

Constraining Estimates of Future Emissions of Ozone-Depleting Substances with Measurements

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Projections of future emissions of ozone-depleting substances (ODSs) are based on estimates of current and impending production, predominantly in Article 5(1) (developing) countries, and on estimates of current and future emissions from the reservoirs (banks) of these chemicals that exist in developed countries. Production of CFCs and halons in developing countries is currently diminishing in anticipation of their 2010 production deadline, however the demise of global manufacture will not rapidly eradicate emissions of these ODSs because their world-wide banks are believed large. A recent reassessment of global ODS banks, based on inventories of equipment and products containing ODSs, has more than doubled an earlier bank estimate for CFC-11, and increased a previous CFC-12 bank estimate of 60 Gg (in 2000) more than tenfold. These new estimates make it clear that the majority of future emissions of CFCs and halons will emanate from existing banks, not from impending production. Accordingly, projections of future emissions and ozone layer recovery rely strongly on estimates of the sizes and release rates of contemporary ODS banks.

Measurement-based estimates of modern-day ODS bank releases can help constrain projections of future emissions. For example, a recent measurement-based emission estimate of 16 ± 4 Gg CFC-12 for the USA and Canada in 2003 is contrary to a previous (2000) global bank size estimate (60 Gg) that implied the CFC-12 bank would be exhausted by 2002. As global production winds down, changes in the global atmospheric burdens of ODSs, as measured by ESRL/GMD, provide increasingly accurate information about global bank emissions that will lead to more accurate projections of future ODS emissions and ozone layer recovery.

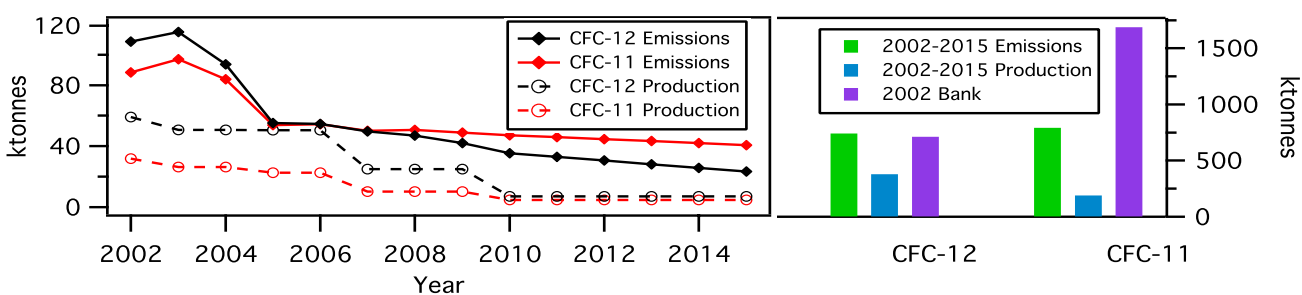


Figure 1. Though CFC-11 and CFC-12 production is expected to drop 80-85% during 2005-2015 (left panel), their estimated emissions will diminish only 25-50% because of large banks. A comparison of the recent bank size estimates for 2002 to the projected cumulative emissions and production during 2002-2015 (right panel) reveals that the predominance of future emissions will emanate from banks.