

TABLE 2-1

SUMMARY OF GLOBAL SOURCES, ANNUAL EMISSION, BACKGROUND CONCENTRATION, MAJOR SINKS, AND RESIDENCE TIME OF ATMOSPHERIC GASEOUS POLLUTANTS

Pollutant	Major Source		Estimated Emission kg/yr		Concentration $\mu\text{g m}^{-3}$	Major Identified Sinks	Residence Time Days
	Anthropogenic	Natural	Anthropogenic	Natural			
SO_2	Combustion of coal and oil	Volcanoes	130×10^9	2×10^9	1-4	Scavenging: Chemical reactions; Soil and surface water absorption; Dry deposition	5 (average)
	(North America)		16×10^9	0.8×10^9			
H_2S	Chemical processes; Sewage treatment	Volcanoes; Biological decay	3×10^9	100×10^9	0.3	Oxidation to SO_2	
N_2O	None	Biological decay	None	590×10^9	460-490	Photodissociation in stratosphere; Surface water & soil absorption	3,600
NO	Combustion	Bacterial action in soil; Photodissociation of N_2O and NO_2	53×10^9	768×10^9	0.3-2.5	Oxidation to NO_2	1-30
NO_2	Combustion	Bacterial action to soil; Oxidation to NO			2-2.5	Photochemical reactions; Oxidation to nitrate; Scavenging	1-30
NH_3	Coal burning fertilizer; Waste treatment	Biological decay	1×10^9	170×10^9		Reaction with SO_2 Oxidation to nitrate scavenging	
CO	Auto exhaust and other combustion processes	Oxidation of methane; photodissociation of CO_2 ; Forest Fires; Oceans	360×10^9	3000×10^9	100	Soil absorption; Chemical oxidation	36
O_3	None	Tropospheric reactions and transport from stratosphere	None	(?)	20-60	Photochemical reactions; Absorption by land surfaces (Soil and Vegetation; Surface Water)	110
Non-reactive hydrocarbons	Auto exhaust; Combustion of oil	Biological processes in swamps	70×10^9	300×10^9	CH 1 1000 non- $\text{CH}_4 < 1$	Biological action	
Reactive hydrocarbons	Auto exhaust; Combustion of oil	Biological processes in forests	27×10^9	175×10^9	<1	Photochemical oxidation	

From: Galloway and Whelpdale, 1980
 Junge, 1972
 Rasmussen and Sapal, 1975
 Spadding, 1972