

# Earth systems and Florida's future

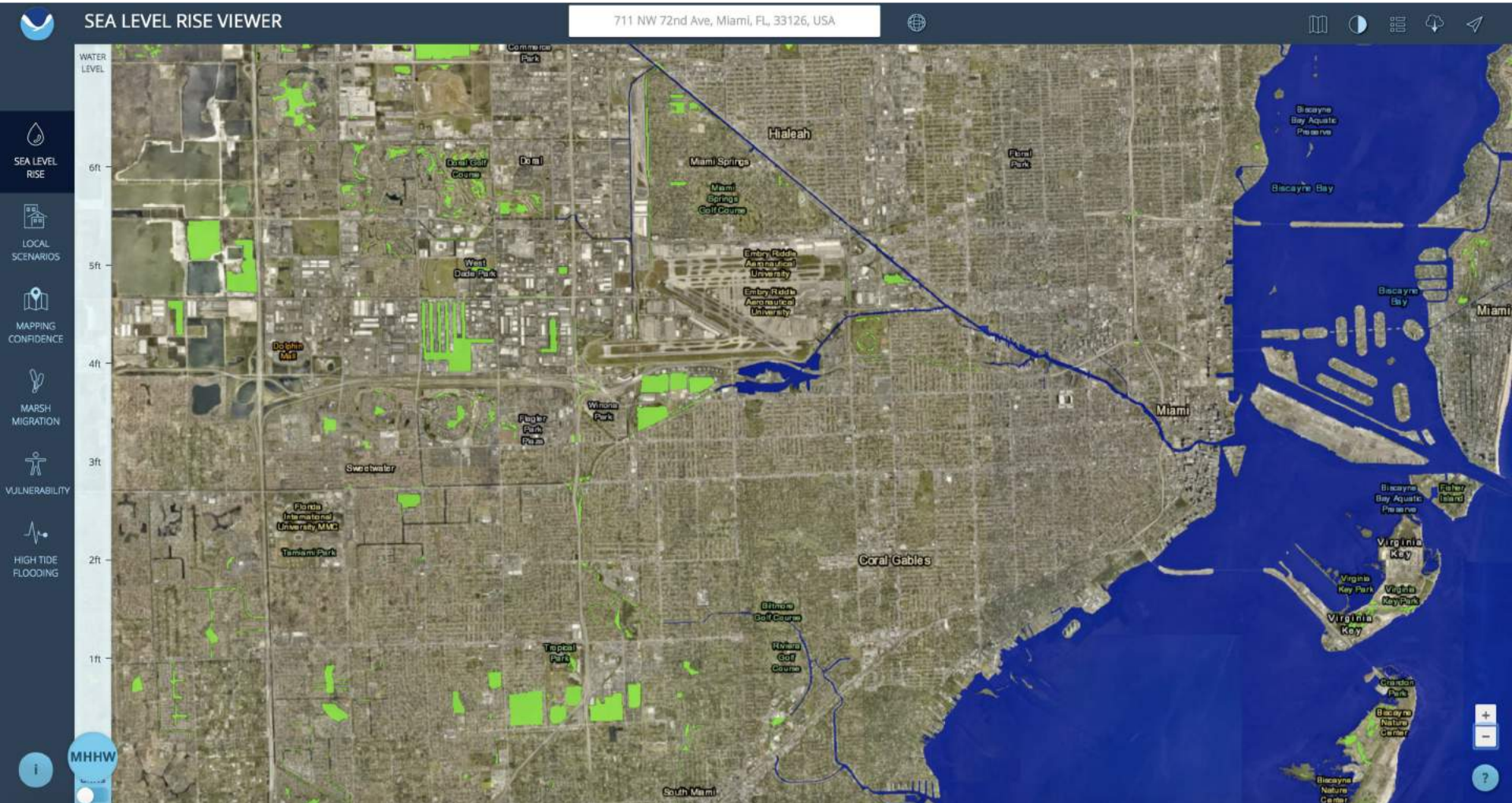
FAST Conference Workshop  
Jen Bauer & Dianne Behringer  
Thompson Institute for Earth Systems  
Florida Museum of Natural History

# Why should we, as Floridians, study Earth systems?

- Impacts to Florida
  - Sea-level rise
  - Invasive species
  - Harmful algal blooms/red tides
  - Increases in daily average temperatures



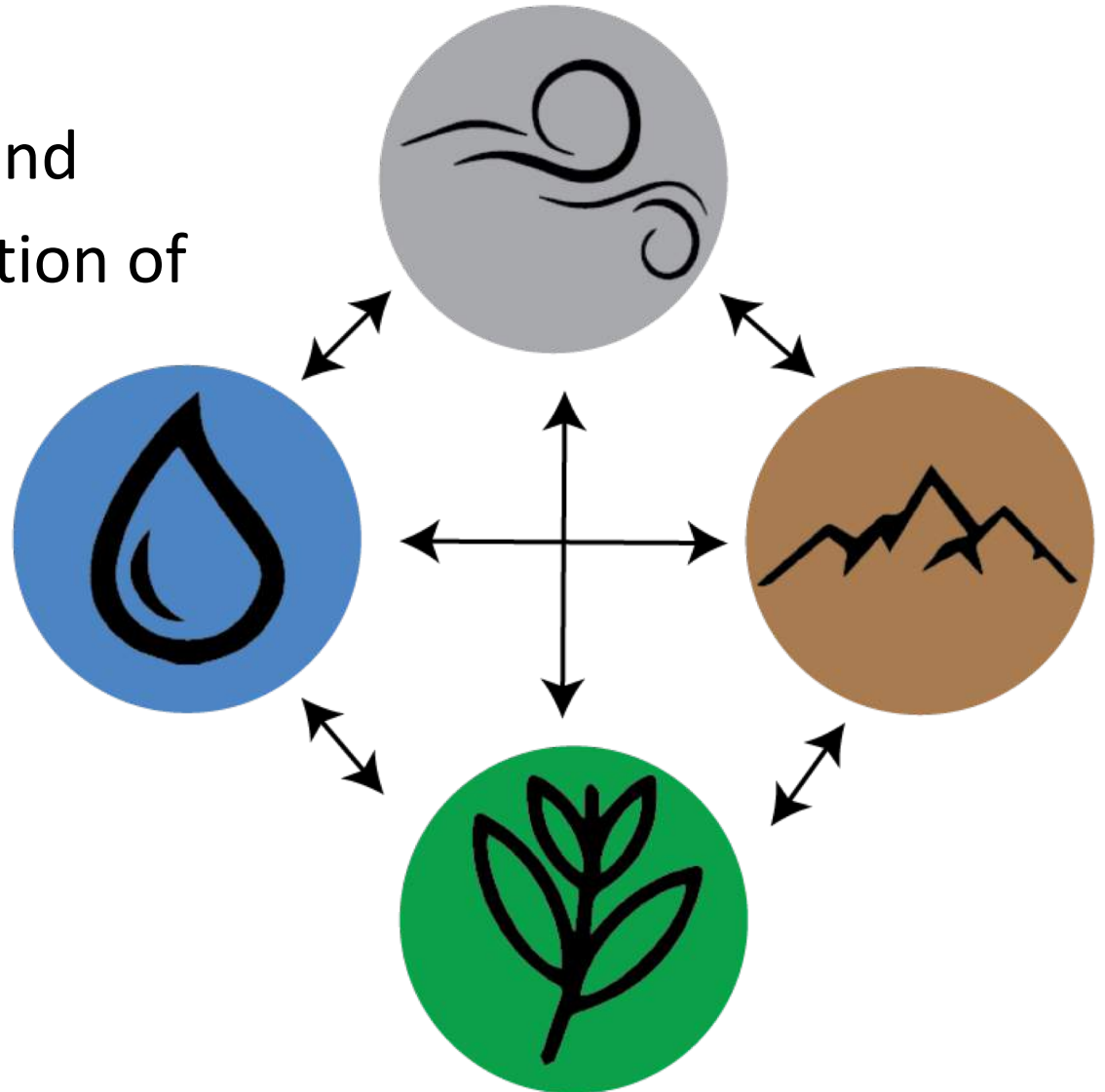
# Why should we, as Floridians, study Earth systems?



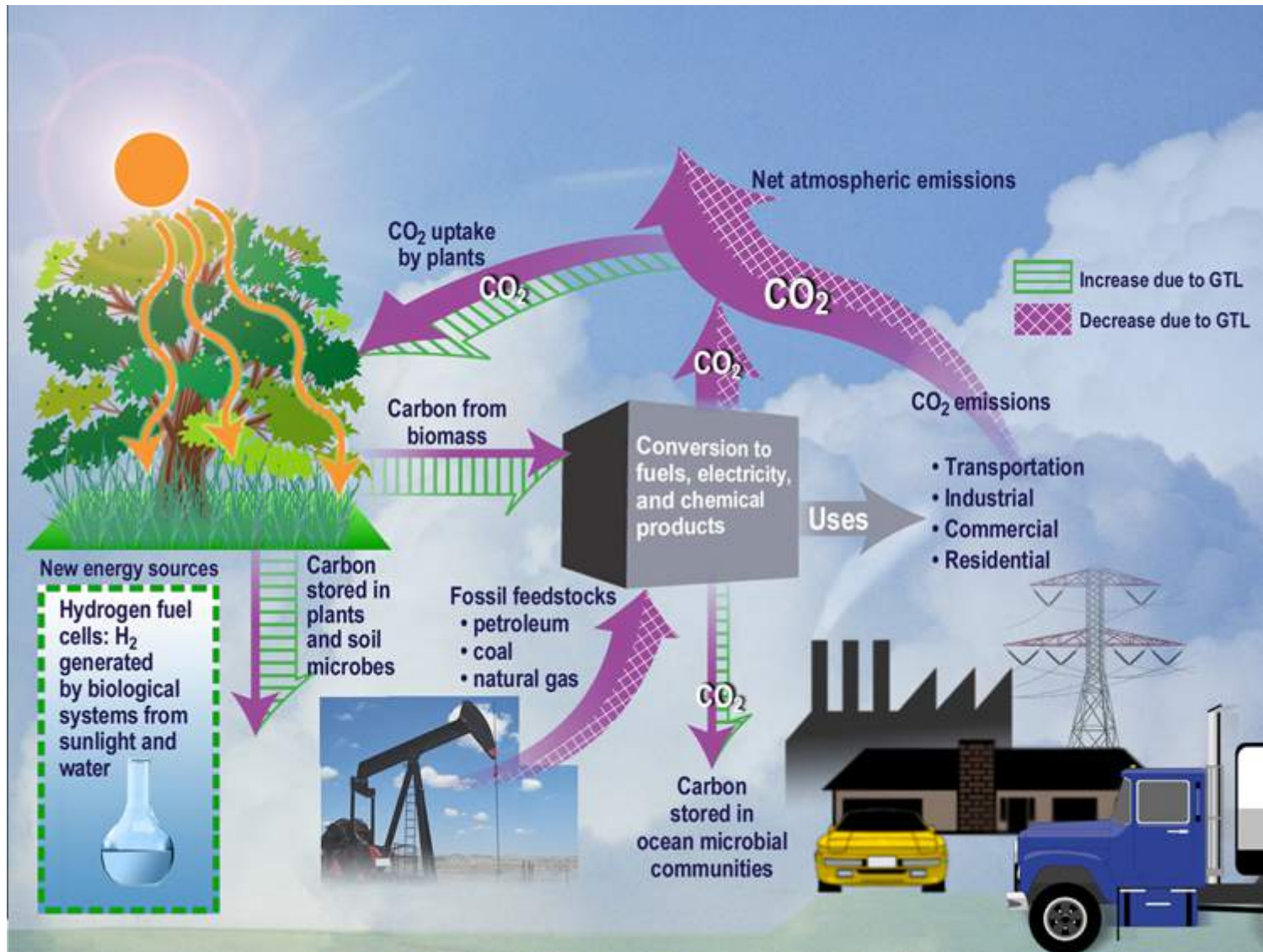


# What are 'Earth systems'?

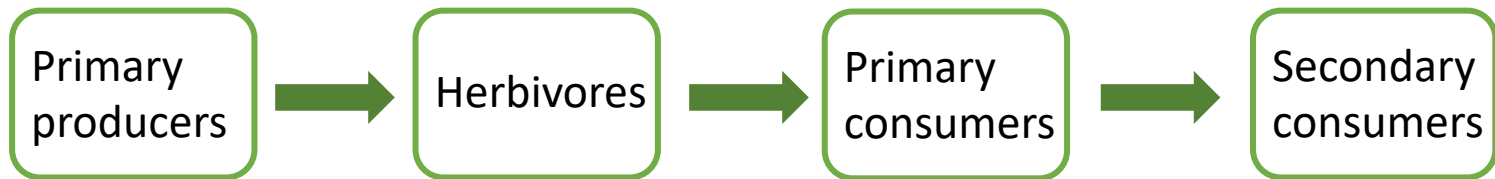
- Air, water, life, land
- The interconnection of these spheres



# Earth system interactions



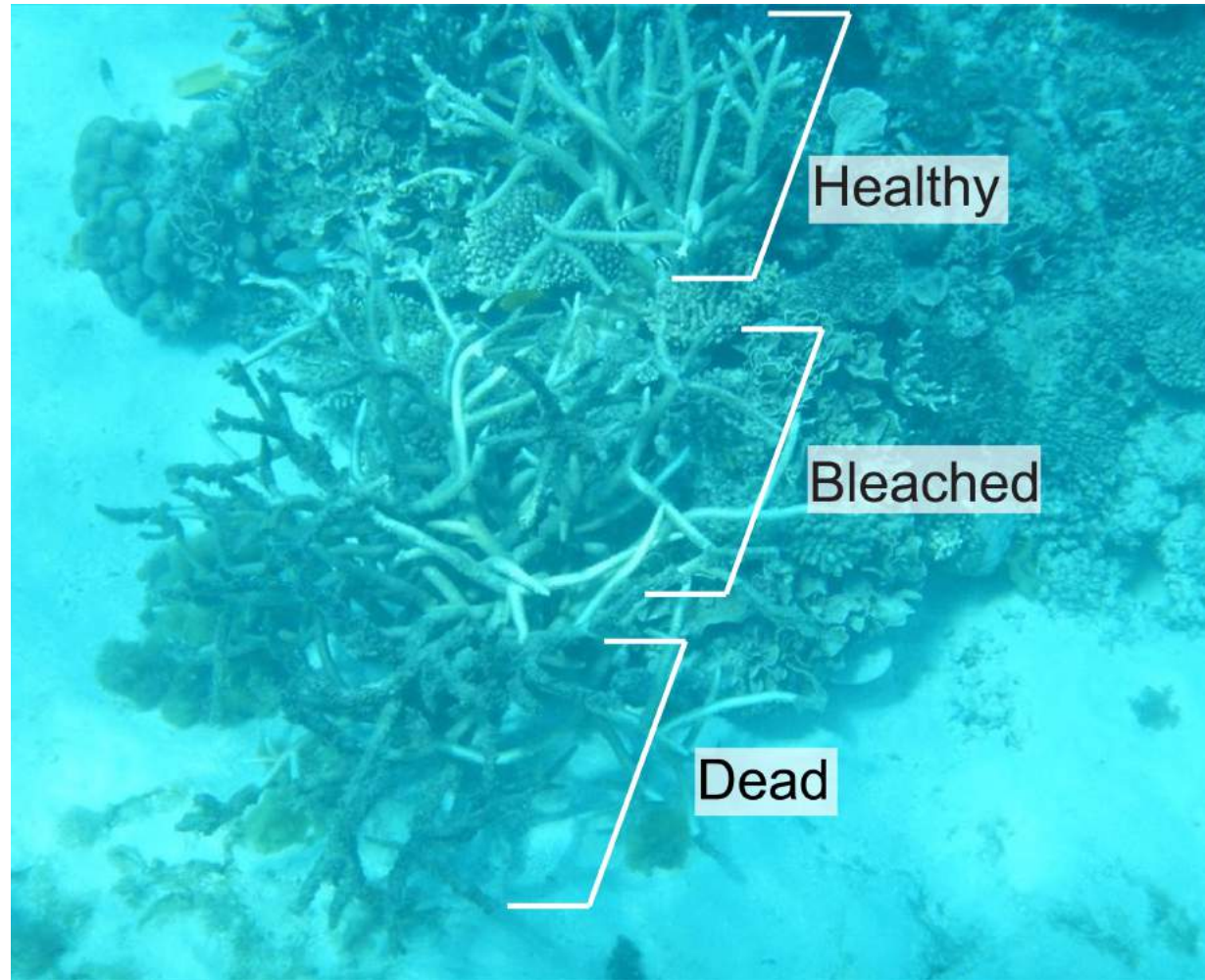
# Life and the biosphere



- Animals in an ecosystem fit into a hierarchy or rank and each animal fulfills a role in the ecosystem

# Fragile ecosystems

- Ocean acidification
- CO<sub>2</sub>
- 1% of ocean floor
- 25% of ocean life





# Impact of invasive species in Florida

- Over 500 invasive species in Florida
  - Harm to native species
  - Threat to human health and safety
  - Economic damage



Giant African Land Snail carries parasitic worm



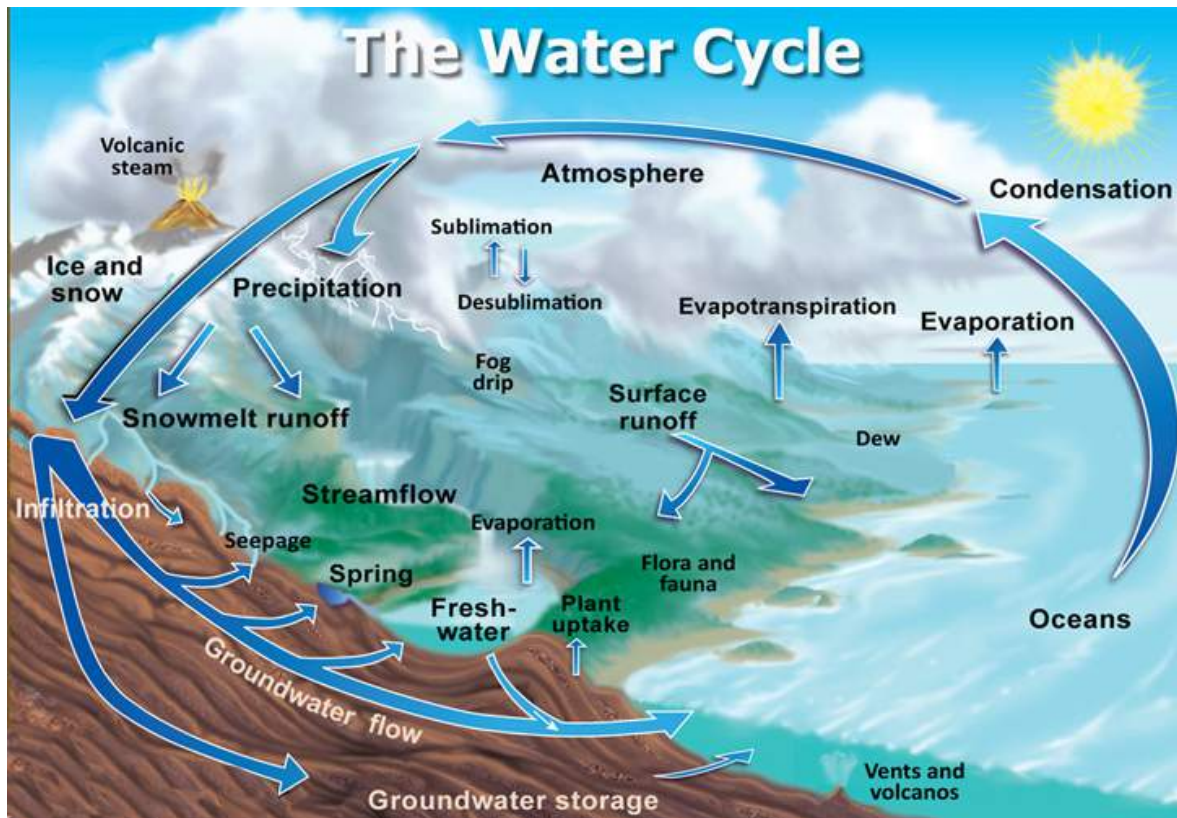
Burmese pythons decimated small mammal populations



Cuban tree frog decimated Florida's native frog, toad, and lizard populations

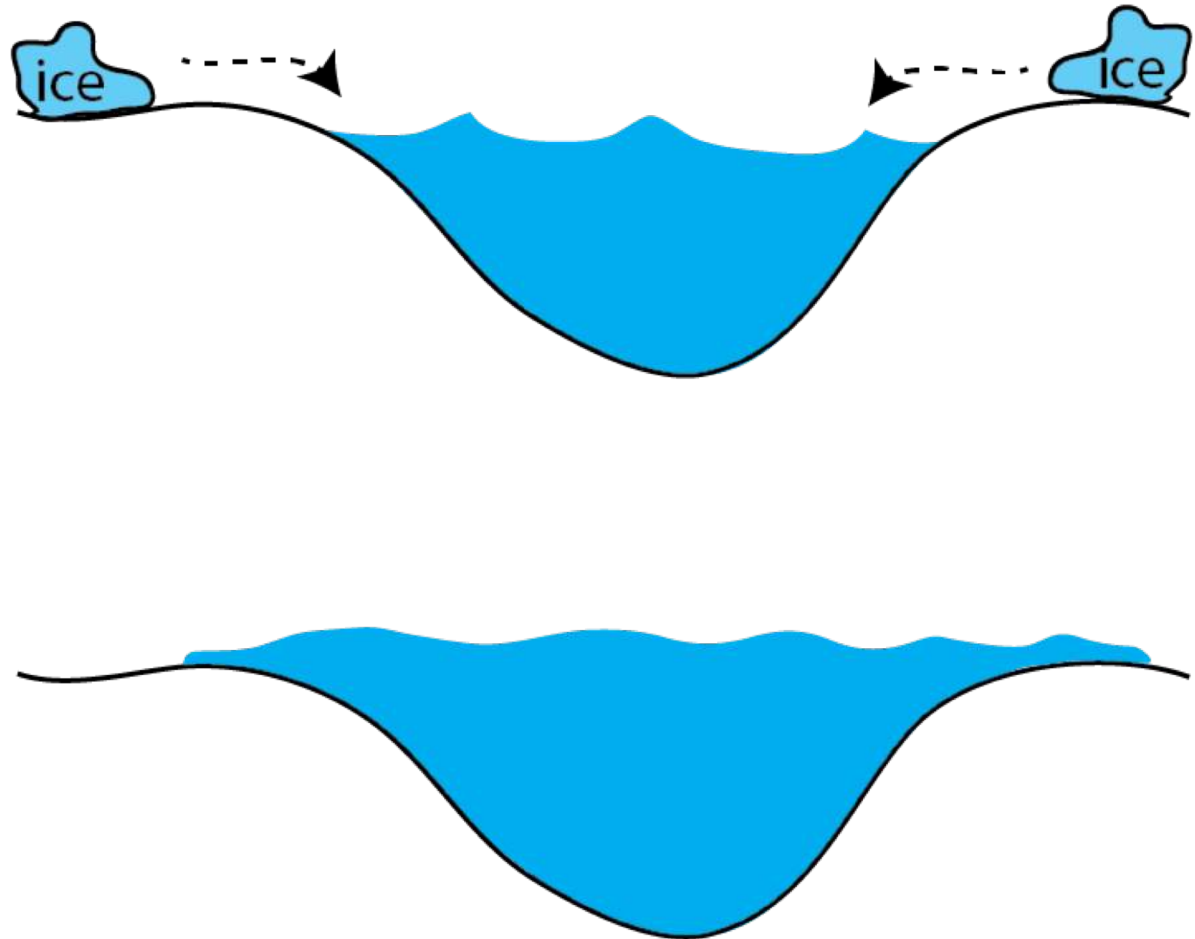
# Water and the hydrosphere

- All water on, under, and above the surface Earth



# How does sea level rise happen?

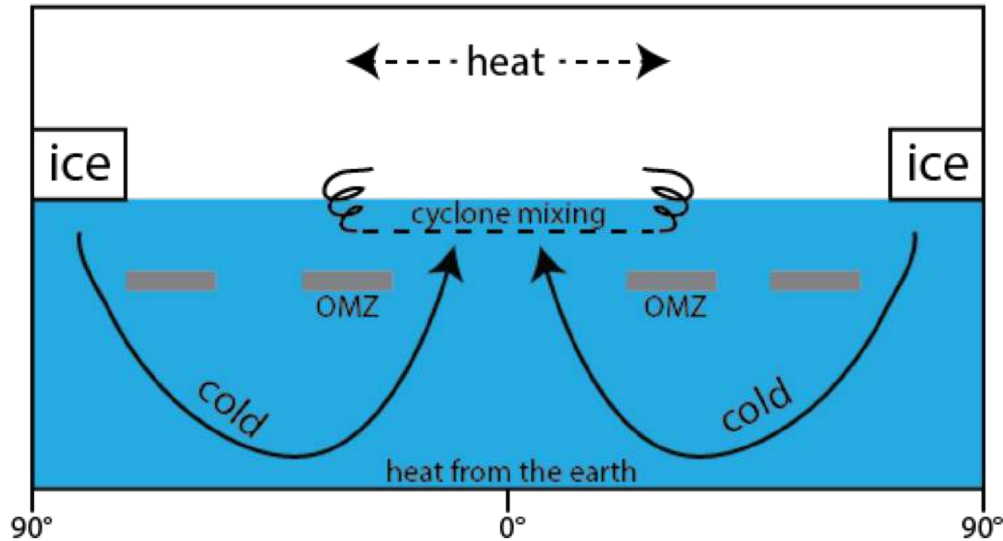
- Increase in climate
- Ice sheets on land



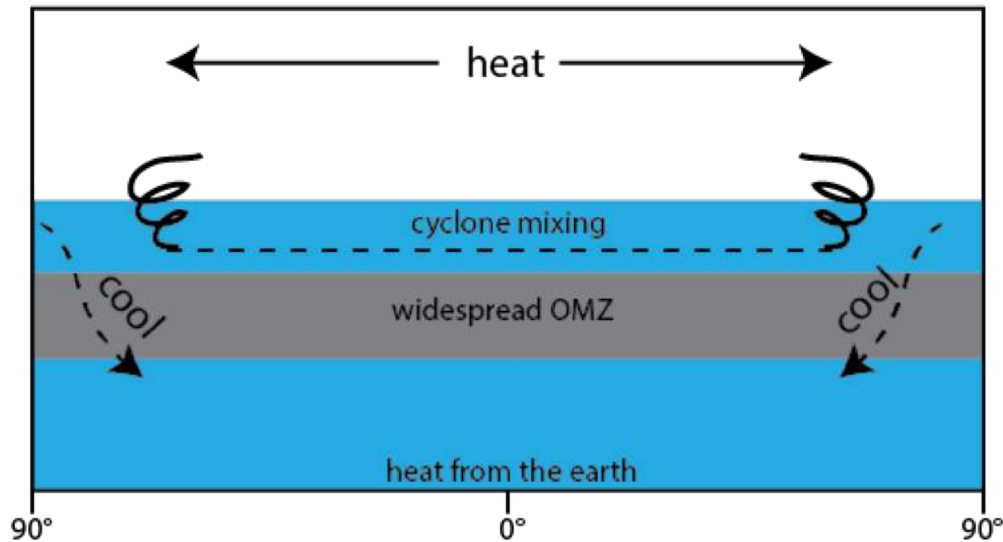
# Audience volunteer, please!

- Sea level interactive activity

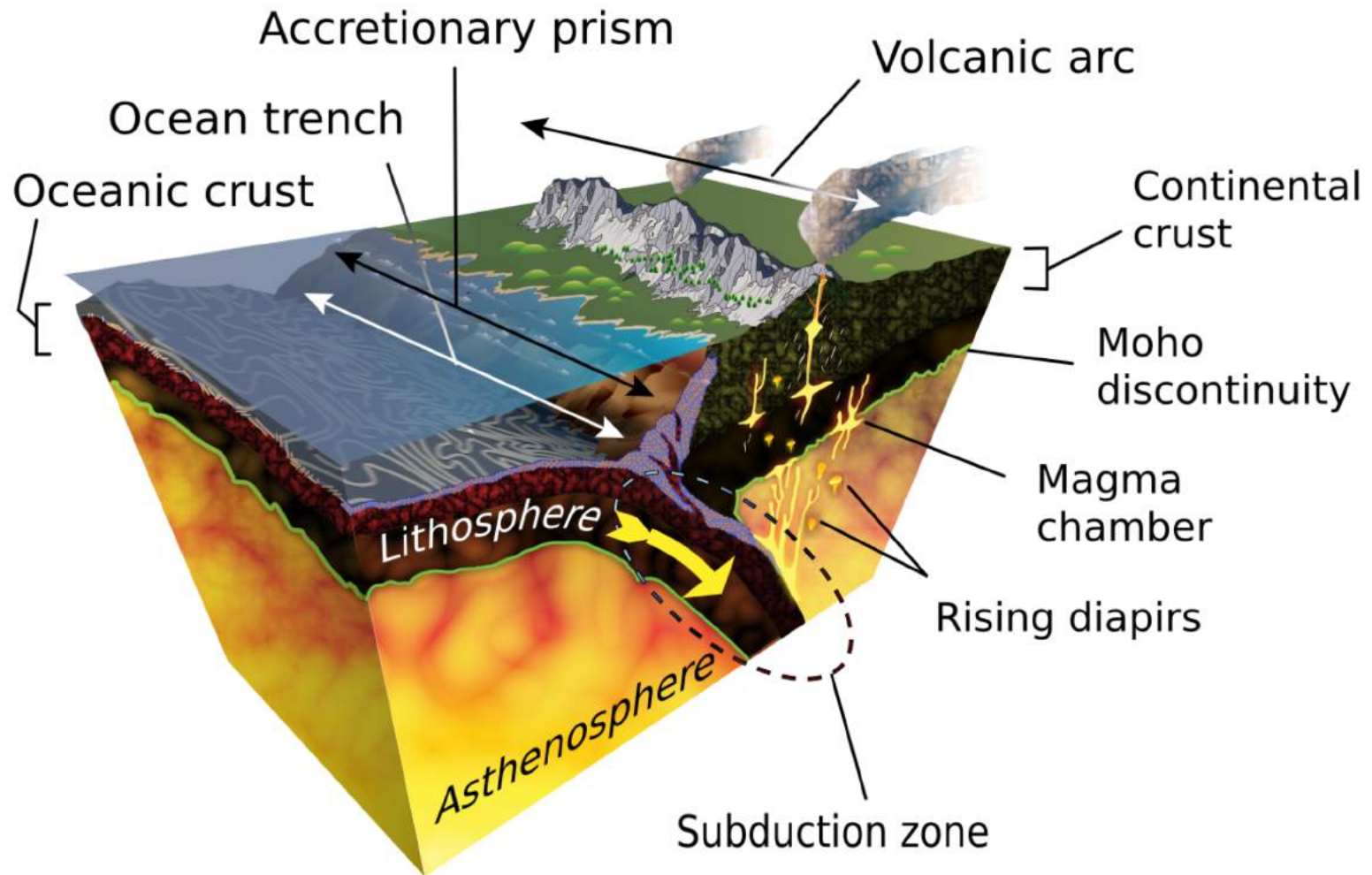
# Ocean circulation



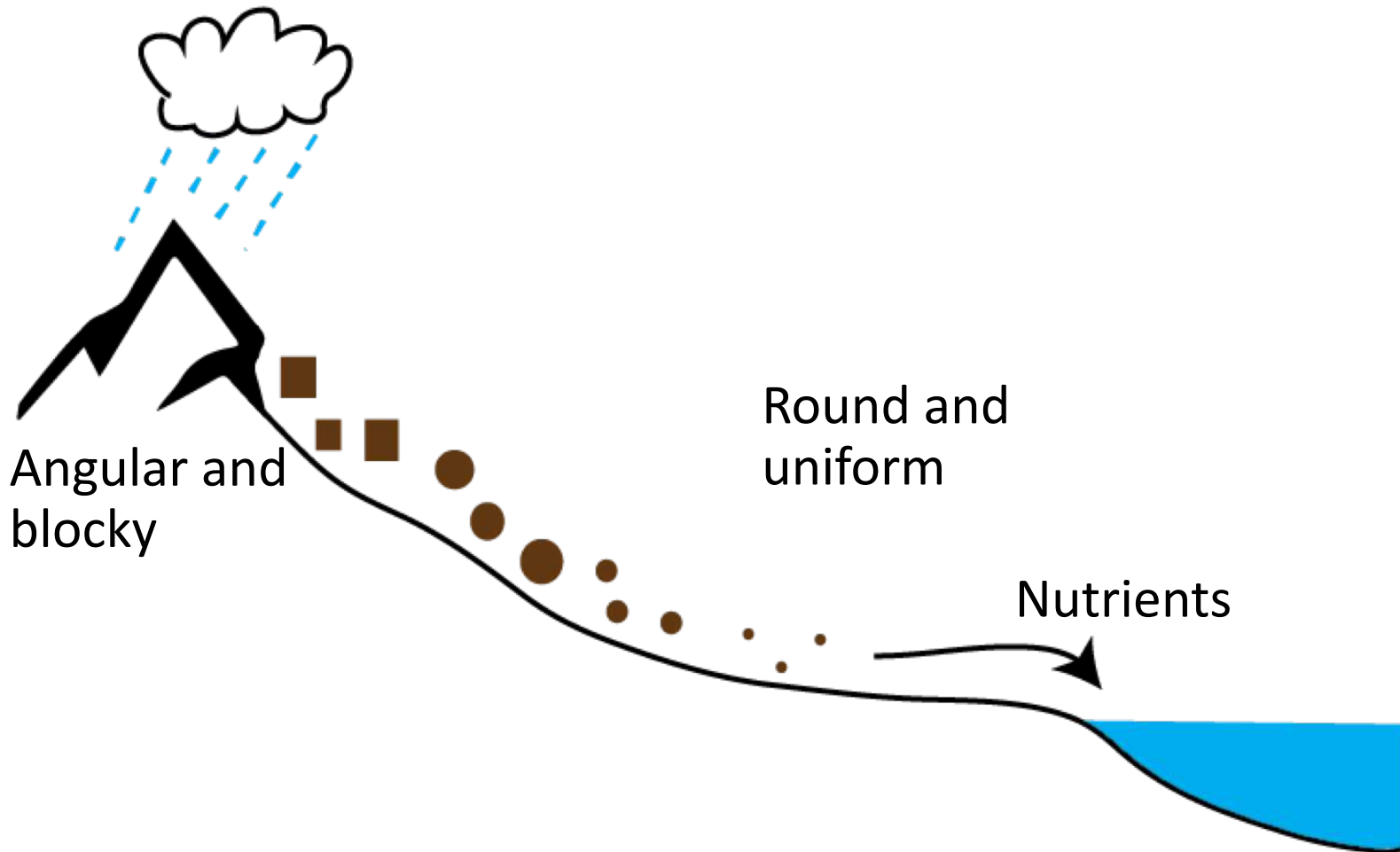
- Density driven
- Moves nutrients and oxygen throughout the oceans



# Land and the lithosphere



# Erosion and weathering



# Karst landscape

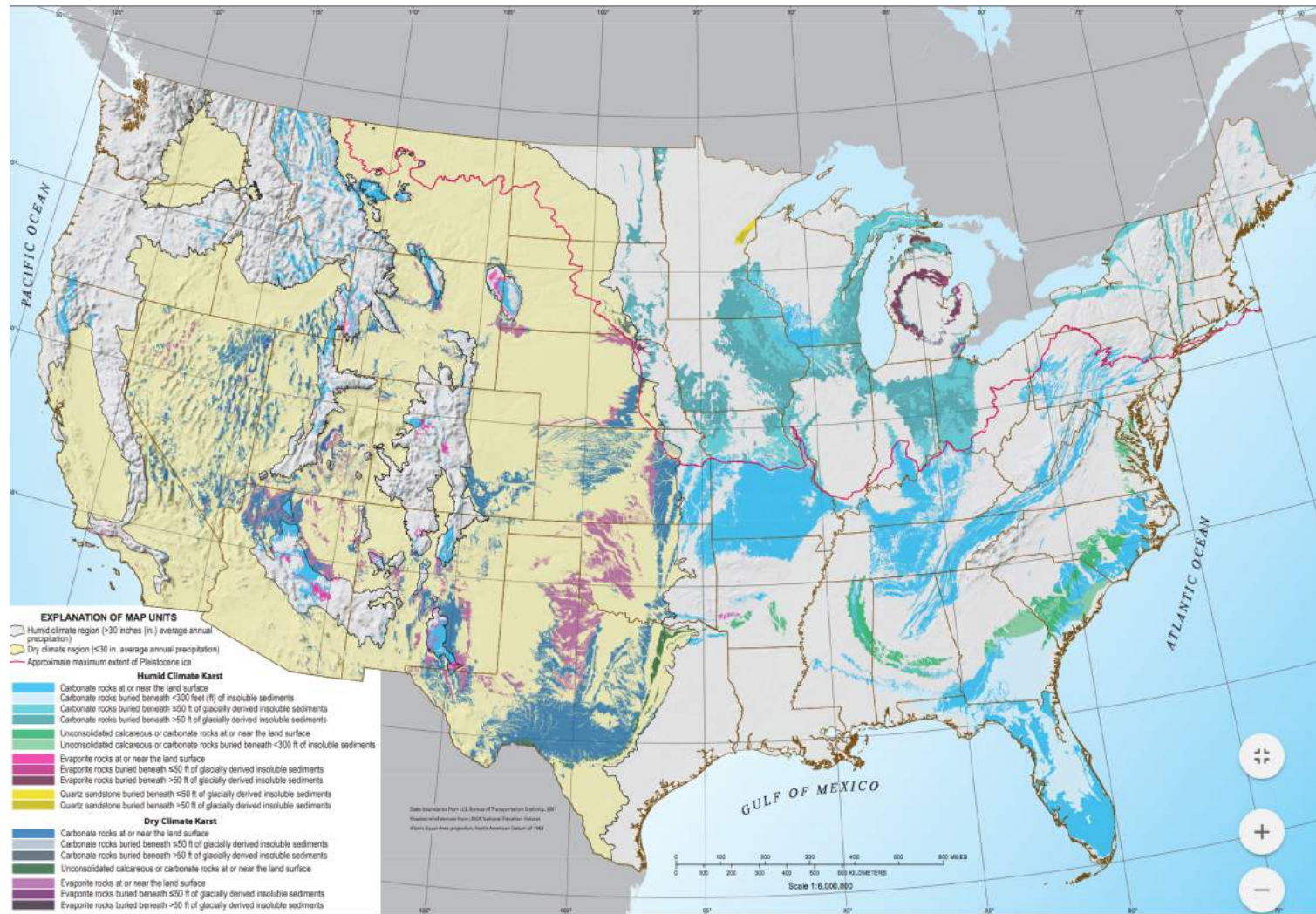


Figure 1. Karst and potential karst areas in soluble rocks in the contiguous United States.



# Karst features of Florida

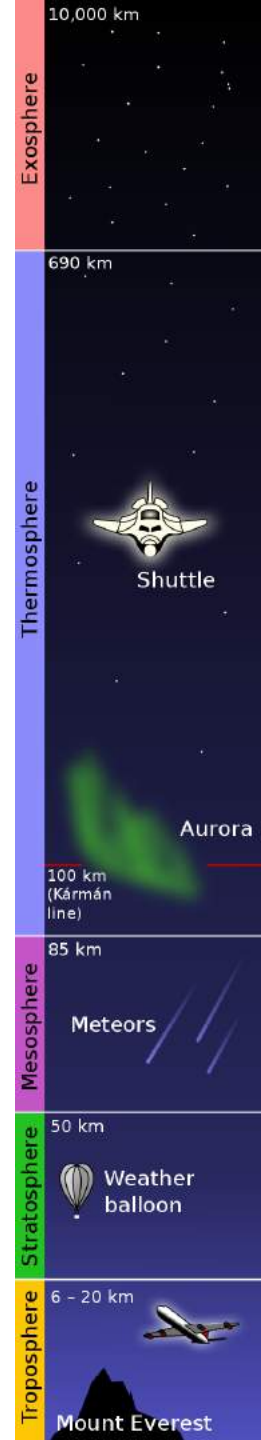
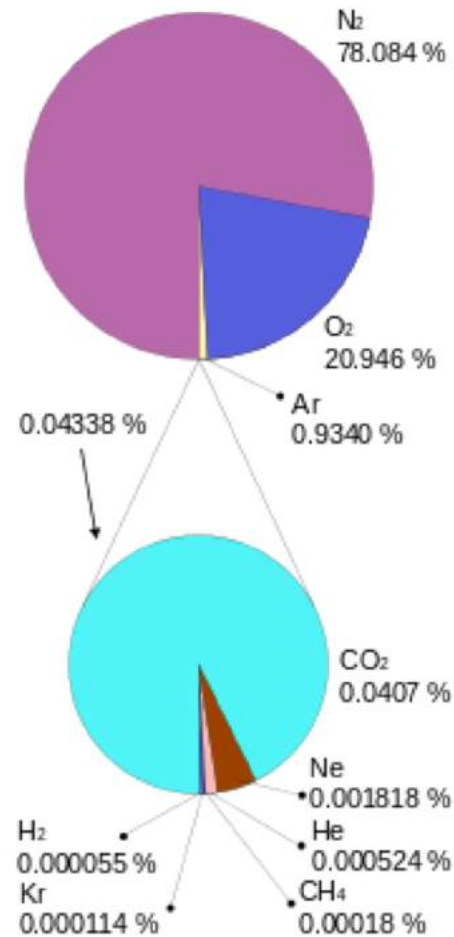
- Sinkholes



- Caves
- Aquifers

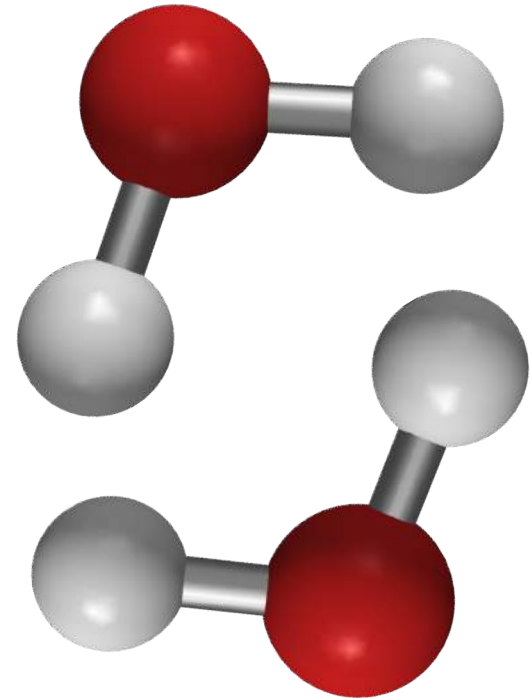
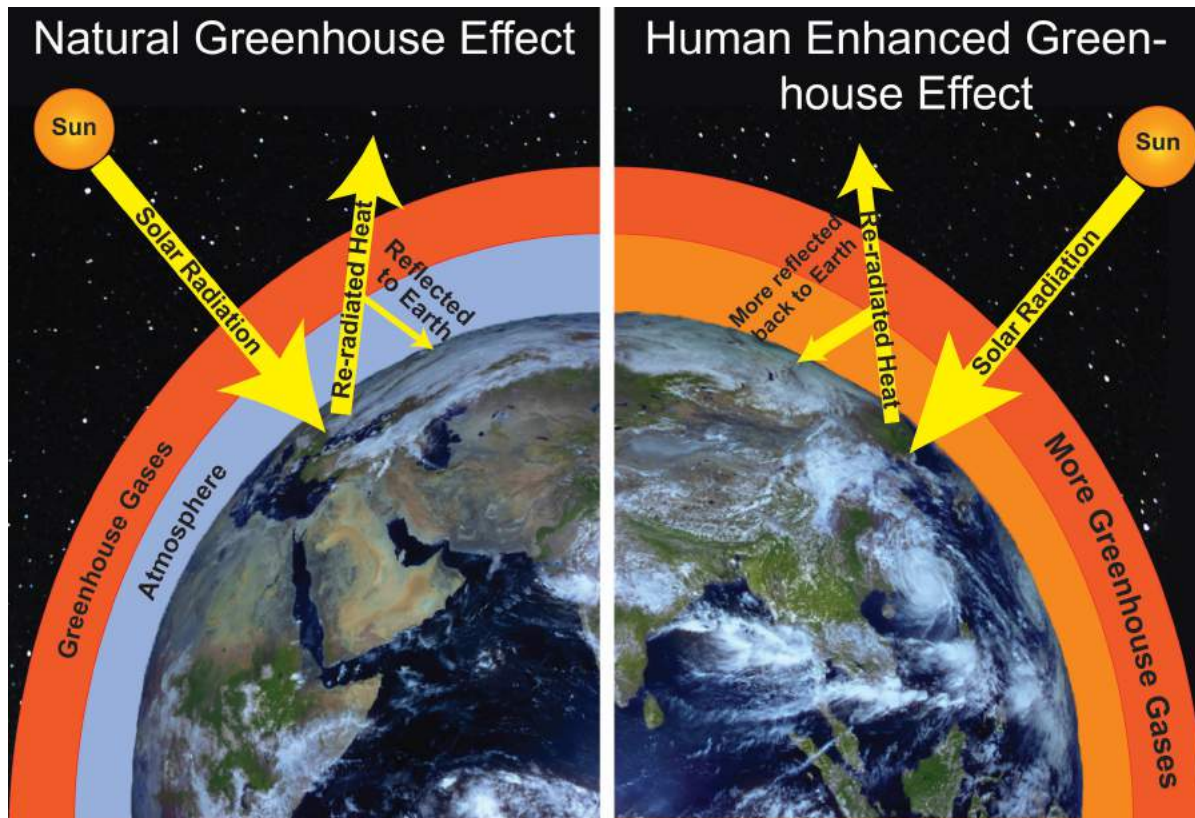
# Air and the atmosphere

- Layer of gases
- Protects life
- Pressure allows for liquid water
- Absorbs UV radiation



# Greenhouse Effect

- Compounds can be bent and the structures that are bent wiggle and cause heat to be sent back to Earth



# Keeling Curve

- Updated daily:  
@Keeling\_Curve




Tweets 2,516 Following 1,311 Followers 12.7K Likes 54 Following

**Keeling\_Curve** @Keeling\_curve  
Official daily CO2 update from Scripps Institution of Oceanography as concentrations pass 400 parts per million. *Get the story behind this key*

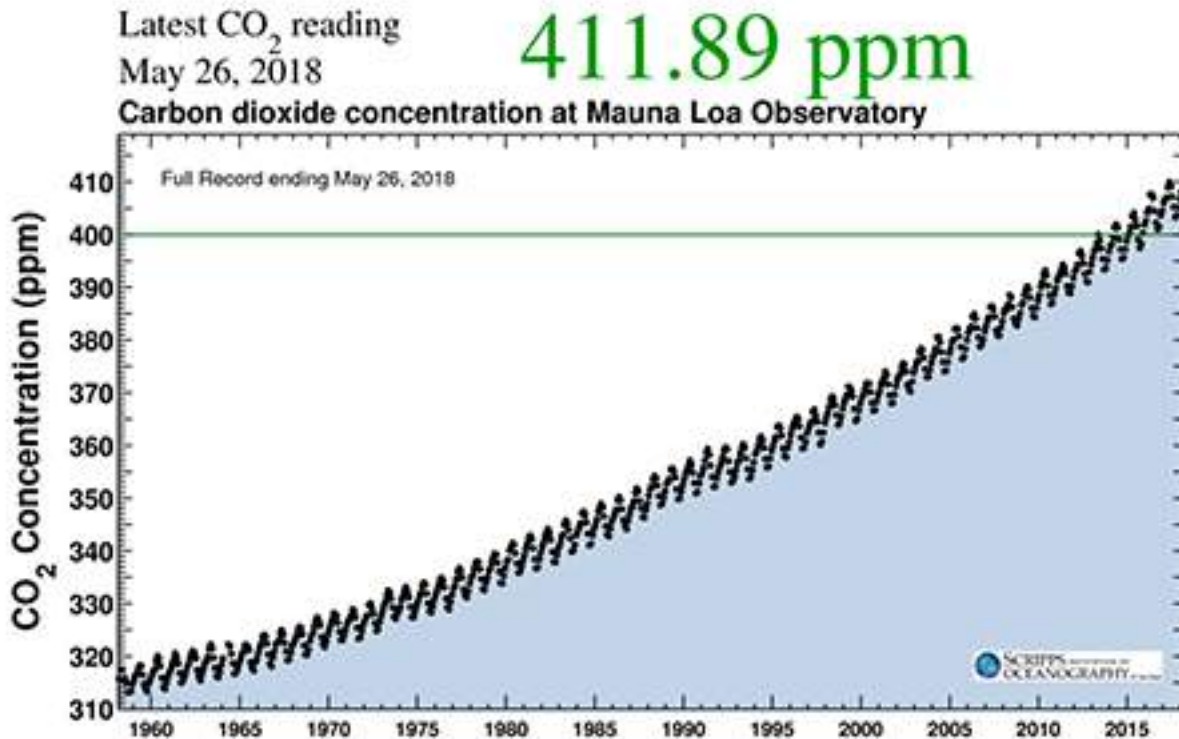
Tweets Tweets & replies Media

**Keeling\_Curve** @Keeling\_curve · 21h  
405.97 parts per million (ppm) CO2 in air 14-Oct-2018  
Translate Tweet



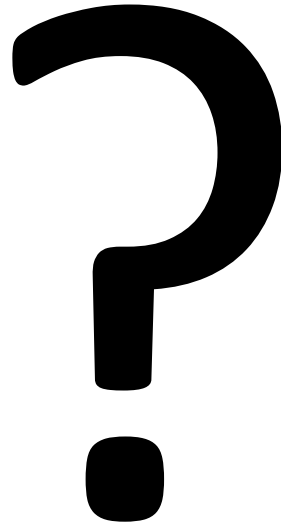
**The Keeling Curve**  
The Keeling Curve  
scripps.ucsd.edu

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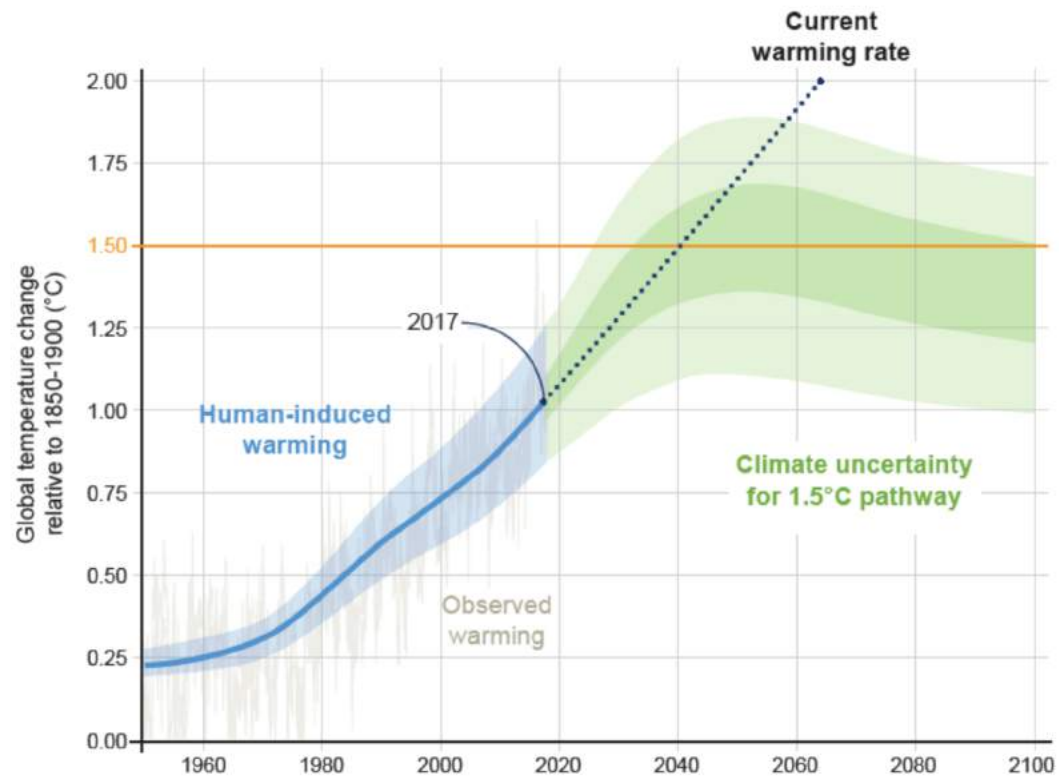
- Plot and analyze data

Future of Florida



# Future of Florida

- Increased temperatures
- Melting ice
- Ocean acidification
- 1.5-2°C is the tipping point
- Individuals can always help!



# Workshop Outline

- Group by grade level to brainstorm and draft lesson plans (20 minutes)
  - Content experts
- Presentation of lessons describing the brainstorming process (10 minutes)
- Resources and next steps (remaining time)

# Thompson Institute for Earth Systems

[ties@floridamuseum.ufl.edu](mailto:ties@floridamuseum.ufl.edu)

<https://www.floridamuseum.ufl.edu/ties/>