

Humans and the Environment

A Geographer's Perspective

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Overview

My Background

A Geographic Perspective

System thinking

Human-Environment Systems Intro

Moving Forward:

Sep 14th: Southern Africa

Sep 21st: Southeast Asia

Sep 28th: Louisville, KY



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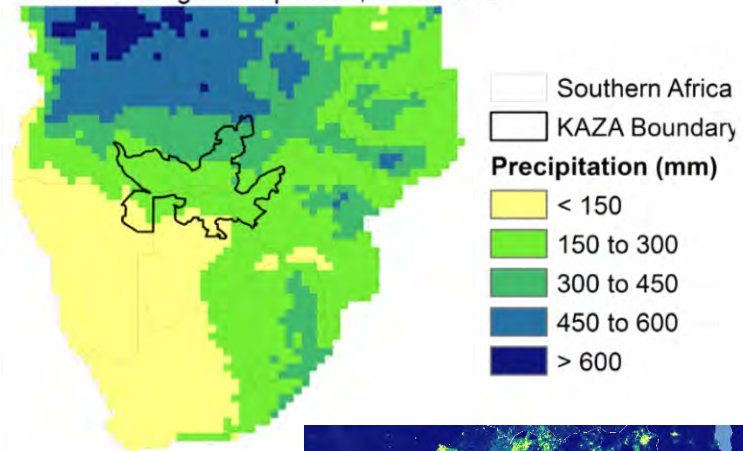


Land Dynamics

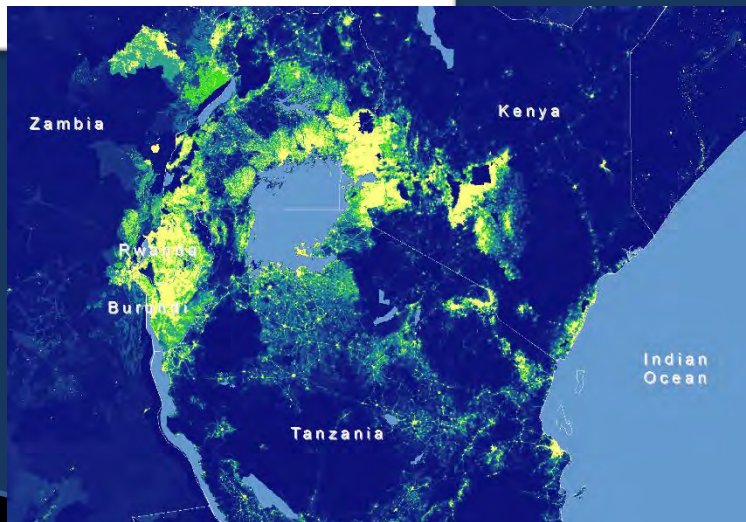
Climate Variability

Population

a. OND Average Precipitation, 1950-2008



*Geospatial
Techniques*





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Geography



Geography is...

Simple definition:

A discipline concerned with:

Why things are located where they are.

-Stutz and Warf

Google earth

Geography is...

A science that deals with two questions:

- Where are things –
Looks at and for **PATTERNS**
- Why/How things are at a location –
Looks at and for **PROCESSES**

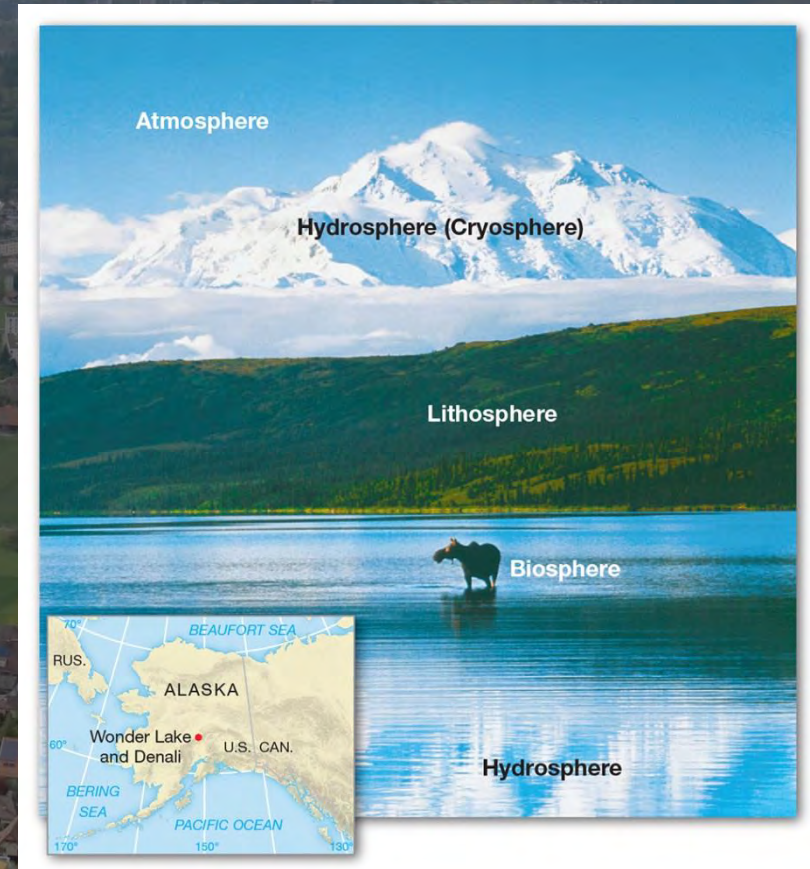
– James Rubenstein

Google earth

Environmental Spheres and Earth Systems

- Earth's surface a result of complex interactions
- Four interconnected *environmental spheres*

1. **Lithosphere:** rocks and mineral matter
2. **Atmosphere:** mixture of gases
3. **Hydrosphere:** water in all its forms; frozen water exists in cryosphere
4. **Biosphere:** all parts where living organisms exist



Human Geography is...

A quick and simple definition:

**“... the study of the way in which society organizes itself
in space.”**

— *Krumme*

Google earth

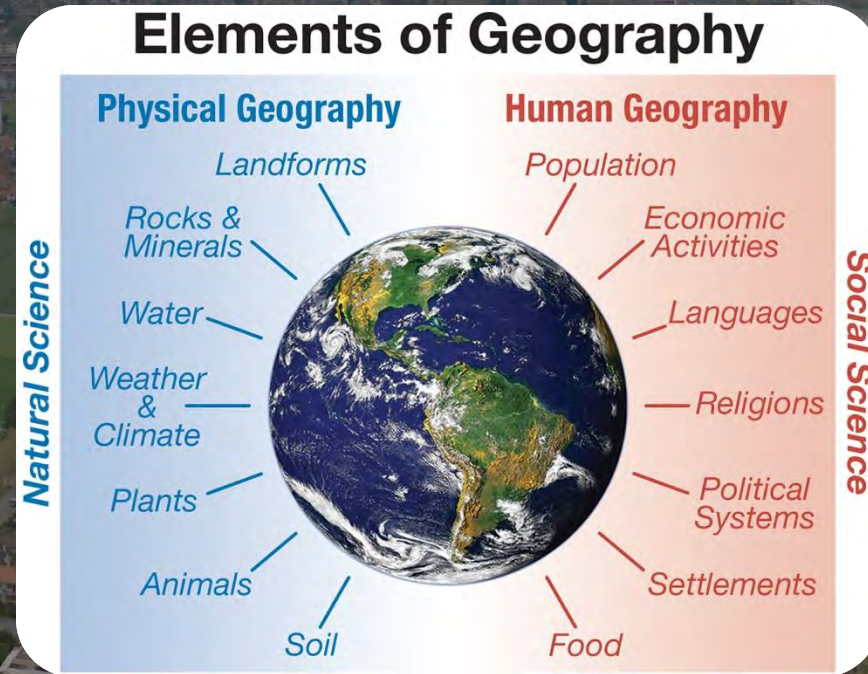
Human-Environment Geography is...

- “Geography (*geo*, “Earth,” and *graphein* “to write”) is the science that studies the relationships among
 - geographic areas,
 - natural systems,
 - society,
 - cultural activities,
 - and the interdependence of these *over space*.”
- Christopherson

... and time.

Geography and Science

- **Geography:** “Earth description”
- From place to place, how things differ and how they are interrelated
- Key themes:
 - *Global environmental change:* human- and natural-caused changes
 - *Globalization:* traces of interconnected world
- Scale across **space** and **time**.

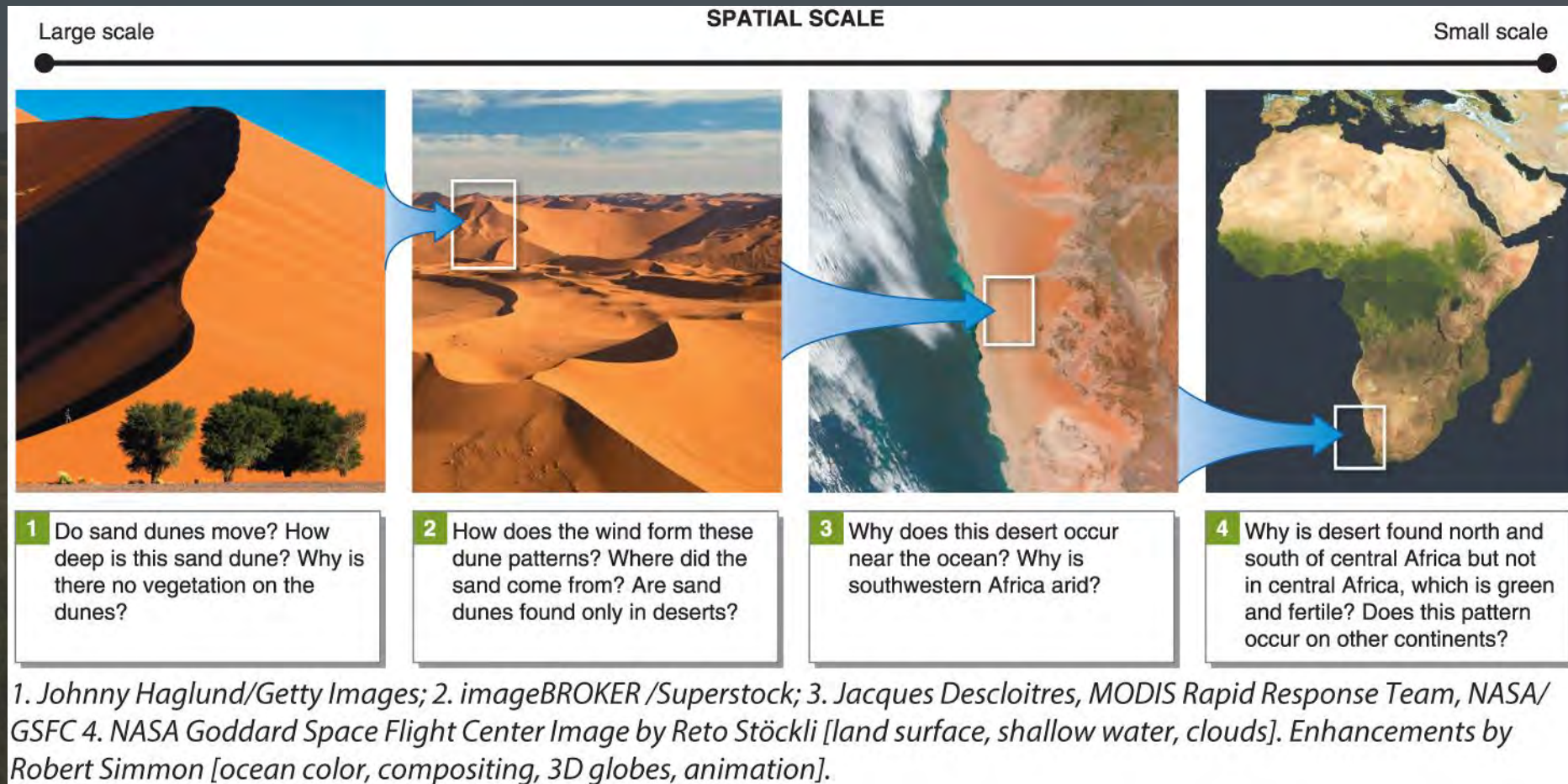


Traditional Descriptions of Scale

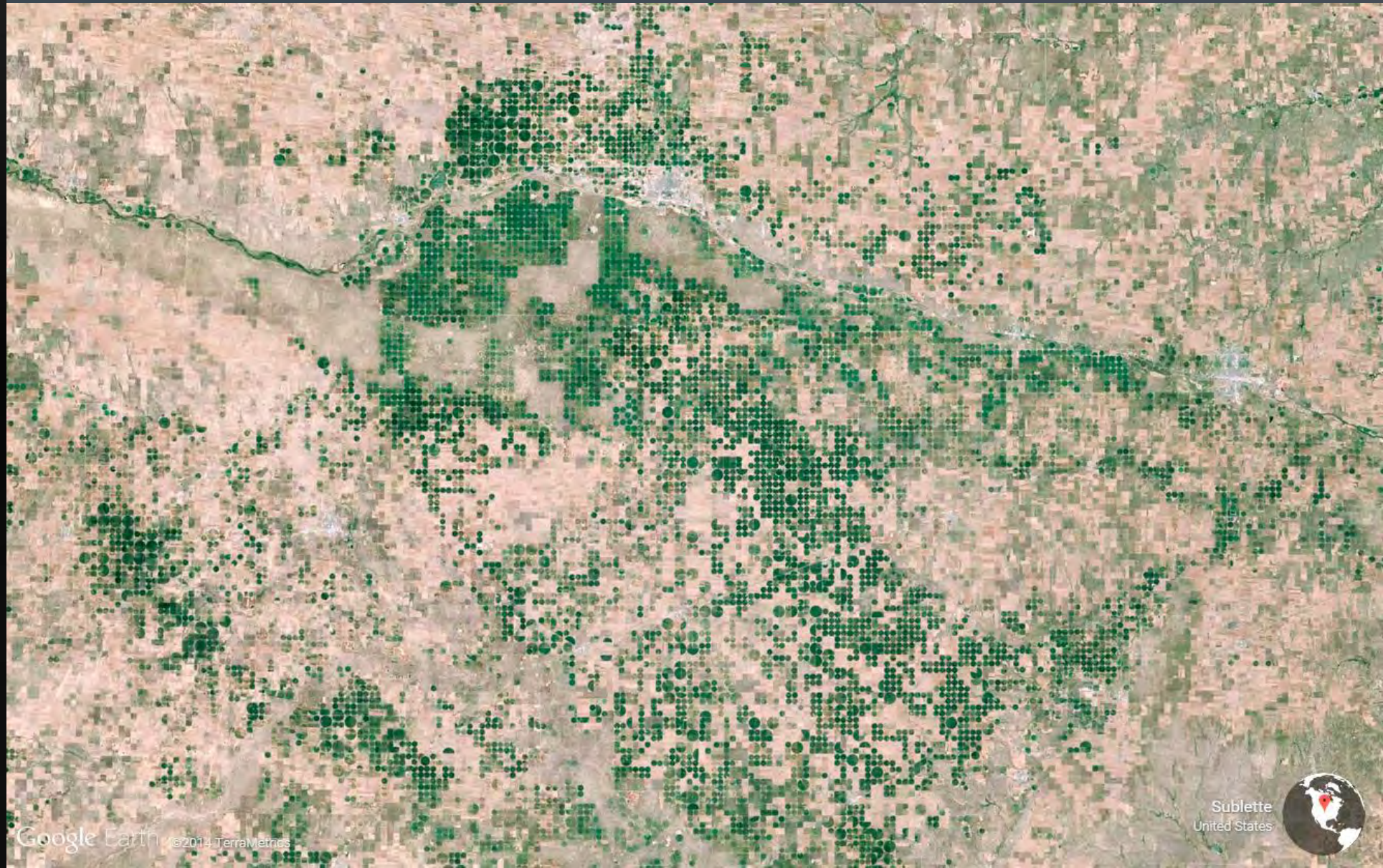
Spatial scale: the physical size, length, distance, or area of an object or the physical space occupied by a process

Temporal scale: the window of time used to examine phenomena and processes, or the length of time over which they develop or change

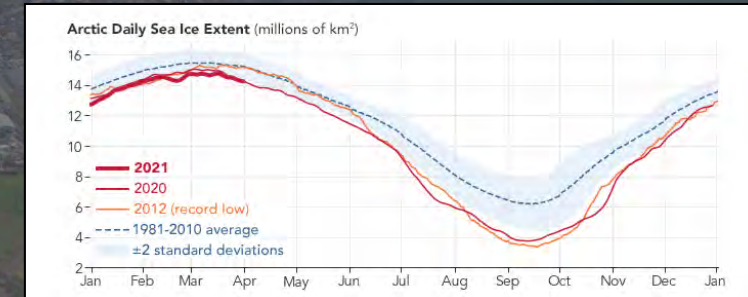
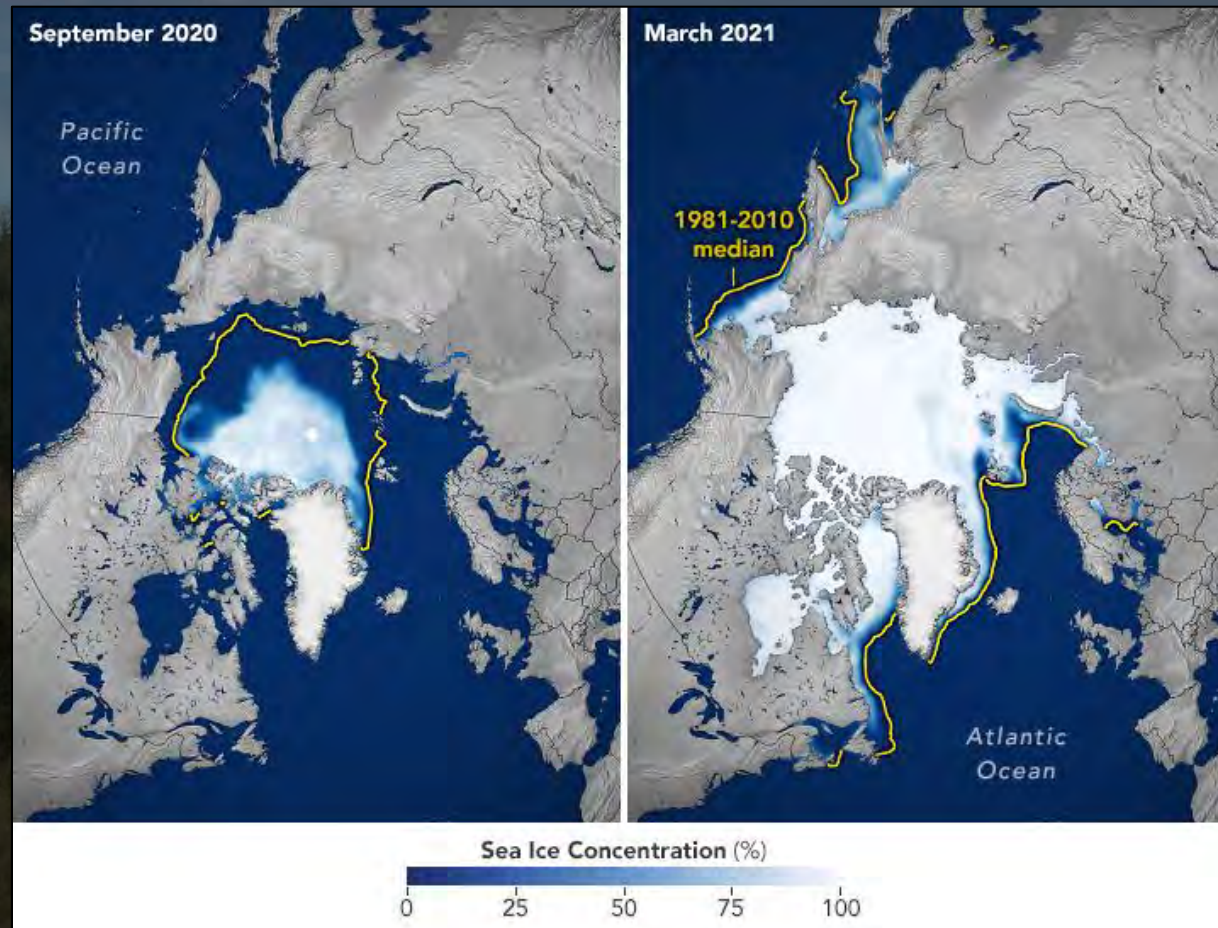
Traditional Descriptions of Scale



Geographer's Definition – Scale is Defined by Grain and Extent



Illustrating Spatiotemporal Scale: Arctic Sea Ice Loss





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Systems

A hand holds a white, multi-paned picture frame in the foreground. Inside the frame, the word "Systems" is written in a brown, serif font. The background is a scenic coastal view featuring a green cliff on the left, a sandy beach, and the ocean under a cloudy sky.

[Photo Source](#)

A large flock of birds, possibly terns, is captured in mid-flight, forming a dense, dark, winged mass against a pale, overcast sky. Below them, a wetland landscape unfolds with a body of water in the foreground. The water's surface is calm, reflecting the sky and the birds. A single bird stands on a small patch of land near the water's edge. The background consists of a flat, green field with some distant trees and structures under a grey sky.

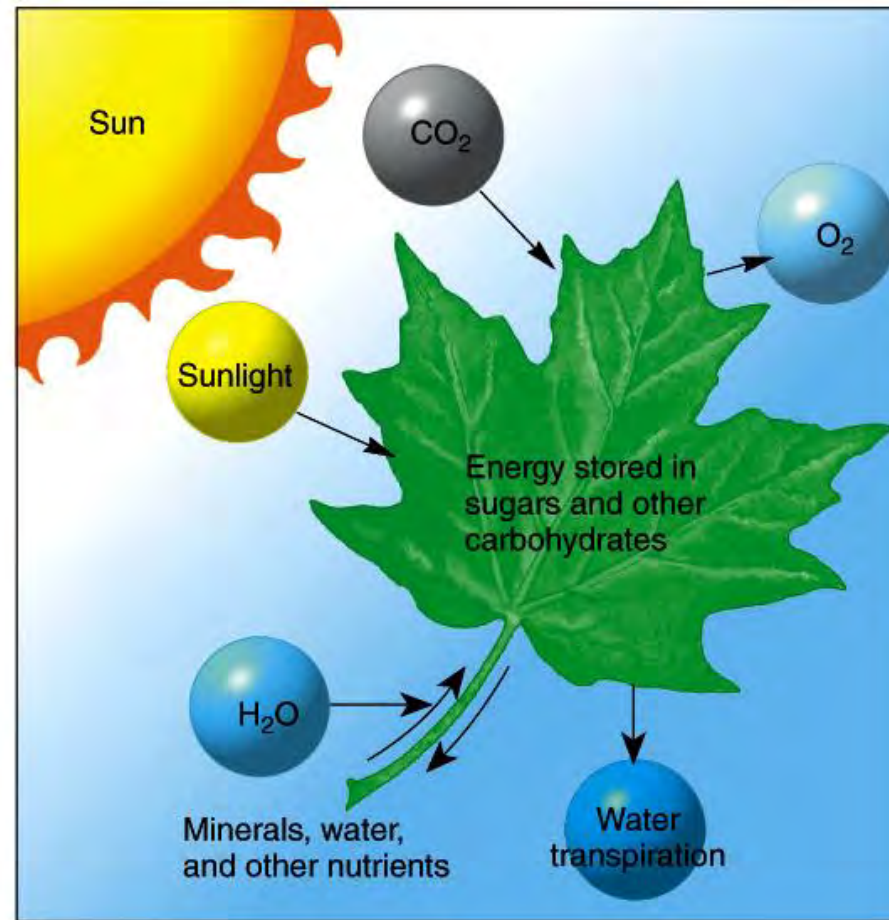
A system is a set of things interacting in a way that produces something greater than the sum of its parts. Systems can range in complexity.

Systems

- **Systems:** Any ordered, interrelated set of things and their attributes, **linked by flows of energy and matter**, as distinct from the surrounding environment
- **Systems = Relationships between Processes + Things** (matter, organisms, etc) facilitated by exchanges of Energy

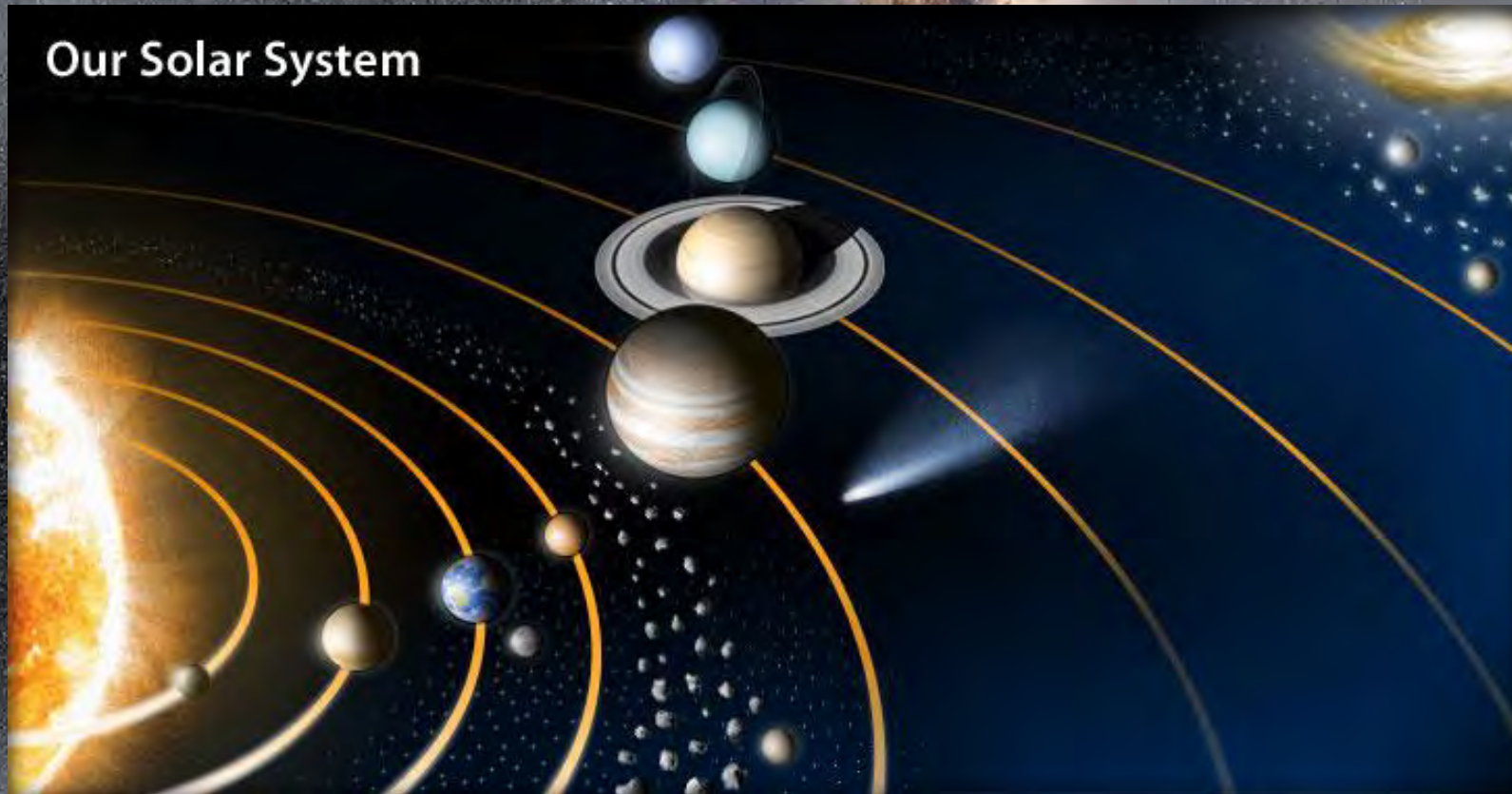
Two types: Open v. Closed

Open System



(a) Plant photosynthesis

Closed System (sort of...)



Elements of Systems

- **Boundary** (the yard)
- **Inputs and outputs** (cats, dead rats)
- **Internal components** (rats, dogs)
- **Interactions**
 - Positive interactions (rats breeding)
 - Negative interactions (cats on rats, dogs on cats)

A Rat Infestation



Feedbacks

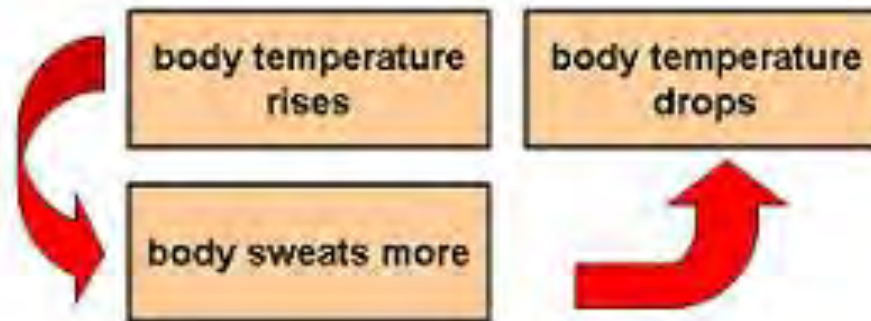
- System produces results that influence how the system functions
- **Positive feedback:** a system's outputs (results) encourages change in the same direction
- **Negative feedback:** a system's outputs discourages change — creates stability

Feedbacks

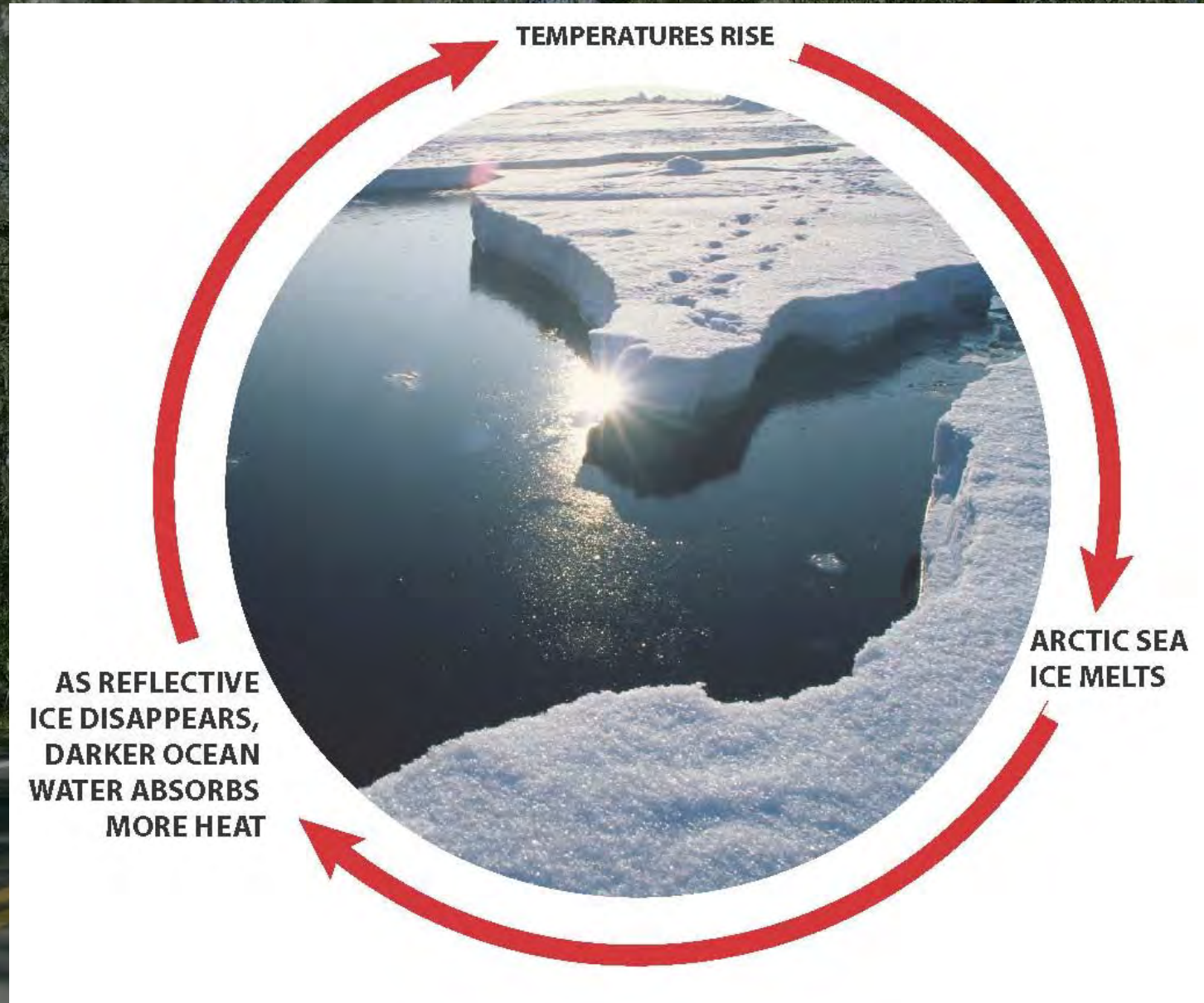
Positive feedback



Negative feedback



Ice-Albedo (reflectivity) Feedback





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Anthropogenic Landscapes



Markley Boyer / WCS / Yann-Arthus Bertrand / Corbis



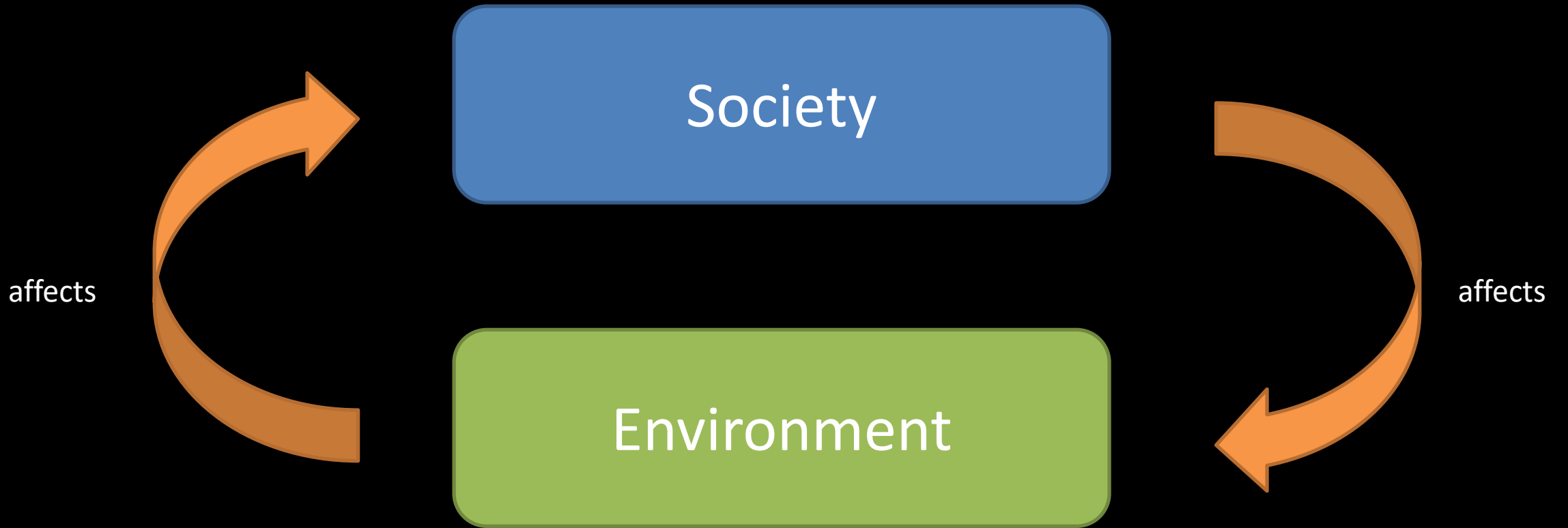
The Human Reach

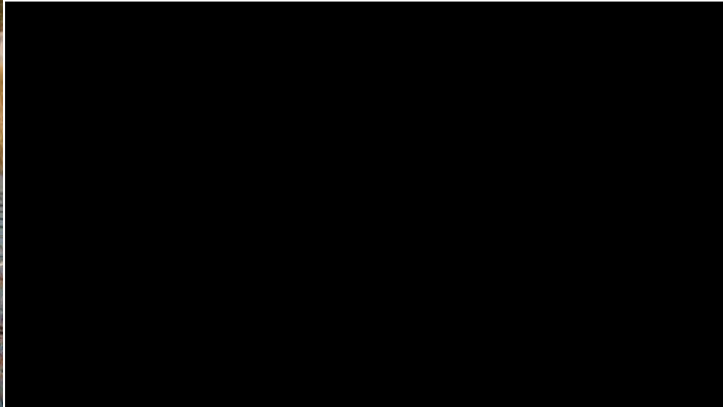
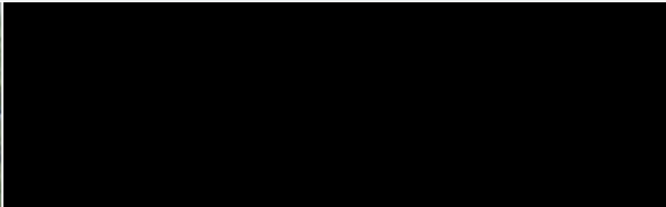
Understanding the global scale of human activities

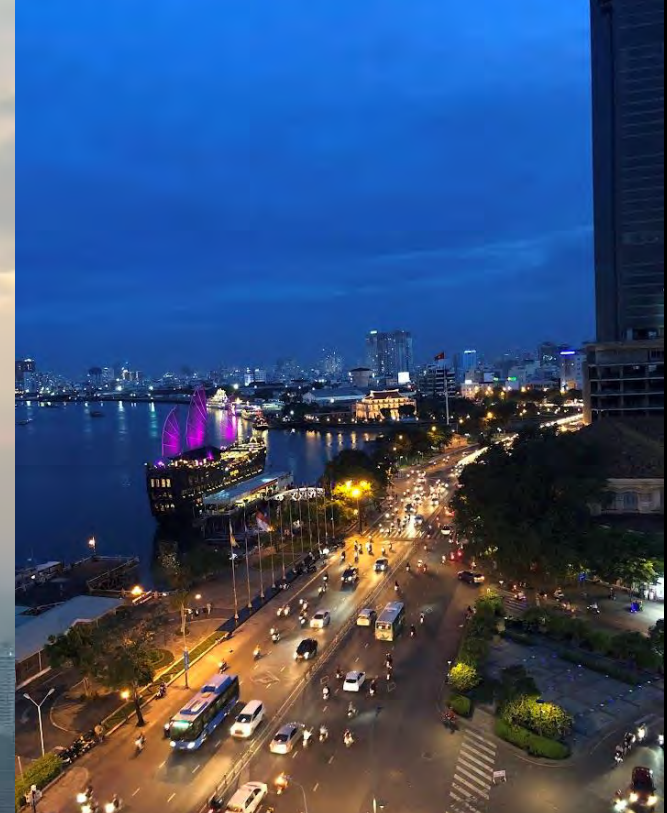
A chapter from *The Living in the Age of Humans* series,
produced by Esri's StoryMaps team

Photo source: <http://nasa.gov/>

Human Environment Systems

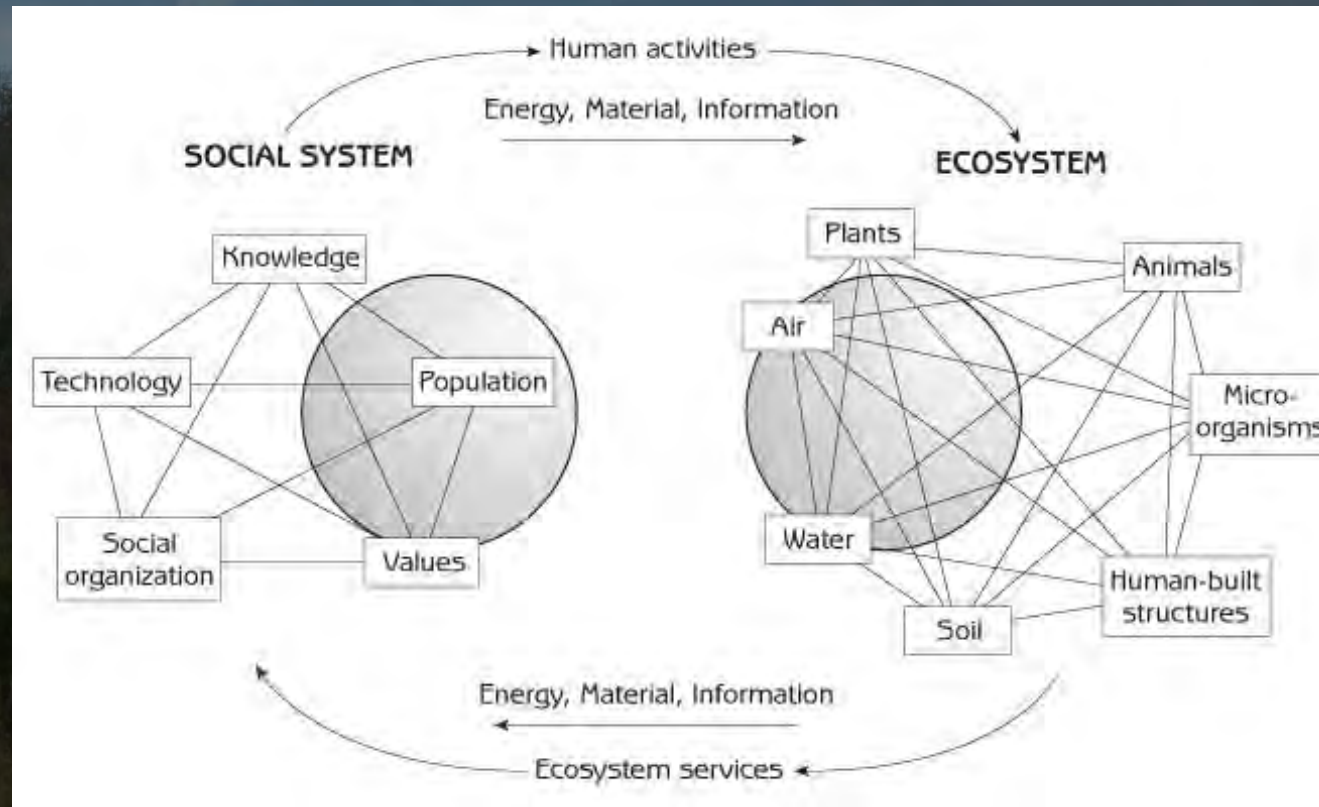






Human-Environment System - Geographic View

How the spatial relationships among Earth's physical and cultural features develop and change through time



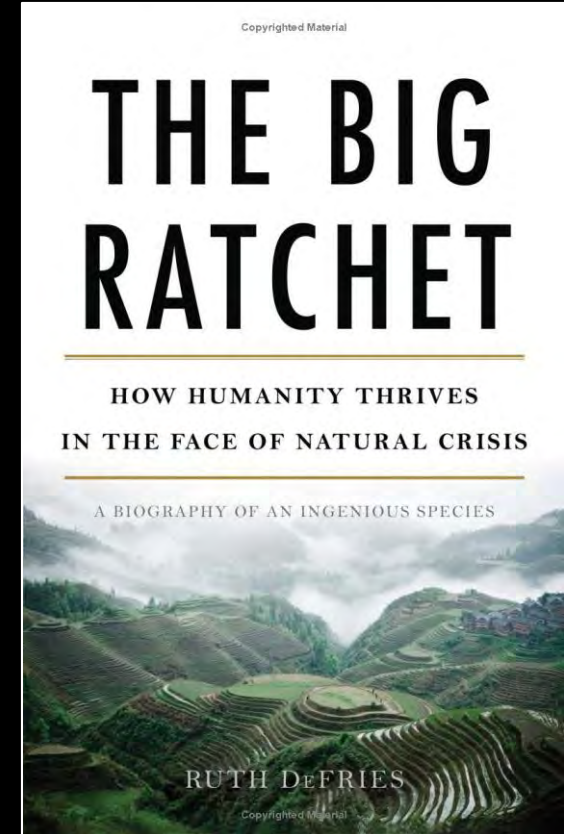
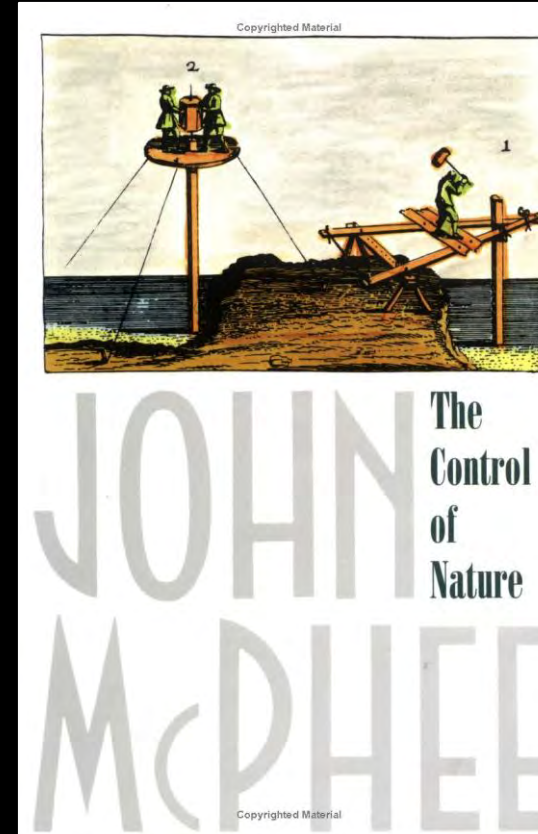
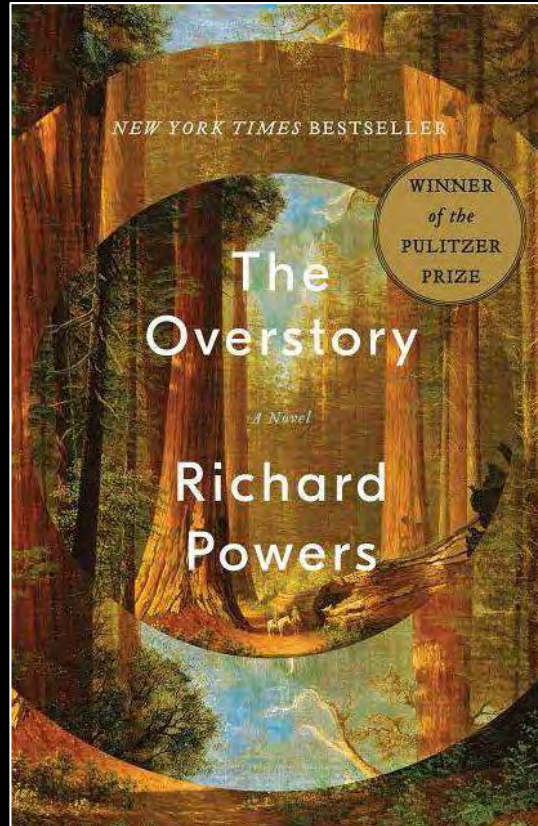
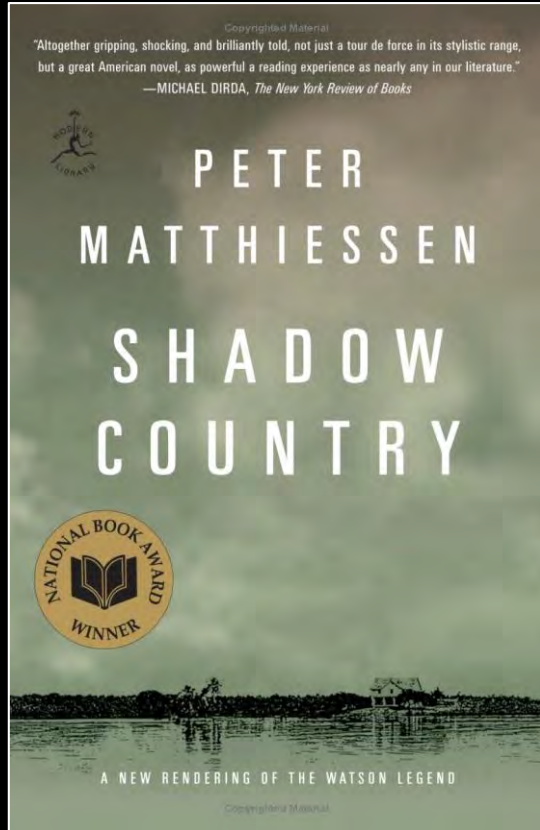
[Source](#)

Human-Environment System - Geographic View

<https://earthengine.google.com/timelapse/>

- Find an area of change and describe the relationship between humanity and the environment
- What are some components of the human system and the environment system? How do these components interact?

Human and the Environment



To be continued...

**September 14, 2023 – Human-Environment System:
Southern Africa**

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