Table 2.1 Properties of Subatomic Particles

Particle	Relative Charge	Relative Mass	Actual Mass, kg
Proton	+1	1	1.67×10^{-27}
Neutron	0	1	1.67×10^{-27}
Electron	−1	0*	9.11×10^{-31}

* The relative mass of the electron is not actually zero, but is so small that it appears as zero when expressed to the nearest whole number.

Table 2.2 **Total and Outer Electrons for Atoms of the First 18 Elements**

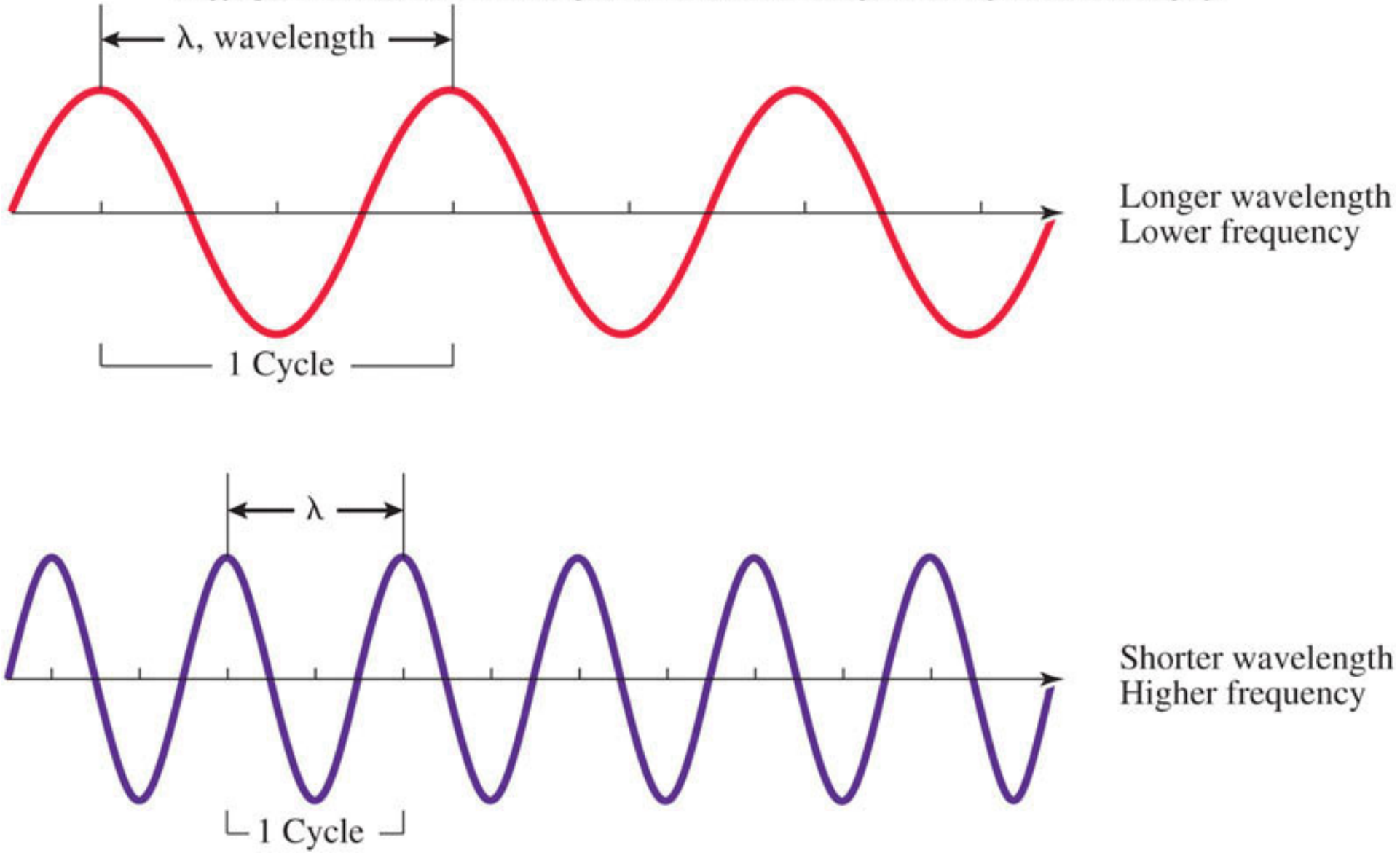
Group 1A	2A	3A	4A	5A	6A	7A	Noble Gases 8A
1							2
H							He
1							2
3	4	5	6	7	8	9	10
Li	Be	B	C	N	O	F	Ne
1	2	3	4	5	6	7	8
11	12	13	14	15	16	17	18
Na	Mg	Al	Si	P	S	Cl	Ar
1	2	3	4	5	6	7	8

Atomic Structure and Periodicity

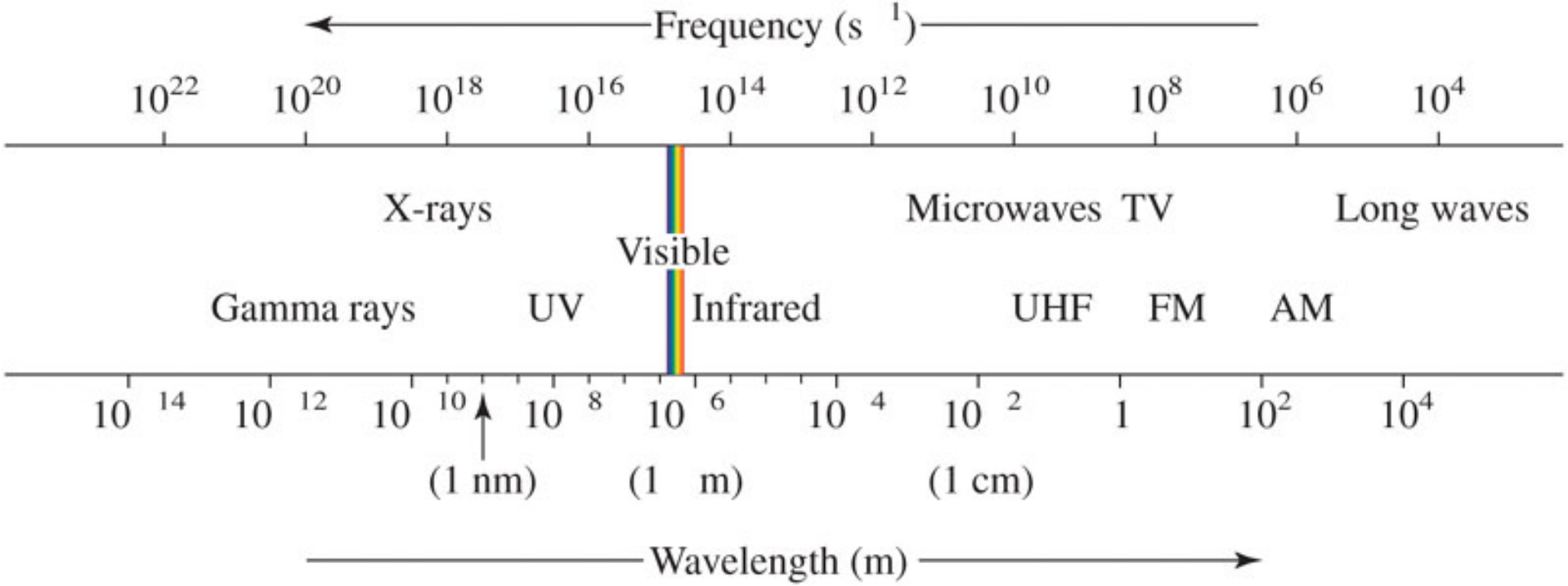
Table 2.3 Isotopes of Hydrogen

Isotope	Isotopic Symbol	Number of Protons	Number of Neutrons	Sum of Protons and Neutrons
hydrogen, H-1	${}_{1}^{1}H$	1	0	1
deuterium, H-2	${}_{1}^{2}H$	1	1	2
tritium, H-3	${}_{1}^{3}H$	1	2	3

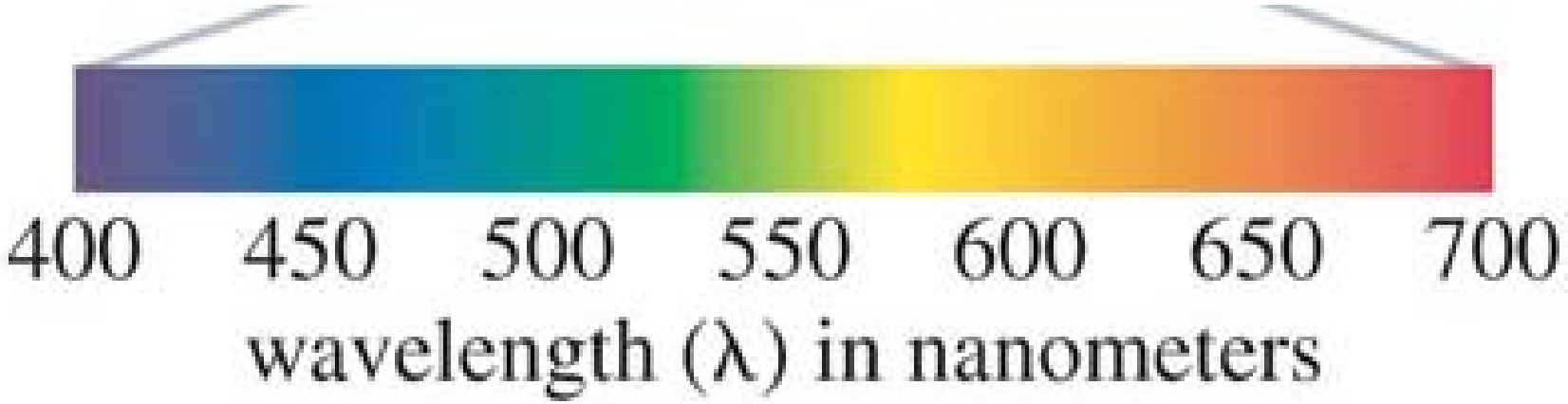
Waves of Light



Waves of Light

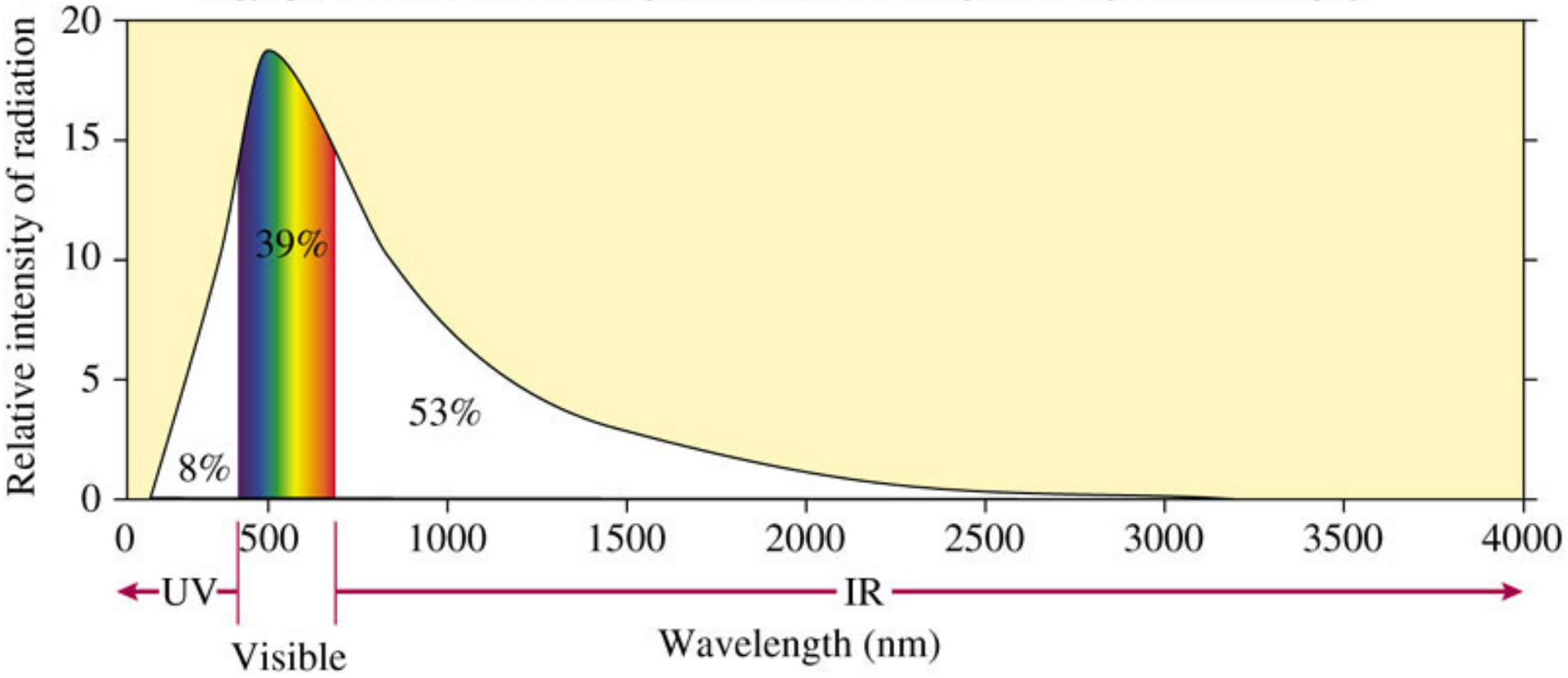


Waves of Light

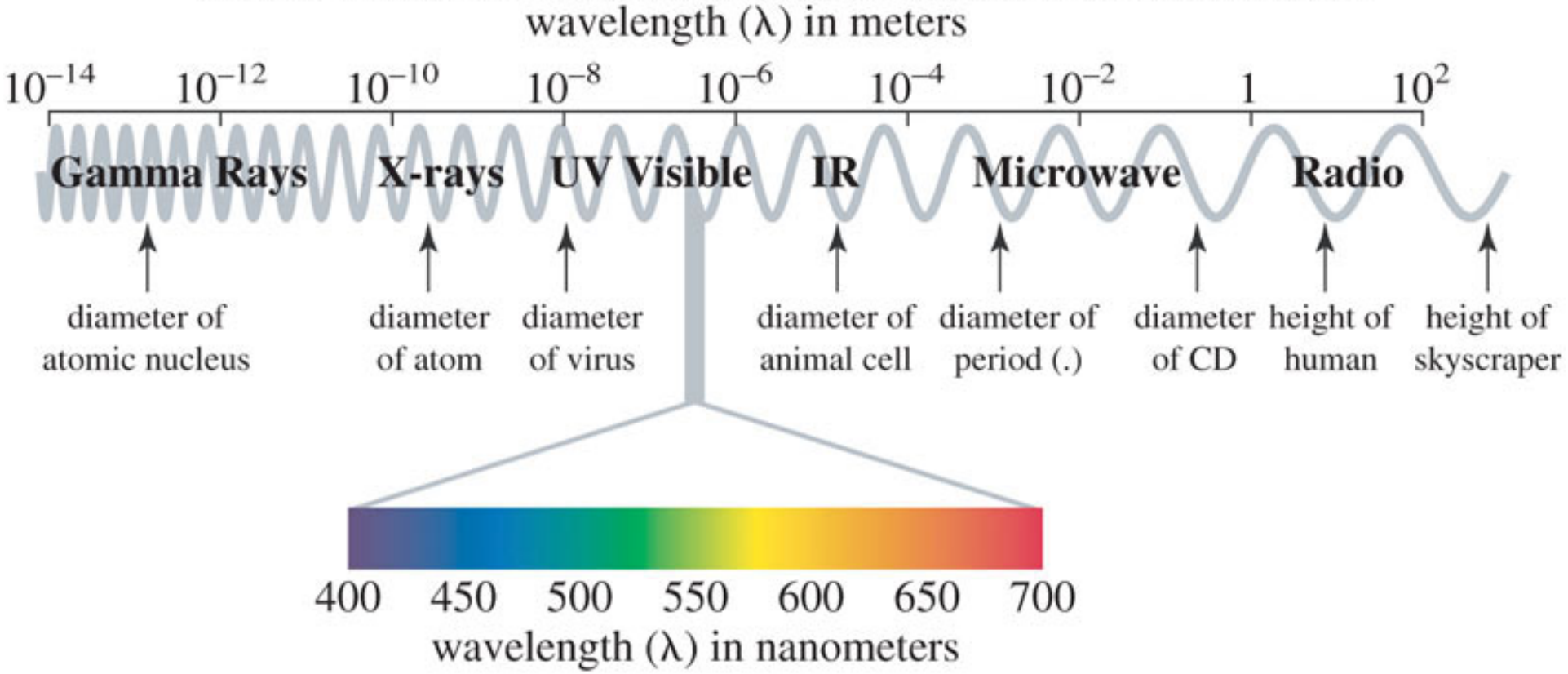


Visible Light

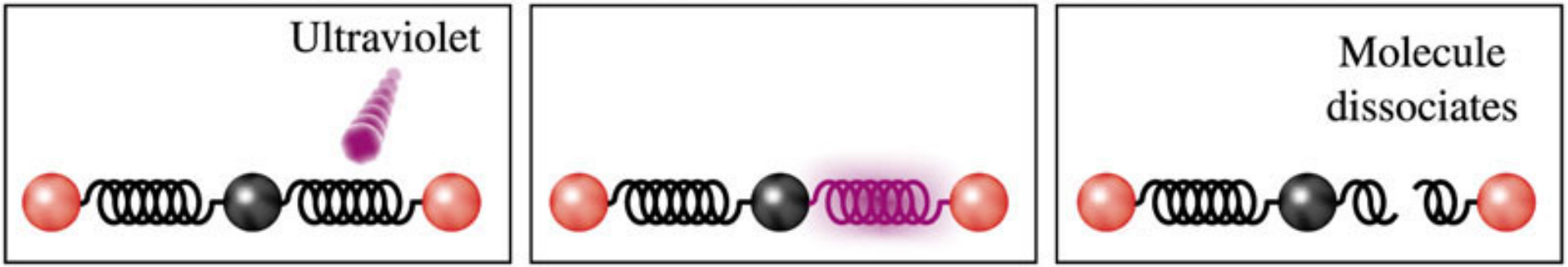
Waves of Light



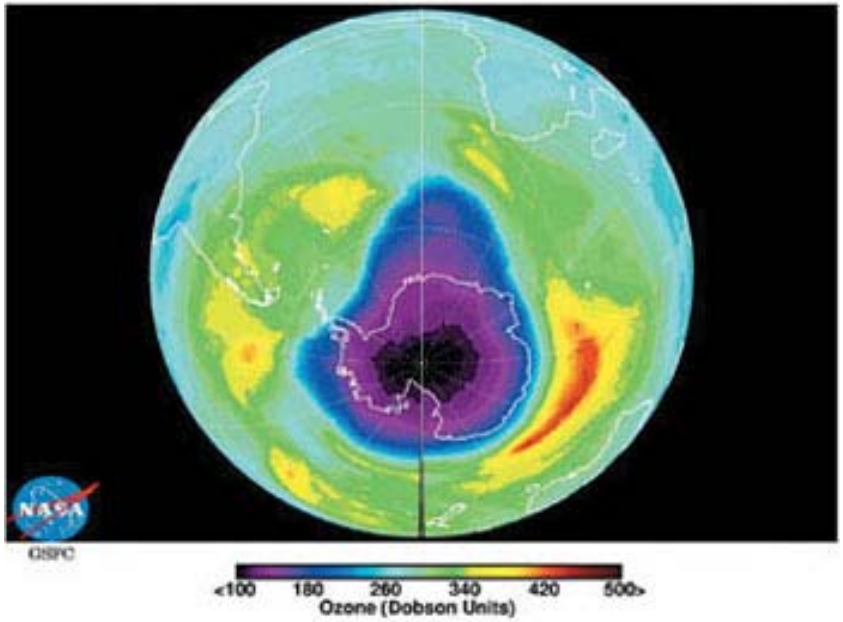
Waves of Light



Waves of Light

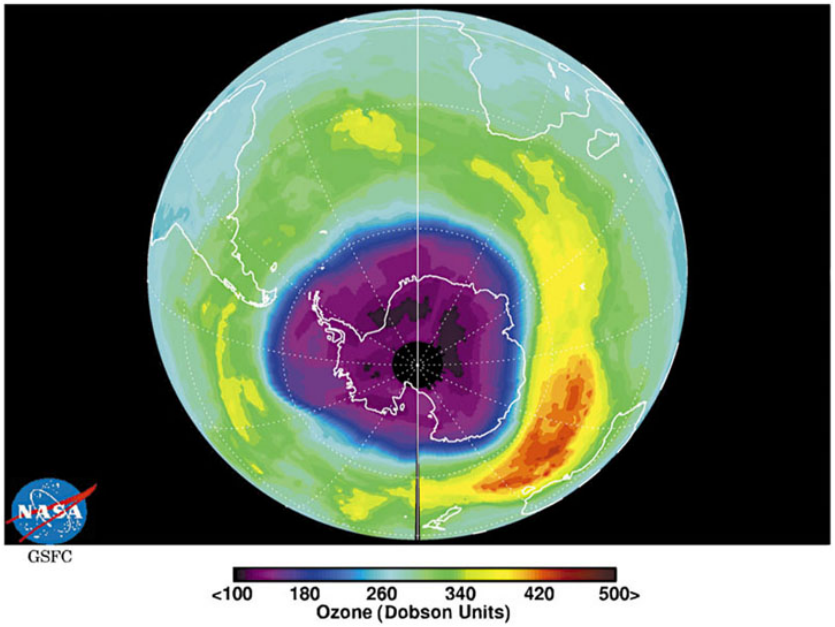


Earth Probe TOMS Total Ozone September 26, 2001
Area = 9.8 million miles² Minimum = 99 Dobson Units



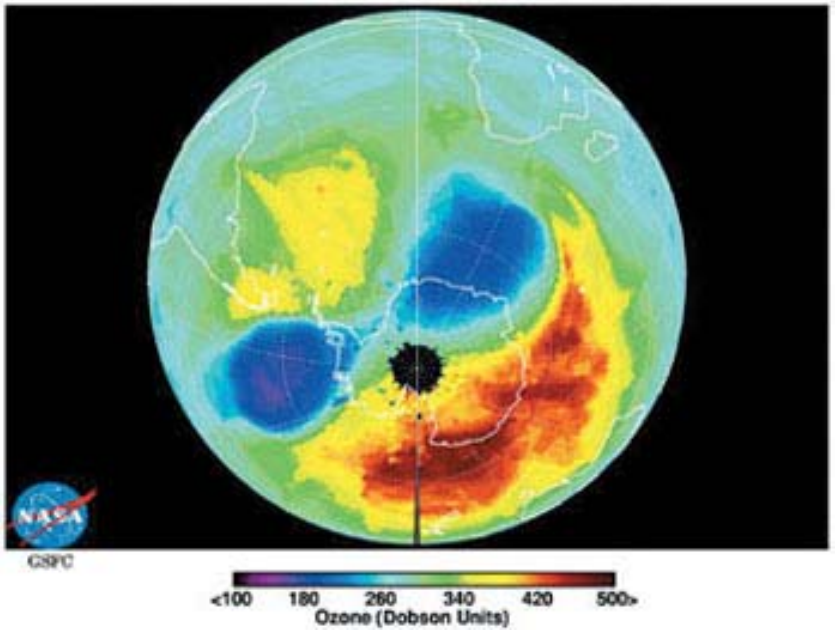
Sept. 2001

Earth Probe TOMS Total Ozone September 24, 2003
Area = 11.1 million miles² Minimum = 111 Dobson Units



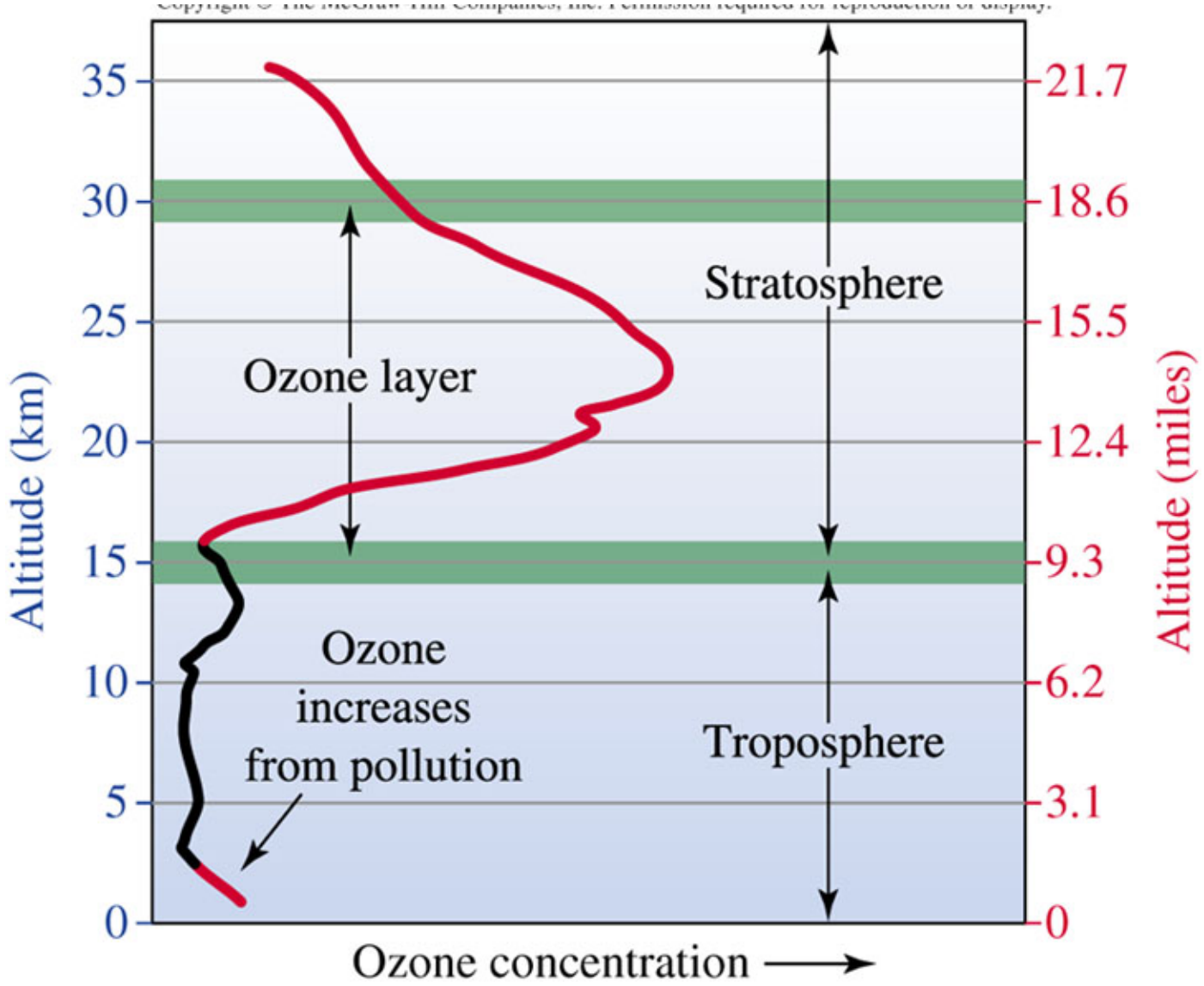
Sept. 2003

Earth Probe TOMS Total Ozone September 24, 2002
Area = 8.1 million miles² Minimum = 159 Dobson Units



Sept. 2002

Ozone: What and Where Is It?

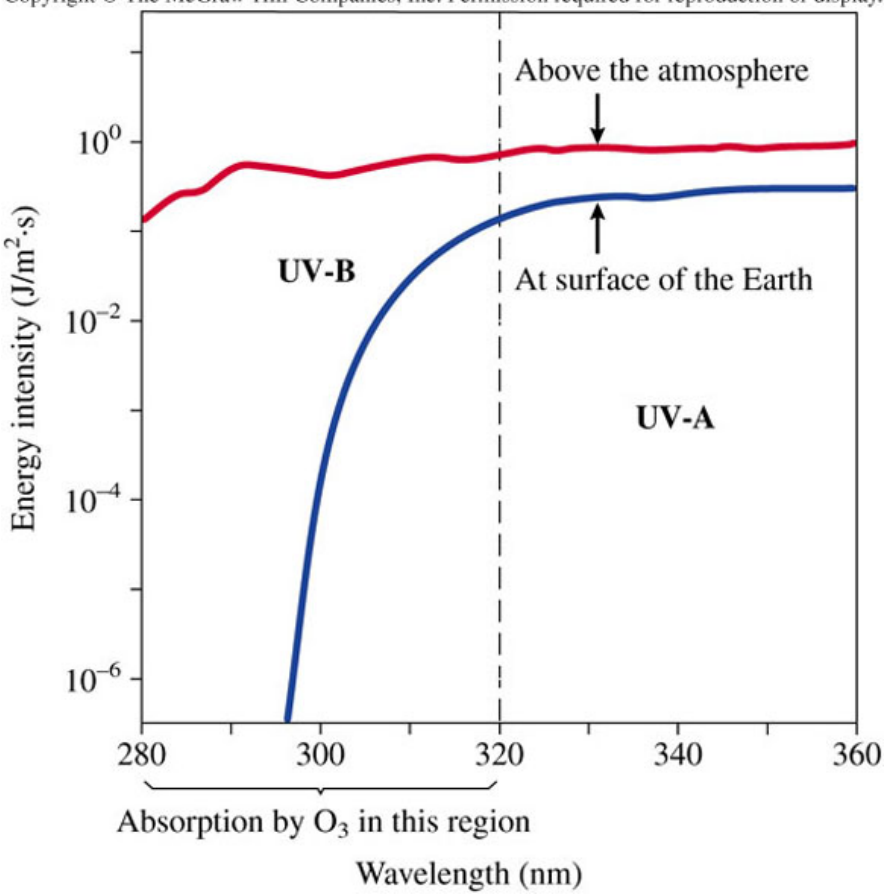


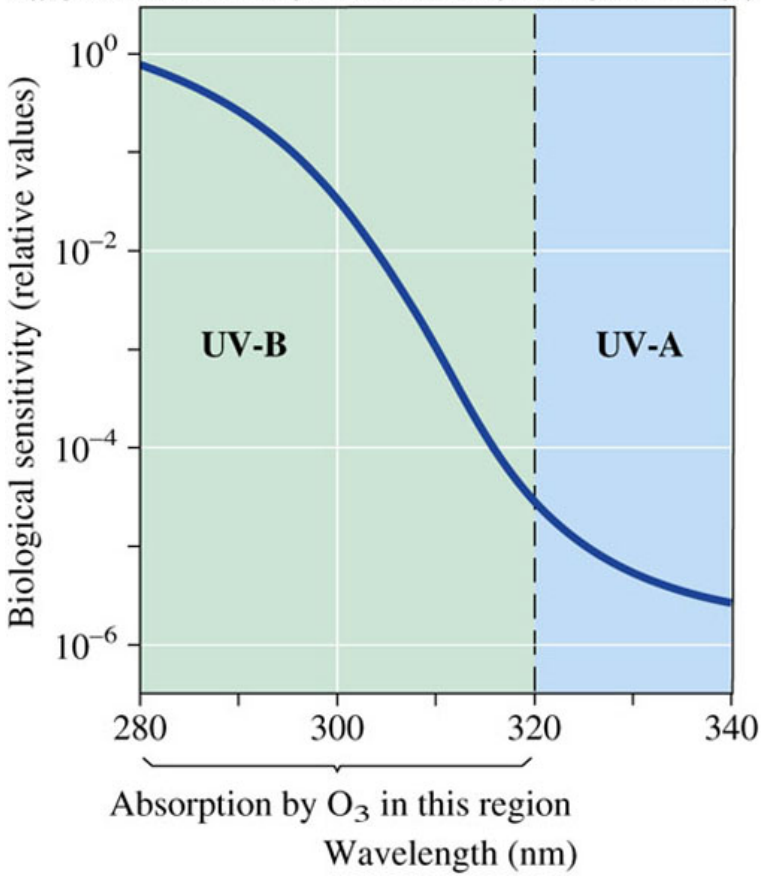
Ozone: What and Where Is It?

Table 2.4 Categories and Characteristics of UV Radiation

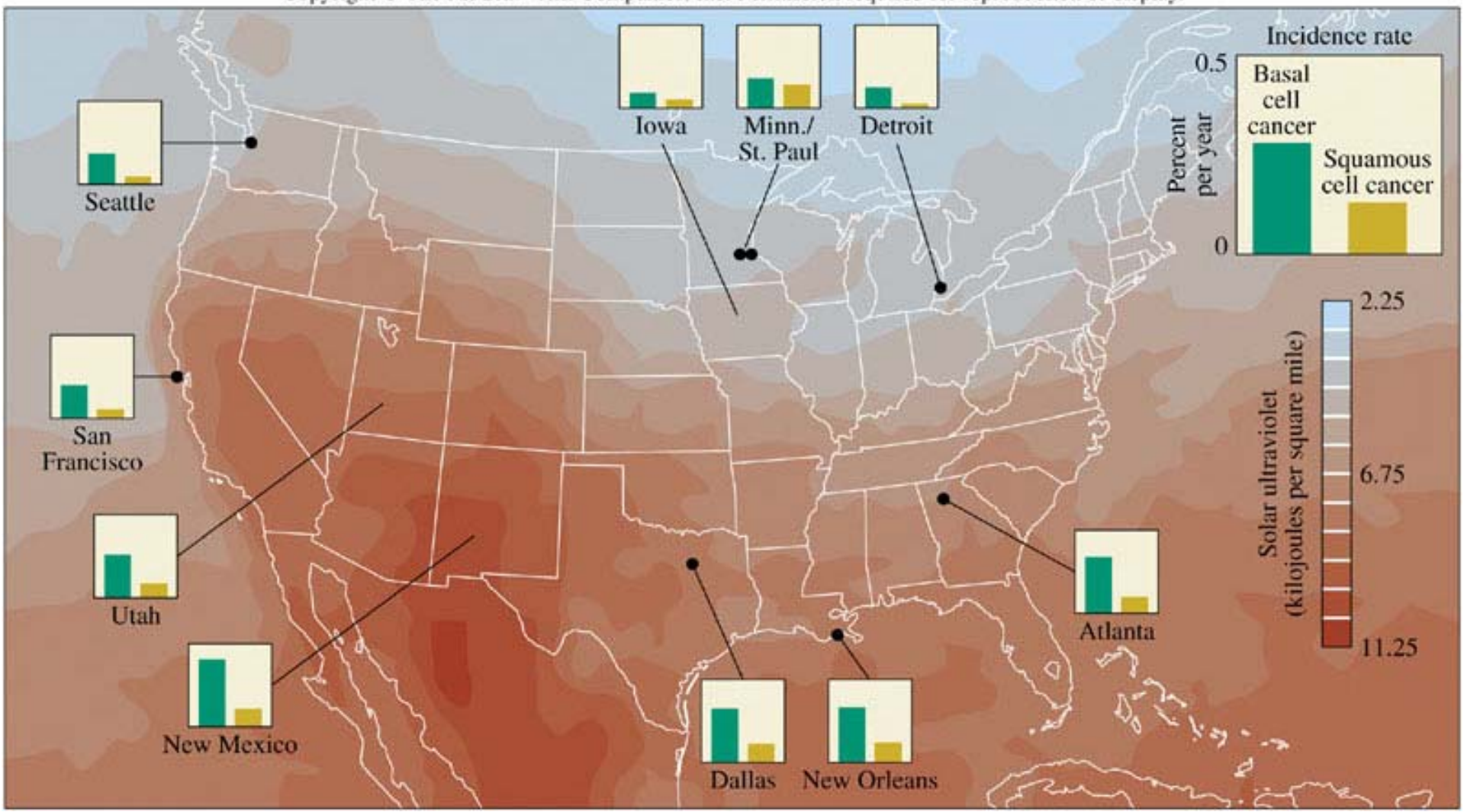
Radiation	Wavelength Range	Relative Energy	Comments
UV-A	320–400 nm	Least energetic of these three UV categories	Least damaging, reaches Earth's surface in greatest amount
UV-B	280–320 nm	More energetic than UV-A, less energetic than UV-C	More damaging than UV-A, less damaging than UV-C, most absorbed by ozone in the stratosphere
UV-C	200–280 nm	Most energetic of these three categories	Most damaging of these three, but not a problem because totally absorbed by oxygen and ozone in stratosphere

Biological Effects of Ultraviolet Radiation

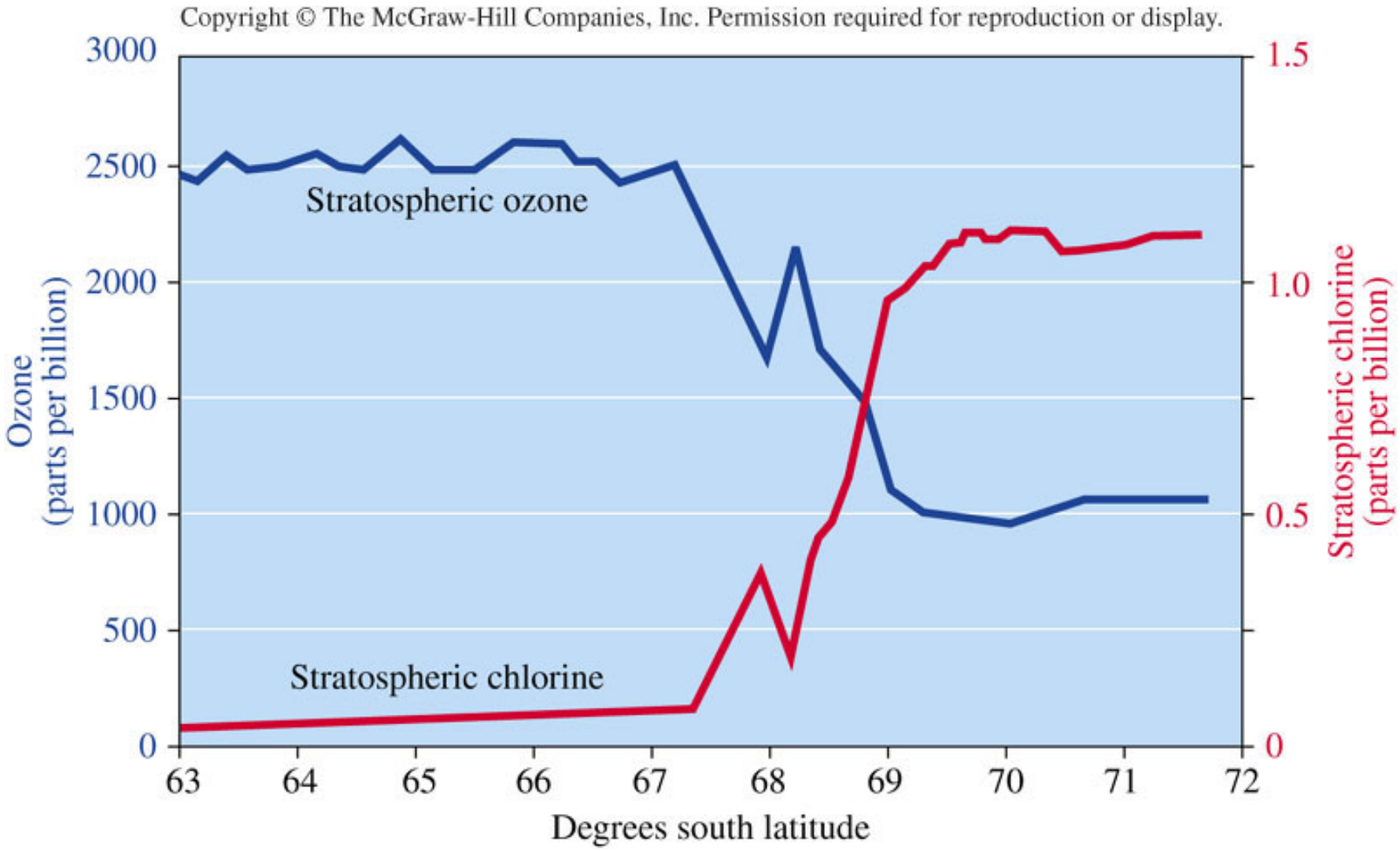




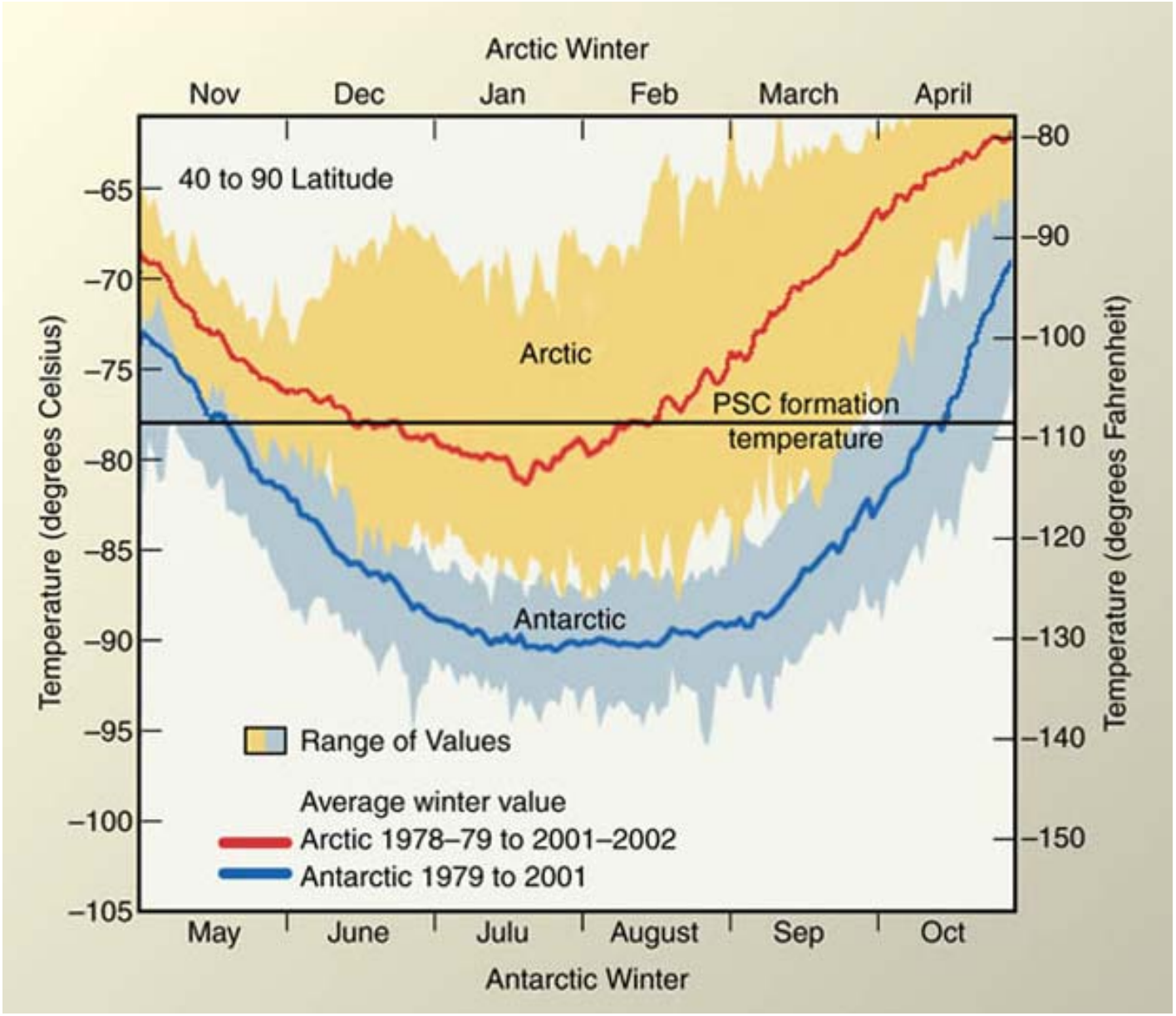
Biological Effects of Ultraviolet Radiation

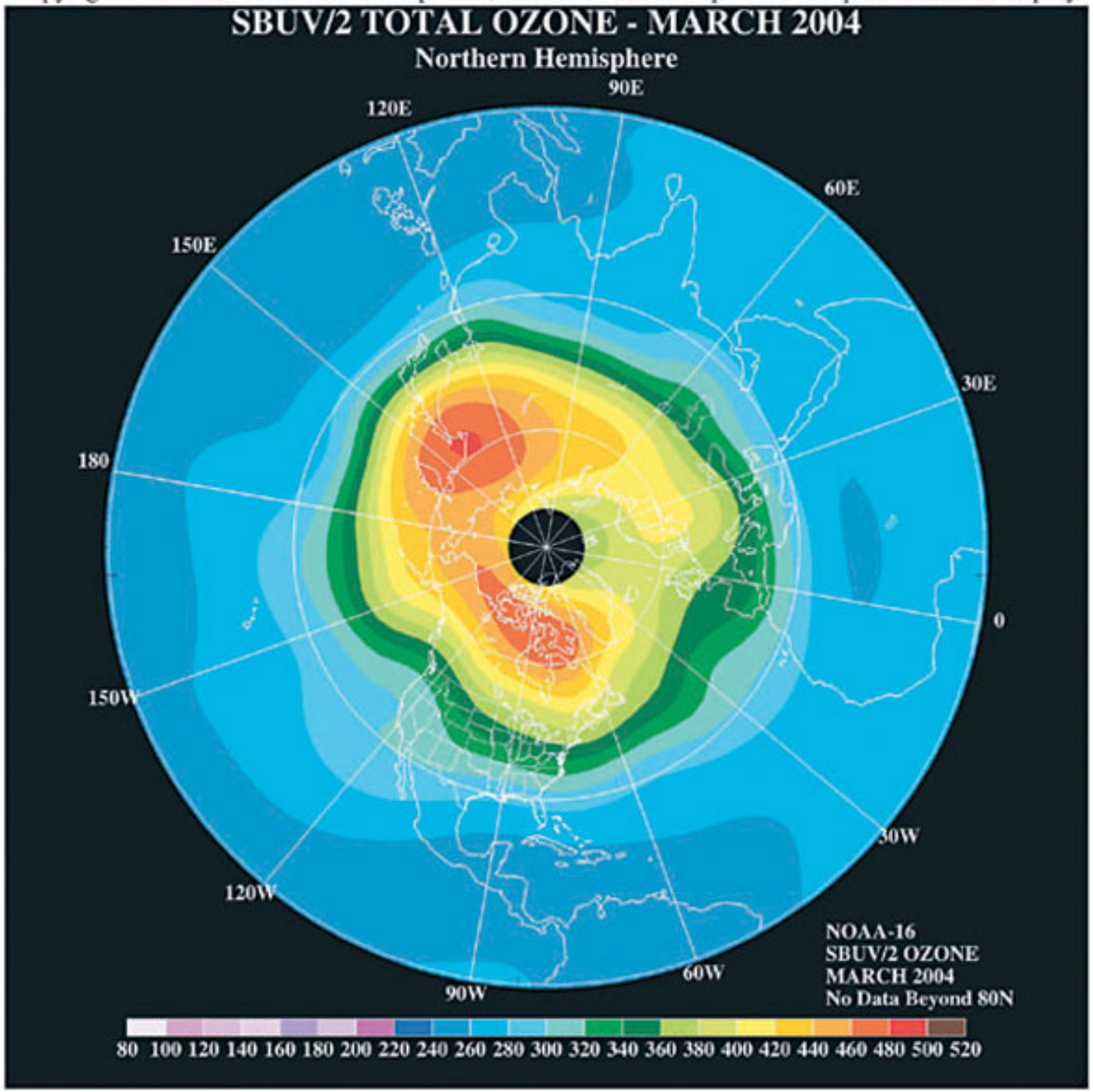


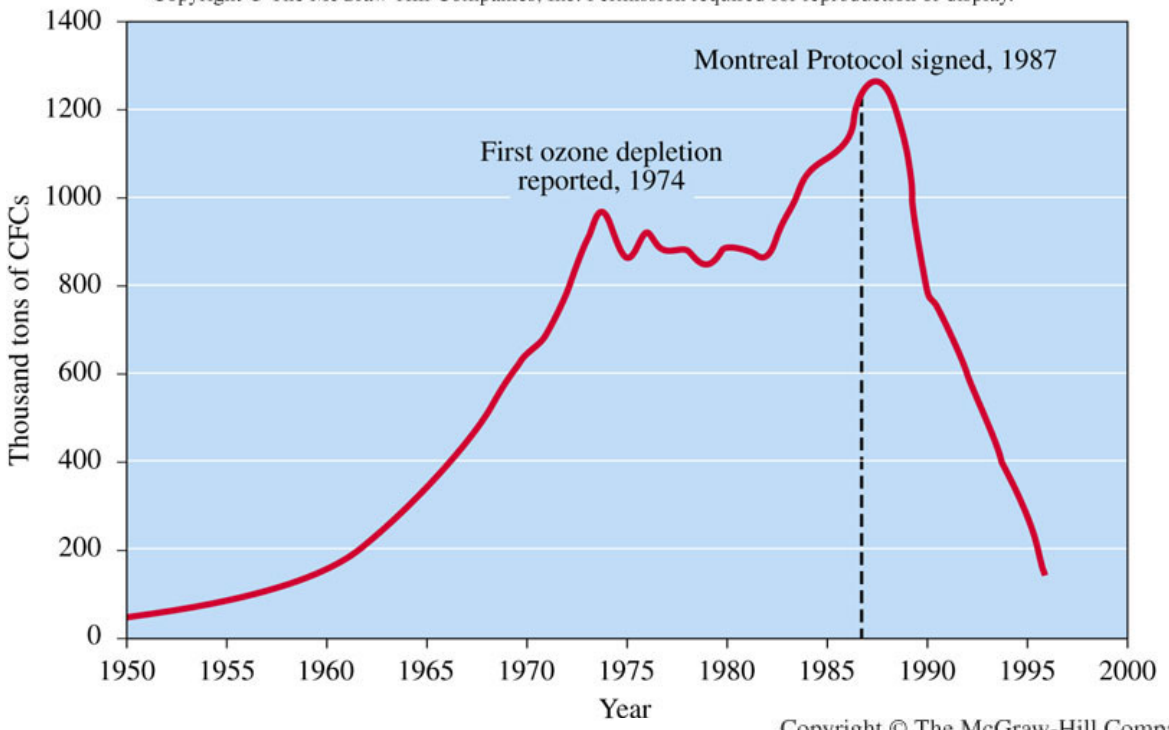
Chlorofluorocarbons: Properties, Uses and Interactions with Ozone



The Antarctic Ozone Hole: A Closer Look







The Antarctic Ozone Hole: A Closer Look