		1.3%	1.6%
Columbia	14815	14815		1.3%	1.4%
Senegal	14502	17276		1.2%	1.7%
Mozambique	13298	13899.5		1.1%	1.3%
Dominican Rep.	12104	12104		1.0%	1.2%

Page 12885, Line 11-16. We quantified the paragraph on text further as follows: “A decreasing trend from 2008 to 2010 is observed for Brazil due to decreases in emissions from charcoal production (with 23% share in the world production in 2008 and 12% in 2010, according to IEA, 2013). Emissions from charcoal production are also important for some African countries (Kenya, Sudan, South Africa, Tanzania, Ethiopia), with

[1] The charcoal production emissions for Thailand are missing because REAS2.1 is not accounting for this source.

country-specific shares in world production varying between 1.3% and 12.910% according to IEA (2013).”

Page 12885, Line 23-24: Indeed the coarse sector breakdown in fig. 2g does only show that the transport sector is mostly contributing. However the BC (controlled) emission factor is two orders of magnitude larger for diesel than for petrol (see Table underneath). Therefore the authors were confident to mention that these BC emissions are caused by the diesel transport.

Table: Emission factors for petrol and diesel vehicles (light duty, passenger car) with different types of end-of-pipe measures (as present in a European fleet).

fuel	vehicle	EOP			2008-2010	fuel	vehicle	EOP			2008-2010	EFpetrol/ EFdiesel
diesel	light duty	EU1	BC	kg/TJ	10.59147	petrol	light duty	EU1	BC	kg/TJ	0.05745	0.5%
diesel	light duty	EU2	BC	kg/TJ	9.35451	petrol	light duty	EU2	BC	kg/TJ	0.04532	0.5%
diesel	light duty	EU3	BC	kg/TJ	8.5041	petrol	light duty	EU3	BC	kg/TJ	0.03732	0.4%
diesel	light duty	EU4	BC	kg/TJ	4.25205	petrol	light duty	EU4	BC	kg/TJ	0.03732	0.9%
diesel	light duty	EU5	BC	kg/TJ	4.25205	petrol	light duty	EU5	BC	kg/TJ	0.03732	0.9%
diesel	light duty	no control	BC	kg/TJ	38.655	petrol	light duty	no control	BC	kg/TJ	0.07774	0.2%
diesel	light duty	pre EU	BC	kg/TJ	38.655	petrol	light duty	pre EU	BC	kg/TJ	0.07774	0.2%
diesel	passenger cars	EU1	BC	kg/TJ	14.813288	petrol	passenger cars	EU1	BC	kg/TJ	0.12405	0.8%
diesel	passenger cars	EU2	BC	kg/TJ	10.097136	petrol	passenger cars	EU2	BC	kg/TJ	0.08373	0.8%
diesel	passenger cars	EU3	BC	kg/TJ	6.95996	petrol	passenger cars	EU3	BC	kg/TJ	0.05681	0.8%
diesel	passenger cars	EU4	BC	kg/TJ	6.357456	petrol	passenger cars	EU4	BC	kg/TJ	0.05681	0.9%
diesel	passenger cars	EU5	BC	kg/TJ	6.357456	petrol	passenger cars	EU5	BC	kg/TJ	0.05681	0.9%
diesel	passenger cars	EU6	BC	kg/TJ	6.357456	petrol	passenger cars	EU6	BC	kg/TJ	0.05681	0.9%
diesel	passenger cars	no control	BC	kg/TJ	41.552	petrol	passenger cars	no control	BC	kg/TJ	0.12405	0.3%
diesel	passenger cars	pre EU	BC	kg/TJ	41.552	petrol	passenger cars	pre EU	BC	kg/TJ	0.12405	0.3%

We modified the sentence as follows: “Fig.2g shows that the largest contributing sector for BC in North America, Europe and the Middle East is road transport, which should be mainly from diesel vehicles given the much higher BC emission factor for diesel than for petrol.”

Page 12886, Line 1-3: We quantified the shares of BC emissions of the industry and residential sector in China and India, and compared these with the shares in USA and Germany. We consulted the IEA (2013) fuel statistics and understood that the (bituminous) coal use in power plants, coke ovens, non-metallic minerals (cement) and even in the residential sector are causing this for China and the use of coal but also of solid biomass is causing the same high share in India.

Page 12886, Line 4-7. We quantified the shares of BC emissions of the residential sector in China and Russia. The emissions for Russia are calculated with EDGARv4.3 and all details are known. Therefore we comment the contribution of the different fuels in the residential sector in more detail, as taken from the EDGARv4.3 BC emissions of the Russian residential sector in the Table below. We consider it out of balance to include this detailed table in the paper but we updated the paragraph as follows: “The residential sector in China accounts for more than half (52%) of its BC total. Russia shows a similar high share of the residential sector (46%) to its total BC. Most important sources calculated in EDGARv4.3 for heating buildings in Russia include bituminous coal (57%), solid biomass (30%), lignite (6%) and industrial waste (3%) burning in the residential sector (for domestic housing as well as commercial services) (EC-JRC/PBL, 2011 and IEA, 2013)."

Table: Fuel-specific breakdown of the BC emissions from the residential sector of Russia in 2010 from EDGARv4.3 (EC-JRC/PBL, 2011)

type of building	fuel type	kton BC in 2010		
Farms	bituminous coal	1.14E-01		0.60%
Farms	diesel	6.66E-02		0.35%
Farms	industrial waste	8.57E-02		0.45%
Farms	lignite	1.08E-01		0.57%
Farms	LPG	2.07E-03		0.01%
Farms	natural gas	3.25E-03		0.02%
Farms	peat	2.86E-03		0.02%
Farms	solid biomass	8.80E-01		4.62%
Commercial services	BKB	8.79E-03		0.05%
Commercial services	bituminous coal	6.55E+00		34.38%
Commercial services	diesel	2.59E-02		0.14%
Commercial services	residual fuel oil	8.15E-03		0.04%
Commercial services	industrial waste	4.18E-01		2.19%
Commercial services	lignite	1.15E+00		6.04%
Commercial services	LPG	4.95E-03		0.03%
Commercial services	natural gas	1.01E-02		0.05%
Commercial services	Oven coke	1.73E-01		0.91%
Commercial services	solid biomass	2.27E+00		11.90%
Fisheries	bituminous coal	4.99E-03		0.03%
Fisheries	diesel	7.63E-03		0.04%
Fisheries	heavy residual fuel oil	1.57E-02		0.08%
Domestic housing	bituminous coal	4.23E+00		22.19%
Domestic housing	diesel	5.51E-03		0.03%
Domestic housing	heavy residual fuel oil	4.72E-03		0.02%
Domestic housing	lignite	1.65E-01		0.87%
Domestic housing	LPG	8.43E-02		0.44%
Domestic housing	natural gas	1.64E-01		0.86%
Domestic housing	peat	6.31E-03		0.03%
Domestic housing	solid biomass	2.48E+00		13.04%
	Totals	**1.90E+01**		

Page 12891, Line 2-3: The authors agree that a decrease in PM emissions from 2008 to 2010 in developing countries results from a combination of reduced activity and penetration of abatement technology. Only for the developing countries calculated with the EDGARv4.3 emissions database these two causes can be decoupled. Largest reductions over these two years were observed for Brasil, Mexico, Columbia, Venezuela, Kazakhstan, Cuba etc. in the industry (fuel transformation), energy and road transport sector. We added a table with the (sub)sectors contributing mostly to the reduction, demonstrating the relative reduction in activity and in (controlled) emission factor, as

modeled in EDGARv4.3. For the paper, we consider it most appropriate to mention only the two largest countries Kazakhstan and Brasil.
Table: Reductions in activity and in emission factor for some developing countries between 2008 and 2010 from EDGARv4.3 (EC-JRC/PBL,2011).

		(2010-2008)/2008	
developing country	activity	activity reduction	emission factor reduction
Brasil	charcoal production	-54.1%	-2.4%
Mexico	energy (bit. coal)	-13.9%	-2.5%
Columbia	energy (bit.coal)	6.3%	-9.0%
	charcoal production	0.0%	-1.0%
Kazakhstan	energy for coal mining	-44.9%	-3.9%
	power with lignite/coal	-11.1%	-30.9%
Venezuela	road transport	2.3%	-2.5%
Cuba	road transport	-43.0%	-2.5%
	energy (crude oil)	-5.9%	0%

In the paper we reformulated the last two sentence in this section with some more information as: "For the other developing countries (calculated with the EDGARv4.3 data and based on the IEA(2013) fuel statistics), the SO2 emissions of the energy sector slightly increase from 2008 to 2010 because of the increased coal use (as also observed by Weng et al., 2012) and the increased use of heavy fuel oil in the Middle East. The PM emissions from the energy and industry of some other developing countries show a decrease from 2008 to 2010, mainly due to the activity reduction but also in some cases due to the modelled decrease in controlled emission factor in EDGARv4.3. Largest reductions were seen for Brazil (with 54% reduction of its 2008 charcoal production) and Kazakhstan (11% reduction in coal power generation, which is modelled with a 31% decreasing BC emission factor)."

Reformulation of some sentence were undertaken, as suggested by referee #2 and resulted in:

Page 12870, Line 7-11: "The per capita emissions of all world countries, classified from low to high income, reveal an increase in level and in variation for gaseous acidifying pollutants, but not for aerosols. For aerosols an opposite trend is apparent with higher per capita emissions of particulate matter for low income countries."

Page 12871, Line 5-9, "Responsibility of providing emission inventories to several international bodies is often distributed within a particular country: e.g. the methane inventory of some Annex I countries is provided by different national institutions. Although they represent the same region, they might be different, which is often the case and leads to confusion (Janssens-Maenhout et al., 2012)."

Page 12871, Line 24-27: "For example, the atmospheric modelling groups, which contributed to the HTAP multi-model experiments described in HTAP (2010), used their own best estimates for emissions for the year 2001, obtaining in some cases comparable global emissions (e.g. for NOx and SO2 model input), and sometimes getting larger differences in the model input (e.g. for NMVOC emissions).”

Minor comments

The authors made the typographic corrections as suggested on
Page 12872 (Line 5), Page 12875, Line 7, Page 12884, Line 20, Page 12885, Line 25, Page 12889, Line 7, Page 12890, Line 25, Page 12891, Line 17-18, Page 12904, Fig.1.

We prefer not to change the labeling of the agriculture with number 7, to avoid confusion with the former HTAP definitions. Agriculture was always number 8 but the former 7 and 4 are converted to 4. Therefore number 7 is no longer existing now.

The authors took the decision to refer to this database unambiguously as “HTAP_v2.2” and corrected this as such through the paper.