

Lecture 18

GLY102

4/1/2021

Sea Level Rise

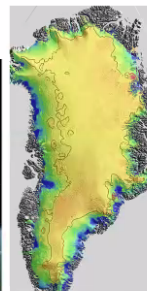
Review

Satellites: A Summary

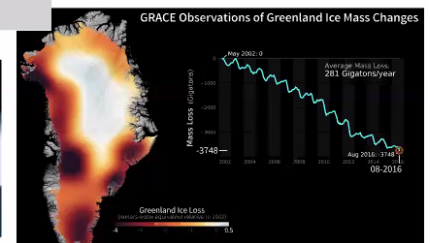
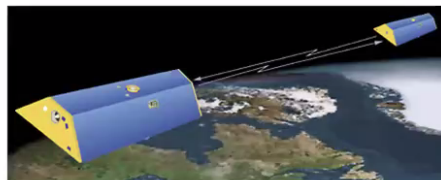
1. Satellites (and airplanes) that use RADAR (like RADARSAT) measure ice sheet velocity and ice sheet thickness



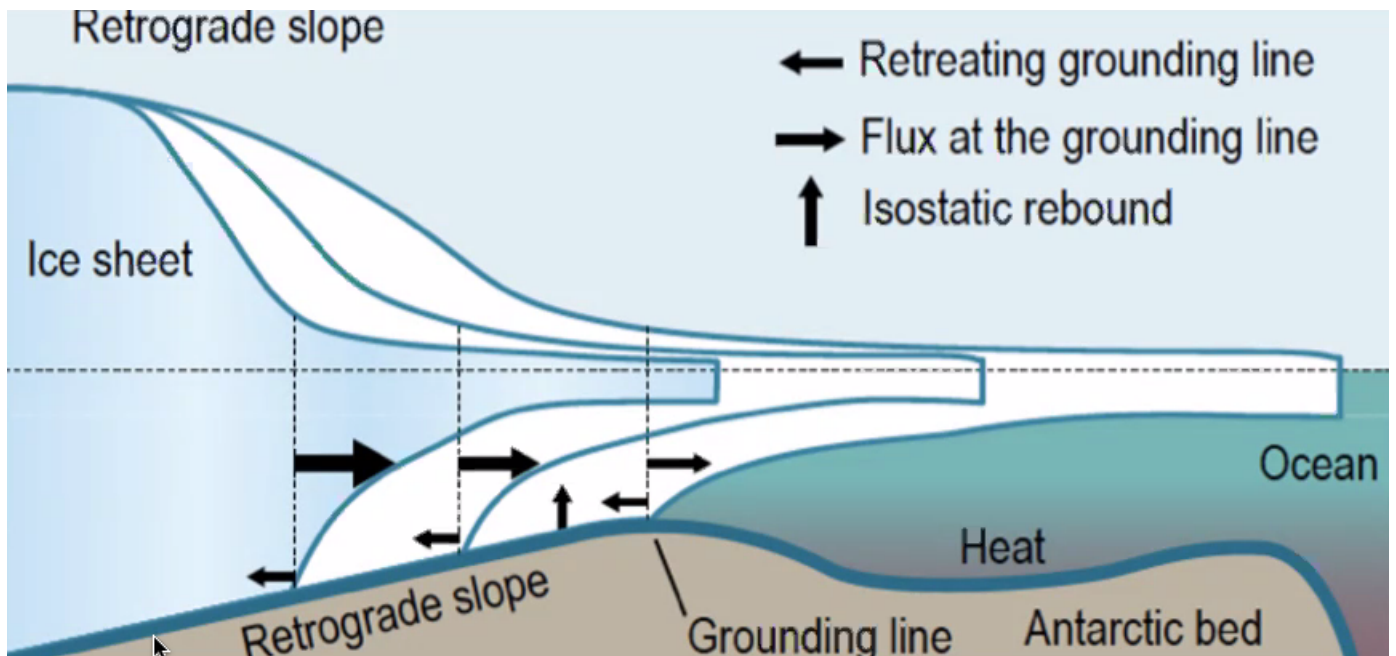
2. Satellites that use laser altimetry (ICESat) measure changes in ice sheet surface elevation



3. Satellites that use gravimetry (GRACE) measure mass changes of ice sheets through time



Glacier calving rates can increase in deeper water

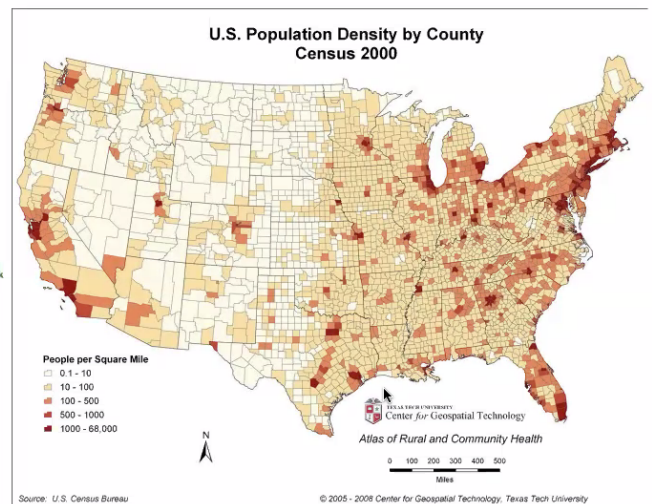
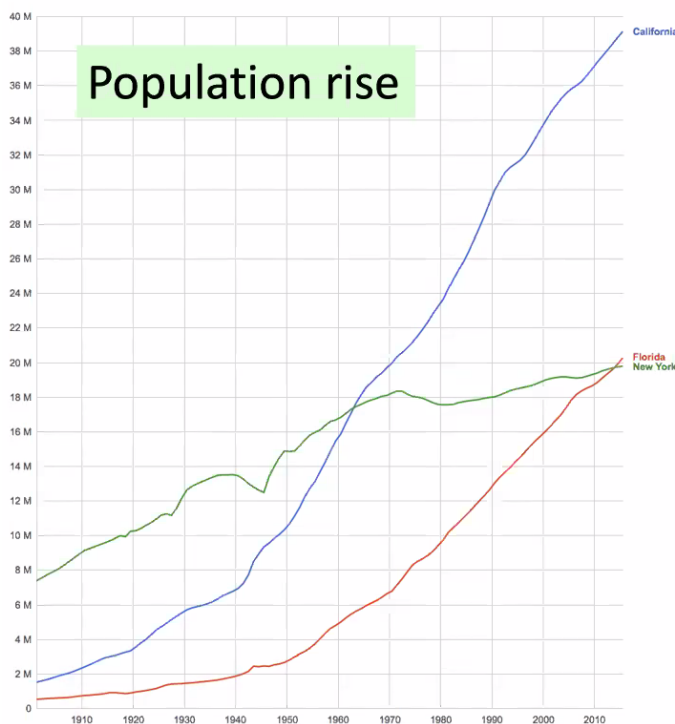


Buoyancy + deepening bed can cause some calving glaciers to retreat uncontrollably

A quick overview of Sea Level

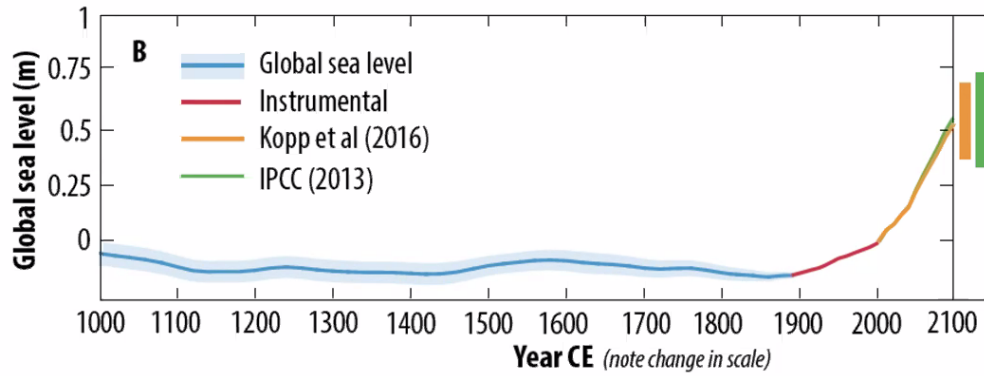
Sea level rise is important:

- One fifth of the world's population lives within about 20 miles of a shoreline



- Coastal populations are growing more rapidly than elsewhere

- Sea level has been rising and continues to rise



- Coastal storms have a larger impact on people when sea level is higher

Sea level defined

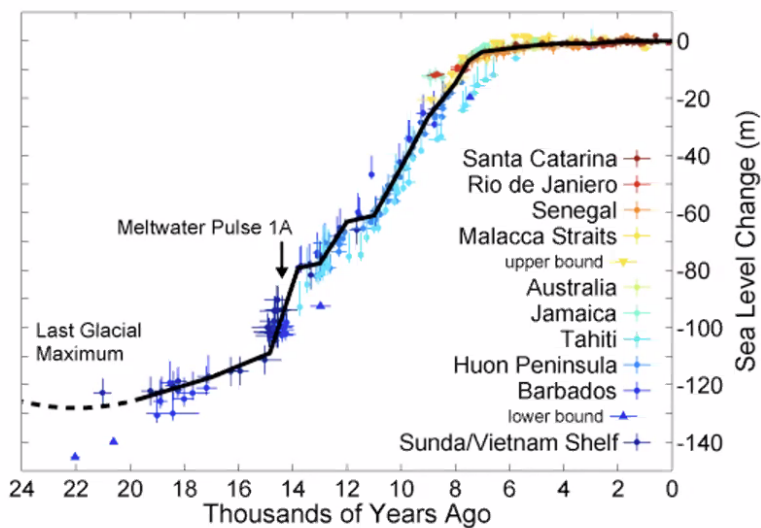
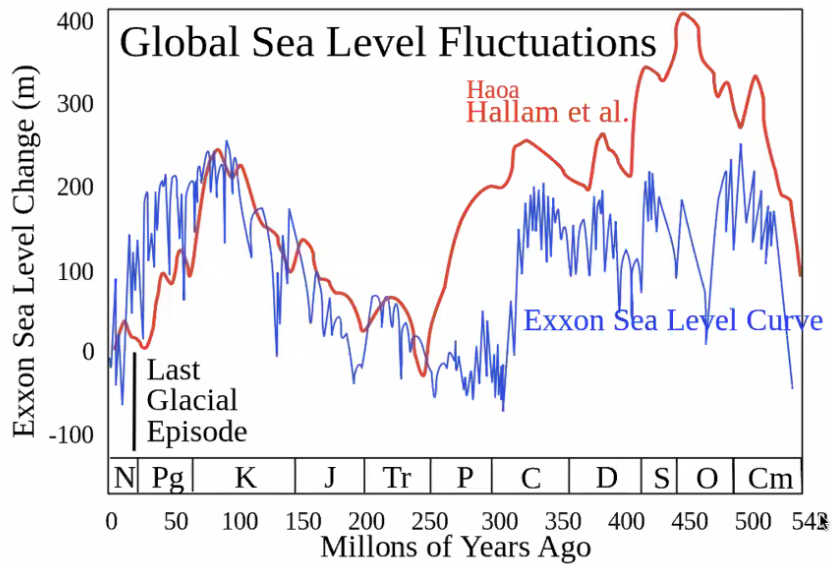
1. **Eustatic** (yew-static) **sea level** - refers to changes in the global ocean reservoir
2. **Local sea level** – refers to the sea level at any one location

Why are these different?

Say you're on a plate tectonic boundary like the San Andreas fault. If a plate on which people were living were to drop next to a plate on which there may be an ocean, for those living on the dropped plate, the sea level would appear to rise. So **locally**, the sea level is rising but for everyone else, **globally**, it's just that one plate dropped. It's a matter of perspective.

Changes in local sea level (sometimes called relative sea level) is due to eustatic (global) sea level changes + local effects like land subsidence or uplift...

History of Sea Level Change



Sea Level was 120m *lower* during the last Ice Age!

Evidence that some of the ocean's water got stuck on land!

This map shows global sea level lowering during the last glaciation (already shown in a previous lecture).



This topic, in addition to the remaining Sea Level topics listed below, will be covered in the next lecture...

Causes of Sea Level Change

Impacts of Sea Level Rise

Sea Level Rise – The Future