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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Spatial and temporal variation of emission inventories for historical anthropogenic NMVOCs in China" *by* Y. Bo et al.

Anonymous Referee #2

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General comments: I have gone through RC S4022 : 'Comments on Bo et al. on NMVOC emissions' by Anonymous Referee 1 on 23 June 2008 and AC S4757 : 'Respond to Referee 1's comments' by Shaodong Xie on 14 July 2008. The authors have conducted a more detailed interpretation when they reviewed previous work in the revised manuscript. Two most recent studies of NMVOC emissions in China, TRACE-P inventory (Streets et al, 2003) and REAS inventory (Ohara et al., 2007), have been added to Table 11 for a clear comparison. There are some differences in data collection and adjustment among three studies. Authors have explained what they accomplished an improvement over previous work in the responses. The authors professed that they have used more firsthand local data for the present paper, such as China Energy Statistical yearbook and consumption data. I find that year-to-year emission

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variation comes from activity data or economic movement. The objectives of emission inventory are generally used to develop control strategies or air quality management and used as input data for air quality model. There are no superior methodologies to verify the accuracy of inventory as thing stands. The comparison of result between air quality model and observations is usually used to evaluate the relative accuracy of inventory. However, the uncertainty of result may come from meteorological data. The emission estimation method is a solid procedure which does not modify much for last decade. Nevertheless, the result of emission estimation has certain degree of uncertainty. The uncertainty derives from the use of different emission factors and activity data. In most cases, emission factors are simply averages of all available data of acceptable quality, and are generally assumed to be representative of long-term averages. Variability of emissions factor can lead to uncertainty of inventory. The variability of emissions within a category and the limited sample size of measurements give rise to random sampling errors in estimation of the mean emission factor. The average emission factor, which is typically based upon the small data set available when an emission inventory is developed, is therefore subject to uncertainty. If the emission inventory includes a large sample of specific units within a source category, then the uncertainty analysis should typically focus on uncertainty in the mean emission rate. However, if an emission inventory includes only one unit from a given source category, and if no site-specific emission data are available, then an assumption might be made that the individual unit is a random sample from the population of all similar units. AP 42 Compilation of Air Pollutant Emission Factors (AP-42) has been the primary tool in developing emission inventories. EPA released a draft review for public comment on April 24, 2007. The assessment of AP-42 describes the statistical analyses used to characterize the uncertainties for categories of emissions factors and provides a procedure to calculate an estimate of the uncertainty associated with emissions factor use. Uncertainty is dependent on the kind of emissions released, the number of tests used to determine the emissions factor, the appropriate decision level (or percentile) within the distribution range, and the number of similar emissions units within a specific

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area. Generally, AP-42 emissions factors are assigned a quality rating of 8220;A8221; through 8220;E8221;based on the quality of the supporting emissions test data and on both the amount and the representative characteristics of those data. Thus, US EPA has developed emissions factor uncertainty ratios by different statistical approaches for single emissions unit applications and for multiple emissions unit applications. I find the findings of this manuscript are indeed important, I recommend the paper should be published. However, I highly suggest the authors should conduct uncertainty analysis of inventory to explain the quality of their work and the range of inventory. In particular, the work should focus on assessing the distribution of inter-unit variability as an estimate of uncertainty.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 11519, 2008.

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Interactive Comment