



NASA

with your host:



Lecture 6: Our Home

Coop

Earth: Ch 7



$$m = 6e24 \text{ kg}$$

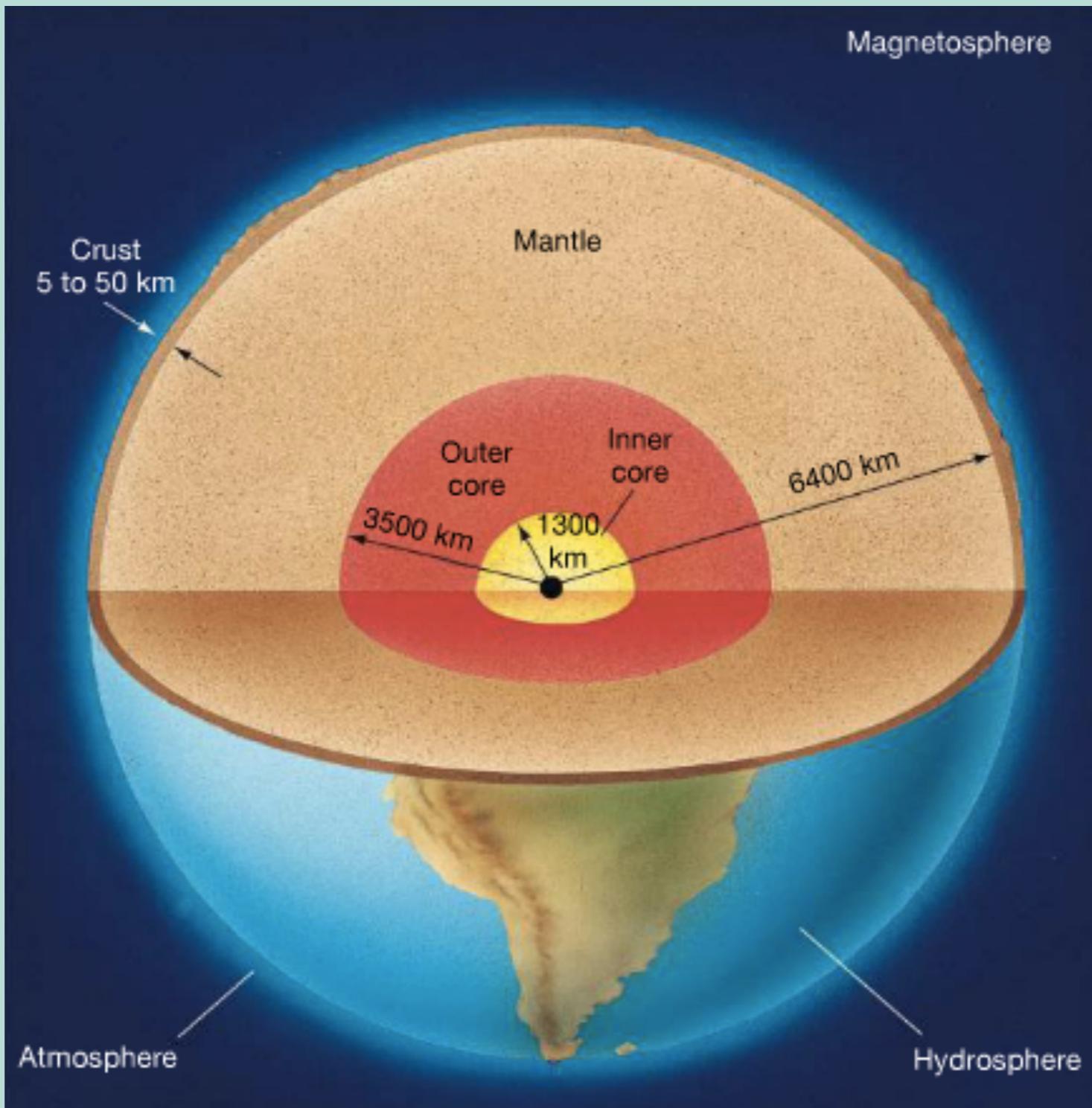
$$\begin{aligned}r &= 6.4e3 \text{ km} \\&= 0.02 \text{ s}\end{aligned}$$

$$\begin{aligned}d_{\text{sun}} \\&= \end{aligned}$$

$$\begin{aligned}1.5e8 \text{ km} \\&= \\8.3 \text{ minutes}\end{aligned}$$

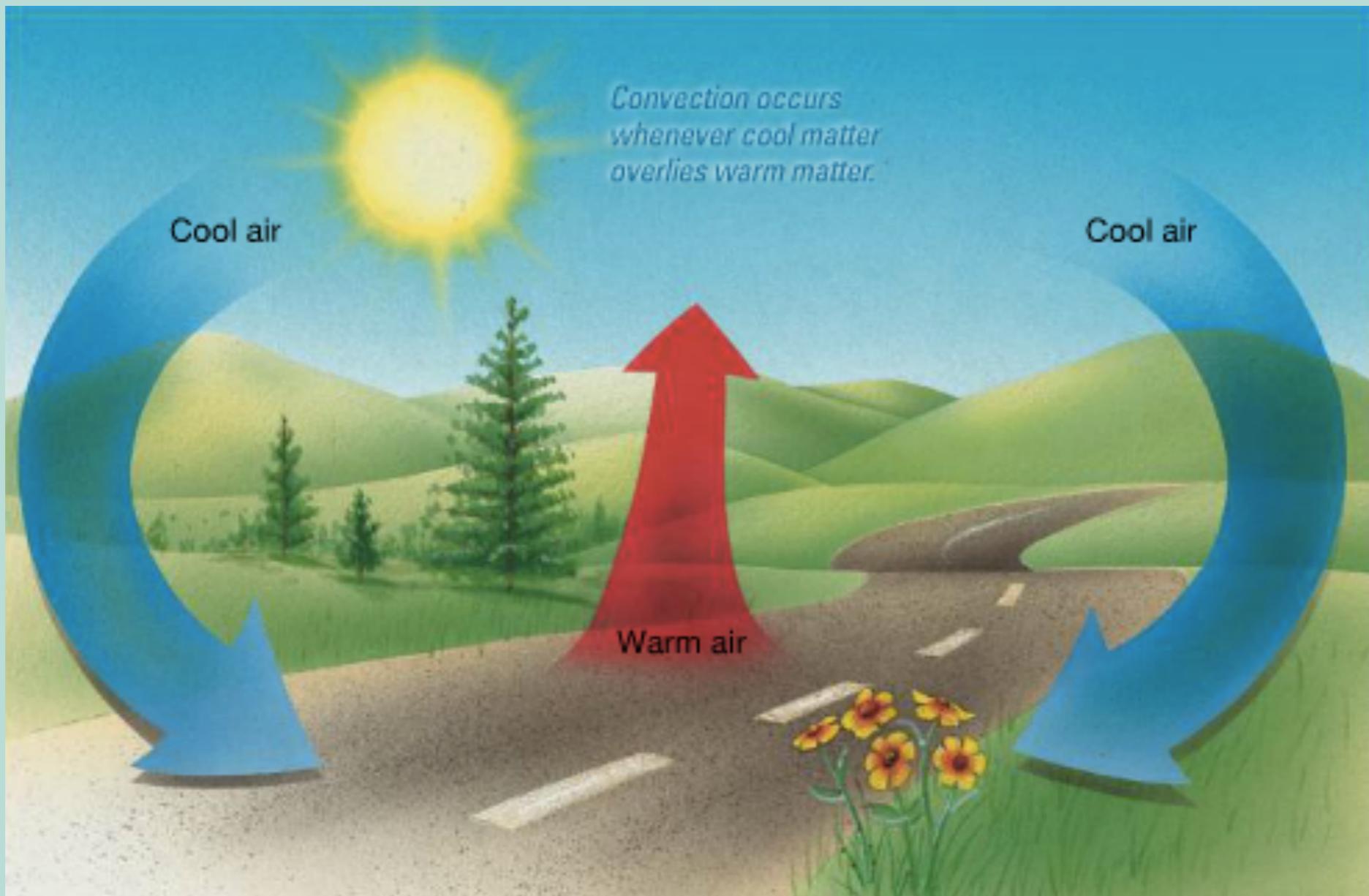
1 moon.

Chomp.

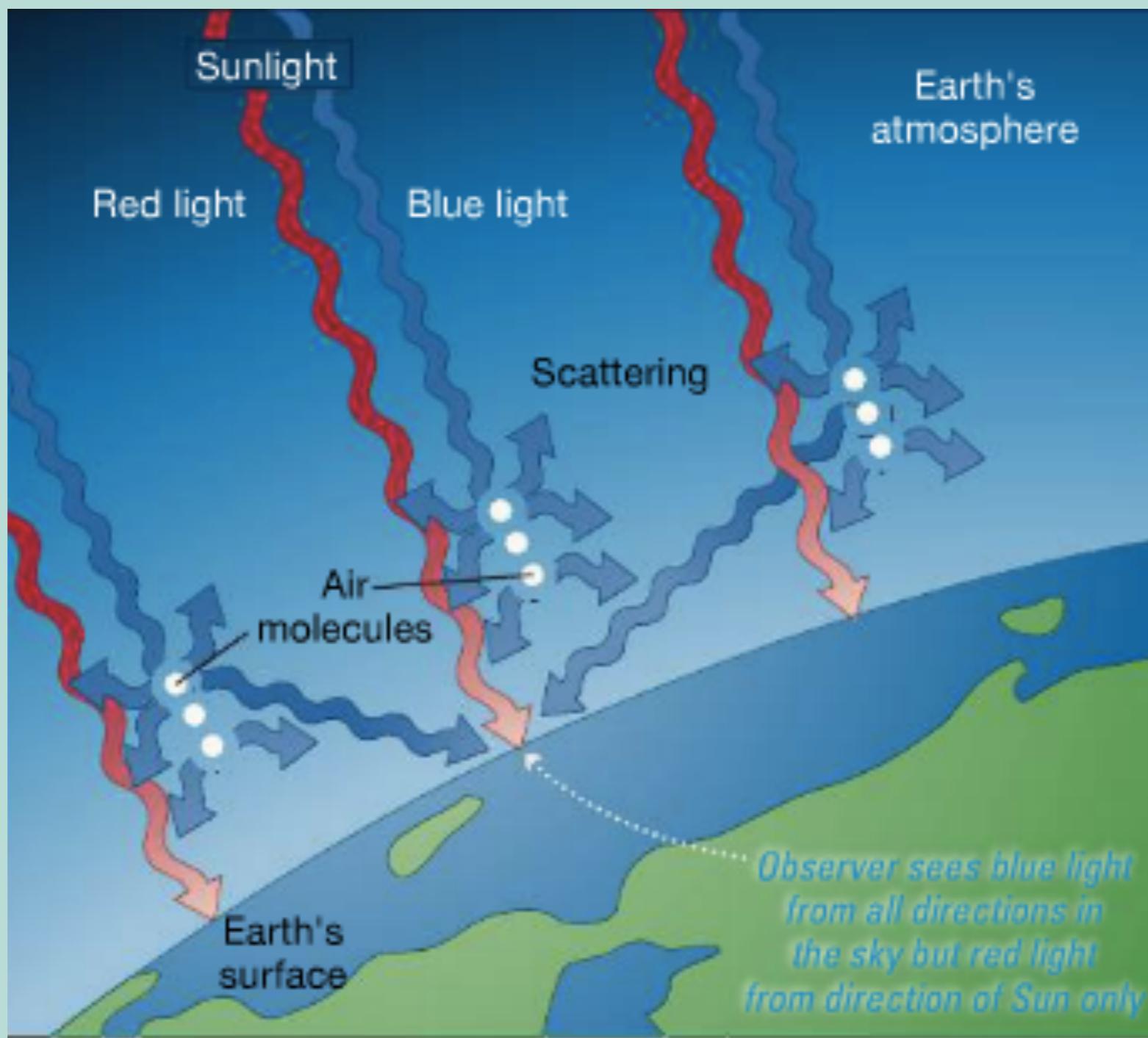


Earth's Atmosphere	Percentage	GHG?
Nitrogen	78.08%	No
Oxygen	20.95%	No
Water	0 to 4%	Yes
Argon	0.93%	No
Carbon Dioxide	0.039%	Yes
Neon	0.0018%	No
Helium	0.0005%	No
Methane	0.00017%	Yes
Hydrogen	0.00005%	No
Nitrous Oxide	0.00003%	Yes
Ozone	0.000004%	Yes

Convection



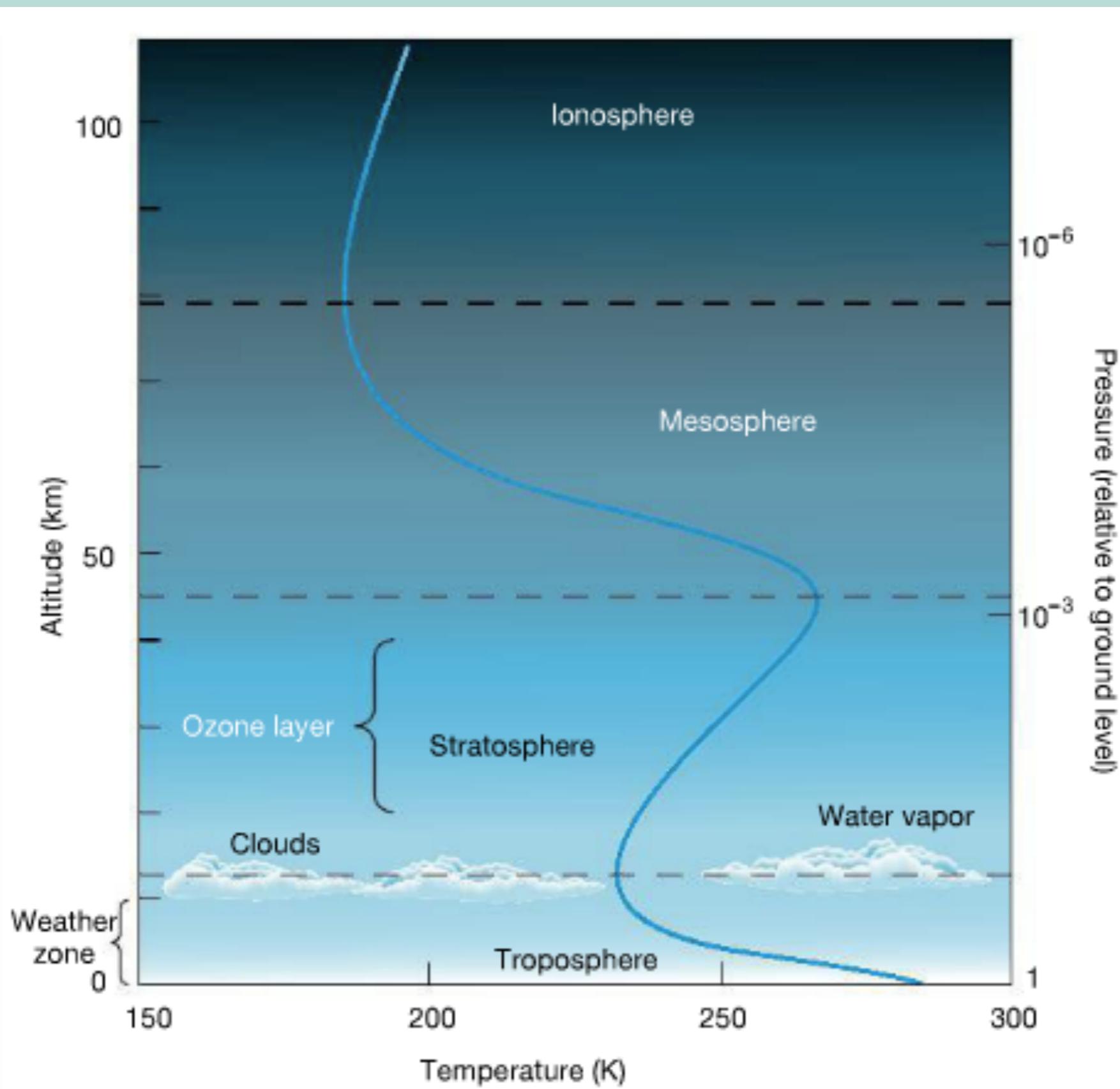
Why is the Sky Blue?



Earth: Ch 7

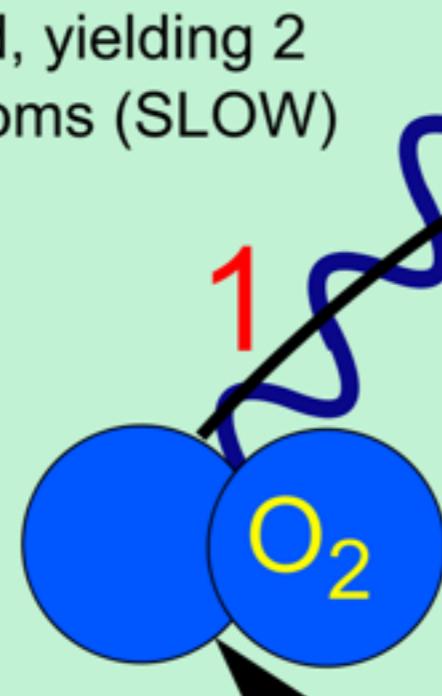


Atmosphere



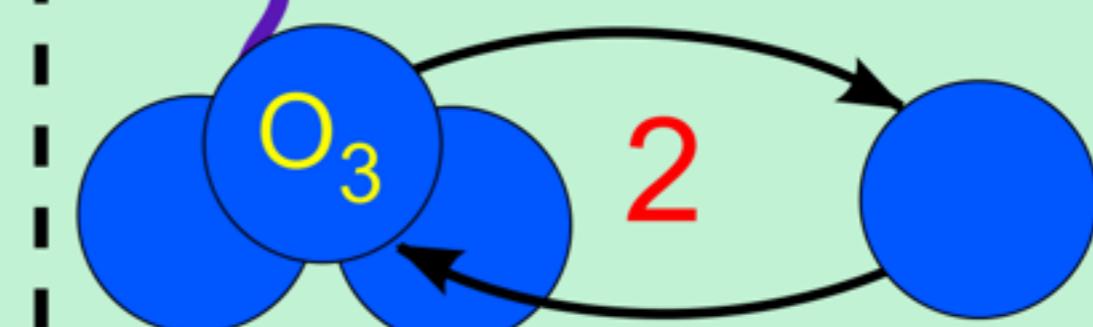
Earth: Ch 7

1. Oxygen molecules are photolyzed, yielding 2 oxygen atoms (SLOW)



SUN

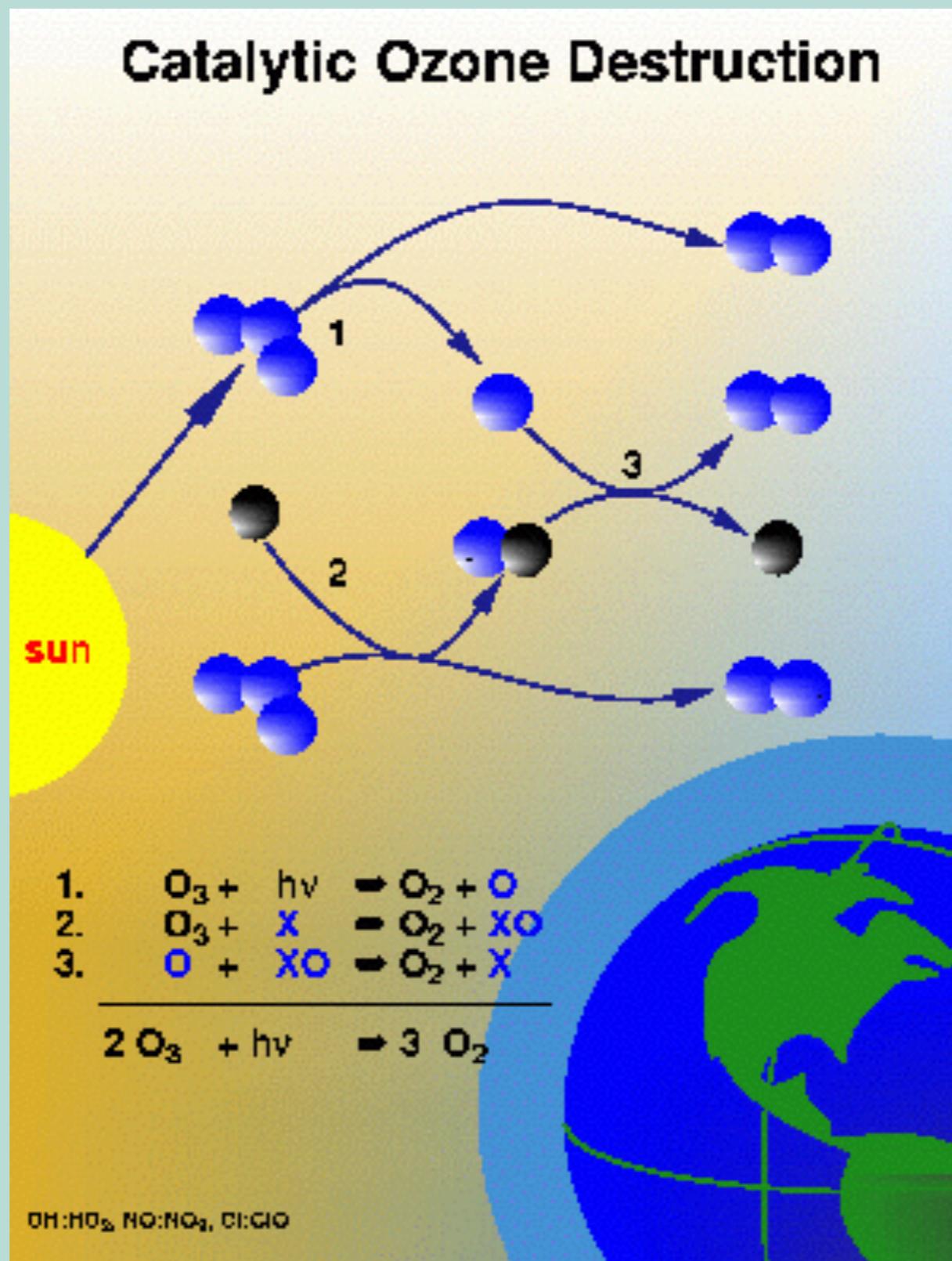
2. Ozone and oxygen atoms are continuously being interconverted as solar UV breaks ozone and the oxygen atom reacts with another oxygen molecule (FAST)

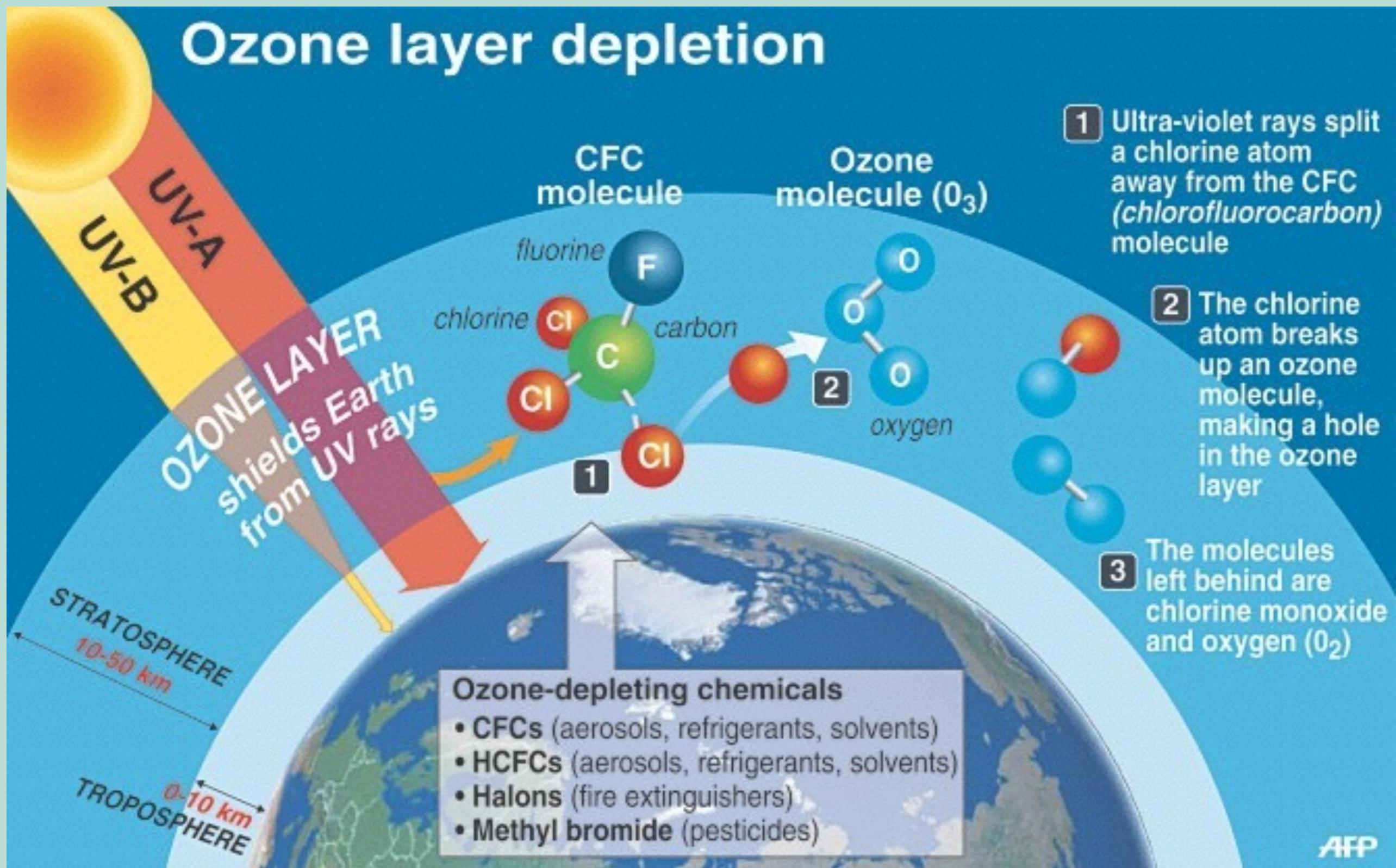


3

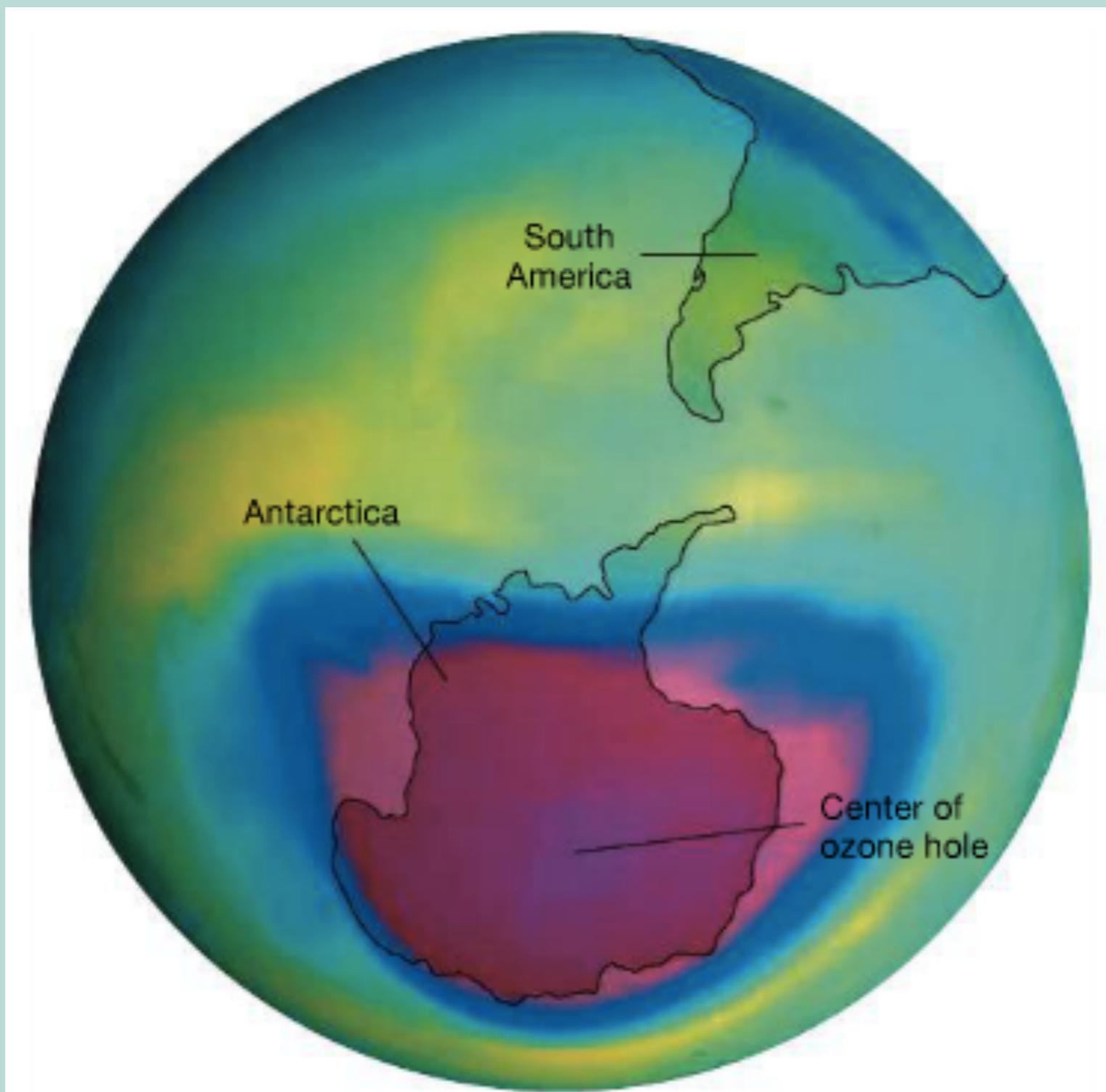
3. Ozone is lost by a reaction of the oxygen atom or the ozone molecule with each other, or some other trace gas such as chlorine (SLOW)

This interconversion process converts UV radiation into thermal energy, heating the stratosphere

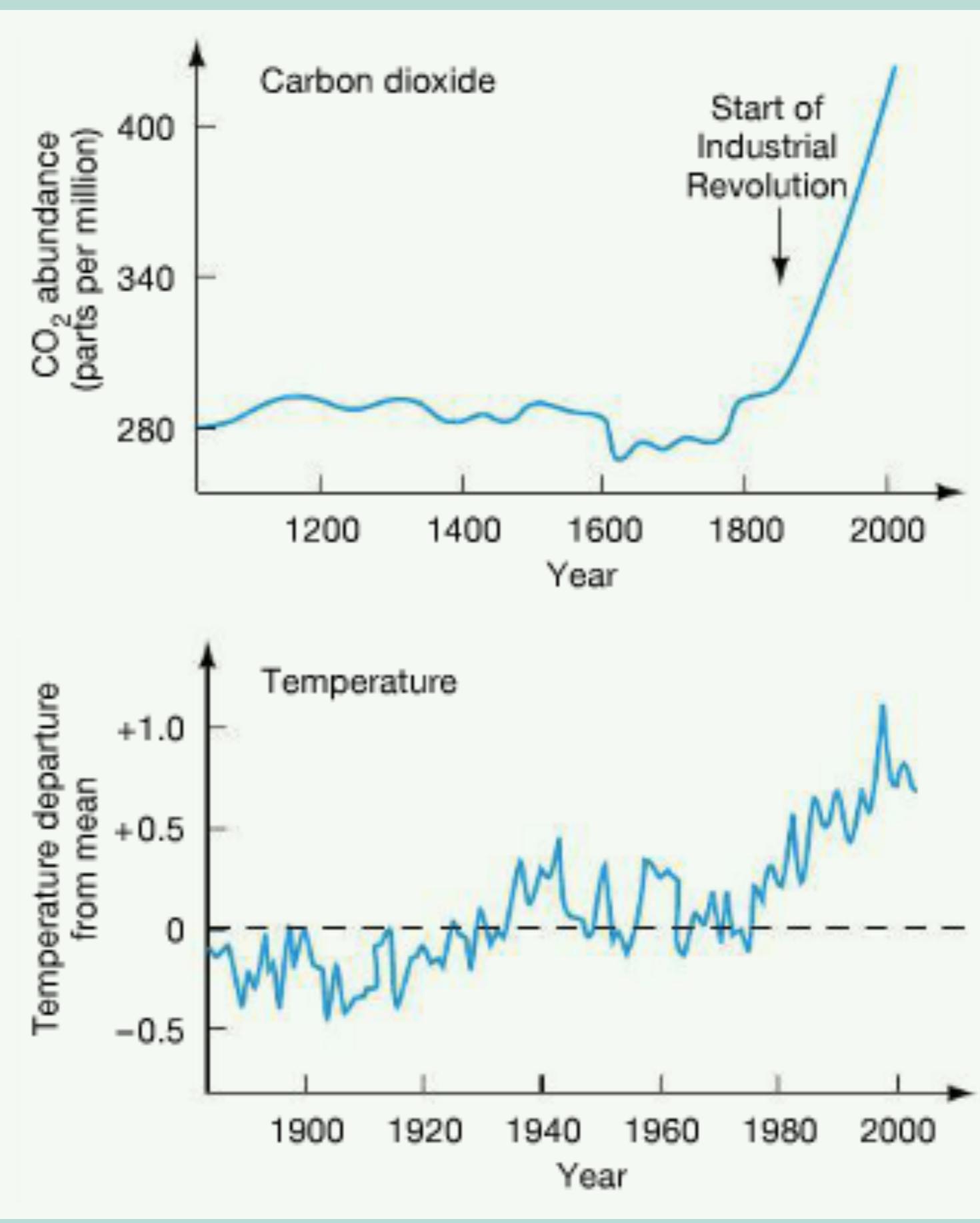




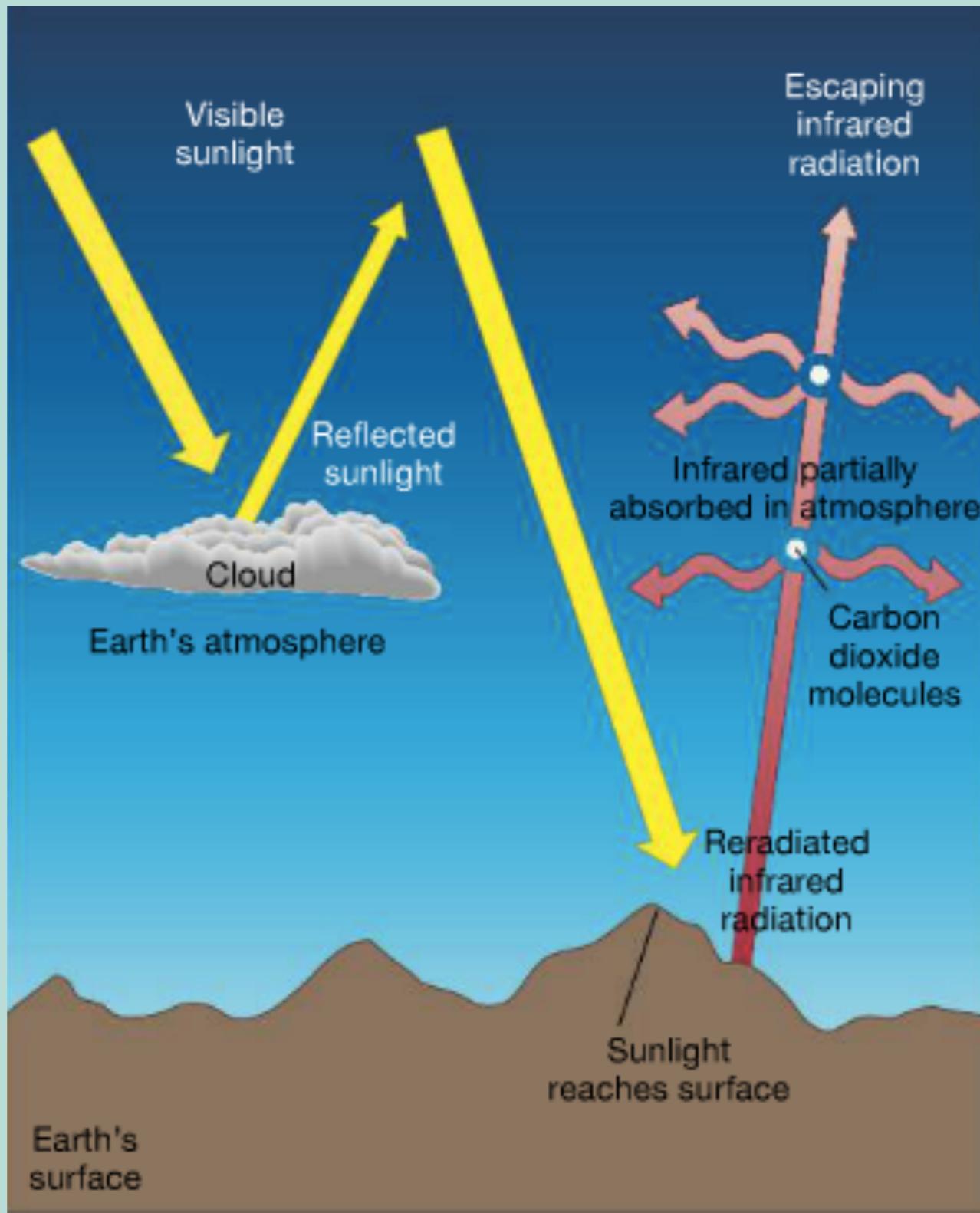
The Ozone Hole



Earth: Ch 7

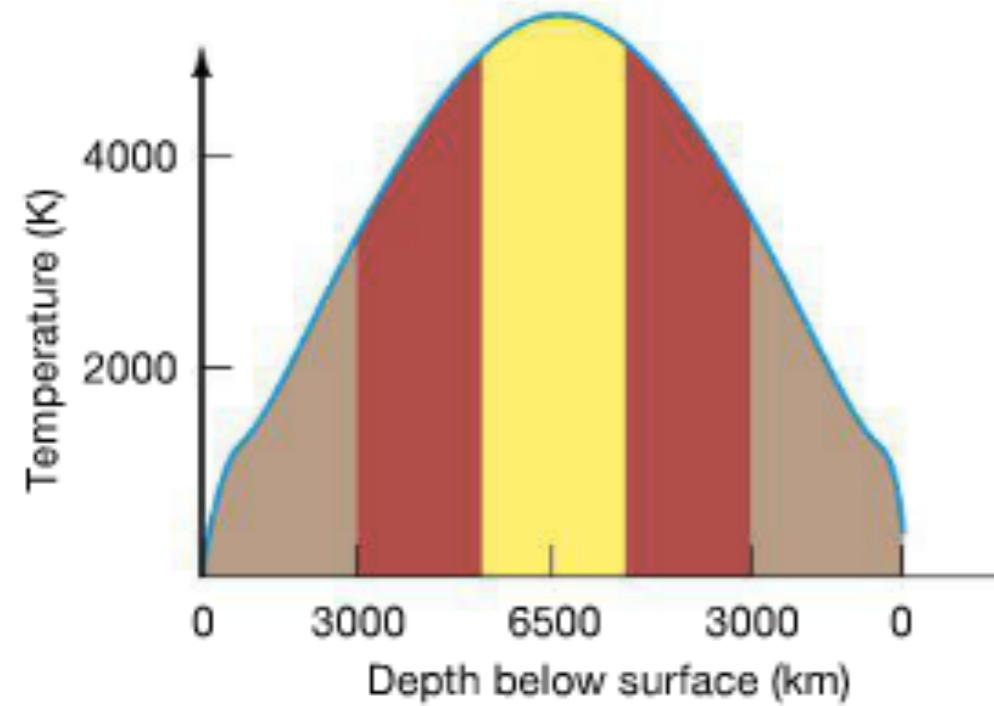
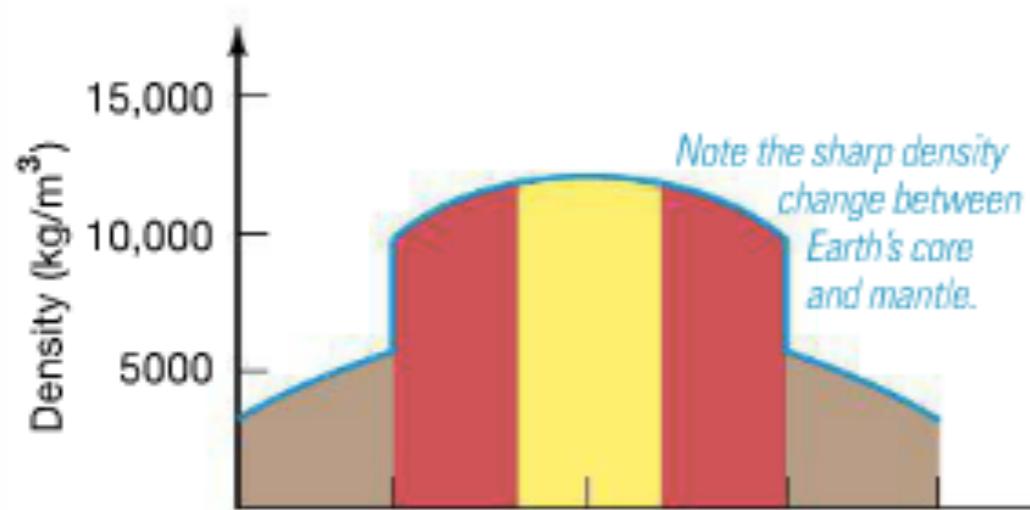
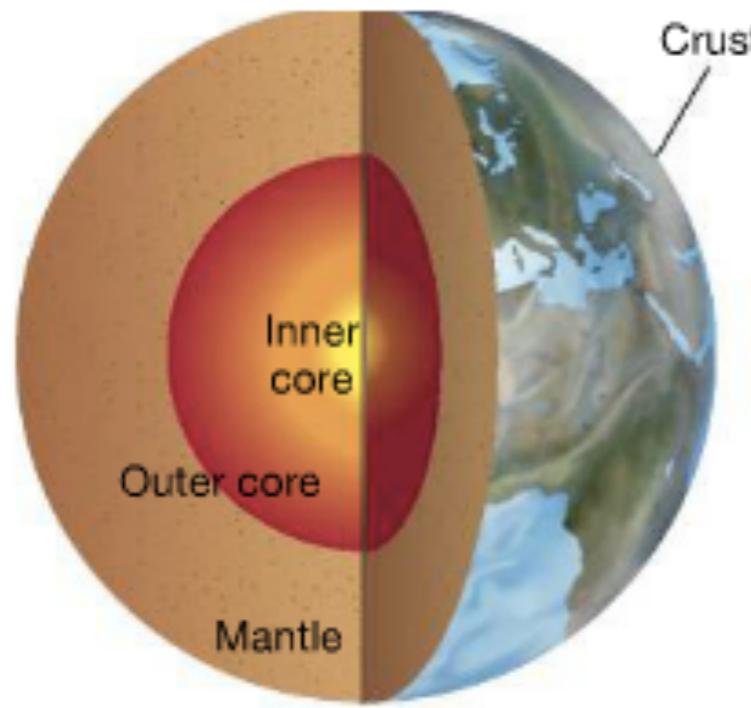


Greenhouse gas blanket





DISCUSSION



Density of Water: 1000

Density of Granite: 2750

Density of Earth: 5500

Density of Iron: 8000

Density of Mercury: 13500

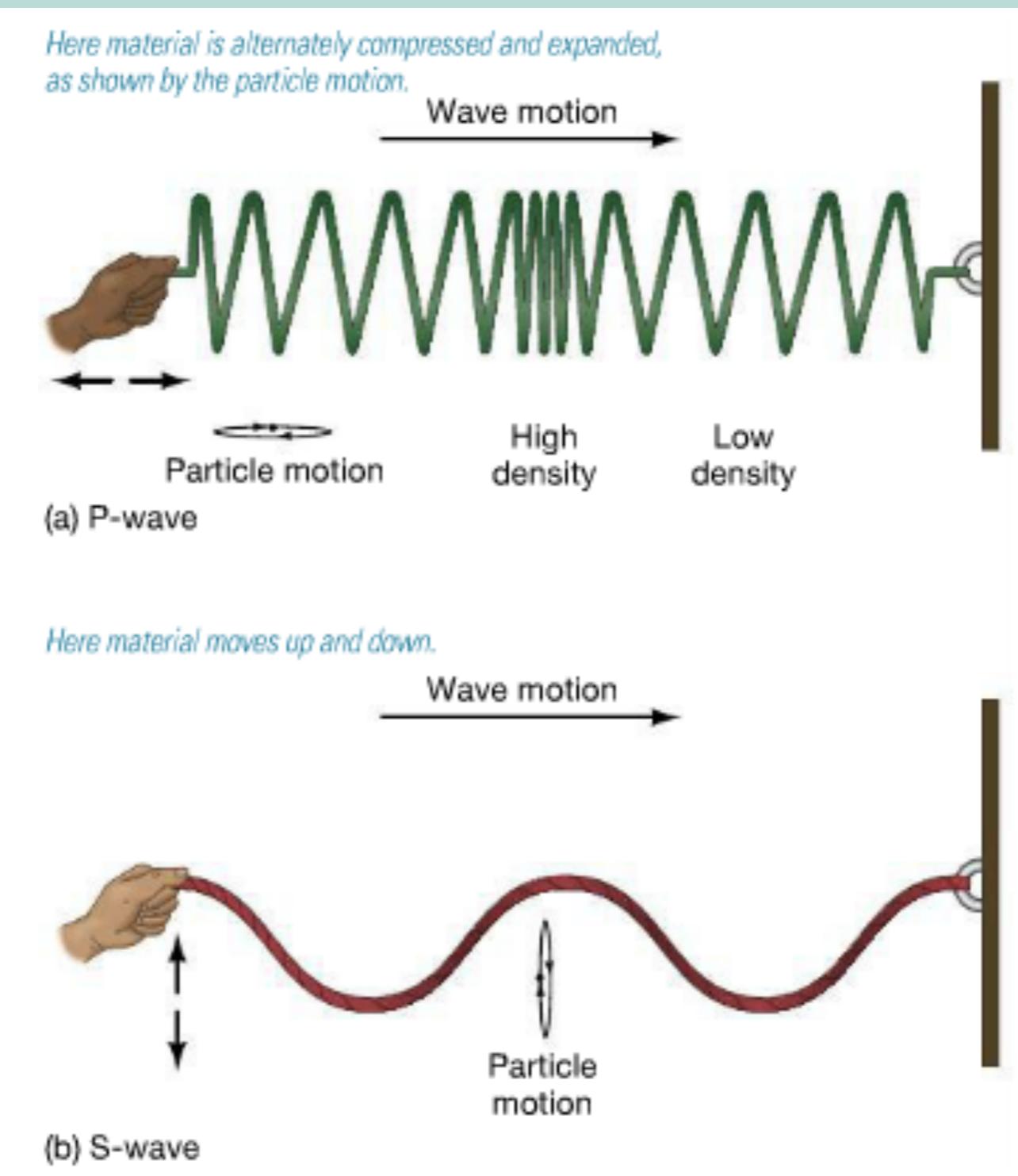


Neutron Star: 1000000000000000

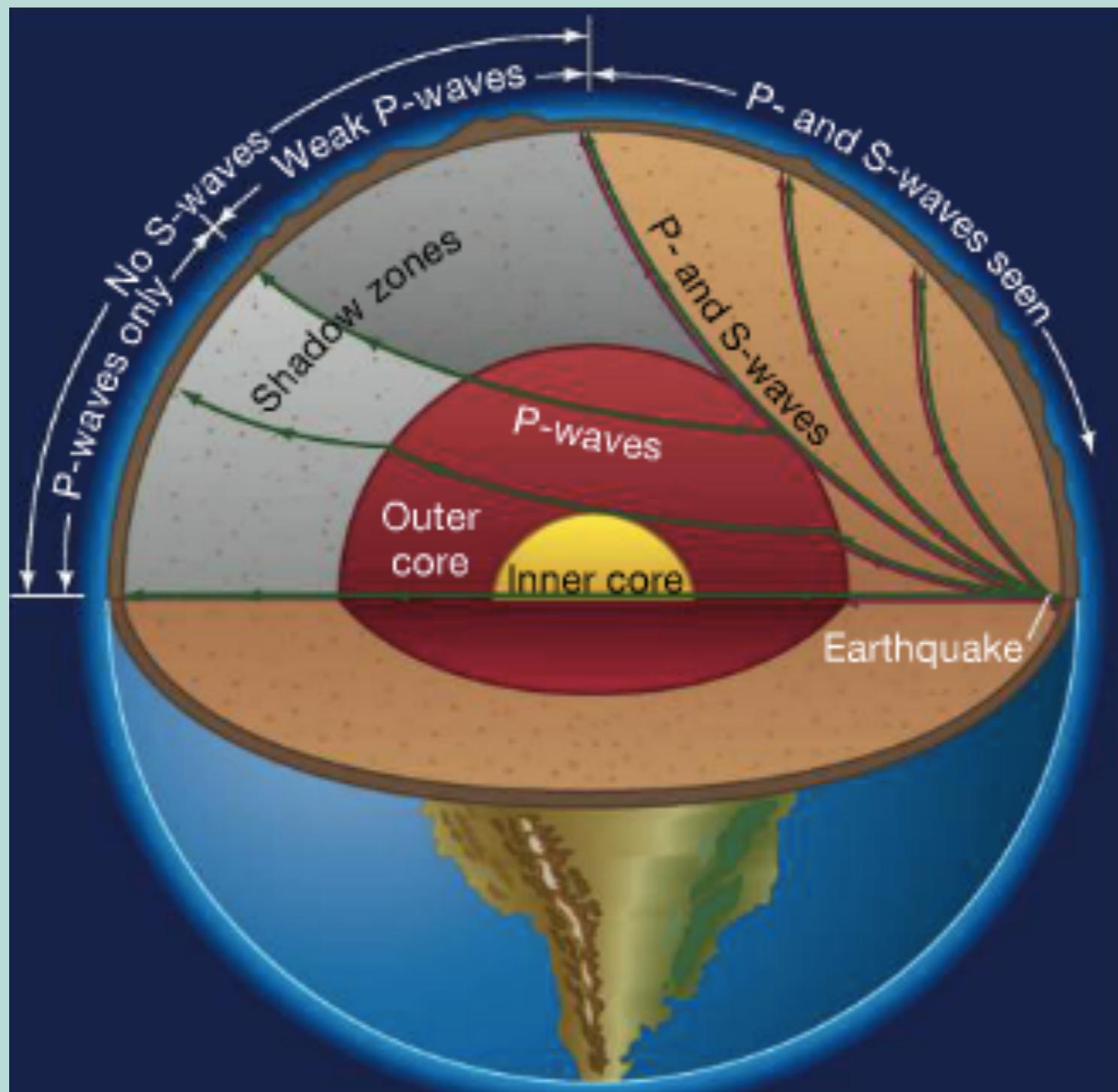
Transverse vs Longitudinal Waves

Primary vs Secondary Waves

P-waves vs S-waves



Evidence for the Core



Seismic Activity



Mt St. Helens: 24 Megatons



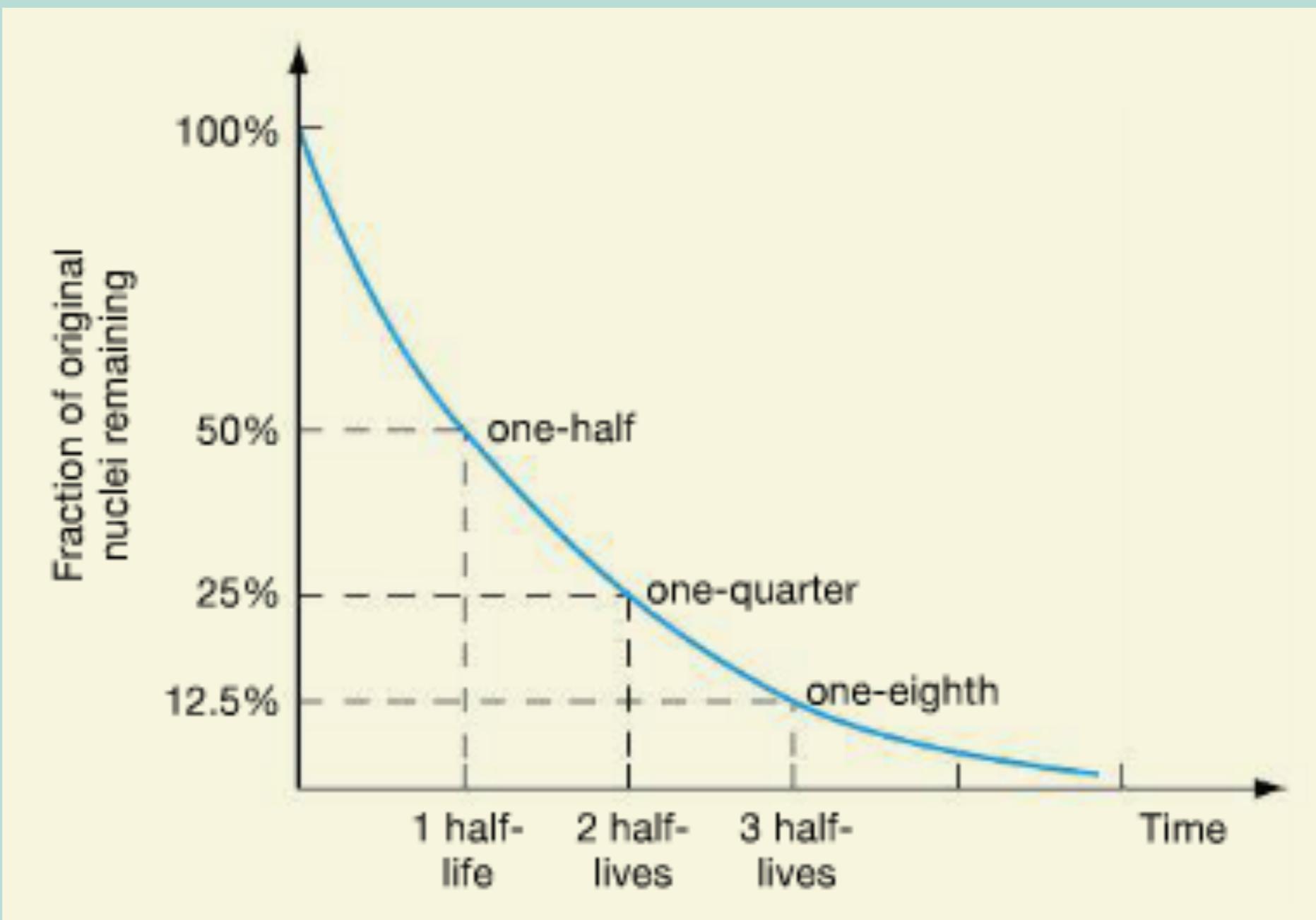
Mt. Tambora: 400 Megatons

Blast heard 1600 miles away

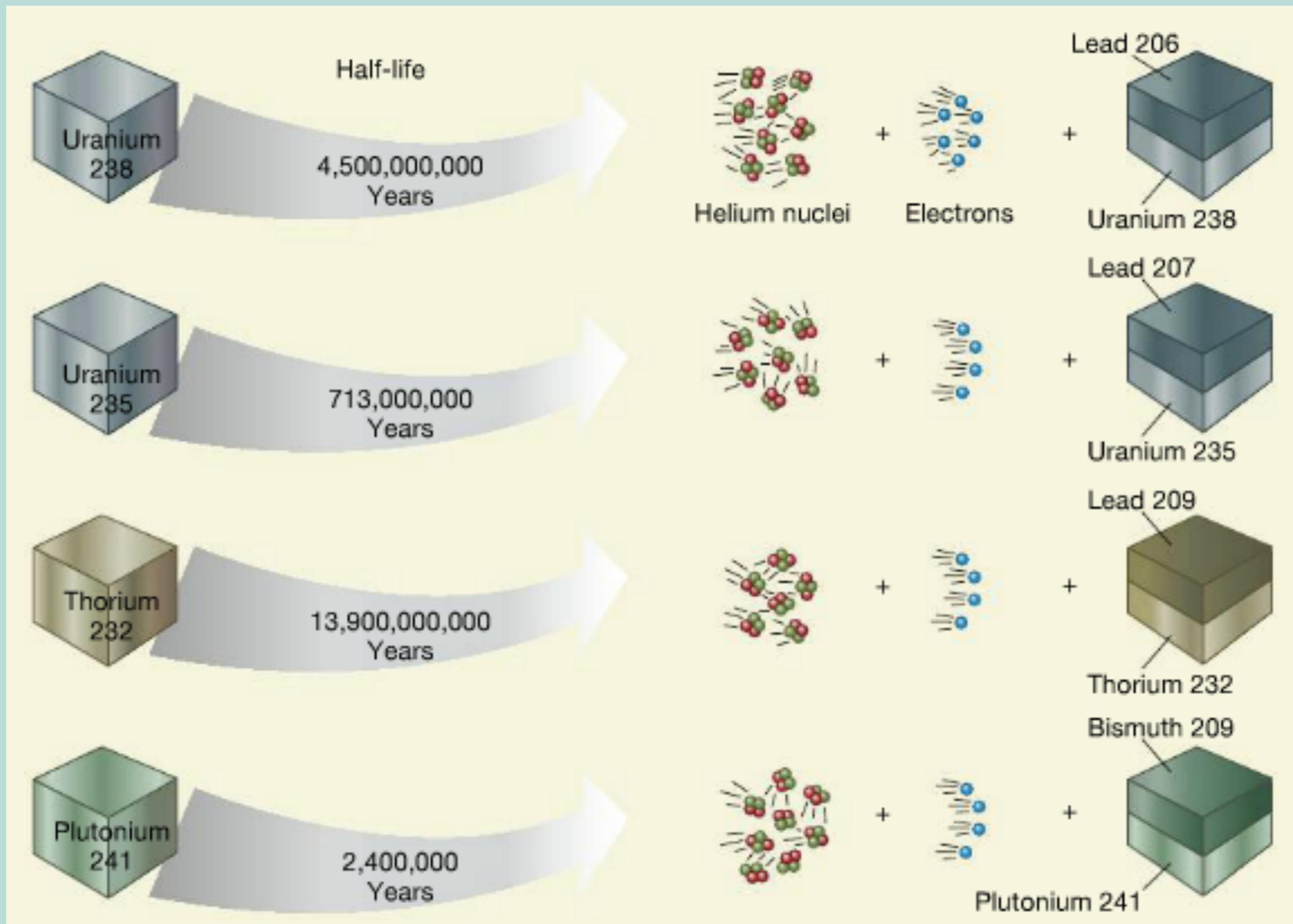
Indonesia, 1815

Darkness for 2 days for 400 miles

Radioactive Half-Life



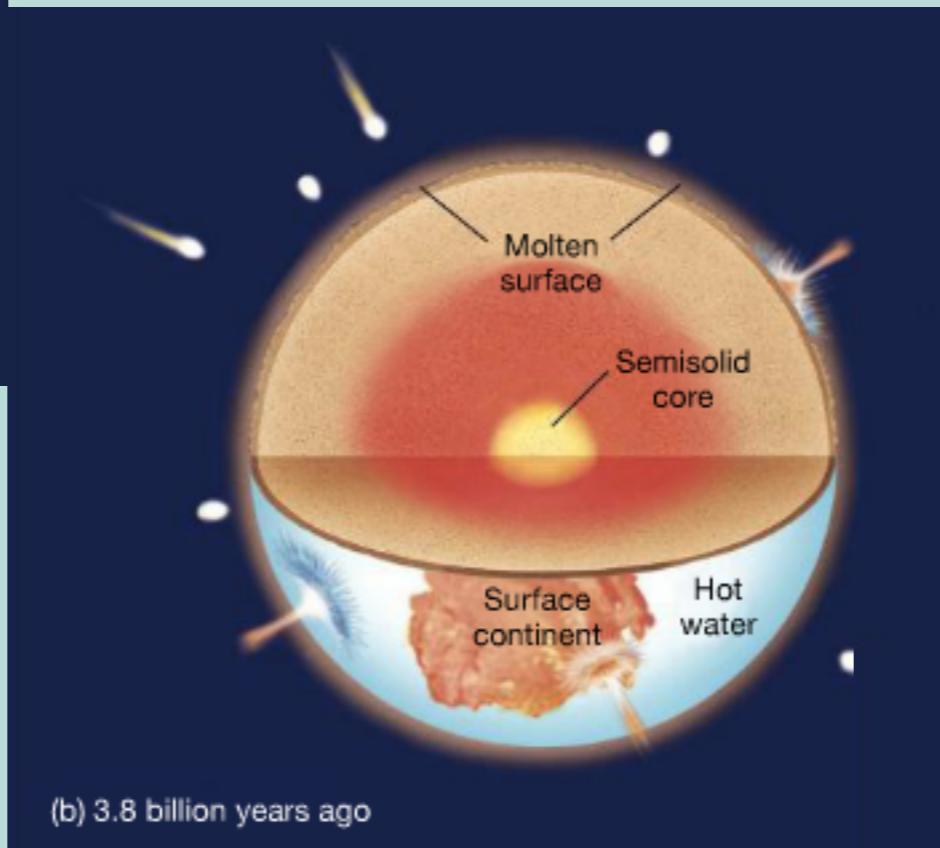
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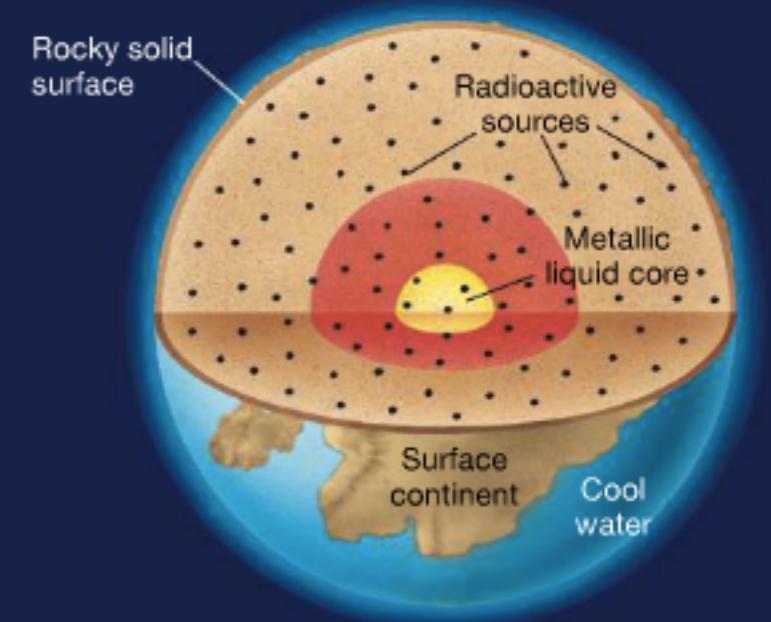
Earth: Ch 7



(a) 4.6 billion years ago



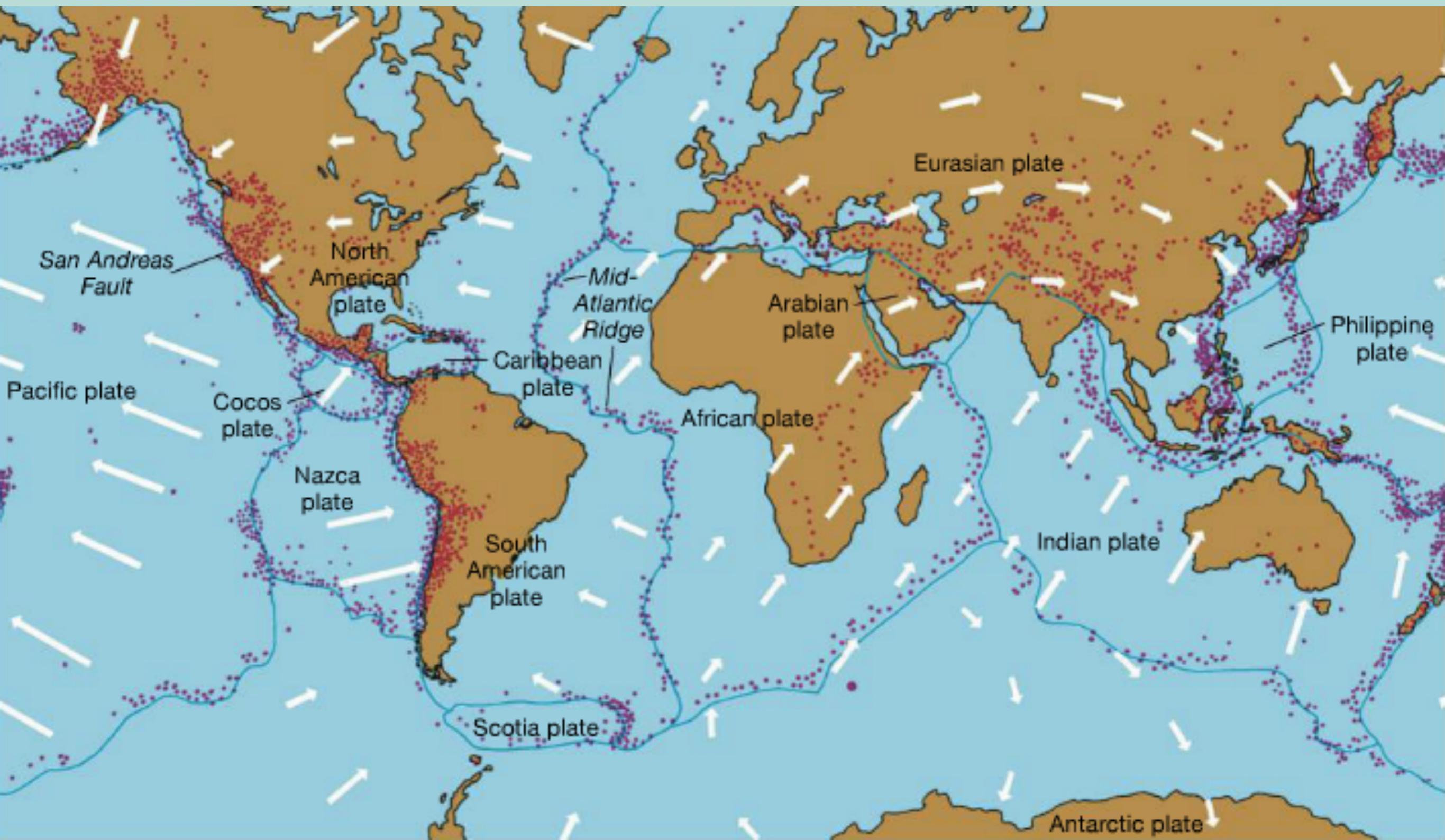
(b) 3.8 billion years ago



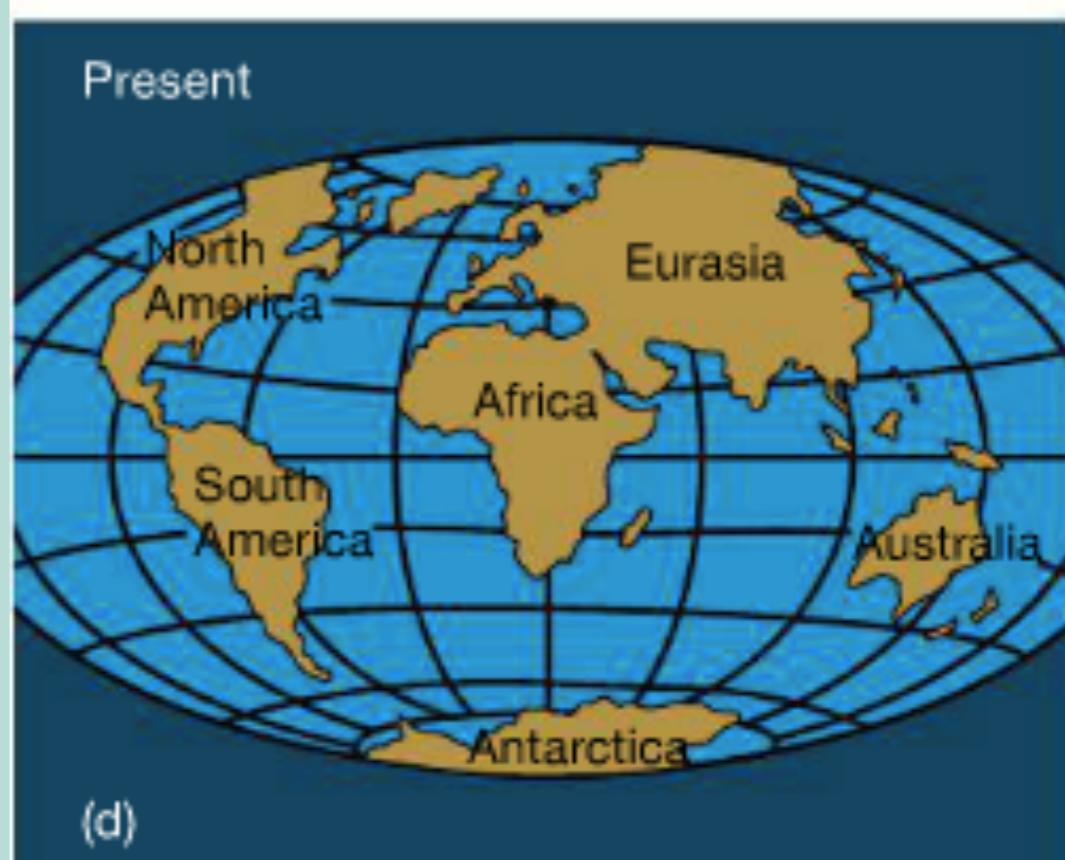
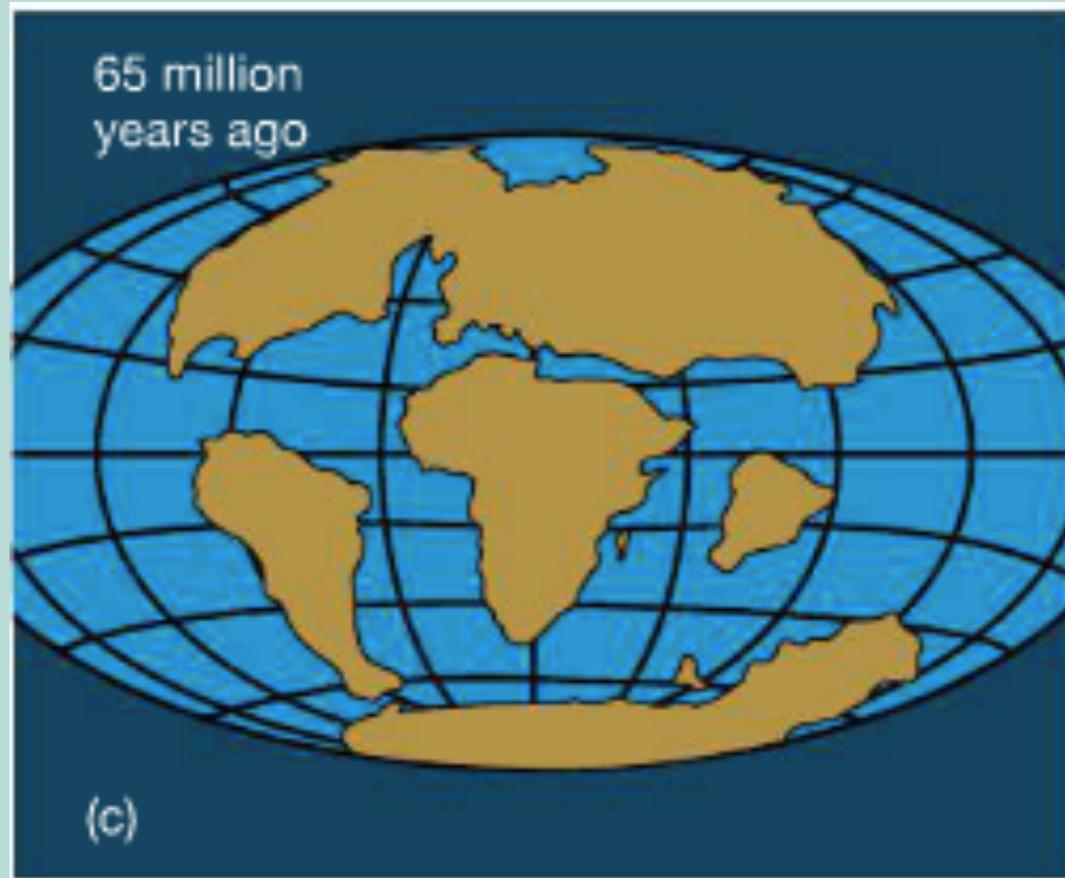
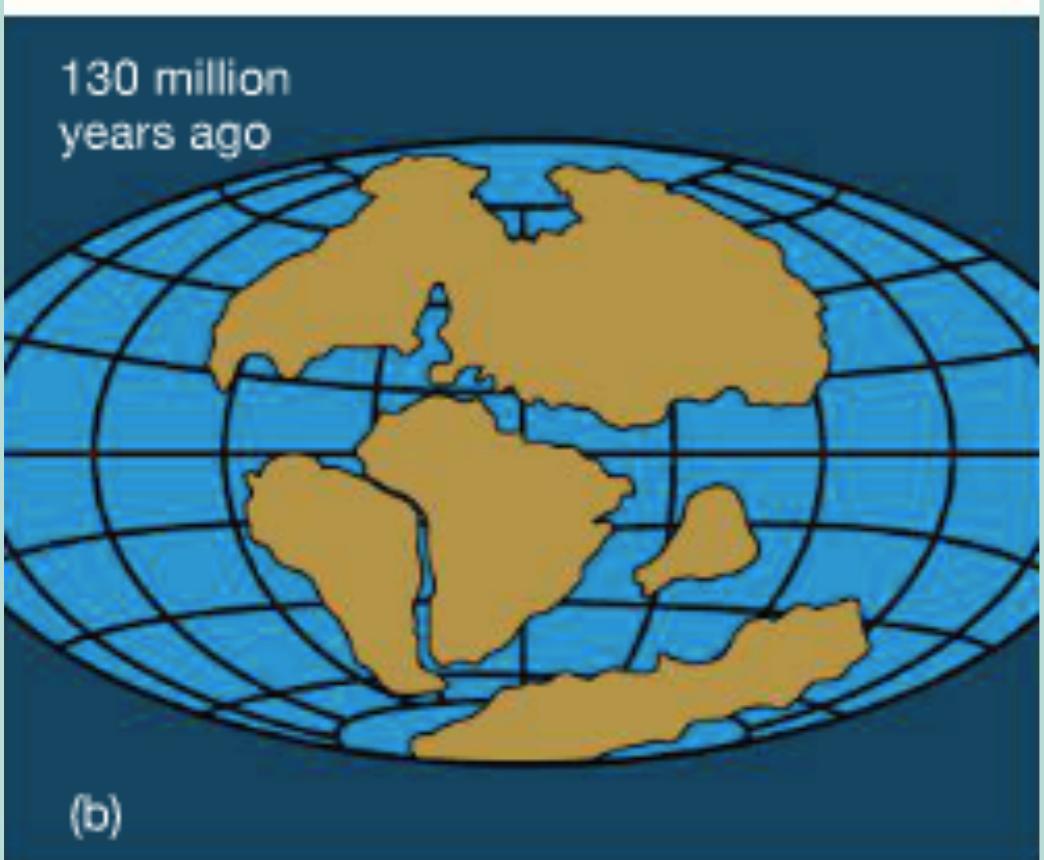
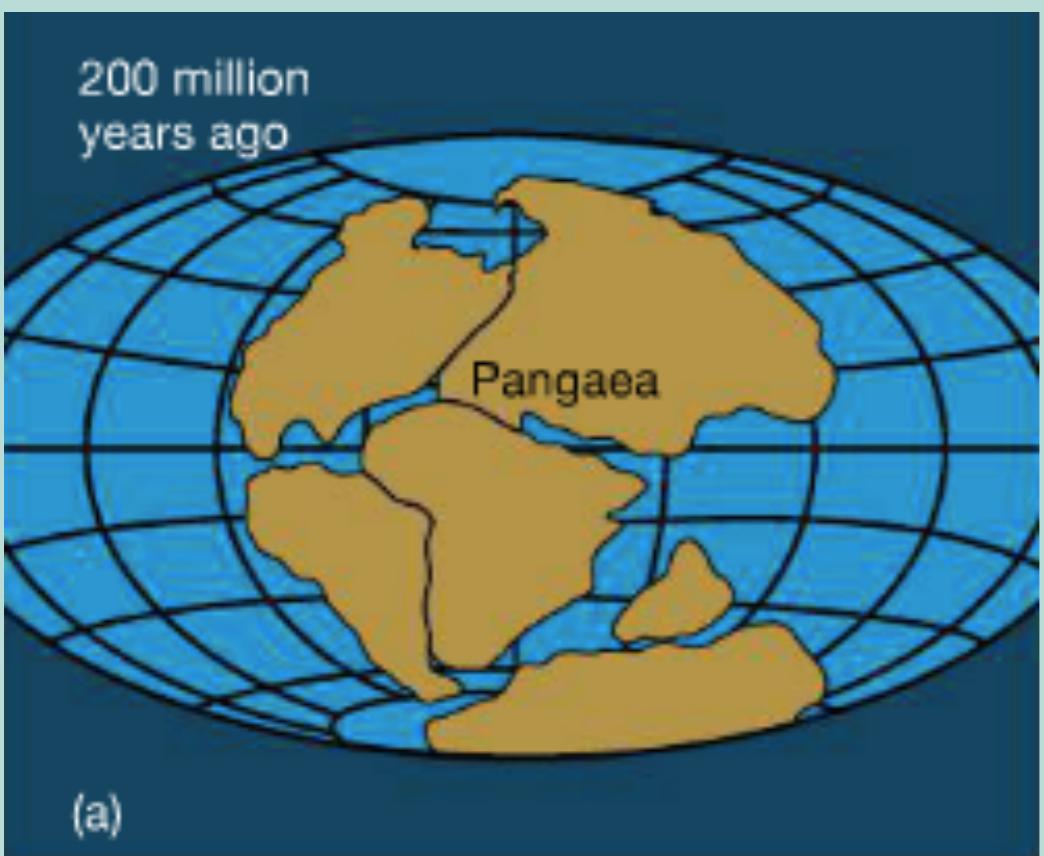
(c) -3 billion years ago

Differentiation

Plate Tectonics



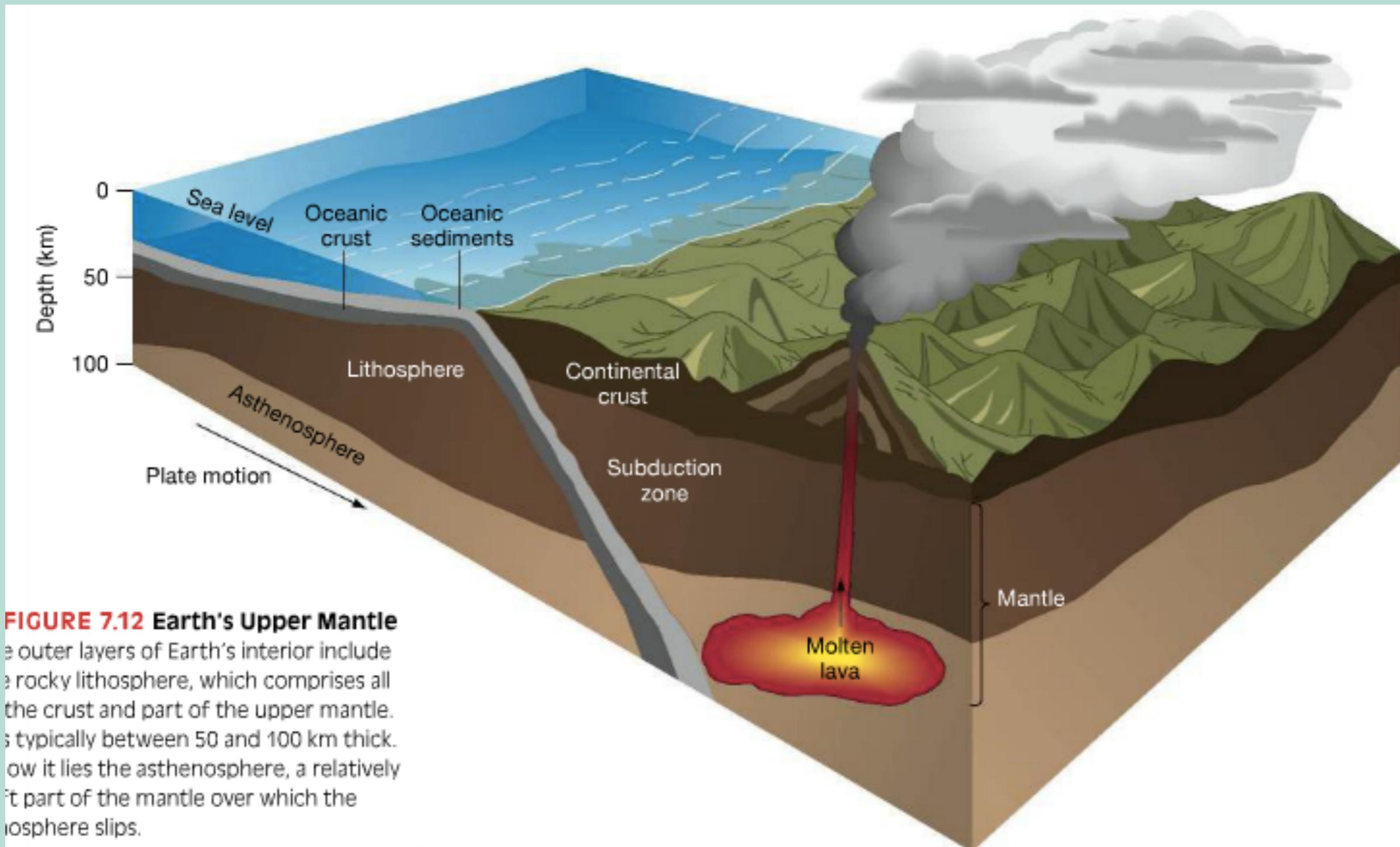
Pangea



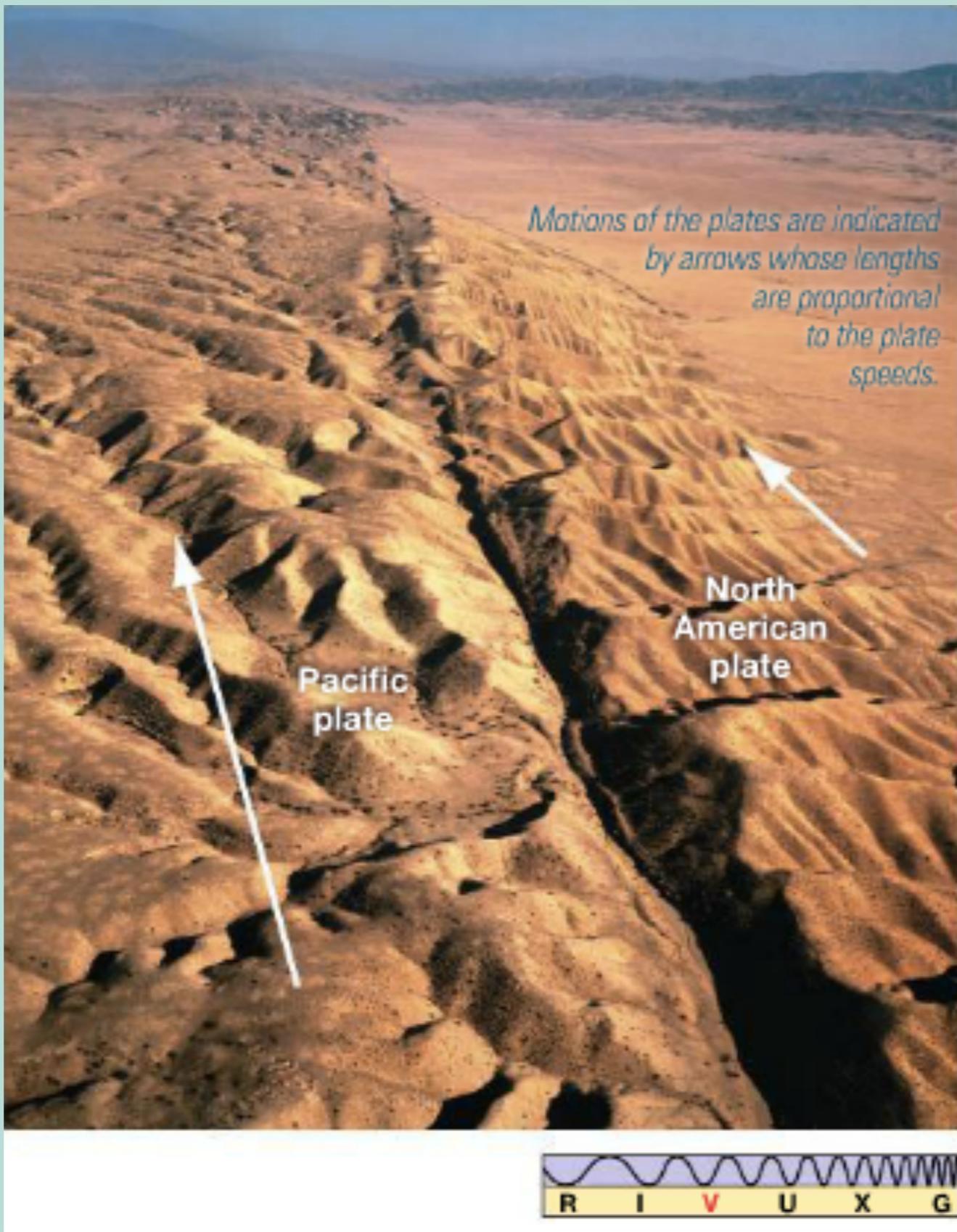
Earth: Ch 7



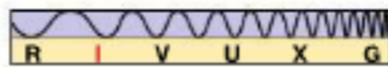
Earth: Ch 7



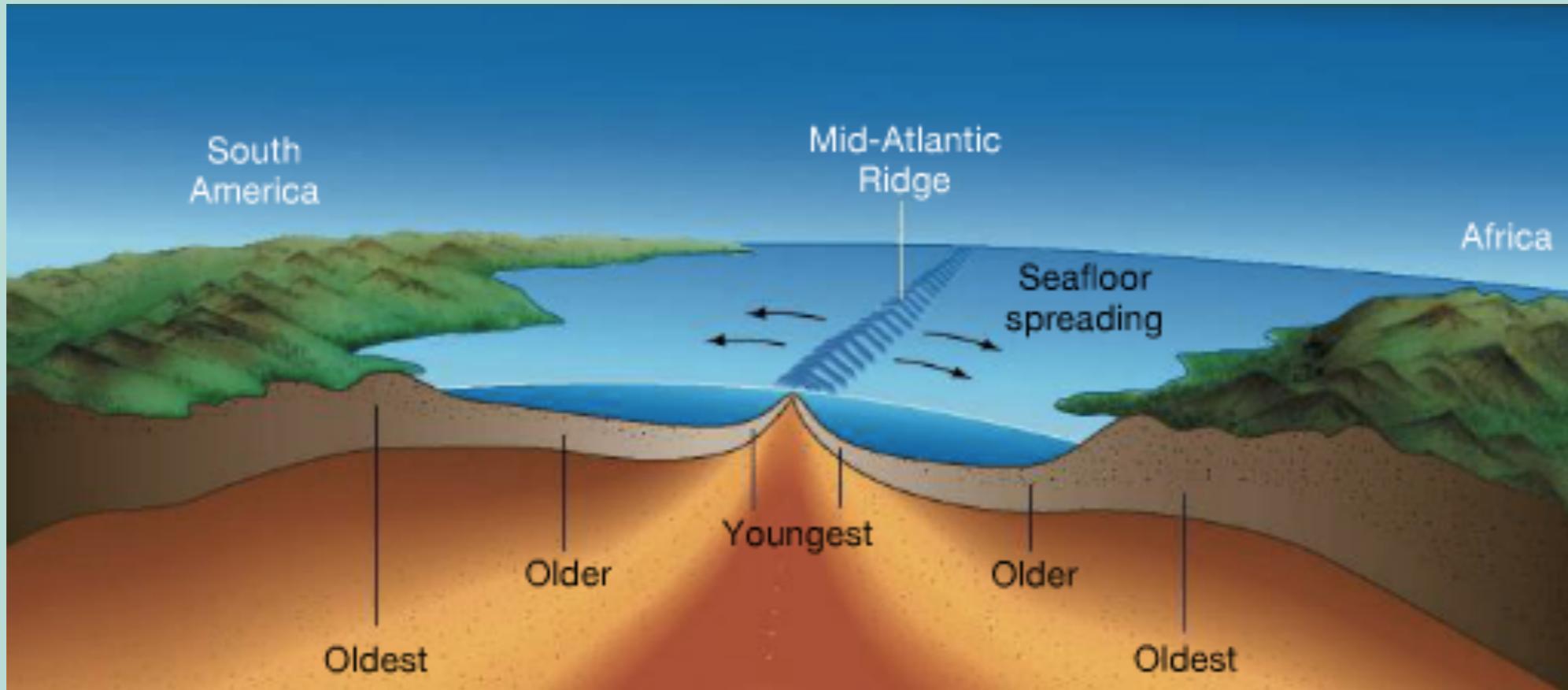
Earth: Ch 7



Continents Colliding



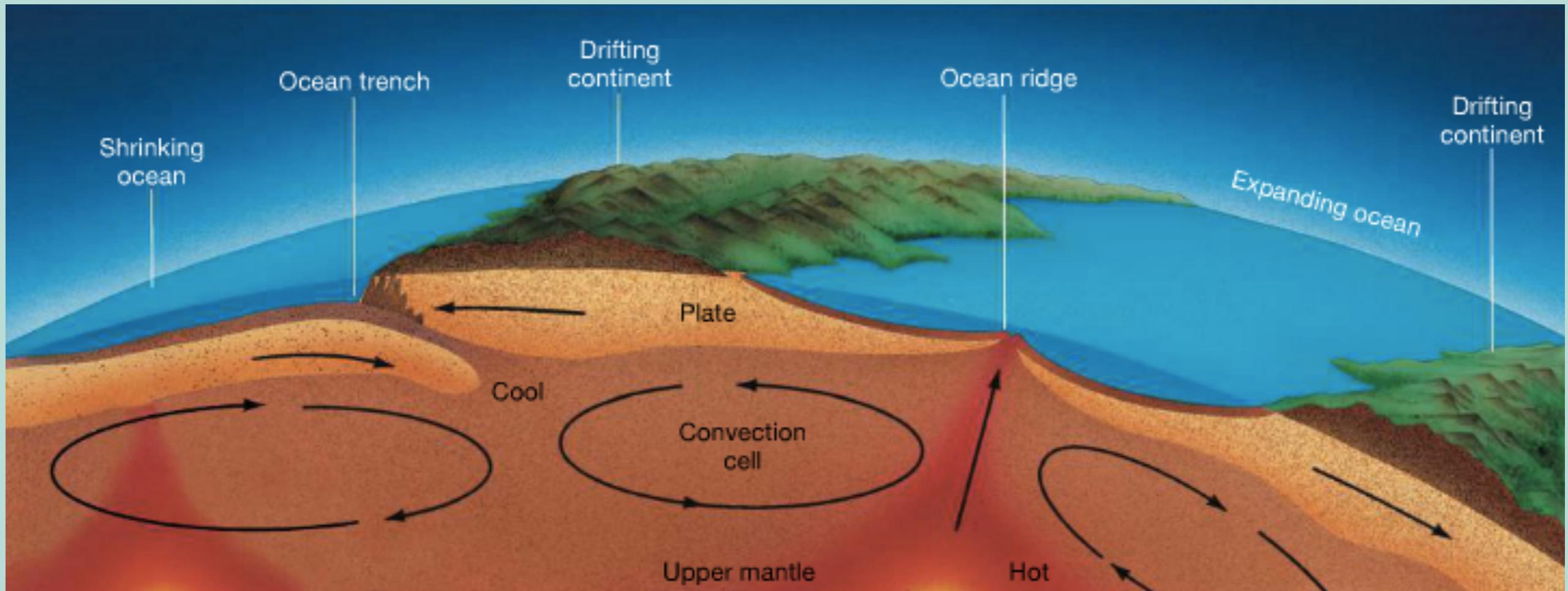
Mid Atlantic Ridge



Can gauge the age of the atlantic ocean with radioactive dating

Teaches us about earth's magnetic poles

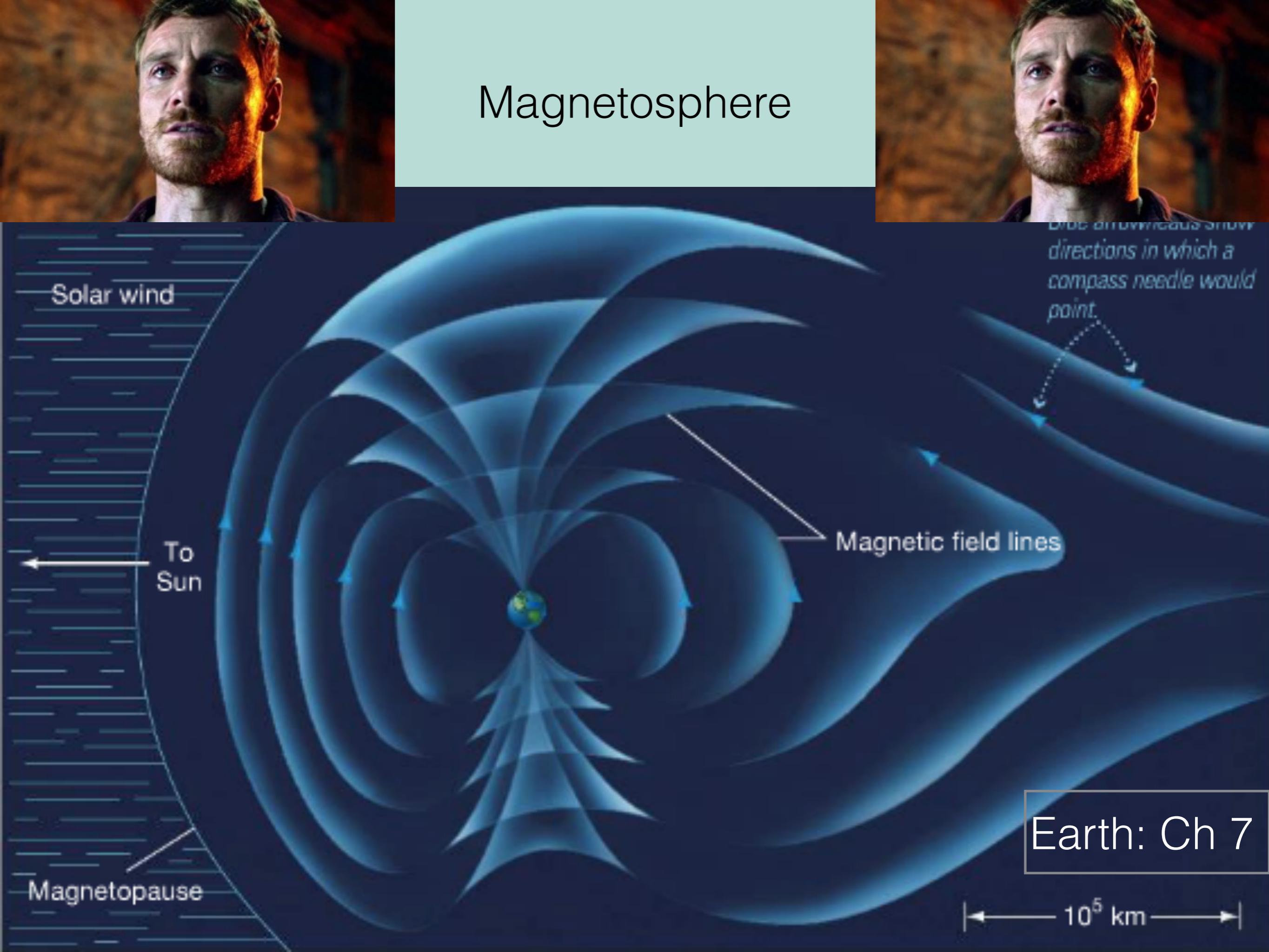
What causes the plates to drift?



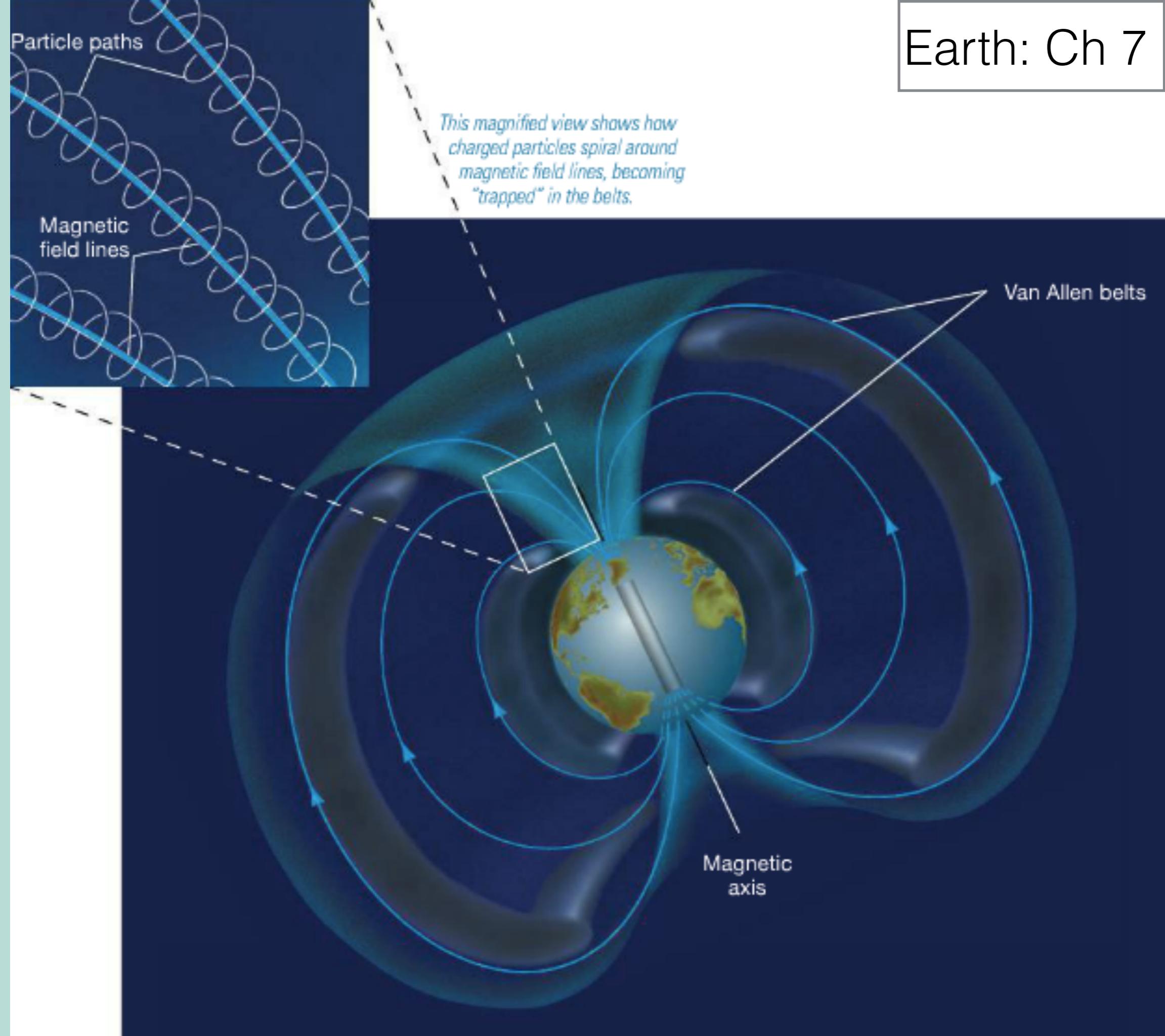
Convection!



DISCUSSION



Magnetosphere



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Aurora borealis



Earth: Ch 7

Aurora australis

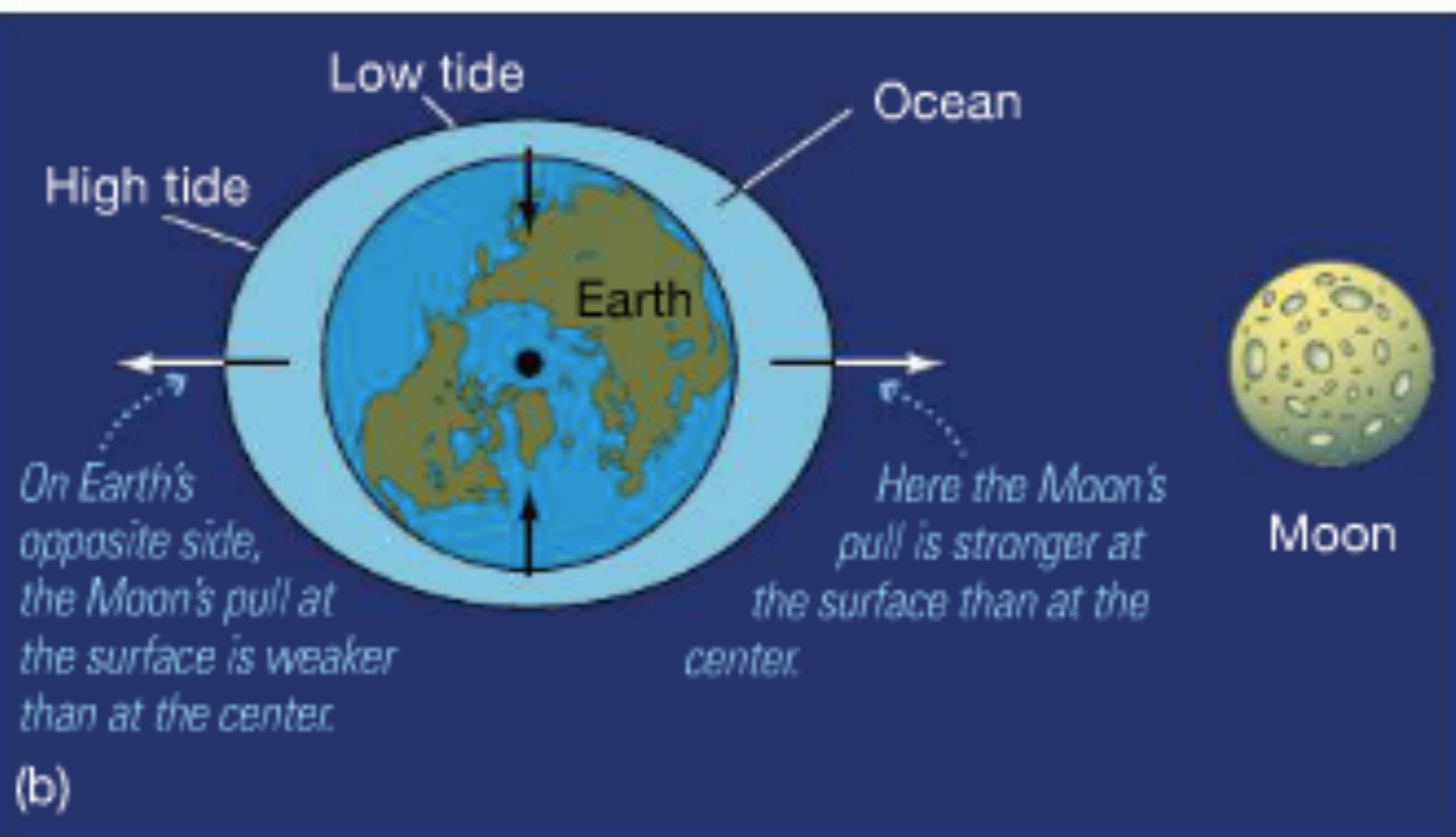
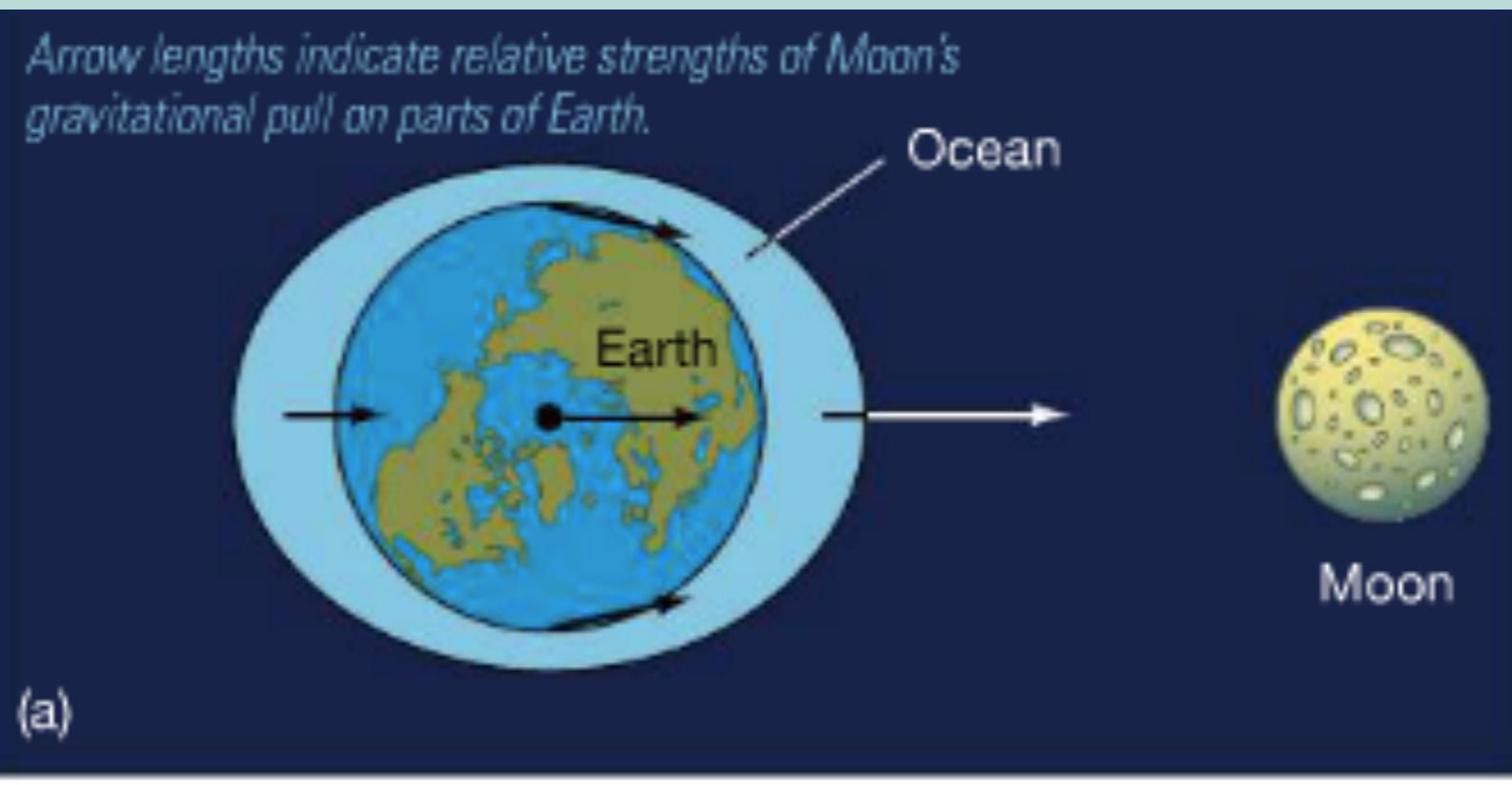


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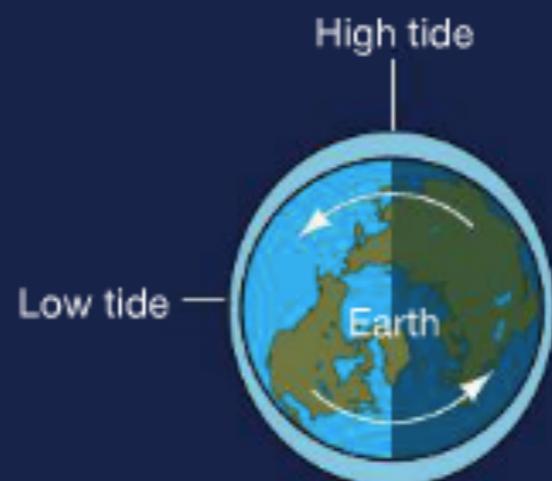
Earth: Ch 7



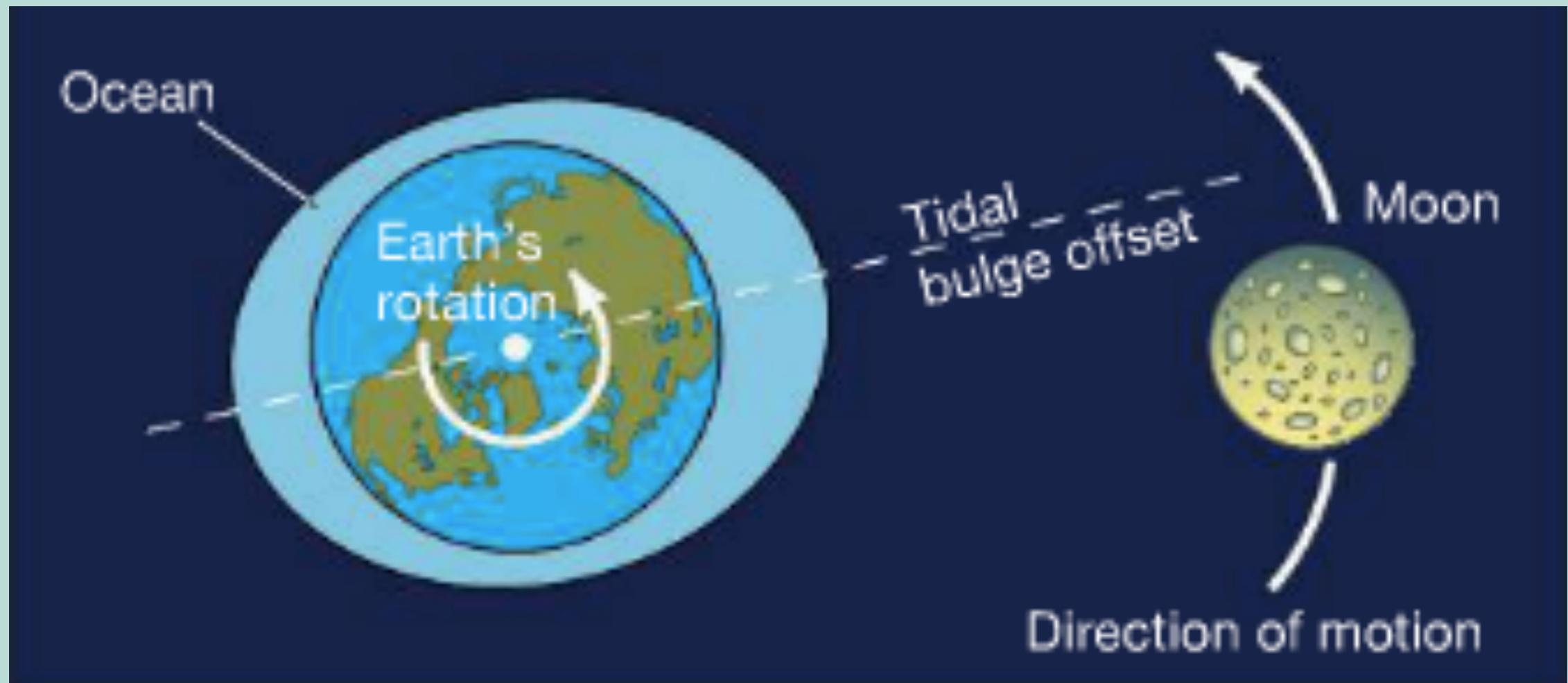
Tides



The sun is far, but it is big.



Tidal Locking



22 hour days, 500 million years ago (coral reef)

Result: 47 Day Days and a moon 1.5 times as far.

Earth: Ch 7

Life on tidally heated exomoons???

Life on tidally locked planets???