



Isotopic signatures of selected atmospheric species (CFCs, halocarbons, alkanes, alkenes, alkynes and aromatics) over one annual cycle from urban, rural and marine locations in Ireland.

K. R. Redeker and R. M. Kalin

EERC, Queens University Belfast, Belfast, UK

k.redeker@qub.ac.uk Fax: 44 028 9066 3754 Phone: 44 028 9097 5633

Isotopic analysis has been used as an effective tool to constrain components of the global carbon dioxide, methane and nitrous oxide budgets. Isotopic analysis for low concentration atmospheric species is often hampered by the required sample size. We present here a methodology capable of gathering isotopic data from over 35 compounds in ambient air, including C2-C8 hydrocarbons (alkanes, alkenes and alkynes), aromatics, CFCs, methyl halides and other halocarbons. A further 25 compounds may be separated and quantified for concentration, including carbon disulfide and low pptv halo- and hydrocarbons. We present here results for nearly one annual cycle of analysis from Ireland, including data from urban, rural and marine locations. We tentatively identify six groupings of contaminants, including four separate hydrocarbon sources, based on concentration correlations. Isotopic signatures of hydrocarbons appear to become more enriched during the summer period. Alkane signatures become more enriched from C3 to C6 and alkene isotopic signatures are relatively more enriched than their alkane counterparts. These results represent the first reported isotopic values for atmospheric HCFC-22, HCFC-134a, CFC-12, CFC-11, methylene chloride, isoprene, chloroform, benzene, toluene and several branched hydrocarbons.