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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The study of emission inventory on anthropogenic air pollutants and VOC species in the Yangtze River Delta region, China" *by* C. Huang et al.

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Journal: ACP Title: The study of emission inventory on anthropogenic air pollutants and VOC species in the Yangtze River Delta region, China Author(s): C. Huang et al. MS Type: Research Article

General comments The paper presents a thorough emission inventory of a major part of one of the quickest changing and most influential countries of the world. Given the number of people living in the Yangtze river delta (YRD) (and thus exposed to (local) air

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Interactive Discussion

Discussion Paper

pollution) as well as the enormous economic activity, it is clearly time that the scientific air pollution community becomes equally familiar with say the YRD or PRD in China as the Po-valley in Italy or Los Angeles in the US. This reviewer favours publication with minor revisions although some improvements can be made and – most important – it is felt that the results can be placed better in perspective. 1) The authors compare their result to an earlier Pearl River Delta (PRD) inventory. It may be true that this is the most "comparable" regional inventory. However, for the international community this reviewer would request including a comparison to Emission inventories for China as a whole as published by e.g. Lamarque et al (2010 – although base year is 2000), EDGAR v4.1 (base year 2005) or GAINS-Asia (IIASA). In section 2.1 the authors explain that "the GDP (Gross Domestic Product) of the YRD region reached 6.55 trillion yuan, about 20% of total national GDP in 2007 (National Bureau of Statistics of China, 2008b). Correspondingly, the energy consumption in the YRD region reached 440 million tce, about 17% of the national total by the end of 2007." The relative importance and proportion of the YRD to all of China offers the possibility to indicatively compare the final results for certain sectors that are not completely dominated by local conditions (like road transport, industry) to the estimated emissions for all of China by assuming that these should be in the order of 15-25%, maybe 10-30%. If the comparison would reveal that for some sectors this is in fact 5% or 50+%, this could be interpreted as a contradiction between the YRD inventory and national scale inventories that may require further investigation (not necessarily in this paper but in future work). This approach serves 2 goals; 1) there is simply more to compare to than only the PRD inventory and 2) most people are still more acquainted with national total emissions and an indication whether the detailed YRD inventory is in line or contradicts part of the national inventory is valuable.

2) The uncertainty assessment in the paper is too brief. For example section 2.3.6 Biomass burning is usually a highly uncertain source. How (un)reliable are the biomass burning activity data for the YRD region? +/- 10%; 100%; 200%? The key question in the YRD inventory would be – does it matter? The YRD EI seems to be completely

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dominated by industry and power plants. So, for example if biomass burning activity is ∼100% uncertain but than still makes a minor contribution to the total YRD emission? – if so, this source is not an important contributor to uncertainty in the annual totals (this leaves unchanged that in episodes such a source can be dominating). Such information is relevant and could be included in section 3.5. In general, based on fig 3. the key sources can be identified and some further quantification of the possible ranges for these key sources should be given. From this may follow recommendation and prioritization of future research.

Please find detailed comments on the paper below.

Title: change to: "Emission Inventory of anthropogenic air pollutants and VOC species in the Yangtze River Delta region, China

p 956, l12. This is referred to as a "top-down" approach. Please reconsider. I would personally prefer "down-scaled". I would qualify Top-down as done with inverse modelling, from ambient measurements or satellite observations. Multiplying energy statistics with emission factors is still a bottom-up approach only the scale is not as detailed as the individual facility level. Also in section 3.5 you simply refer to the whole study as a bottom-up approach. . ..

p957 l 21; How was the annual travelled mileage estimated exactly? Did you use a fixed mileage per litre of fuel?

p 958, l 7-11. This is an important but highly uncertain source. The current description is too brief. How did you get surface silt loading? was it measured? Are there any checks (e.g. from relative importance of crustal components in chemical composition of PM samples) that the estimated emissions for this source make sense?

section 3.2 and fig 3. Please explain what is captured under "process of mineral product" as this is the major PM10 and PM2.5 source. is it realistic? In line with the share compared to the national total for this sector (see above discussion on comparison to

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other national scale inventories)?

p960 l 23 “Another 79 kt SO2 emission could be expected when the rest FGD installation were finished before the end of 2010.” change to: “Another 79 kt SO2 emission could be expected before the end of 2010, provided that the remaining planned FGD installation is implemented”.

p963 l3: largest = most important

p965 top; comparison to INTEX-B: make it a bit more clear in the text which inventory is higher for PM and VOC. Please comment if you think it is due to emission factors or due to different activity data.

References to some data sets that contain emission data for all China to facilitate the comparison asked for.

Lamarque et al (2010), the ACCMIP dataset, ACP 2010 (ACP-2010-67). EDGAR v4.1 (base year 2005) http://edgar.jrc.ec.europa.eu/index.php GAINS-Asia (IIASA) (http://www.iiasa.ac.at/rains/gains_asia/main/index.html?sb=1)

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 951, 2011.