



Estimates and trends of major anthropogenic halocarbon emissions from China

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Halocarbon emissions from China are of great interest. To determine the halocarbon emissions, several studies have used either CO or HCFC-22 as reference tracer in the interspecies correlation method. In this study, an exploratory comparison between CO and HCFC-22 as reference tracer was conducted, thus halocarbon emissions for 2009 were estimated and trends for 2000-2010 were discussed. Results show that those two species are significantly correlated with most of other target species ($p < 0.01$), while HCFC-22 is better correlated. These good correlations and the known large emissions allow both CO and HCFC-22 to be reference tracers. A comparison of results between this emission estimate and another interspecies correlation estimate for 2008 reveals that results are of same magnitude for most halocarbons. Then compared to other estimates by bottom-up approaches and top-down approaches (including modeling method), estimates agree within uncertainties with each other, which give confidence in our methods and assumptions. The calculated fractions of Chinese emissions to the global emissions are around 20% for HCFC-22, HCFC-141b and HCFC-142b, close to 10% for CFC-11, CFC-12, CCl4, and under 5% for HFC-134a, which is consistent with the dominant role of HCFCs in current China consumption of halocarbons. The emissions estimated all by top-down approaches in different researches show the evident decrease of emissions of CFCs in last decade but the increase of HCFCs emissions in China. The ODP-weighted emissions of CFCs are much larger than the reported consumption, revealing that they are mainly emitted from banks and this bank size is shrinking gradually due to these emissions, while HCFCs are found to be accumulated in banking time usage. Despite that data of other ODSs (such as CH3Br, Halons, CH3CCl3, a small contribution to total) emissions are limited and not included, the total ODP-weighted ODSs emissions in China are believed to be decreasing.