TABLE 1.1. Composition of Dry Air at Ground Level in Remote Continental Areas

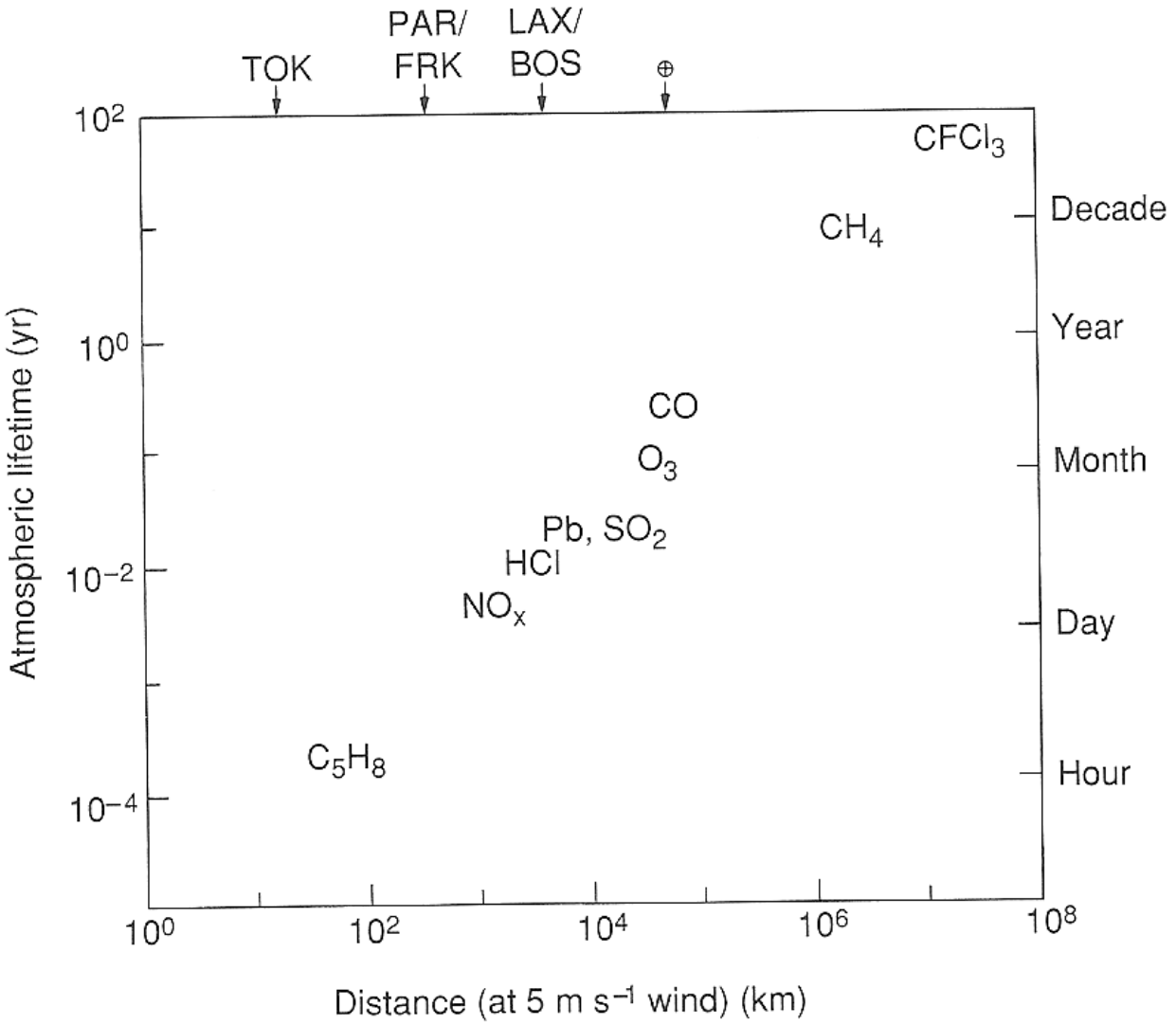
CONSTITUENT	FORMULA	CONCENTRATIONS
Nitrogen	N_2	78.1%
Oxygen	O_2	20.9%
Argon	Ar	0.93%
Carbon dioxide	CO_2	0.035%
Neon	Ne	0.0018%
Helium	He	0.0005%
Methane	CH_4	0.00017%
Krypton	Kr	0.00011%
Hydrogen	H_2	0.00005%
Ozone	O_3	0.000001–0.000004%

Table 3.4 Some Trace Biogenic Gases in the Atmosphere

Compound	Formula	Concentration (ppb)		Mean residence time	Percentage of sink due to OH
		Expected[a]	Actual[b]		
Carbon compounds					
Methane	CH_4	10^{-148}	1750	9 yr	90
Carbon monoxide	CO	10^{-51}	45–250	60 days	80
Isoprene	$CH_2{=}C(CH_3){-}CH{=}CH_2$		0.2–10.0	<1 day	100
Nitrogen compounds					
Nitrous oxide	N_2O	10^{-22}	311	120 yr	0
Nitric oxides	NO_x	10^{-13}	0.02–10.0	1 day	100
Ammonia	NH_3	10^{-63}	0.08–5.0	5 days	<2
Sulfur compounds					
Dimethylsulfide	$(CH_3)_2S$		0.004–0.06	1 day	50
Hydrogen sulfide	H_2S		<0.04	4 days	100
Carbonyl sulfide	COS	0	0.50	5 yr	22
Sulfur dioxide	SO_2	0	0.02–0.10	3 days	50

[a] Approximate values in equilibrium with an atmosphere containing 21% O_2 (Chameides and Davis 1982).

[b] For short-lived gases, the value is the range expected in remote, unpolluted atmospheres.


TOK
PAR/
FRK
LAX/
BOS
⊕
10^2
10^0
10^{-2}
10^{-4}
$CFCl_3$
CH_4
CO
O_3
Pb, SO_2
HCl
NO_x
C_5H_8
Decade
Year
Month
Day
Hour
Atmospheric lifetime (yr)
10^0
10^2
10^4
10^6
10^8
Distance (at 5 m s^{-1} wind) (km)

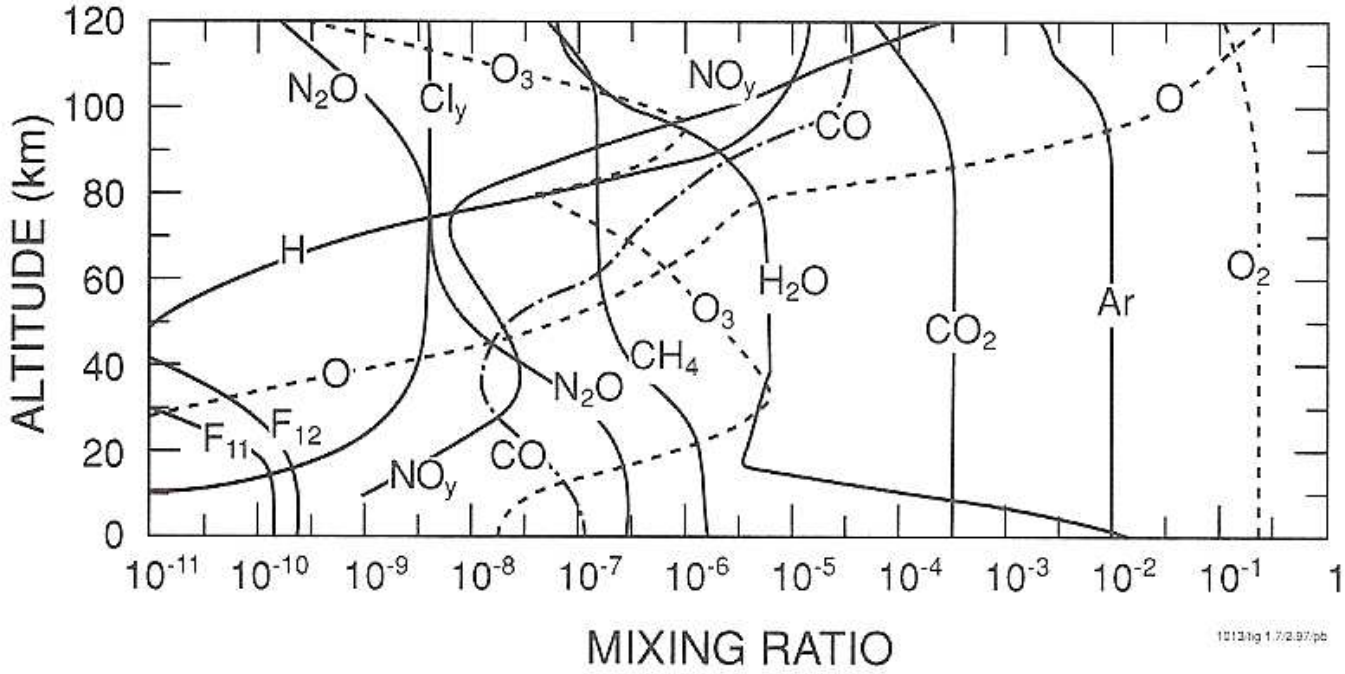


Figure 1.7. *Typical vertical distribution of the concentration of chemical constituents in the atmosphere. Some lines are shown as dashes for clarity ($F_{11} = CFCl_3$ and $F_{12} = CF_2Cl_2$) (Goody, 1995).*

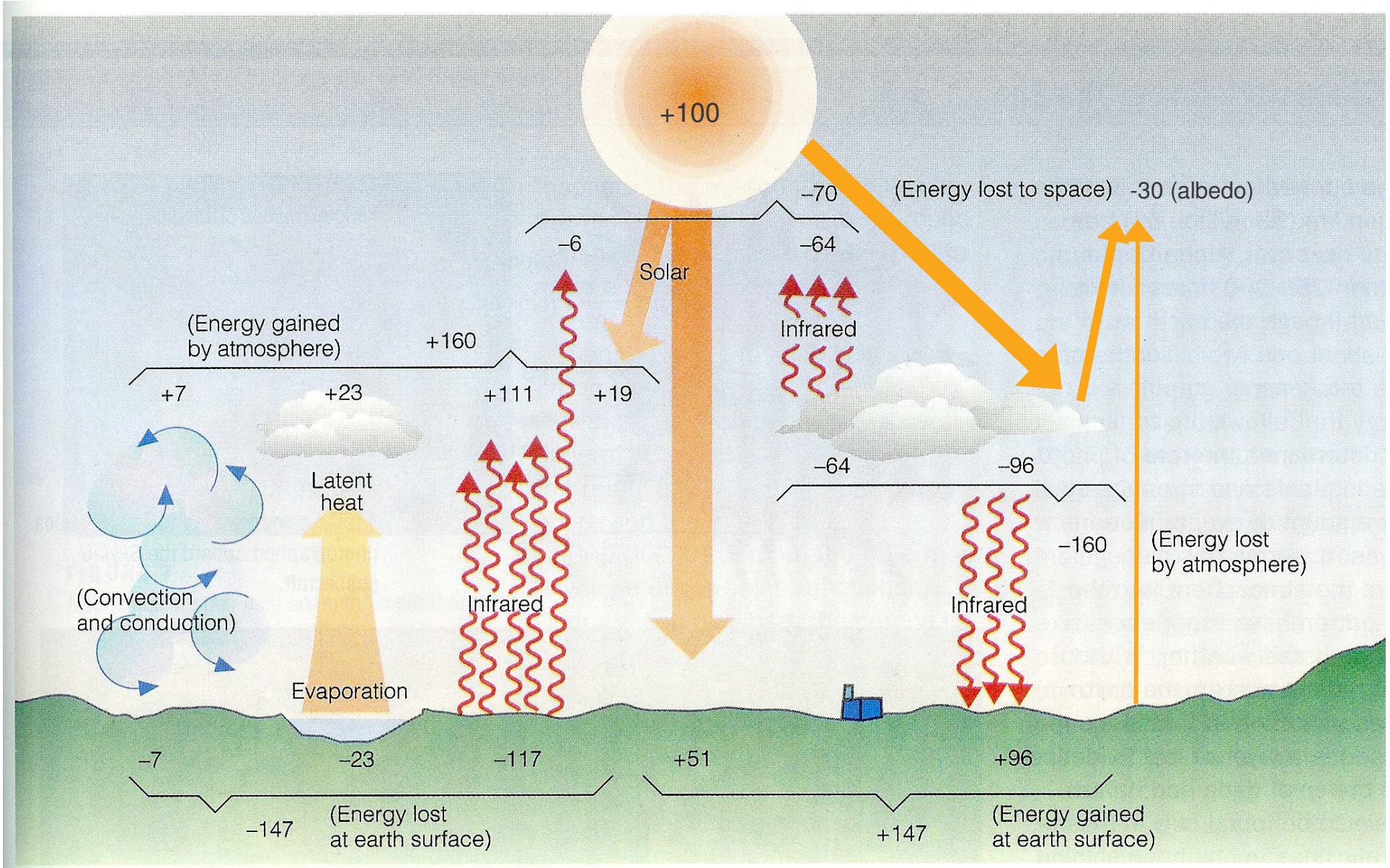
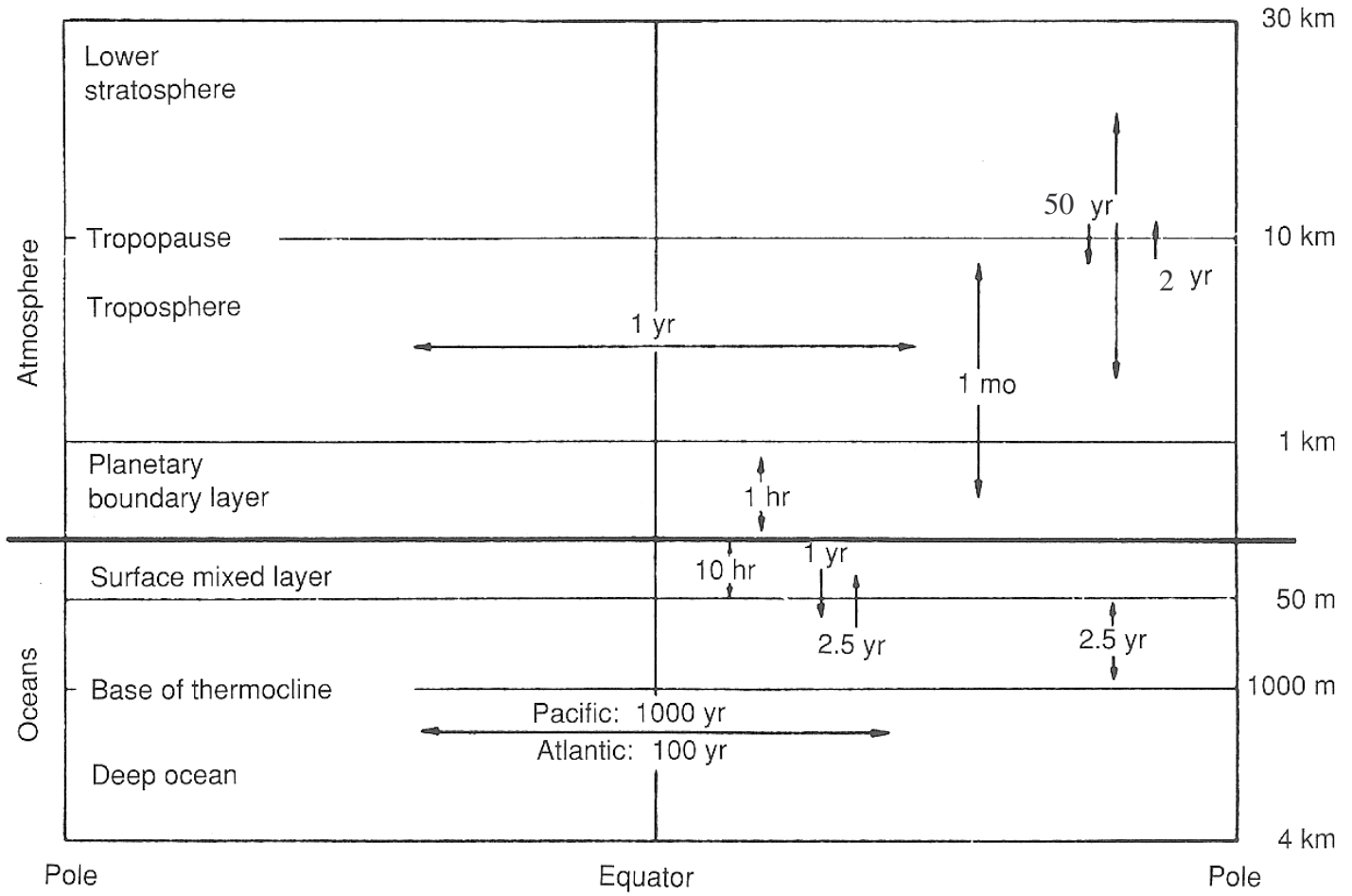


FIGURE 2.16

The earth-atmosphere energy balance. Numbers represent approximations based on surface observations and satellite data. While the actual value of each process may vary by several percent, it is the relative size of the numbers that is important.


30 km
Lower
stratosphere
Tropopause
10 km
Troposphere
Atmosphere
50 yr
2 yr
1 yr
1 mo
1 km
Planetary
boundary layer
1 hr
10 hr
1 yr
Surface mixed layer
50 m
2.5 yr
2.5 yr
Base of thermocline
1000 m
Pacific: 1000 yr
Atlantic: 100 yr
Oceans
Deep ocean
4 km
Pole
Equator
Pole