



Wayne E. Sirmon

GEO 301

World Regional Geography

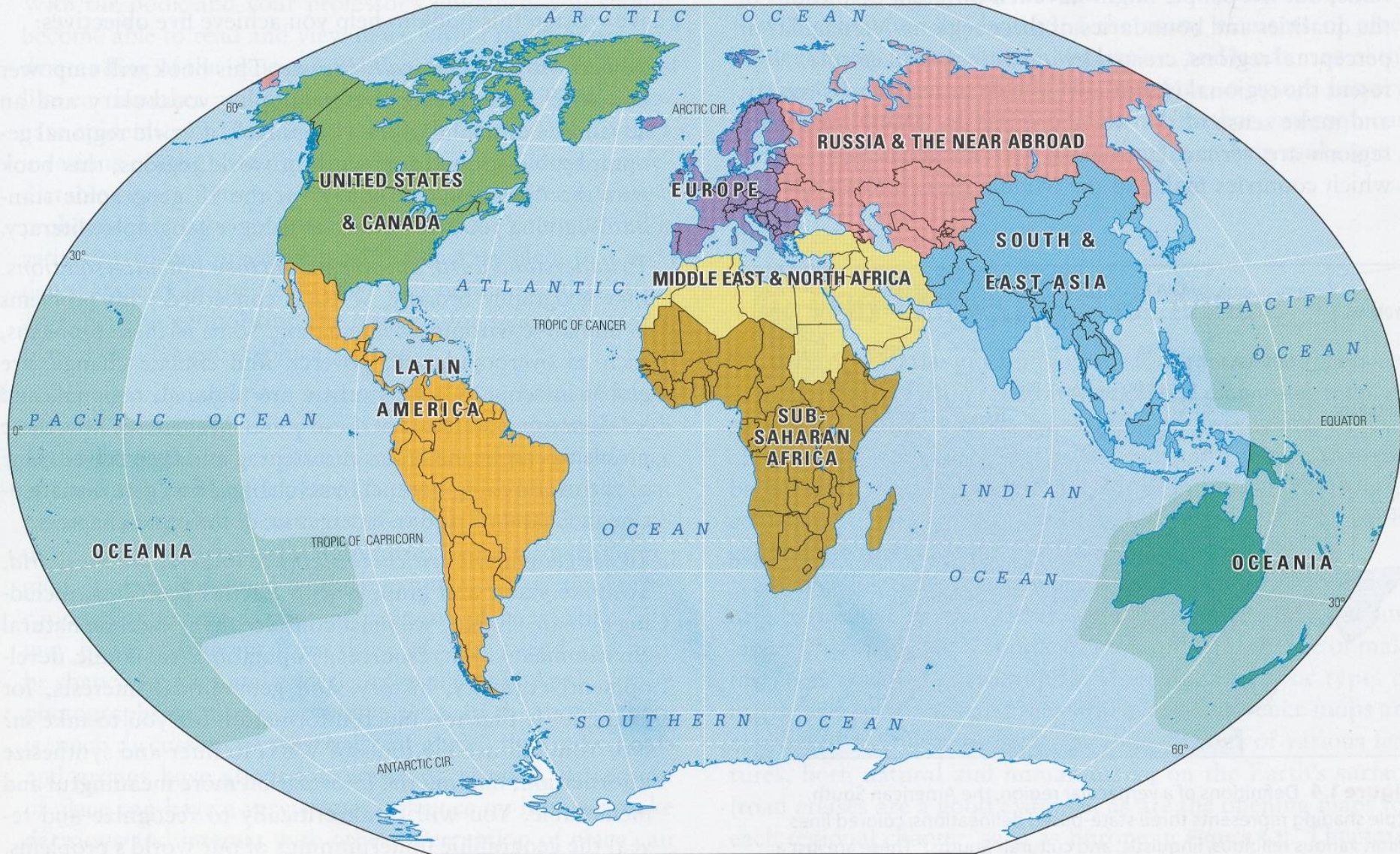
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Aug 31	1st paper topic selection due
Sept 2	Map Exam
Sept 18	Smithsonian Museum Day
Oct 5	1st Paper DUE
Oct 7	Lecture at USS Alabama – biography of Bob Gilliland – 1st to fly the SR-71

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Chapter Two – Physical Processes and World Regions

Kick Start Questions:

August 24

What is the history of “Plate Tectonics?”

WORLD CLIMATES — The Koppen climate classification system

WATER, WATER EVERYWHERE — Is water the earth’s most critical resource?

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**Physical
Geography**

Plate Tectonics

Patterns of Climate and Vegetation

Biodiversity

Oceans

Climate Change

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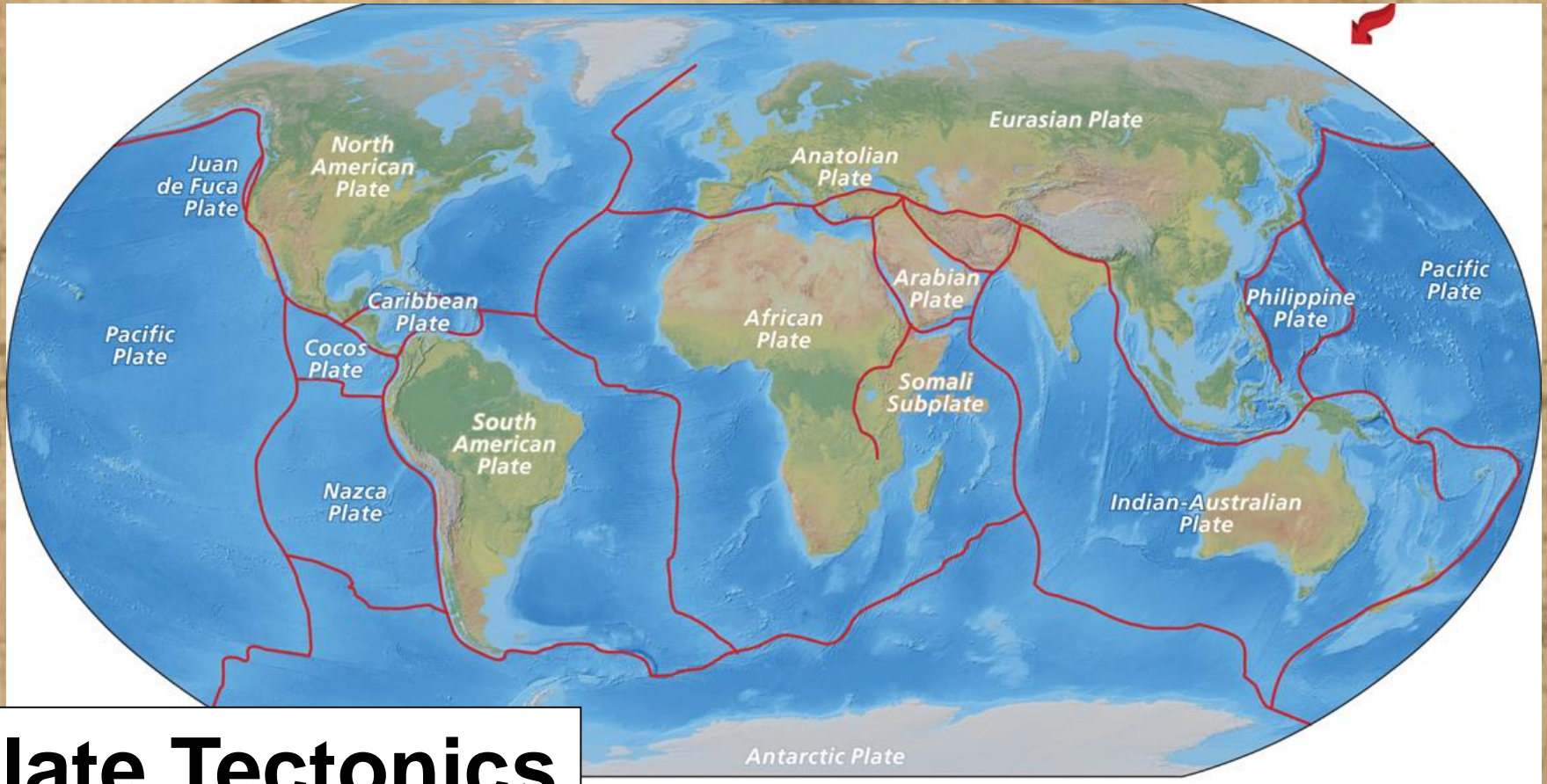


Plate Tectonics

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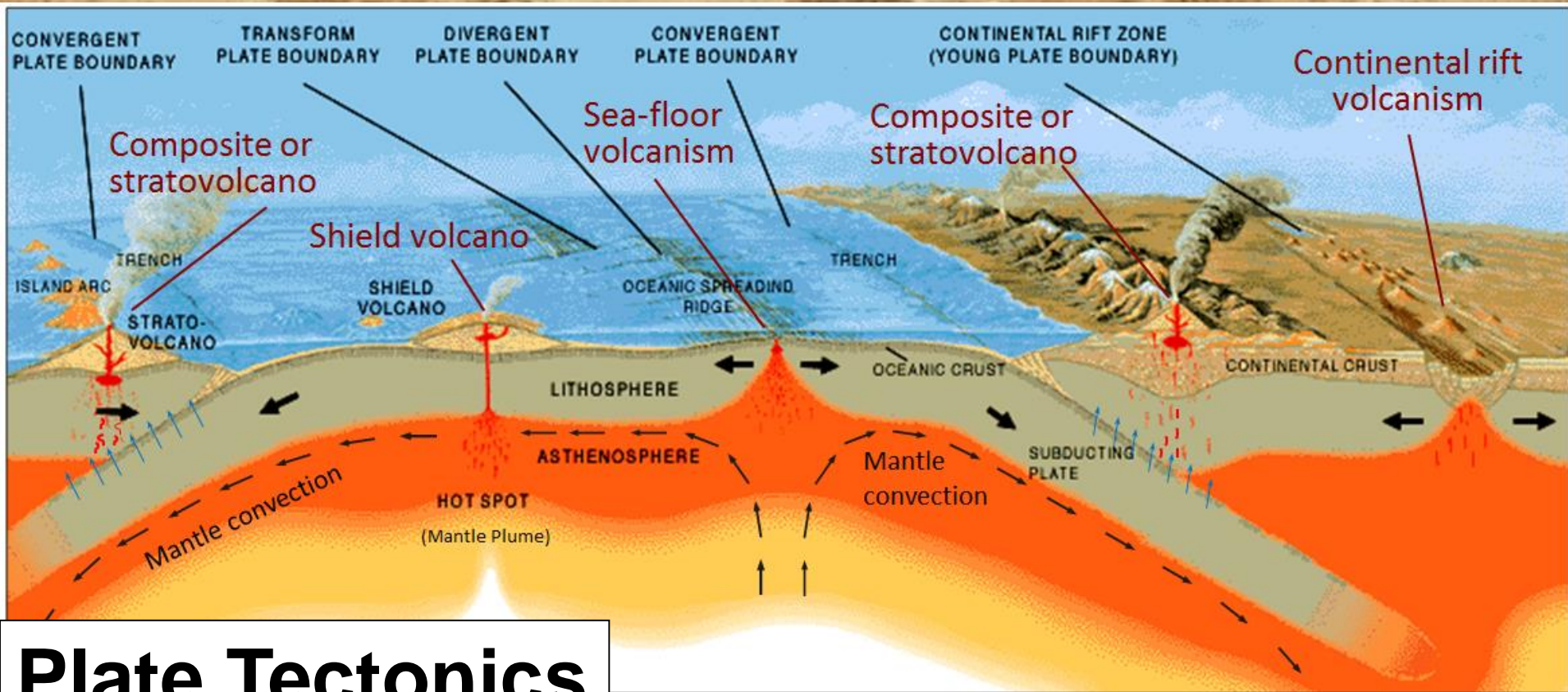


Plate Tectonics

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WEATHER

SHORT-TERM STATE OF
THE ATMOSPHERE

CAN VARY FROM TIME
TO TIME OR LOCATION TO
LOCATION

ALWAYS INCLUDES TIME
AND LOCATION

CLIMATE

LONG-TERM PATTERN
OF WEATHER

LONG-TERM = 30 YEARS
OR MORE

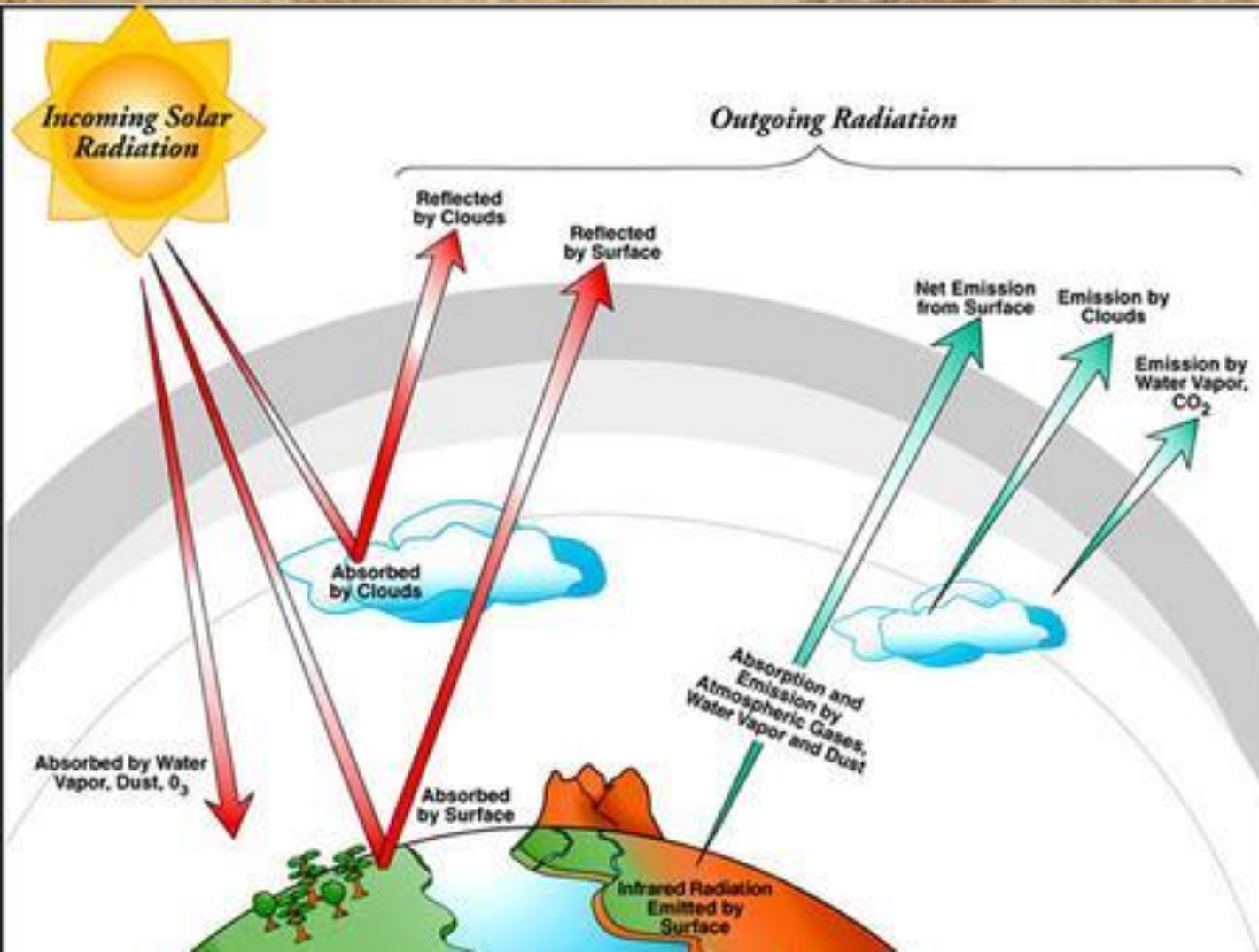
AVERAGE WEATHER
OVER MANY YEARS
IN ONE SPECIFIC PLACE

Weather is your mood.

Climate is your personality.

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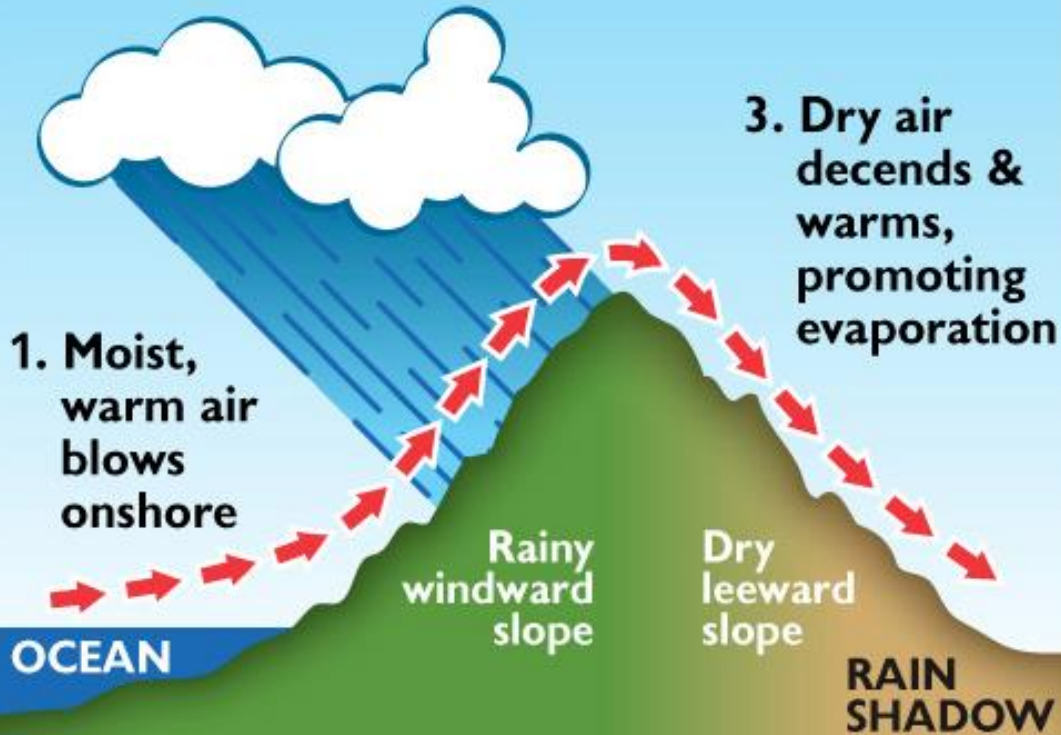


Uneven heating of earth results in temperature and therefore air pressure gradients.

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2. As air rises over mountains, it cools, causing moisture to condense and fall as precipitation



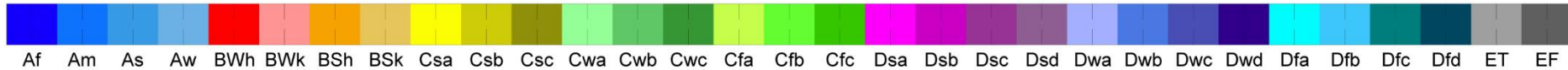
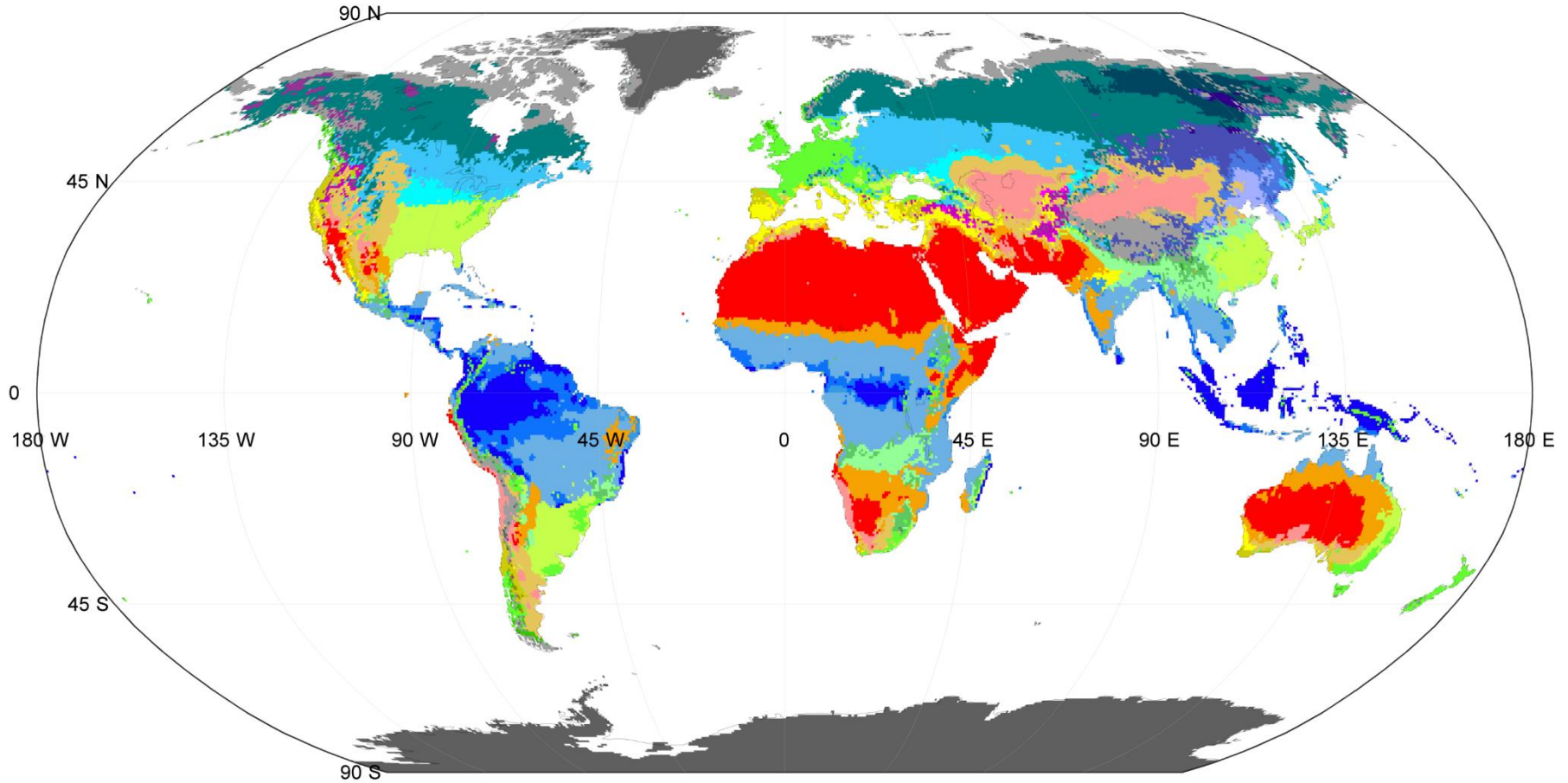
The amount of moisture air can hold is a function of temperature and pressure.

ADIABATIC LAPSE RATES

↑ 1,000 ft ↓ 3.2 - 2.2 degree F



World map of Köppen climate classification for 1901–2010



Af Am As Aw BWh BWk BSh BSk Csa Csb Csc Cwa Cwb Cwc Cfa Cfb Cfc Dsa Dsb Dsc Dsd Dwa Dwb Dwc Dwd Dfa Dfb Dfc Dfd ET EF

First letter

A: Tropical
 B: Dry
 C: Mild temperate
 D: Snow
 E: Polar

Second letter

f: Fully humid
 m: Monsoon
 s: Dry summer
 w: Dry winter
 W: Desert
 S: Steppe

Third letter

h: Hot arid
 k: Cold arid
 a: Hot summer
 b: Warm summer
 c: Cool summer
 d: Cold summer

Data source: Terrestrial Air Temperature/Precipitation: 1900-2010 Gridded Monthly Time Series (V 3.01)

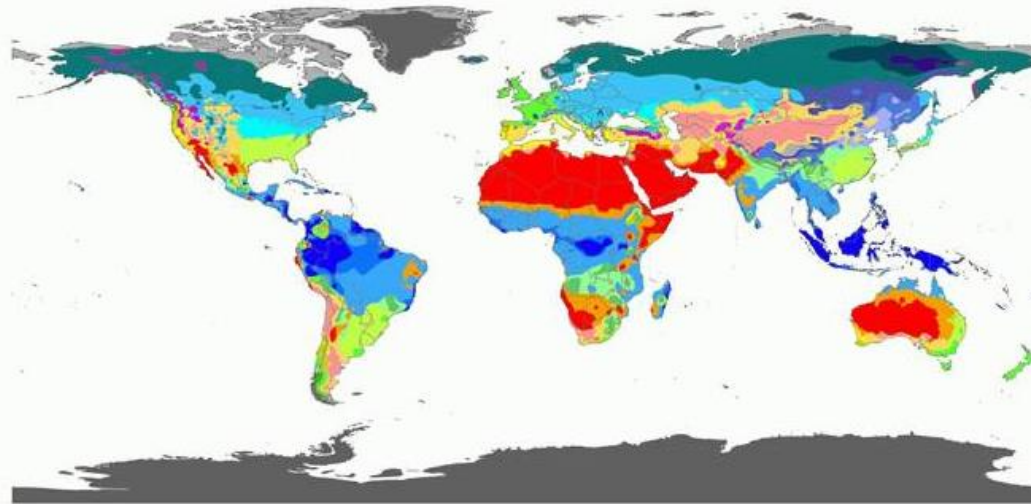
Resolution: 0.5 degree latitude/longitude

Website: <http://hanschen.org/koppen>

Ref: Chen, D. and H. W. Chen, 2013: Using the Köppen classification to quantify climate variation and change: An example for 1901–2010. Environmental Development, 6, 69-79, 10.1016/j.envdev.2013.03.007.

Köppen climate classification

World map of Köppen-Geiger climate classification



DATA SOURCE : GHCN v2.0 station data
Temperature (N = 4,844) and
Precipitation (N = 12,396)

PERIOD OF RECORD : All available

MIN LENGTH : ≥30 for each month.

RESOLUTION : 0.1 degree lat/long

Contact : Murray C. Peel (mpeel@unimelb.edu.au) for further information

First letter

A: Tropical
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D: Snow
E: Polar

Second letter

f: Fully humid
m: Monsoon
s: Dry summer
w: Dry winter
W: Desert
S: Steppe

T: Tundra
F: Frost

Third letter

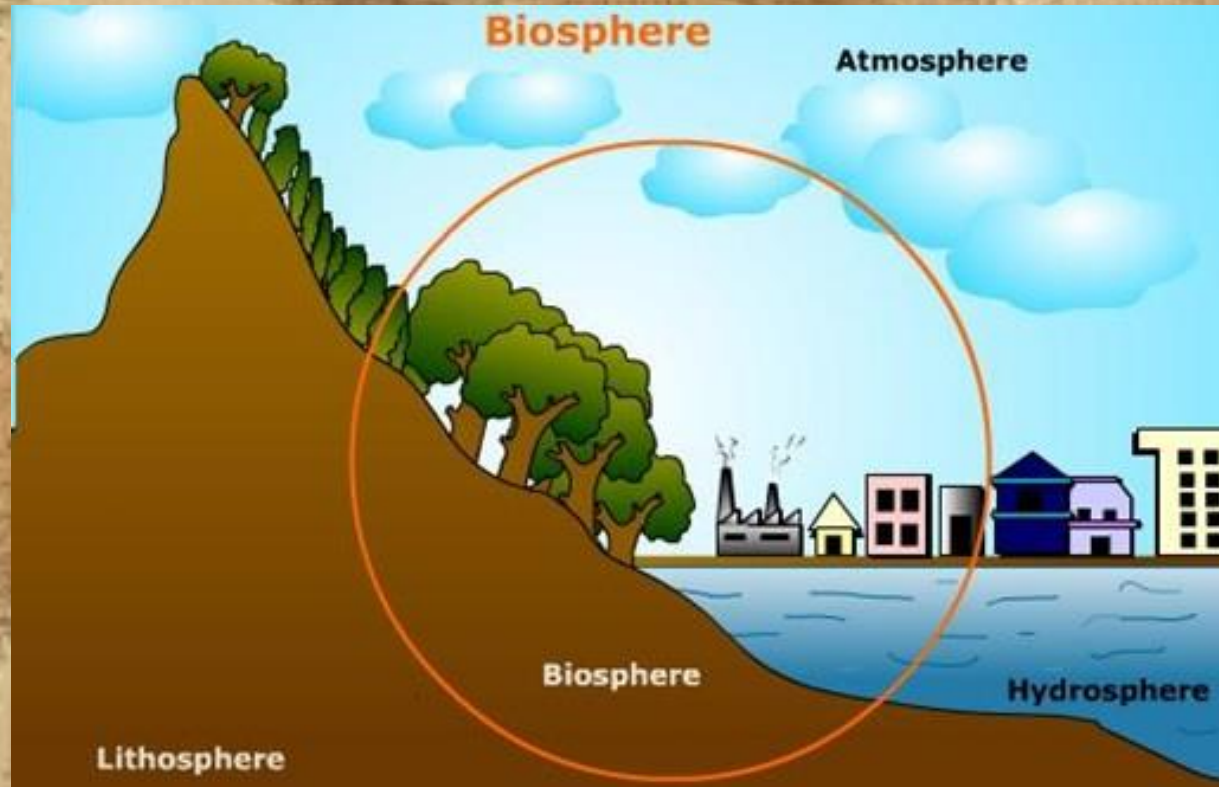
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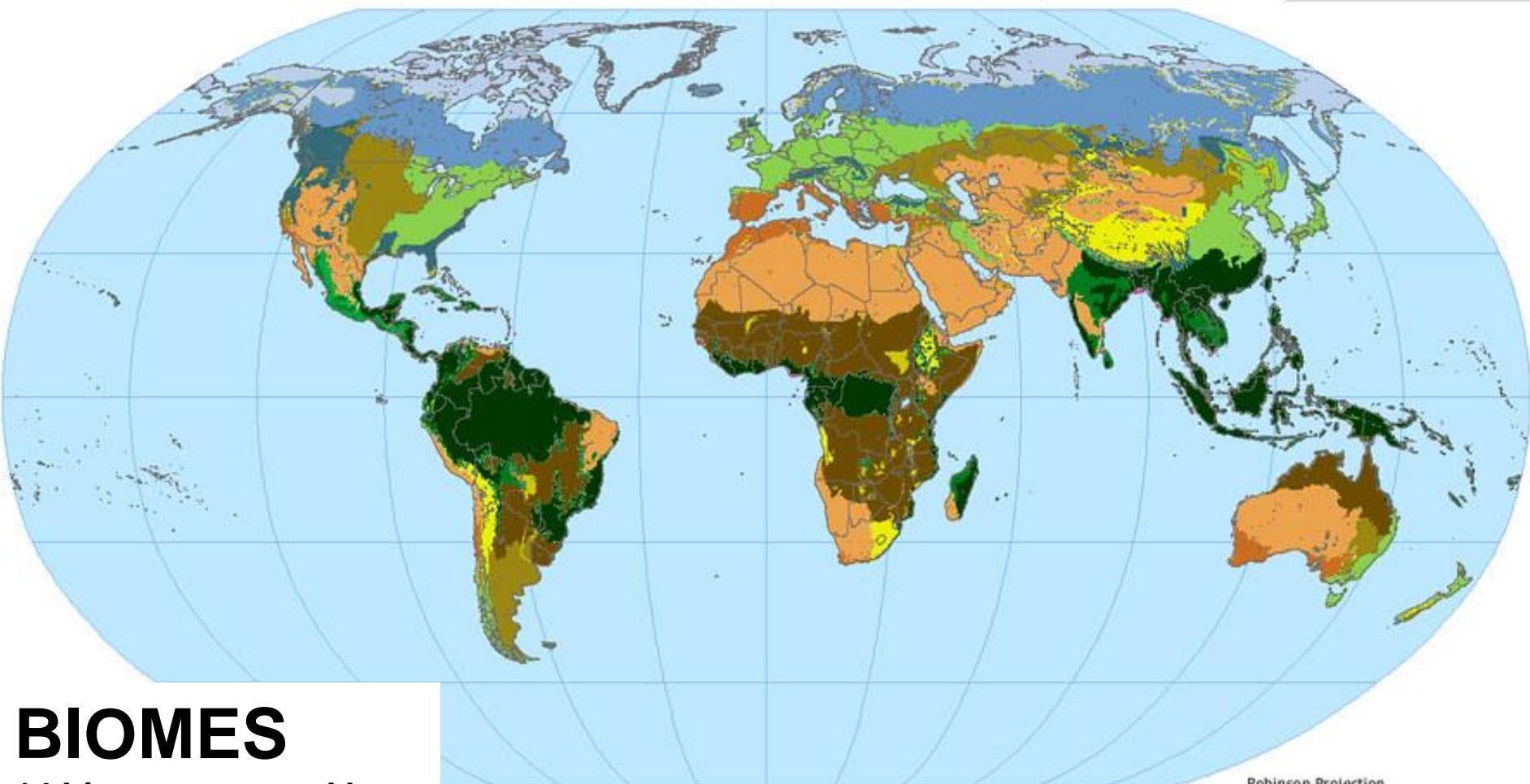
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BIOSPHERE

The entirety of the Earth's integrated physical spheres, with humans and other impacts included as part of nature.





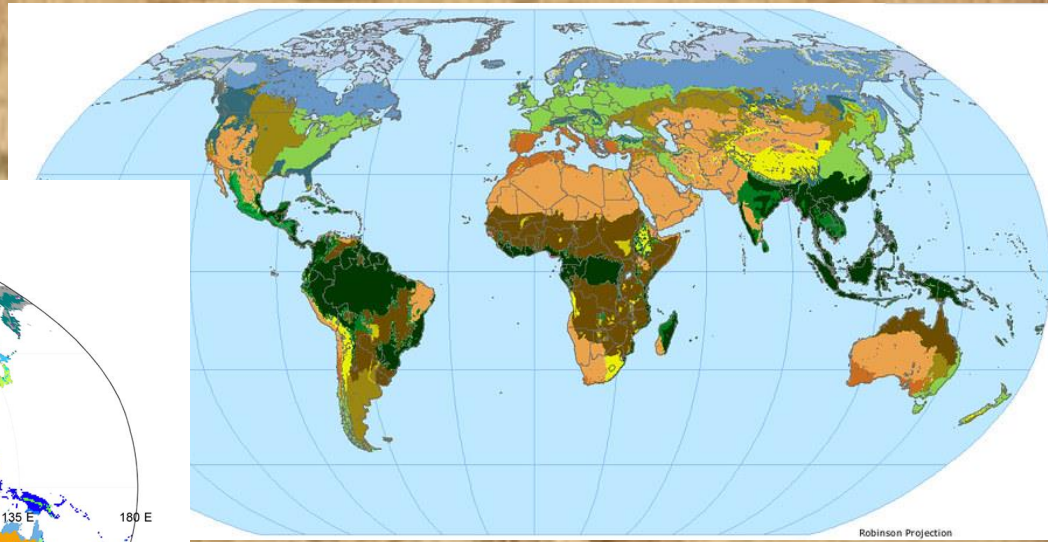
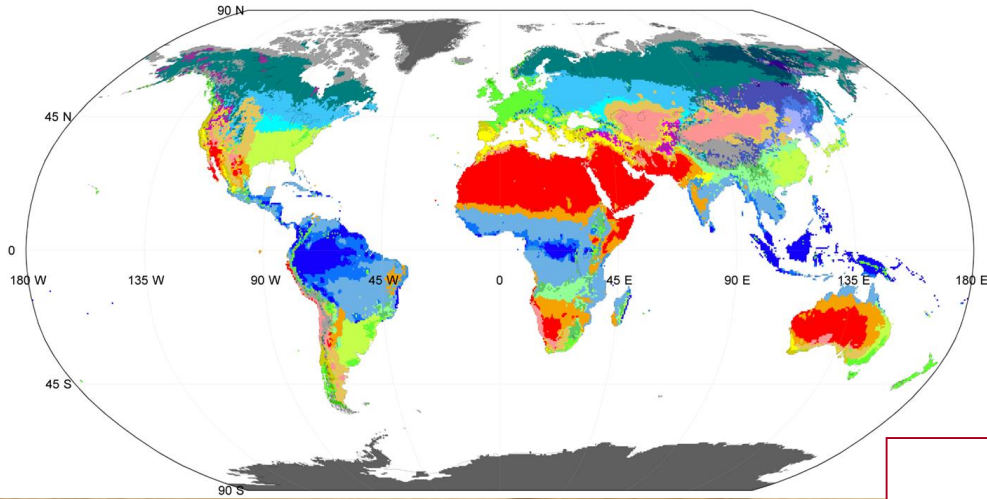
Robinson Projection

BIOMES

14 biomes are used by our textbook. The regions are based on climate, flora and fauna in a system developed by the World Wildlife Fund.

- | | |
|--|--|
| Tropical, Subtropical Moist Broadleaf Forest | Temperate Grasslands, Savannas, Shrublands |
| Tropical, Subtropical Dry Broadleaf Forest | Flooded Grasslands, Savannas |
| Tropical, Subtropical Conifer Forest | Montane Grasslands, Shrublands |
| Temperate Broadleaf, Mixed Forest | Tundra |
| Temperate Conifer Forest | Mediterranean Forest, Woodlands, Scrub |
| Boreal Forest/Taiga | Deserts, Xeric Shrublands |
| Tropical, Subtropical Grasslands, Savannas, Shrublands | Mangroves |

World map of Köppen climate classification for 1901–2010



Climate vs Biome

Characteristic	Climate	Biome
Classification	By temperature and rainfall	Primarily by plant life
Relationship	Influences biomes	Influenced by climate
Field of study	Atmospheric science	Biology

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Water

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Water Footprint

Water

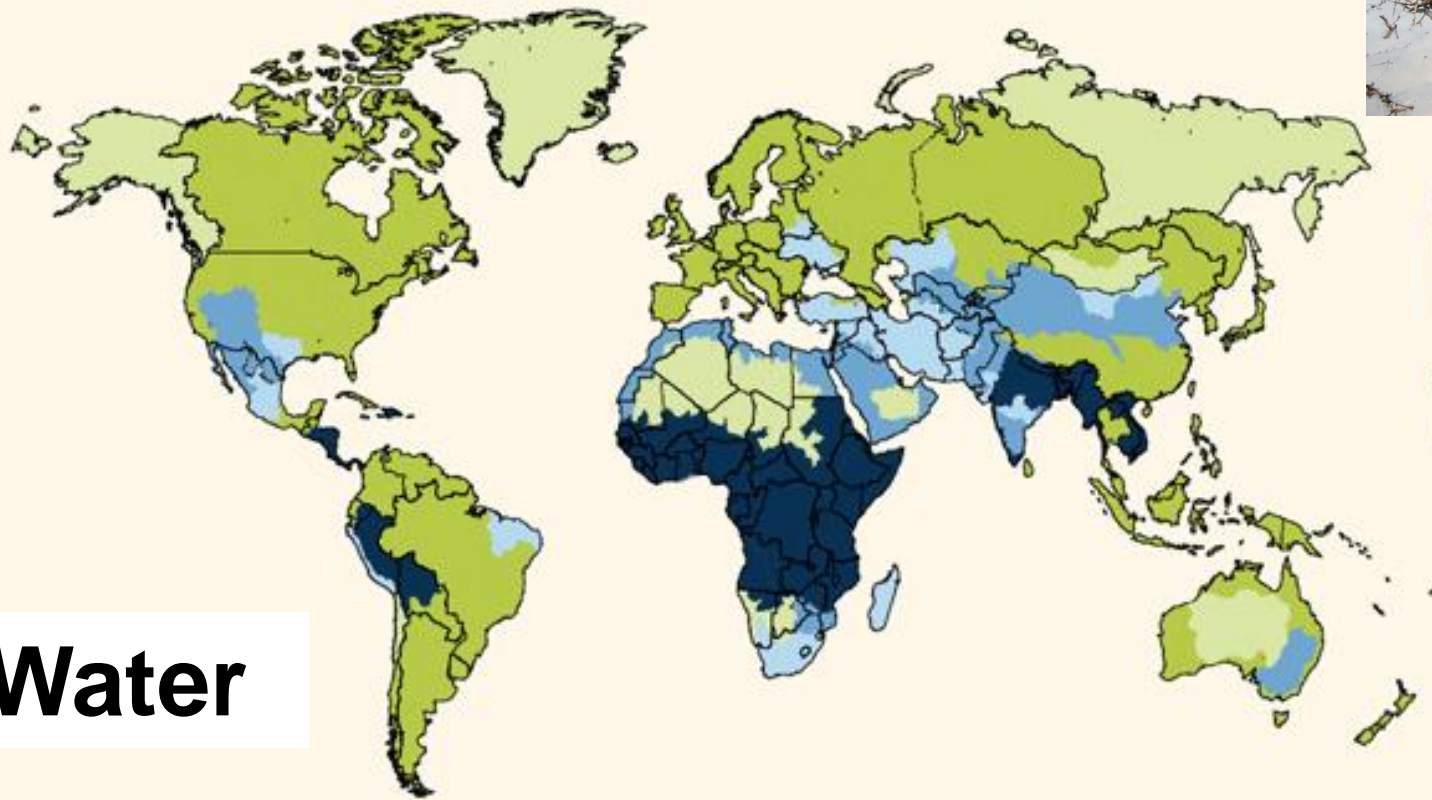
Using TWO online “water footprint calculators” estimate what your water footprint is (not counting living in a dorm).

Email me your results by Wednesday evening and be ready to discuss it in class on Thursday.

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Global physical and economic water scarcity
(a lack of investment in water infrastructure)

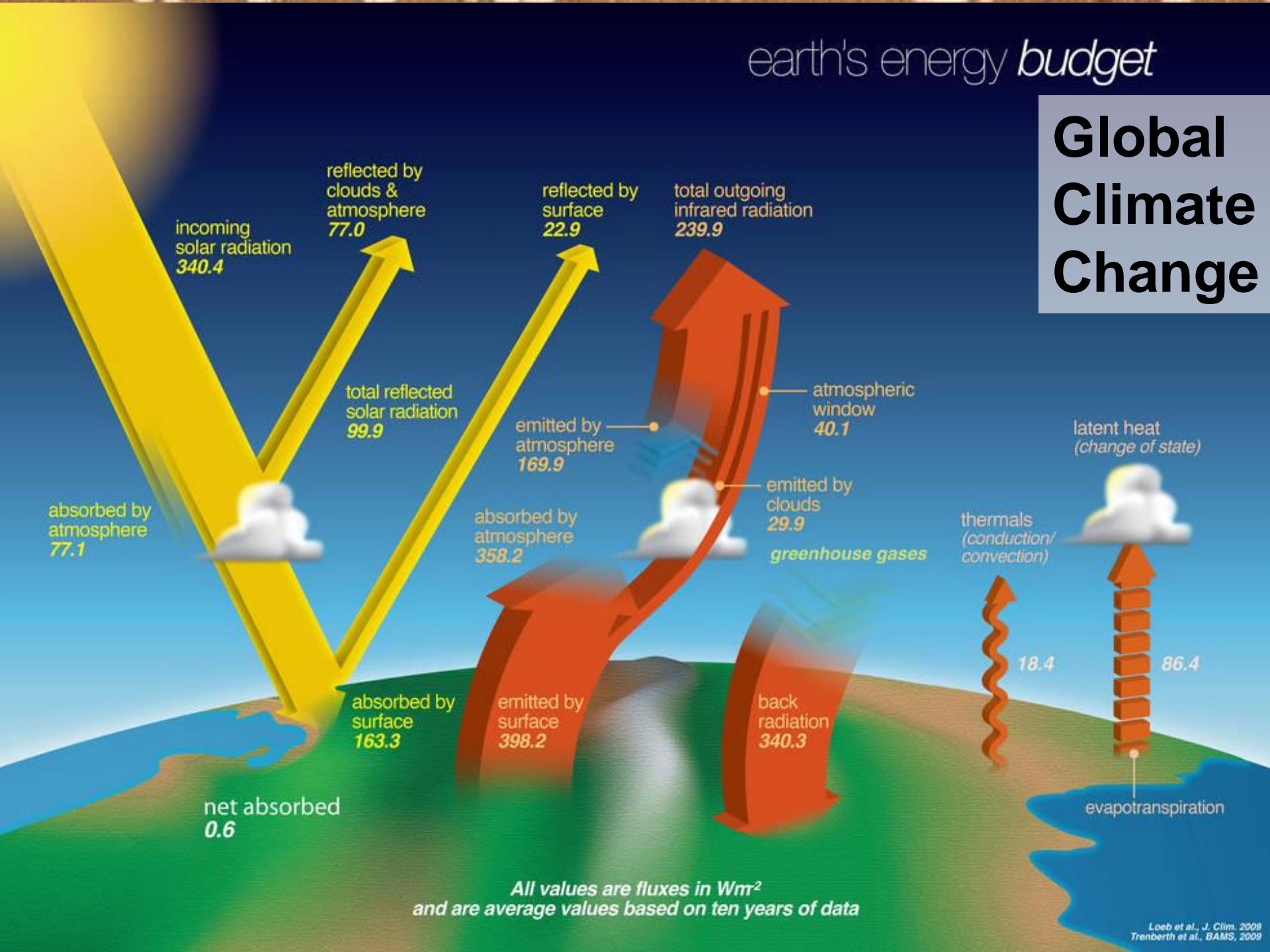


- Little or no water scarcity
- Physical water scarcity
- Approaching physical water scarcity
- Economic water scarcity
- Not estimated

Water

earth's energy *budget*

Global Climate Change



All values are fluxes in Wm^{-2}
and are average values based on ten years of data

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HELLO

my name is

~~Climate Change~~

~~Global Warming~~

IT'S COMPLICATED

Global Climate Change

NEXT



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Chapter Two –

Global Climate Change

Kick Start Questions for next time:

August 26

What gases are labeled “greenhouse gasses”? Why?

The predicted rise in sea level is caused by what two effects of increased temperature? What percentage is assigned to each?

What is meant by “carbon sequestration”?