

Recent Accelerated Growth Observed for HCFCs in the Atmosphere

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In the 15 years before 2004, atmospheric observations had shown steady or, more recently, declining rates of increase for the most abundant HCFCs in the background atmosphere. Since 2004, however, accumulation rates for these gases have increased substantially; global tropospheric growth rates of HCFC-22, HCFC-142b, and HCFC-141b observed in 2007 were 50 to 100% larger than measured in 2004. Particularly surprising are the increases observed for HCFC-142b—global emissions derived for this gas for 2007 from our observations are two times larger than projected in the latest WMO scientific ozone assessment report. HCFC growth rates have *increased* since 2004 despite a large *decrease* (by more than a factor of 3) reported for HCFC production and consumption in developed countries from 2002 to 2006. The enhanced atmospheric increases most likely arise from enhanced HCFC use in developing countries. HCFC production and consumption in developing countries increased exponentially at about 20%/yr over the past decade, accounting for 80% of global HCFC production and consumption by 2006. Most of this HCFC was produced and consumed in China. Additional hints regarding the source of this enhanced emission can be found in the atmospheric data themselves. Small but persistent changes in the atmospheric distribution of HCFC-142b, for example, are discernable in the data. A qualitative analysis suggests an enhanced source since 2004 from low-latitudes in the northern hemisphere, consistent with changes in consumption reported to UNEP over this period. Here we will discuss these results and their implications for ozone depletion and climate. They appear to provide an interesting bellwether concerning the influential role developing countries can and will play in controlling the chemical composition of the global atmosphere.

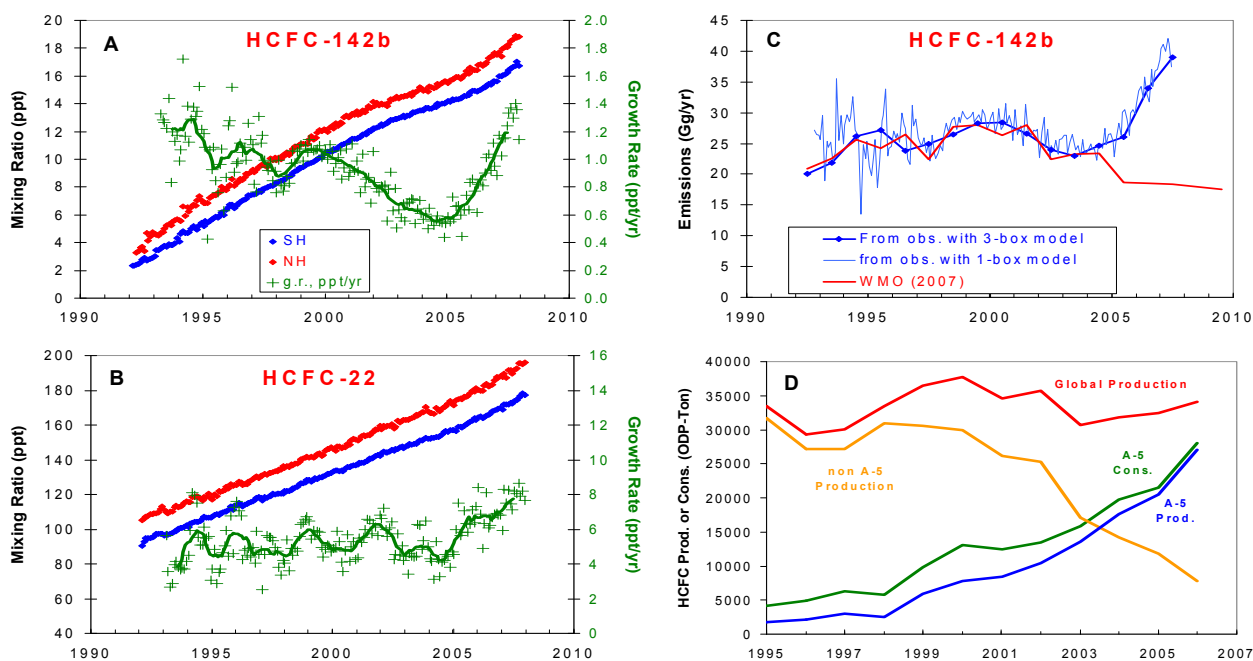


Figure 1. Panels A&B: Measured global tropospheric mixing ratios and growth rates of HCFCs from NOAA's global sampling network; Panel C: global HCFC-142b emissions derived from these measurements compared to the baseline scenario in WMO (2007); and Panel D: HCFC production and consumption data reported to UNEP during the past decade.