



Historical and projected Chinese HFC-410A emission from room air conditioning sector at a city level

Lisha Liu (1), Yanwei Dou (2), Bo Yao (1), Lei Wang (2), Min Peng (2), Pengju Bie (3), and Jianxin Hu (3)

(1) Meteorological Observation Center, China Meteorological Administration, Beijing, China (liulisha0126@163.com), (2) China Household Electrical Appliances Association, Beijing, 100010, China, (3) State Key Joint Laboratory for Environment Simulation and Pollution Control, College of Environment Science and Engineering, Peking University, Beijing, 100871, China

HFC-410A (a blend of HFC-125 (C₂H₅F) and HFC-32 (CH₂F₂)) as one of the substitutes of hydrochlorofluorocarbons (HCFCs) was mainly used as blend refrigerant in room air conditioning (RAC) sector in China. However, HFC-410A was also one of strong greenhouse gases (GHGs) and regulated under the Montreal Protocol and Kyoto Protocol. In this study, an updated and city-level HFC-410A emission inventory for Chinese RAC sector was developed from 2006 to 2017 and projected to 2050 with a bottom-up method. The HFC-410A emission reached 12.0 Gg yr⁻¹ in 2017 and kept an annual growth rate of 115.7% in China. Based on the updated emission factors, the end-of-life emission made the biggest contribution to the total emission, accounting for more than 95%. Furthermore, HFC-410A emission was projected in the future under Business-as-usual (BAU) scenario and mitigation scenario. Under the BAU scenario, the HFC-410A emission would grow to 89.2 (54.8-126.0) Gg yr⁻¹ in 2050 and the cumulative emission would reach 1945 Gg from 2018 to 2050. Under the mitigation scenario, the emission of HFC-410A will decline to 43.1 (26.1-62.0) Gg yr⁻¹ in 2050 and emission summary will be 1572 Gg during 2018 to 2050. In addition, due to the population and social-economic conditions, greater HFC-410A emission strengths were observed from Beijing-Tianjin-Hebei region, the Yangzi River Delta, the Pearl River Delta and provincial capitals than from the rest of China.

KEYWORDS: Room air conditioning (RAC); HFC-410A; Emission; China; Future projection;