

Changes in CFCs and SF₆ concentration in air of southern Poland

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The concentrations of chlorofluorocarbons (CFCs) and sulphur hexafluoride (SF₆) in the atmosphere are on the ppt level. CFCs are stable, synthetic, halogenated alkanes and they contribute to ozone depletion by photolytic processes in the stratosphere. CFCs and SF₆ also participate in intensification of the greenhouse effect. The production and release of CFCs increased rapidly between the 1970s and 1980s. Then atmospheric CFCs concentration decreased since the end of 1990s because of the Montreal Protocol limitations.

The measurements of CFCs and SF₆ in air are usually conducted at the so-called clean stations, i.e., at places situated outside of the urban areas influence. In Europe such clean station is the Mace Head (Ireland), which is AGAGE participant since 1987 (Prinn et al., 2000). In central Europe such measurements have been carried out in urban area of Krakow since 1997 and in mountains at Kasprowy Wierch in 2013.

The work presents a general view of environmental pollution of air in southern Poland (in the years 1997-2013) by selected halocarbons i.e., freons F-11 (CFCl₃), F-12 (CF₂Cl₂), F-113 (CCl₂FCClF₂), chloroform (CHCl₃), 1,1,1-trichloroethane (CH₃CCl₃), carbon tetrachloride (CCl₄) and SF₆ (Różański et al., 2014). To obtain concentrations of measured compounds the mathematical procedure has been used, where concentrations were calculated using a five points Lagrange's interpolation method. Using temporary measurement data, the daily arithmetic means and their standard deviations were determined. Based on these, efficiency of Montreal Protocol legislation, implemented in Poland (The Journal of Laws No. 52) could be assessed (Śliwka et al., 2010). Additionally the work discusses a problem recalibration of the main laboratory standard to SIO2005 scale. Next in work are presented meteorological characteristics of Krakow region and their influence on observed concentration of measured compounds.

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