

Slides for Climate Class 1

Climate change occurs when either side of energy balance is perturbed.

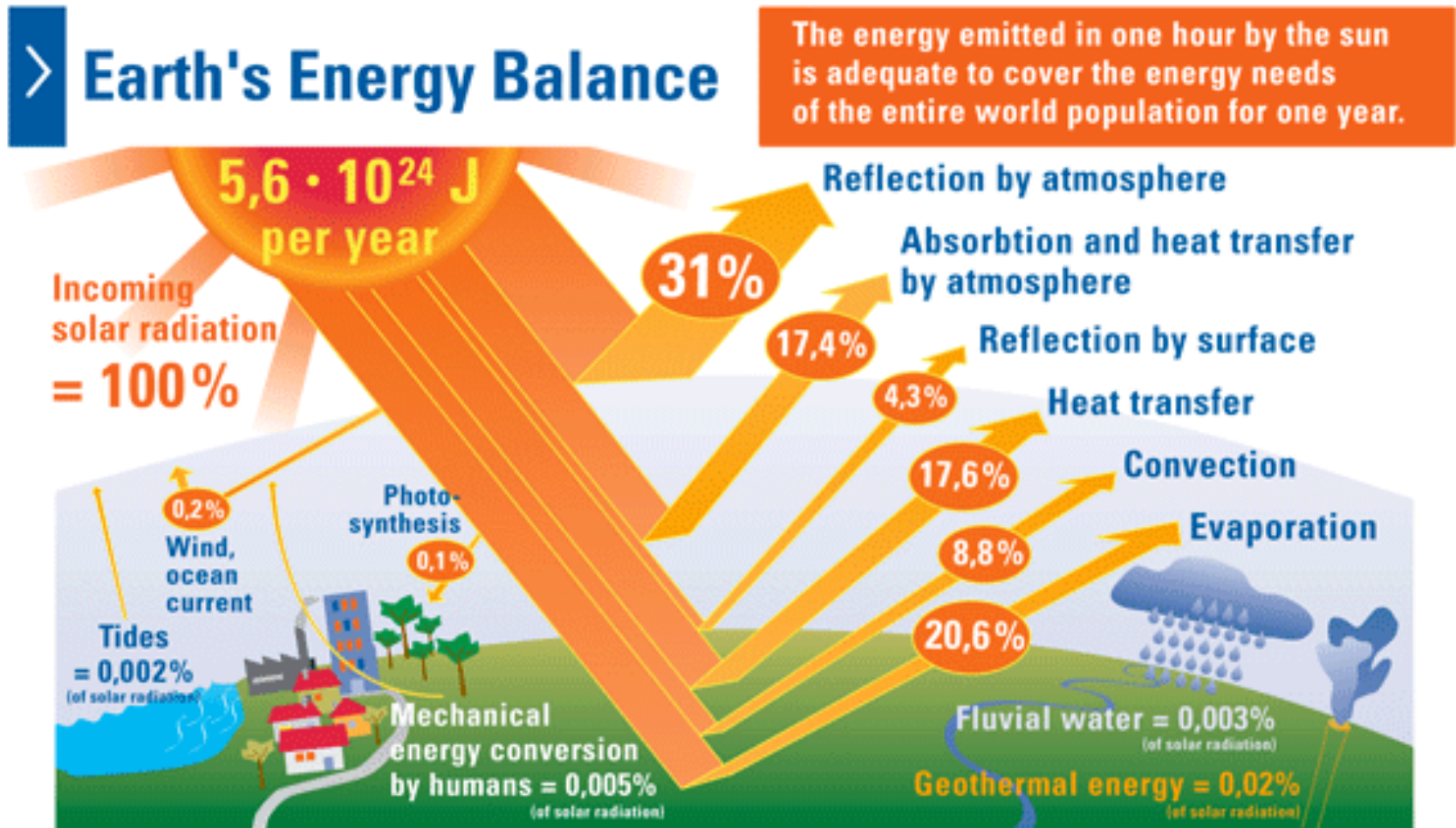


Figure: Hydrogen Ambassadors

Greenhouse Effect

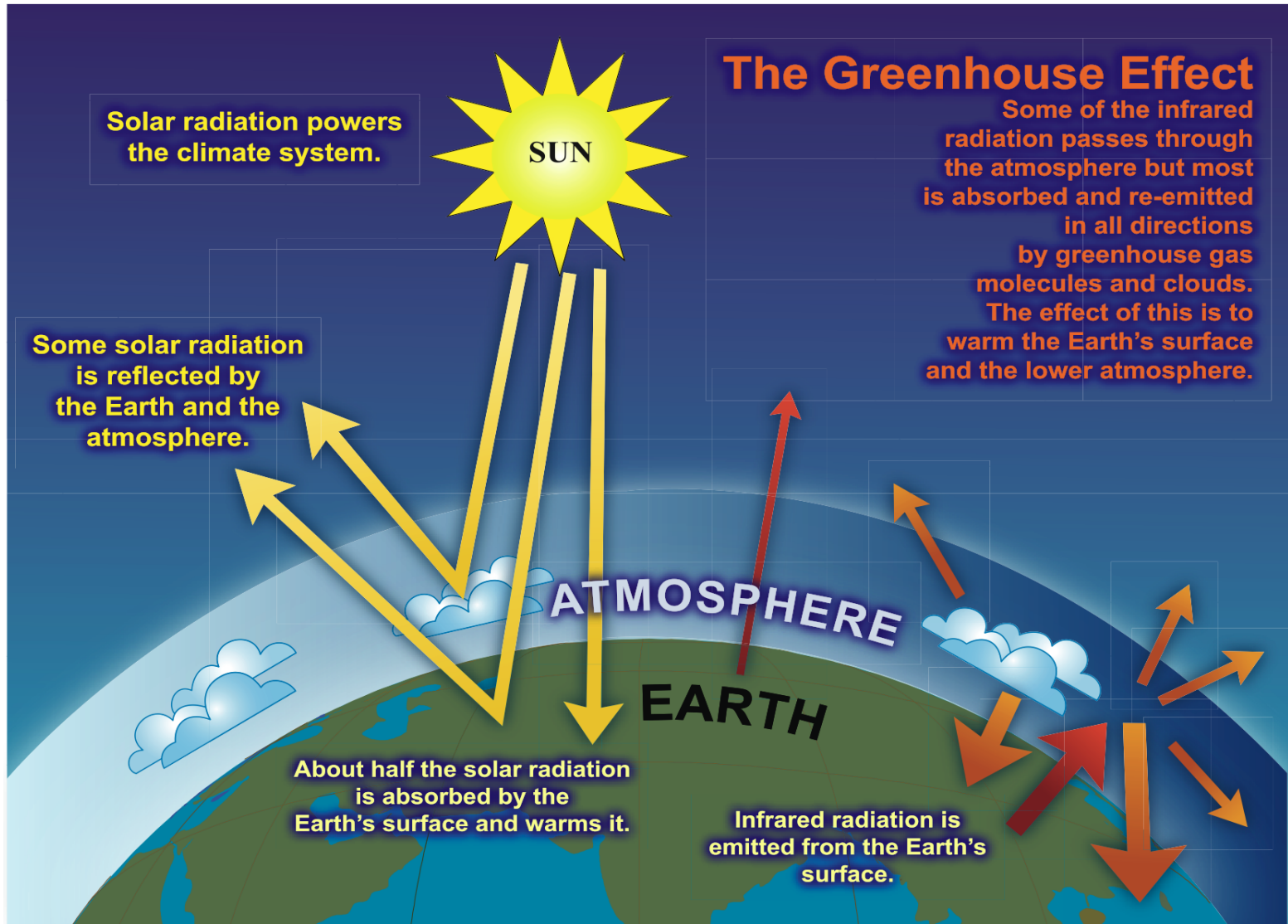


Figure: Penn State University

What are the Greenhouse Gases?

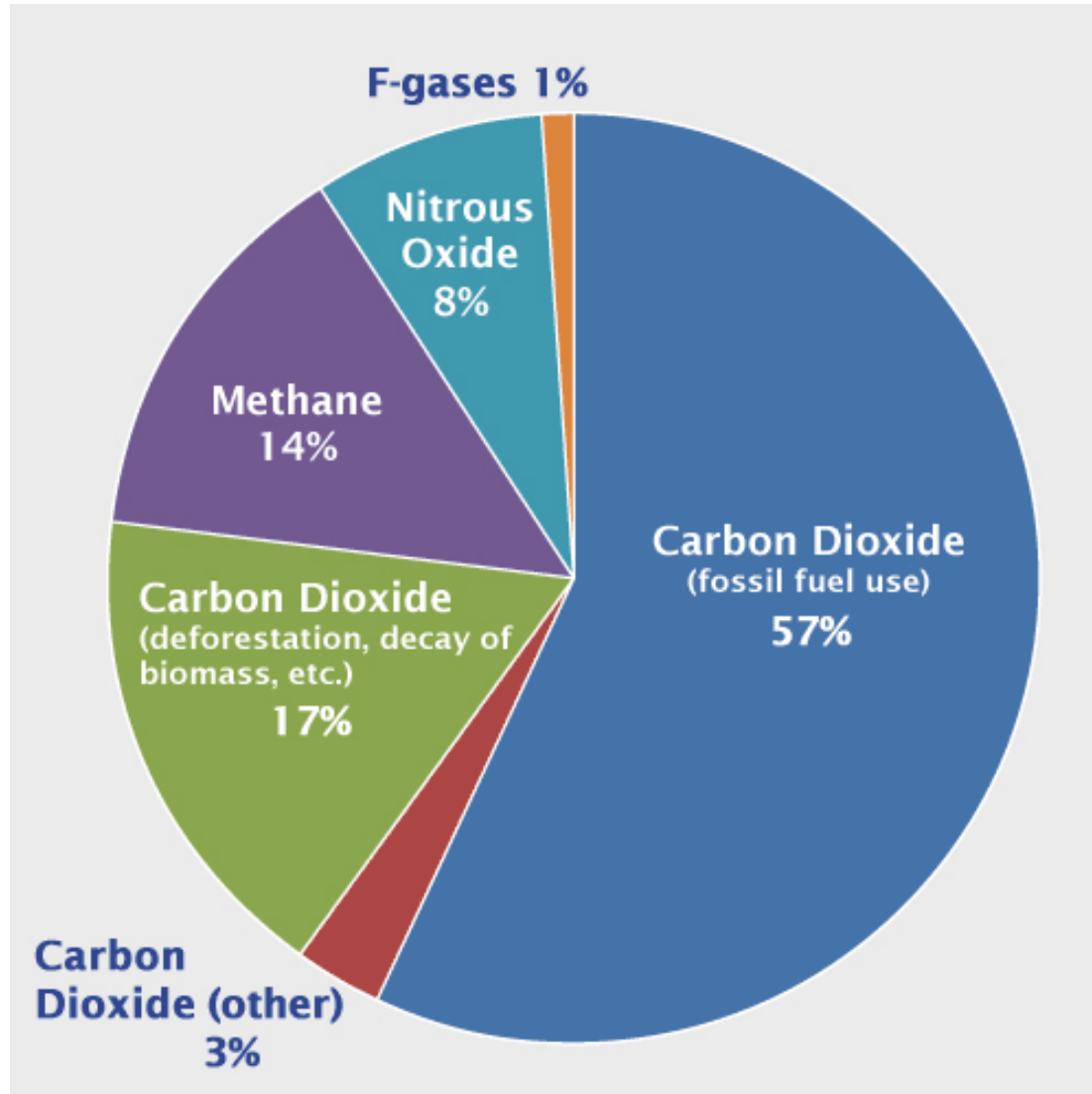


Figure: Environmental Protection Agency

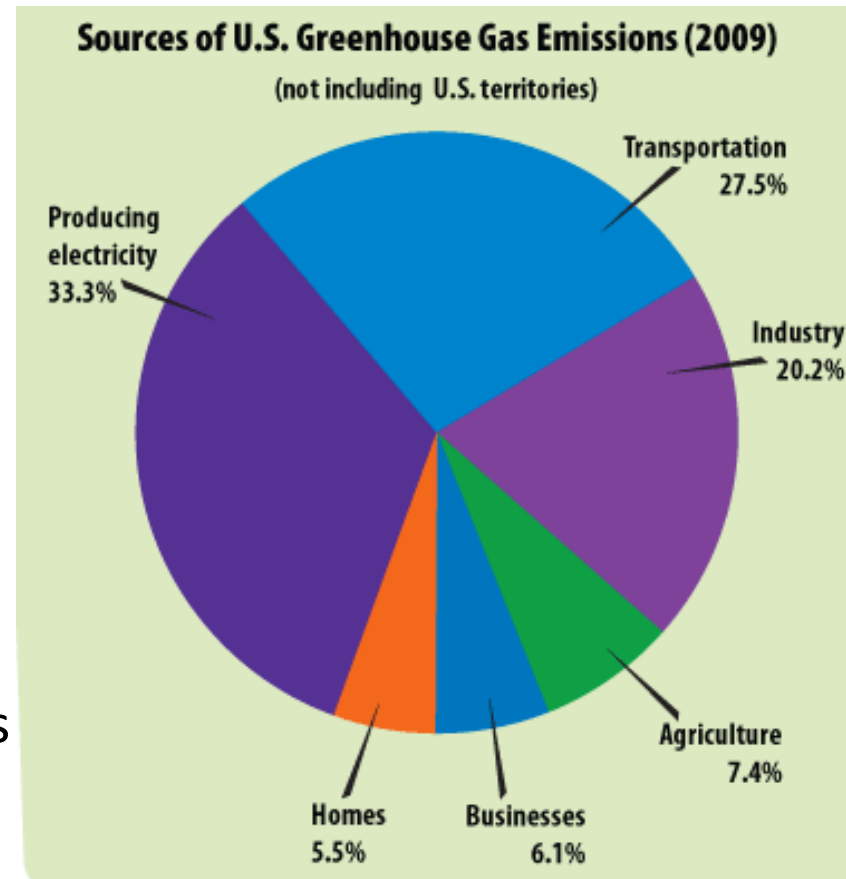
Sources of US Greenhouse Gases

- **Emissions**

- Greenhouse Gases & Aerosols
 - Fossil fuels (Personal & Industry)
 - Land use

- **Land use changes**

- Agriculture
- Deforestation
- Urbanization
- Water management & reservoirs



The Carbon Cycle

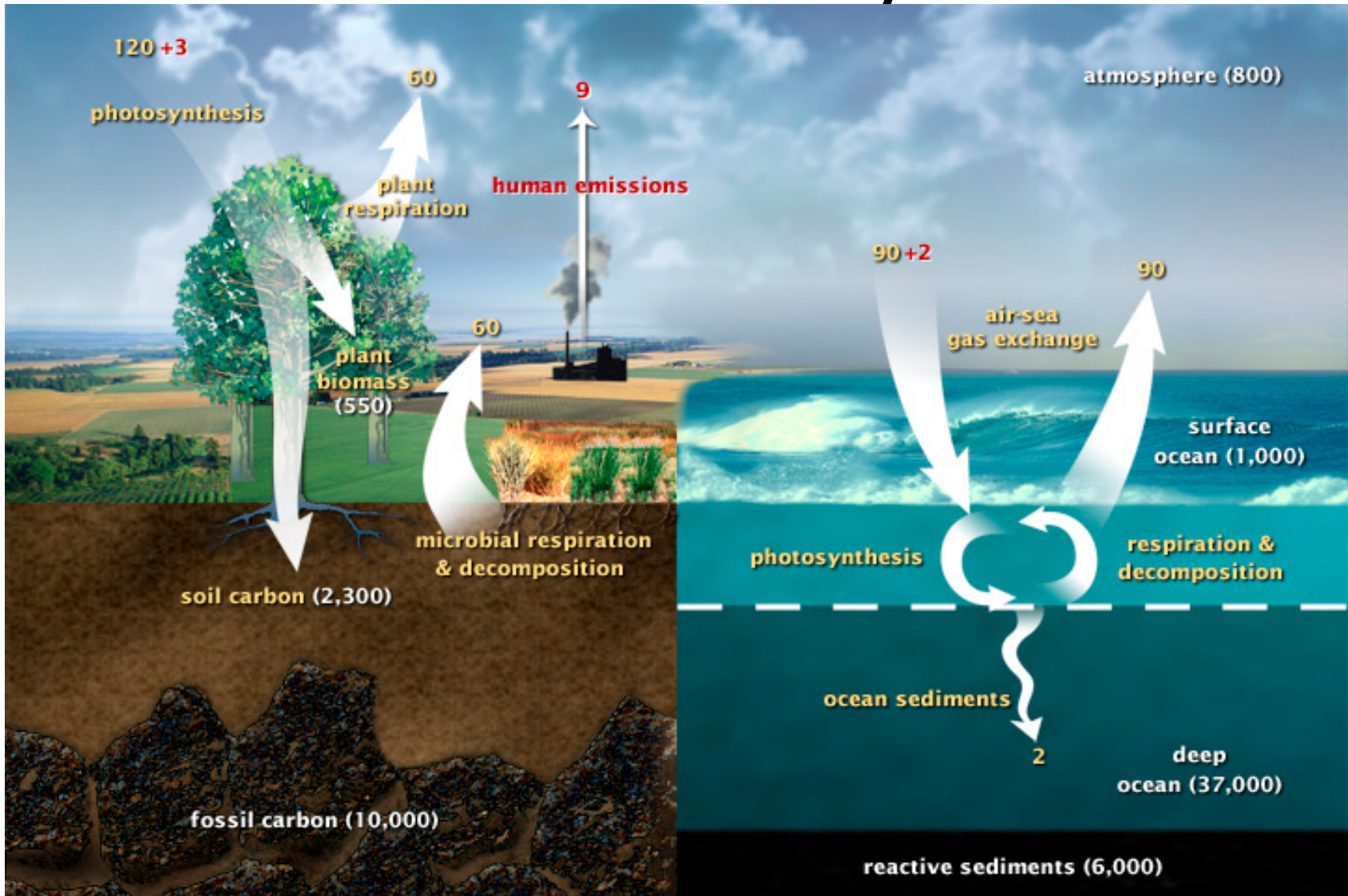


Figure: National Aeronautics and Space Administration

The Keeling Curve

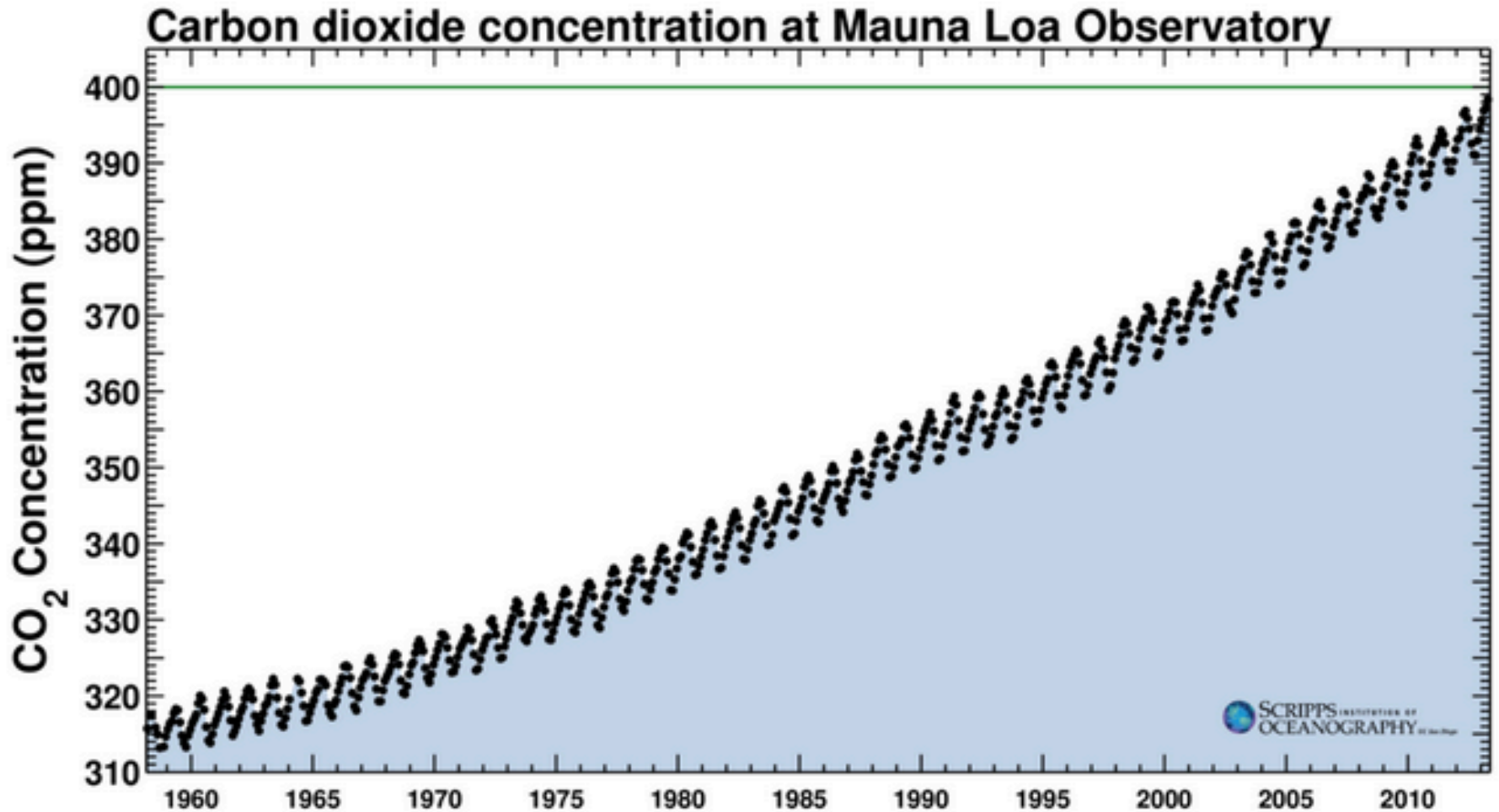


Figure: Scripps Institution of Oceanography

The Keeling Curve

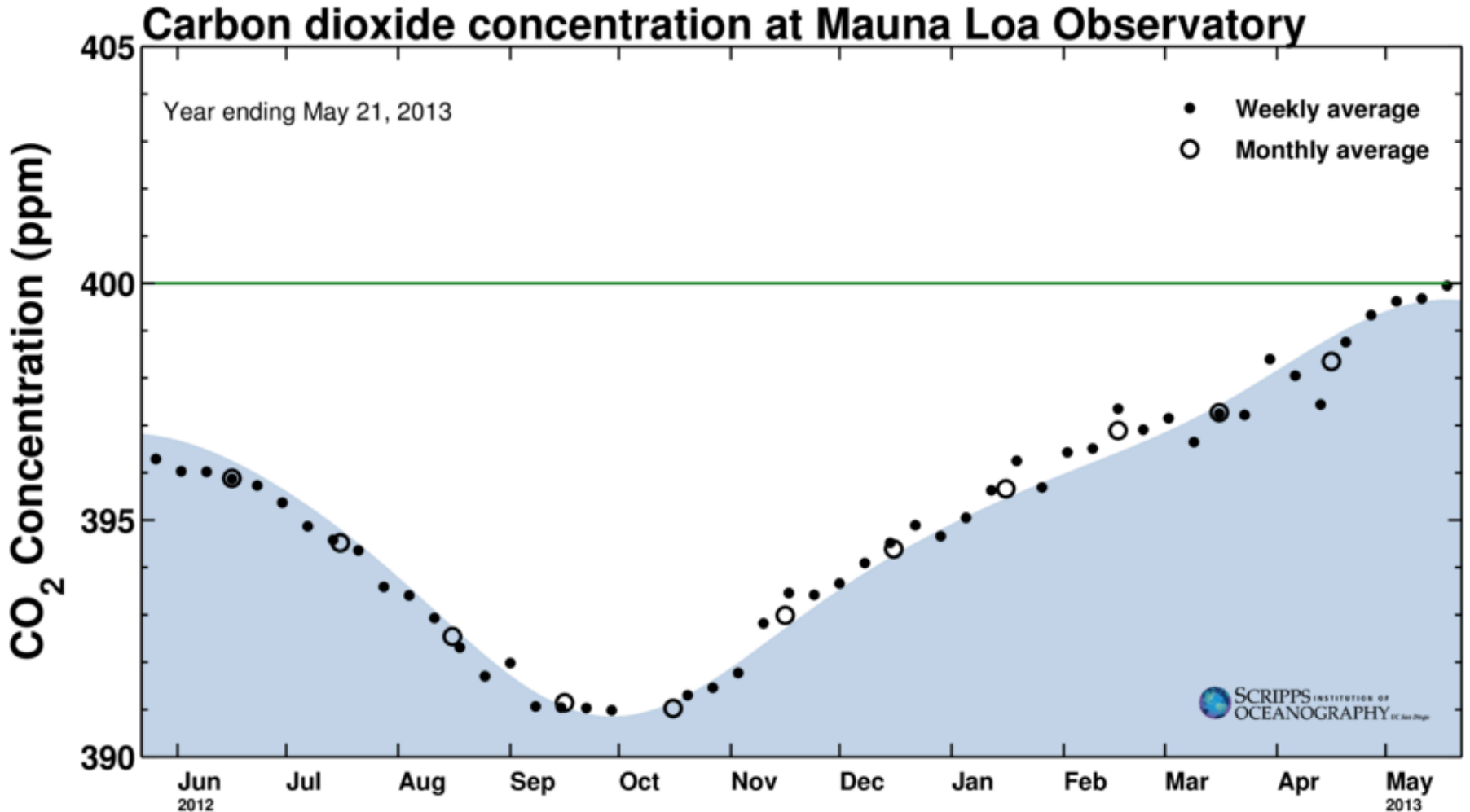


Figure: Scripps Institution of Oceanography

Climate Impacts

- A couple good sites to use as a jumping off point-
- <http://climate.nasa.gov/effects>
- <http://www.nature.org/ourinitiatives/urgentissues/global-warming-climate-change/threats-impacts/index.htm>

What causes sea level to change?

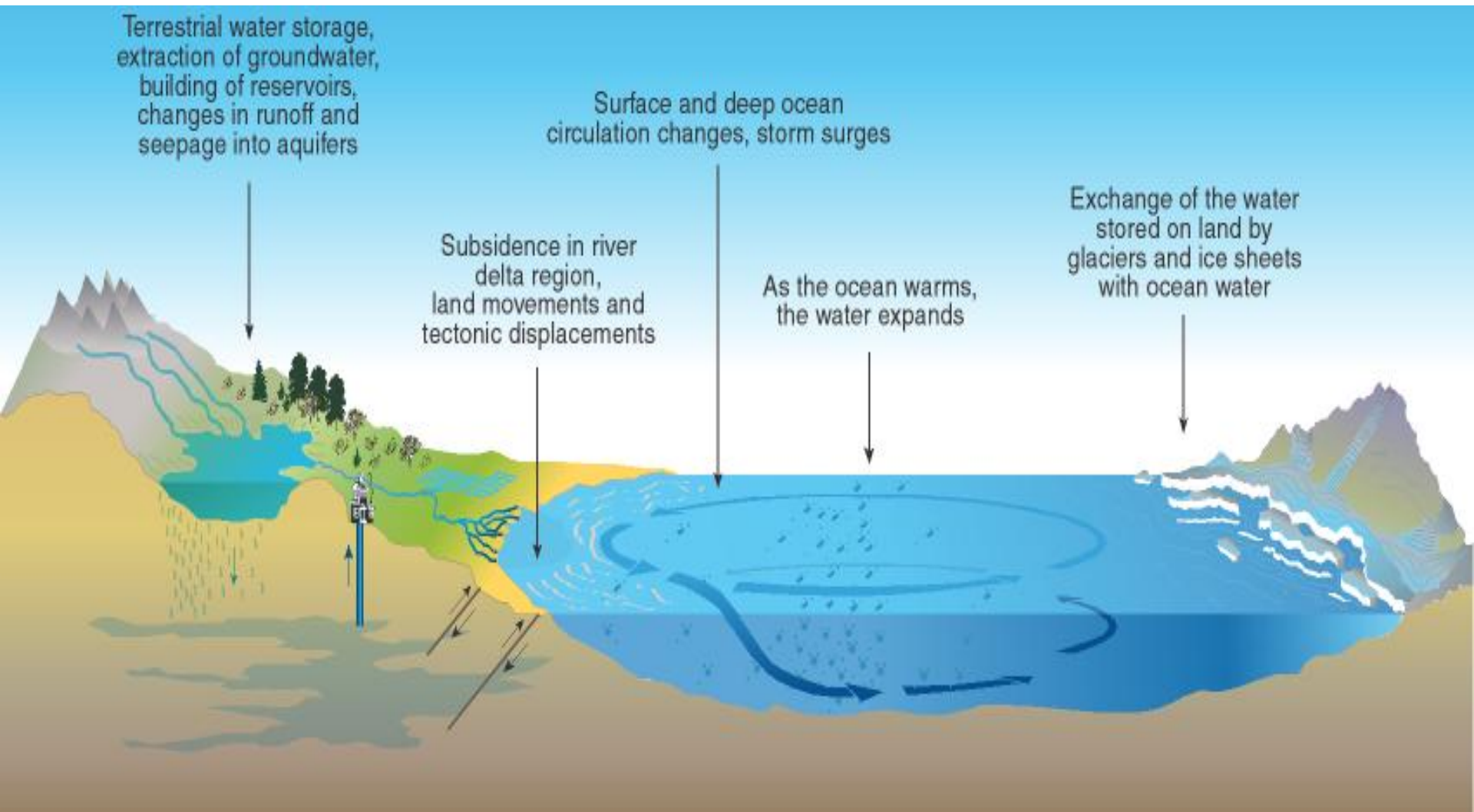


Figure: Climate.org

Climate Change Impacts: Real Time

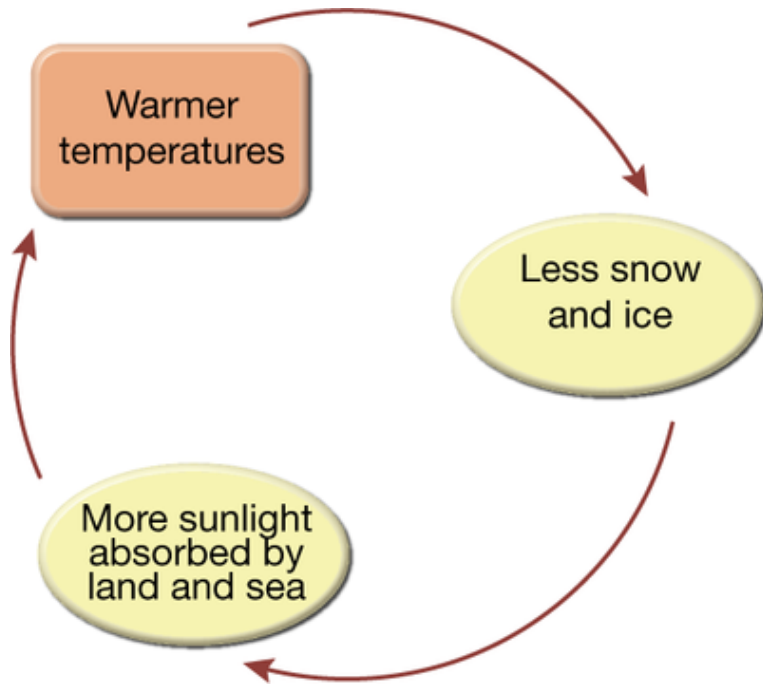
- Sea Level Trends: <http://tidesandcurrents.noaa.gov/sltrends/sltrends.shtml>
- Ice Trends: http://nsidc.org/cgi-bin/bist/bist.pl?config=seaice_index

Adaptation, Case Study of The Northwest

- Adaptation in general - <http://www.epa.gov/climatechange/impacts-adaptation/>
- NE Specific - <http://www.epa.gov/climatechange/impacts-adaptation/northeast.html>

Feedback Loop Examples

Albedo Feedback



Permafrost Feedback

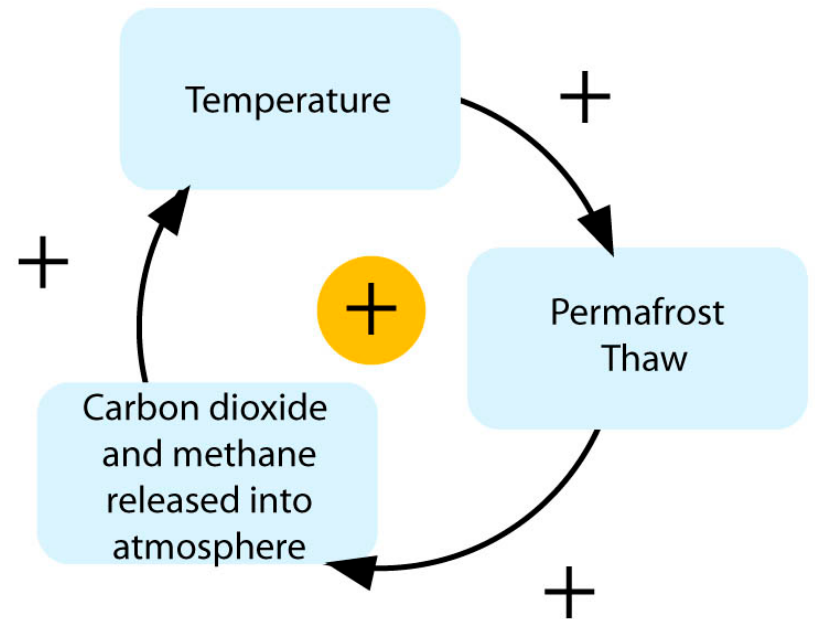


Figure: Carlton College

Experiment Discussion

- <http://www.epa.gov/climatestudents/impacts/signs/glaciers.html>