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SubSection: 3.1.4 Composition of the Earth's atmosphere

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3.1.4 Composition of the Earth's atmosphere

The atmospheric composition data are abridged from US National Air and Space Administration (Washington, D.C.) model of the US standard atmosphere. This represents an idealised steady state from the surface up to 100 km relative to dry air at sea level.

(Parts in 10^6 of dry air by volume)

N ₂	O ₂	Ar	CO ₂	Ne	He	CH ₄	Kr	N ₂ O	H ₂	O ₃	Xe
780 984	209 475	9340	314	18	5.2	2.0	1.14	0.5	0.5	0.4	0.086

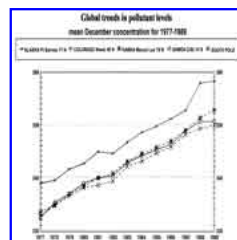
The United Nations Environmental Programme (Data Report, 3rd edn, 1991–92) includes a collation for (at least) the period 1977–1989 of latitudinal differences in values of mean monthly concentrations of carbon dioxide, methane, nitrous oxide and fluorocarbons 11 and 12. Figure 1 (Parts 1, 2, 3 & 4) illustrates the 13-year rising trend in December levels of these four pollutants separately, for latitudes 71°N, 40°N, 19°N and 14°S and the South Pole.

Figure 2 portrays less clear cut trends, some first rising and then all falling, for sulphur dioxide mean concentrations in residential areas of

15 major cities of the world.

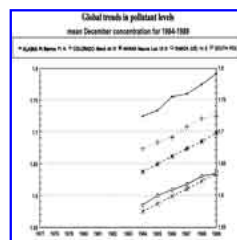
Figure 3 (Parts 1, 2, & 3) displays changes in anthropogenic emissions of carbon dioxide for 1970, 1980 and 1988, and of sulphur dioxide and oxides of nitrogen for 1980, 1984 and 1988, expressed in million tonnes per year and in proportion of the world total between continents. Data were abstracted and summarised by the UNEP from OECD reports and national statistics.

(Click the Images to view Larger Images)



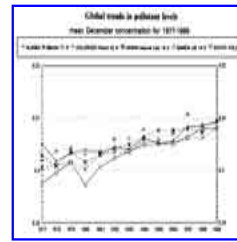
CARBON DIOXIDE, as parts/million by mole fraction (ppmf), measured by non-dispersive IR analyser

Fig. 1 (Part 1)

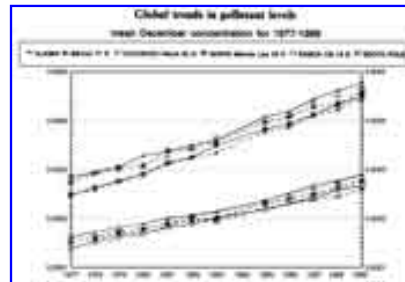


METHANE, as parts/million by volume (ppmv), in dry air, measured by gc/fid

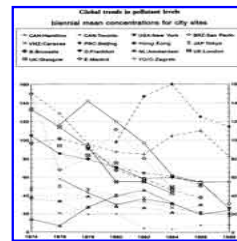
Fig. 1 (Part 2)



NITROUS OXIDE, as parts/million by mole fraction (ppmf), measured by gc/ecd
Fig. 1 (Part 3)



CFC11 (lower) & CFC12 (upper curve), as parts/million by volume (ppmv), measured by gc/ecd
Fig. 1 (Part 4)



SULPUR DIOXIDE, as micrograms per cubic metre
Fig. 2

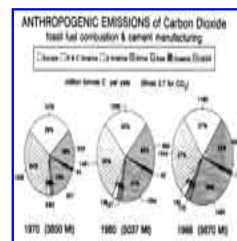


Fig. 3 (Part 1)

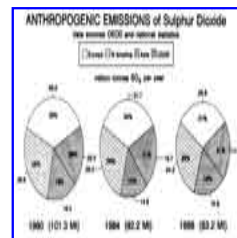


Fig. 3 (Part 2)

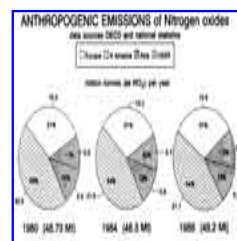


Fig. 3 (Part 3)

G.F.Phillips

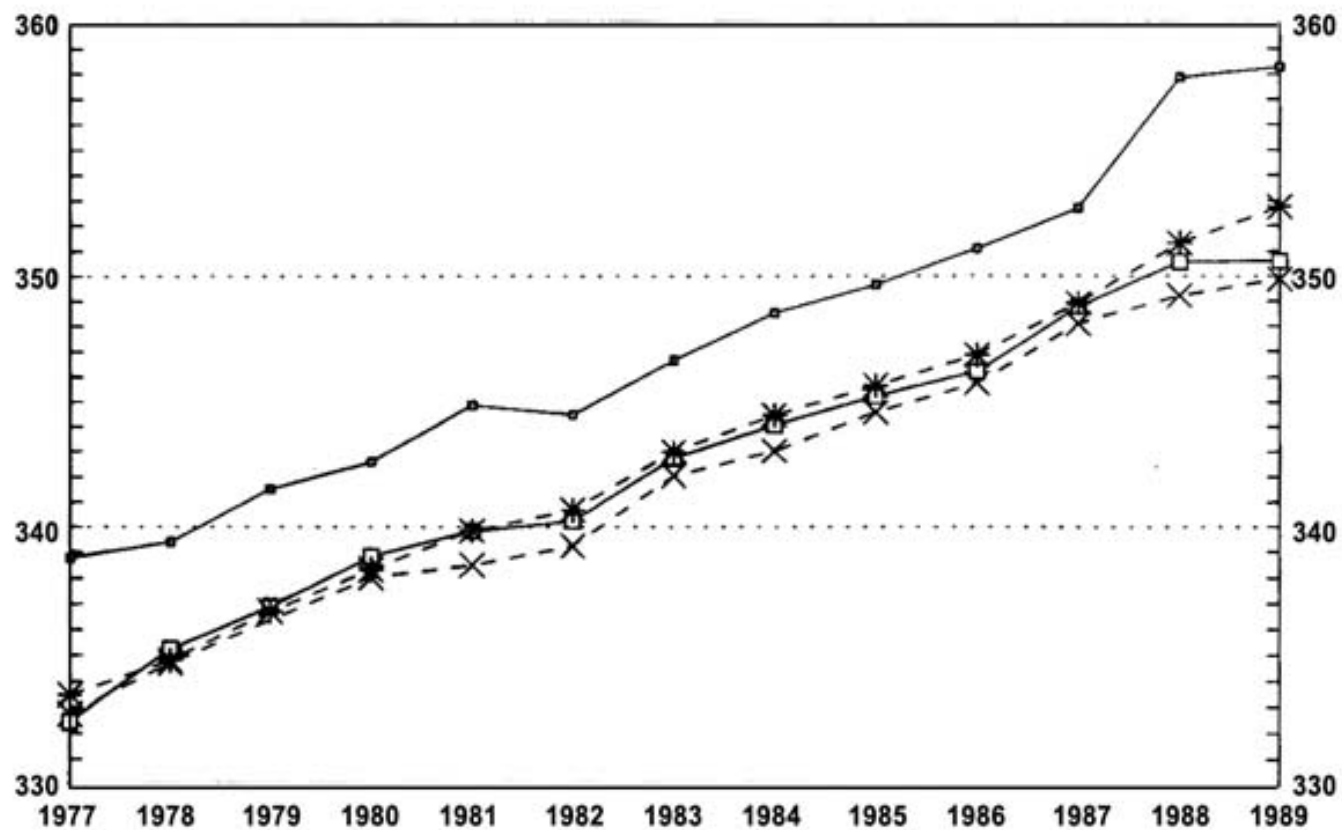
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Global trends in pollutant levels

mean December concentration for 1977-1989

◻ ALASKA Pt Barrow 71 N + COLORADO Niwot 40 N * HAWAII Mauna Loa 19 N ◻ SAMOA (US) 14 S × SOUTH POLE

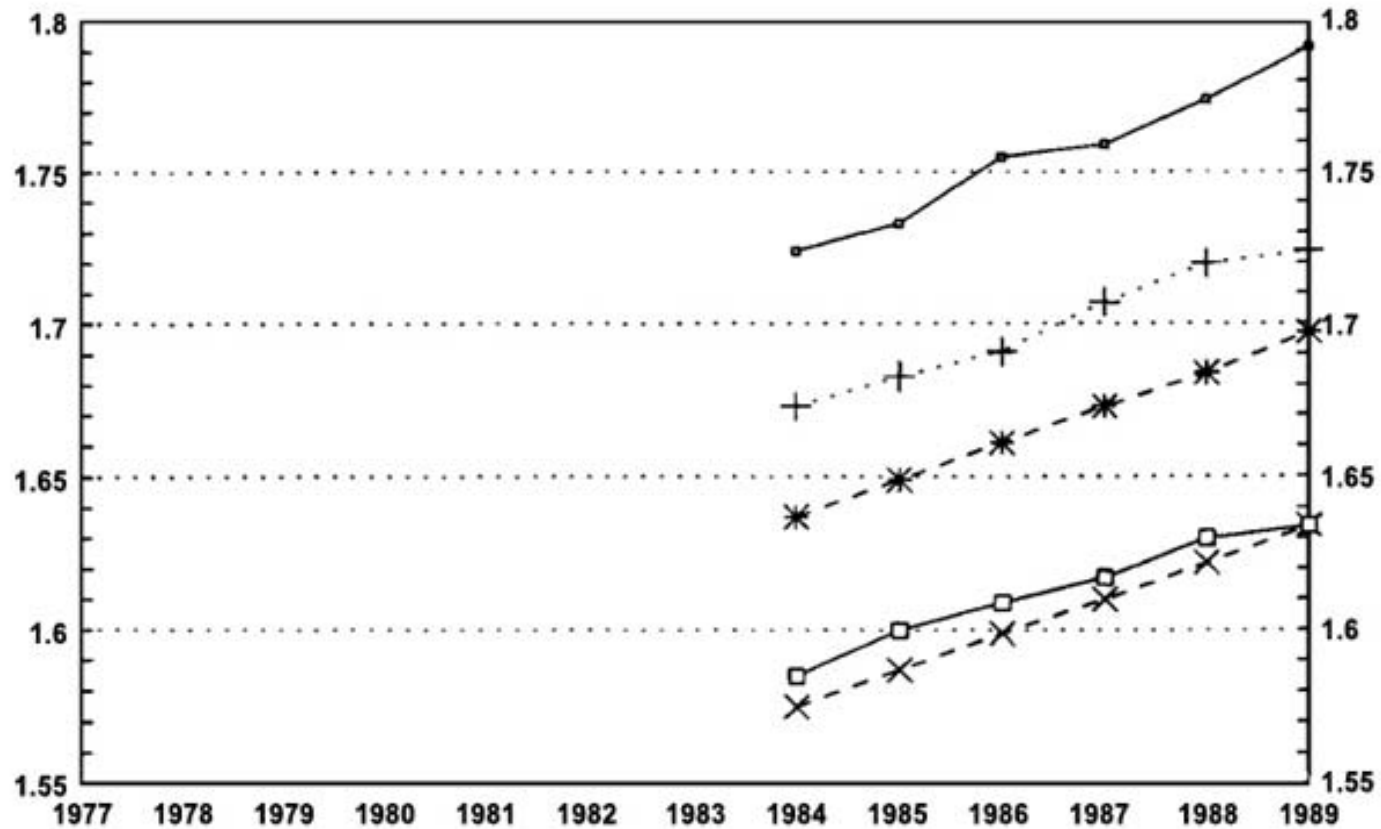


CARBON DIOXIDE, as parts/million by mole fraction (ppmf), measured by non-dispersive IR analyser

Global trends in pollutant levels

mean December concentration for 1984-1989

→ ALASKA Pt Barrow 71 N + COLORADO Niwot 40 N * HAWAII Mauna Loa 19 N □ SAMOA (US) 14 S × SOUTH POLE

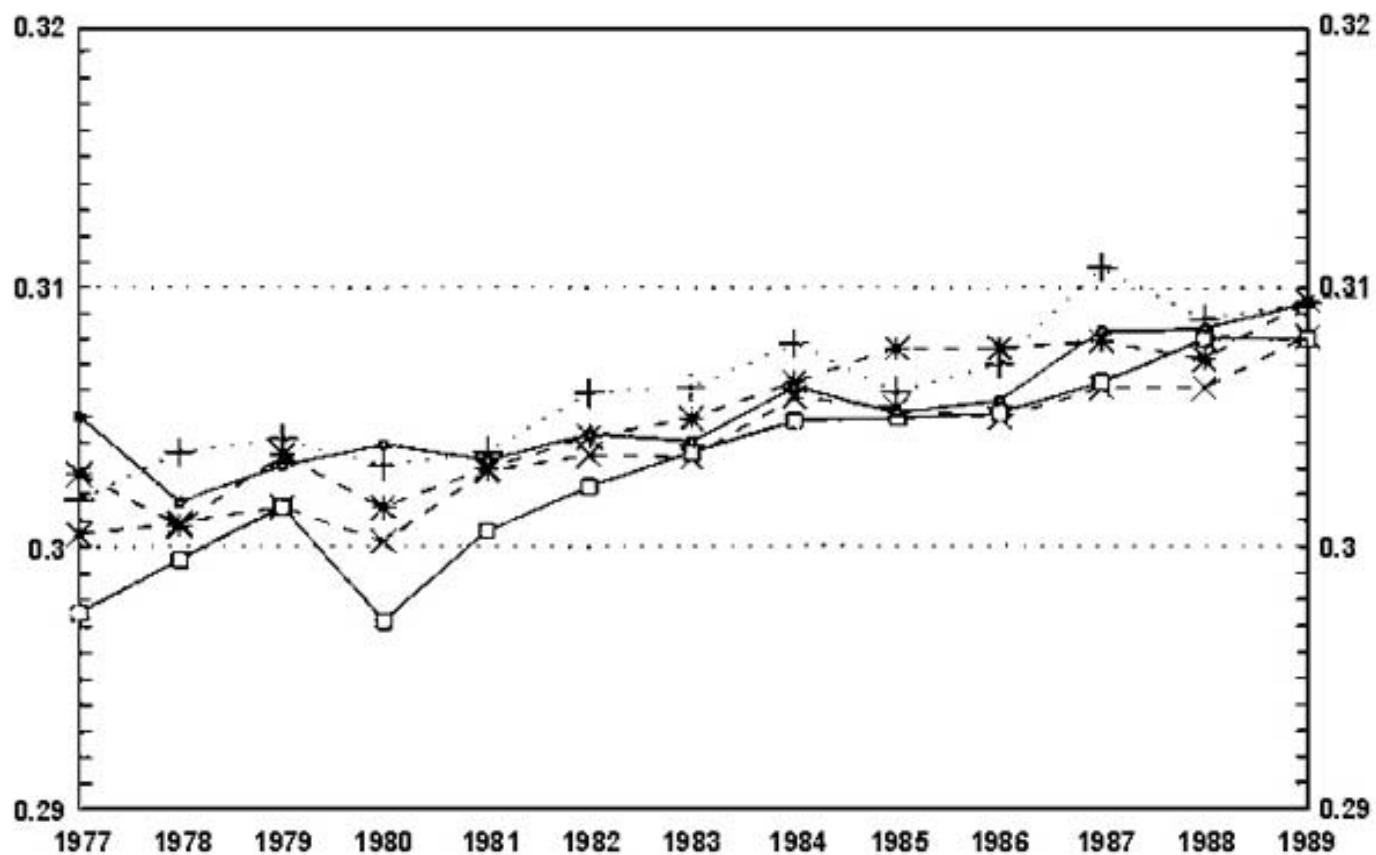


METHANE, as parts/million by mole volume (ppmv), in dry air, measured by gc/fid

Global trends in pollutant levels

mean December concentration for 1977-1989

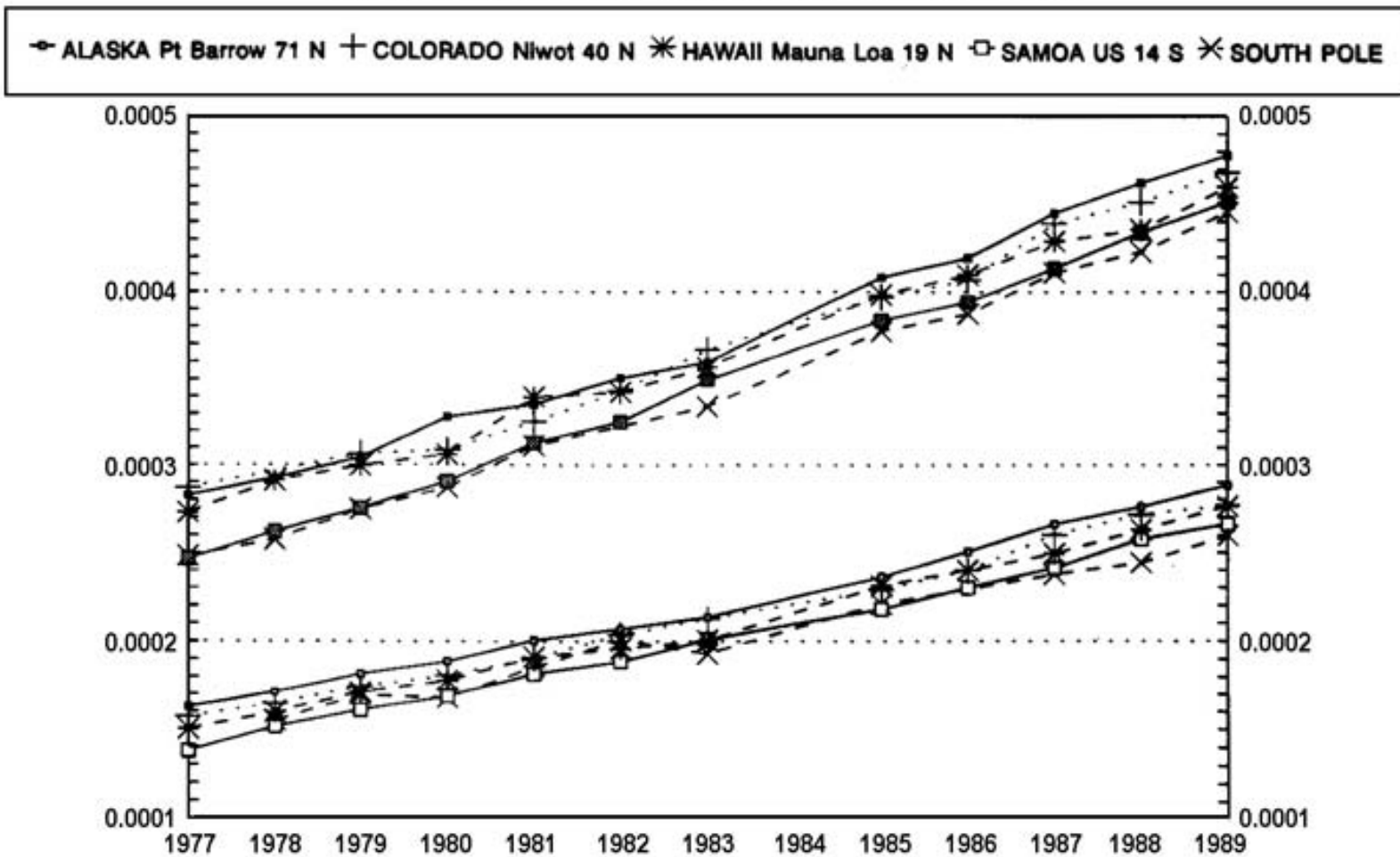
◊ ALASKA Pt Barrow 71 N + COLORADO Niwot 40 N * HAWAII Mauna Loa 19 N ◻ SAMOA US 14 S ✕ SOUTH POLE



NITROUS OXIDE, as parts/million by mole fraction (ppmf), measured by gc/ecd

Global trends in pollutant levels

mean December concentration for 1977-1989



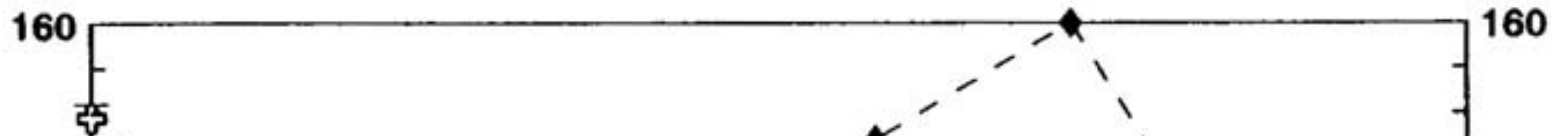
CFC11 (lower) & CFC12 (upper curve), as parts/million by mole volume (ppmv), measured by gc/ecd

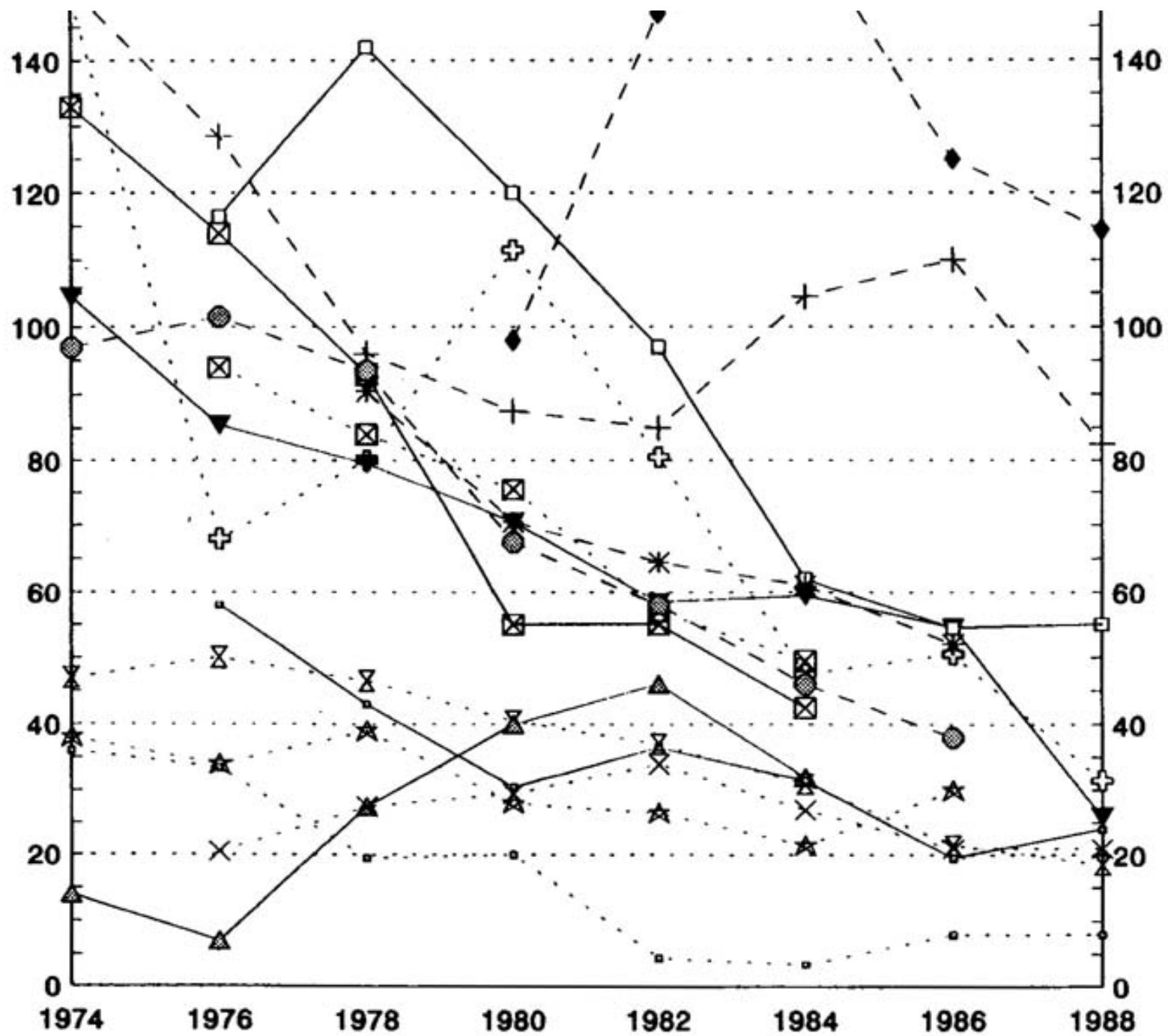
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Global trends in pollutant levels

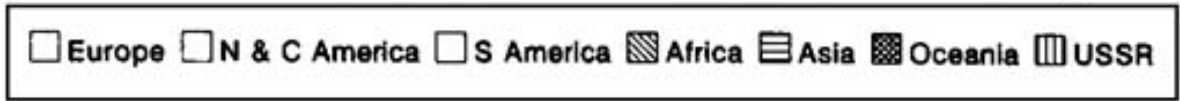
biennial mean concentrations for city sites



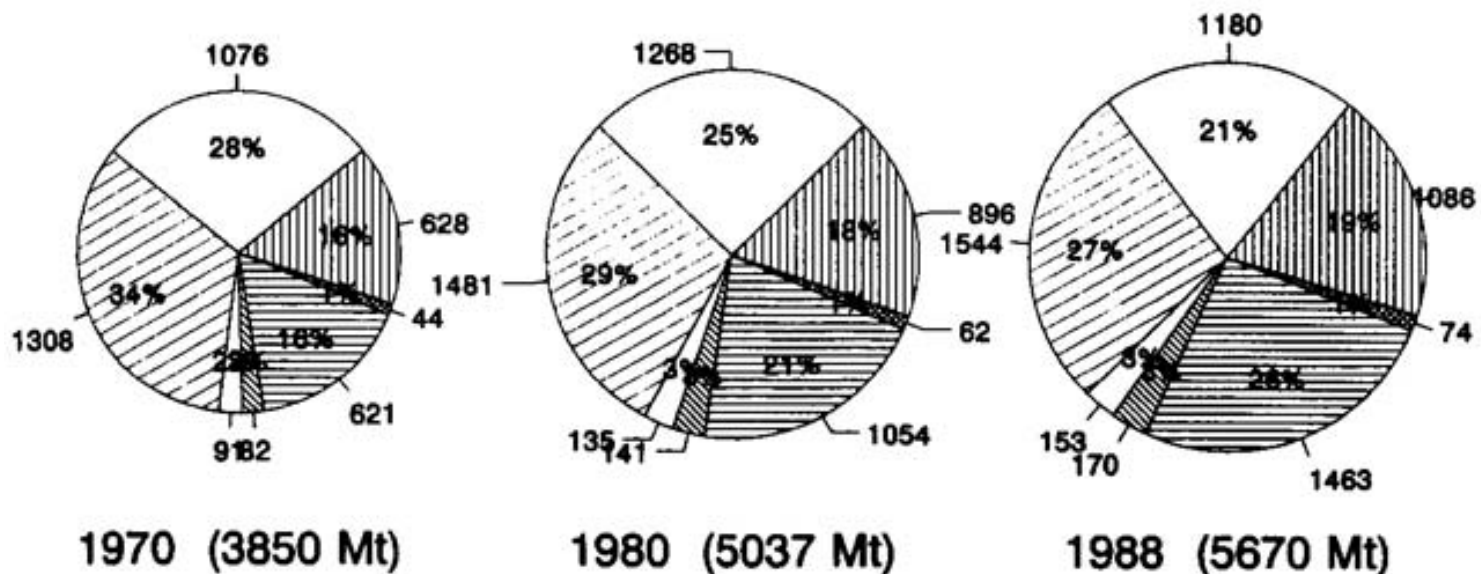


SULPUR DIOXIDE, as micrograms per cubic metre

ANTHROPOGENIC EMISSIONS of Carbon Dioxide fossil fuel combustion & cement manufacturing



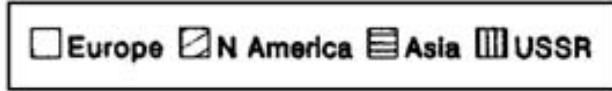
million tonnes C per year (times 3.7 for CO₂)



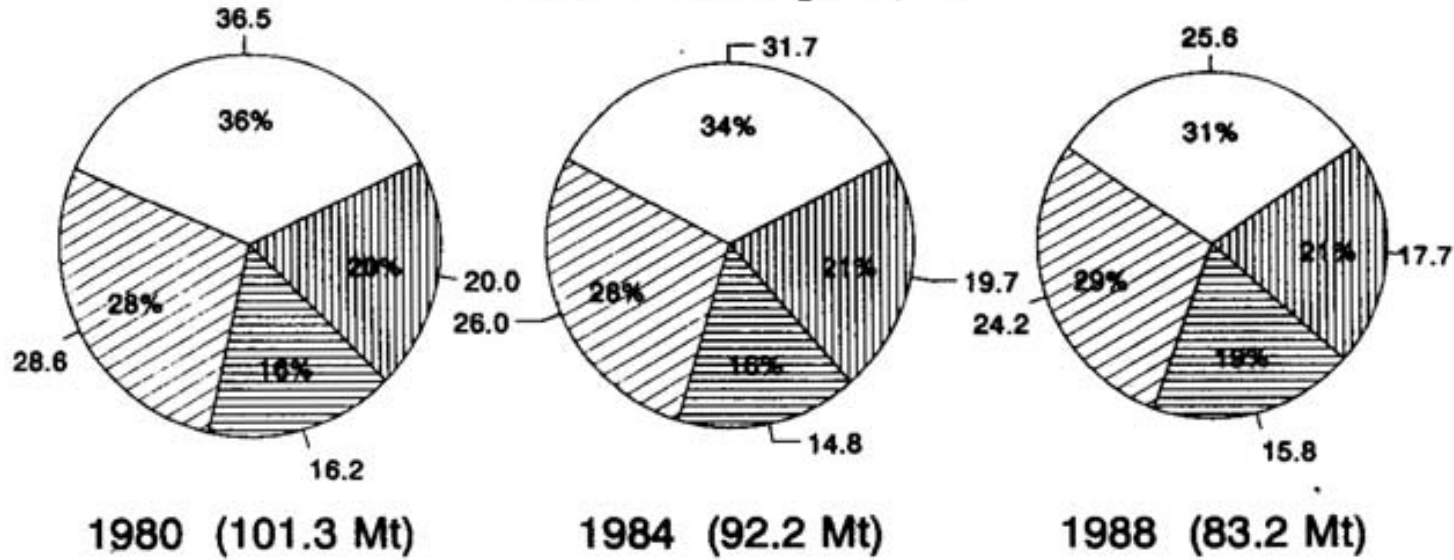
ANTHROPOGENIC EMISSIONS of Carbon Dioxide

ANTHROPOGENIC EMISSIONS of Sulphur Dioxide

data sources OECD and national statistics



million tonnes SO₂ per year



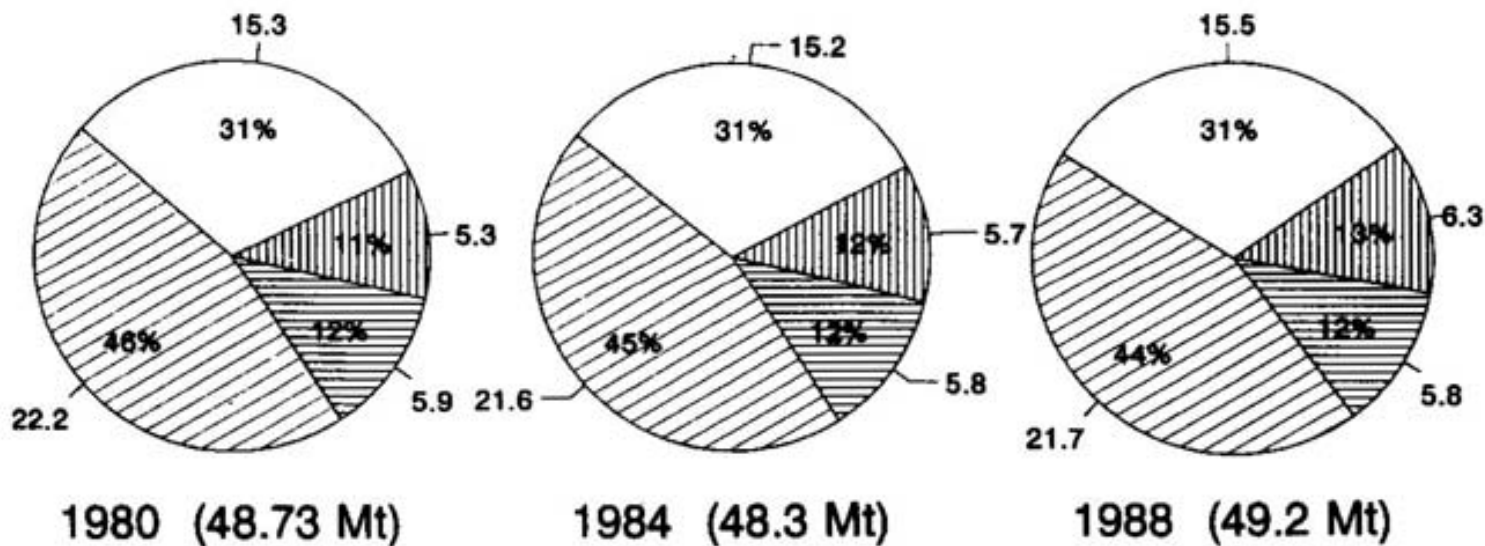
ANTHROPOGENIC EMISSIONS of Sulphur Dioxide

ANTHROPOGENIC EMISSIONS of Nitrogen oxides

data sources OECD and national statistics



million tonnes (as NO₂) per year



ANTHROPOGENIC EMISSIONS of Nitrogen oxides