

Urban Ambient Mixing Ratios of Hydrochlorofluorocarbons in China

X. Fang, J. Wu, Y. Shi, J. Zhang and J. Hu

State Key Joint Laboratory for Environmental Simulation and Pollution Control, College of Environmental Sciences and Engineering, Peking University, Beijing, China; 86-10-62756593, E-mail: jianxin@pku.edu.cn

In January and February 2001, a wide survey of 19 halocarbons in 45 cities was conducted in China. Up until now, ten years have passed and urban atmospheric levels of halocarbons in China may have changed greatly. In this study, 92 samples in 46 Chinese cities were collected in October and November 2010, and the levels of hydrochlorofluorocarbons (HCFCs) that were measured are similar to the research conducted in January and February 2001 by Barletta in 45 Chinese cities. One of biggest differences between the two studies is that HCFC consumption in China are very different geographically. Mixing ratios of HCFCs show a large enhancement with respect to Ammonia (NH_3) background values, especially for HCFC-22 (585 pptv average in this study and 209 pptv for NH_3 background). Compared to the results of the previous study, it can be observed that levels of HCFCs have increased rapidly since 2001. HCFC-22, HCFC-141b and HCFC-142b have grown to 3, 2, 3 times higher (respectively) than that in 2001. Since the implementation of the Montreal Protocol, China has achieved remarkable successes in ozone protection (CFCs phase-out), while their replacements have become widely applied. In the next decades, this may bring about increasing emissions and atmospheric mixing ratios. Regions of urban clusters with high mixing ratios of HCFC-22 were identified, including the North China Plain, Yangtze River Delta and the Pearl River Delta, where further monitoring will be conducted in the future.

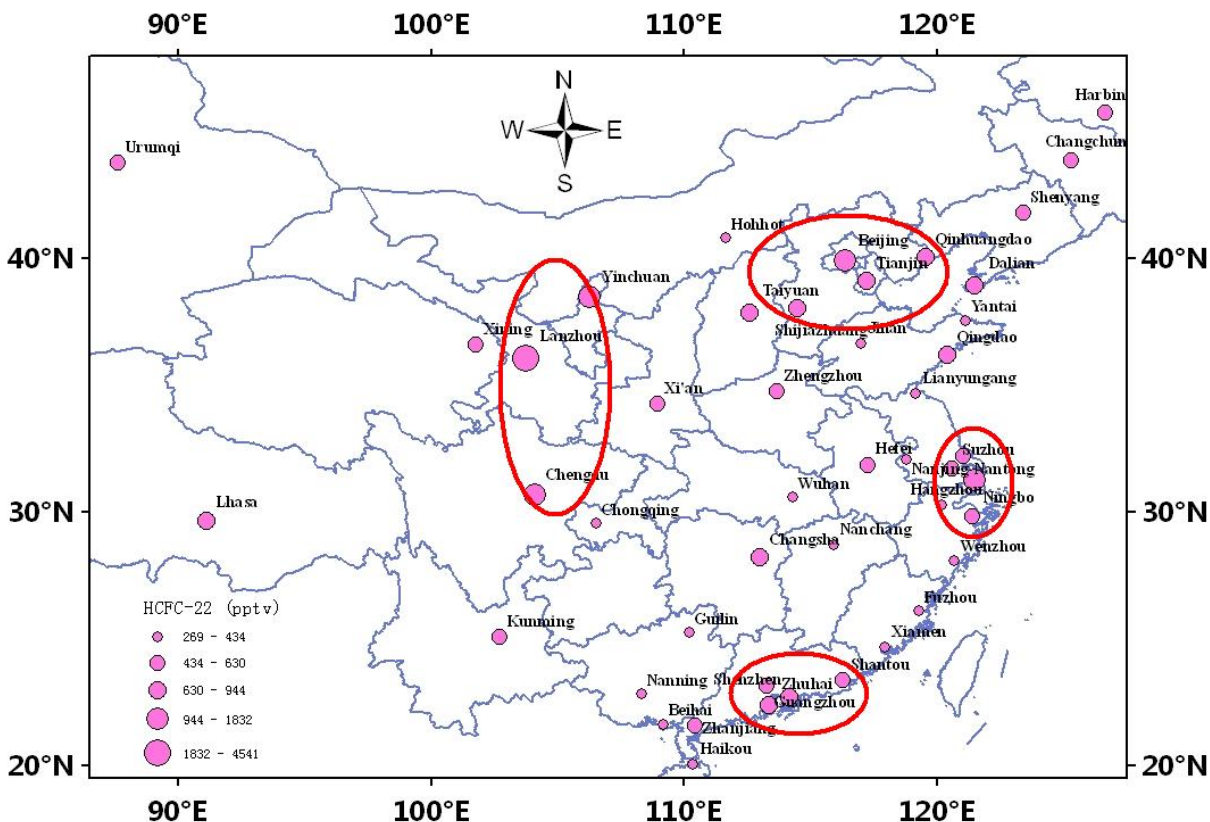


Figure 1. Map showing the geographical HCFC-22 mixing ratios of sampling sites. The pink solid circle represents the mixing ratio of HCFC-22 in different cities. The bigger circle represents the higher mixing ratio. The red hollow circle displays the relative “polluted” regions.