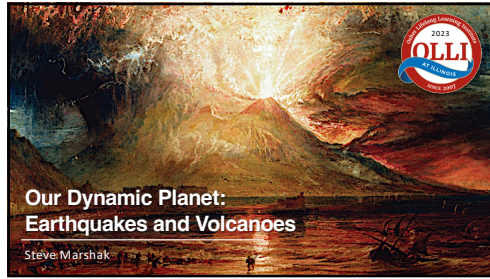


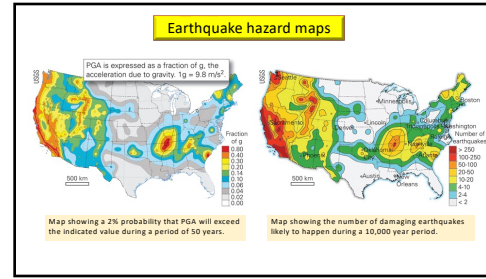
Earthquakes & Volcanoes, Lecture 3

Steve Marshak

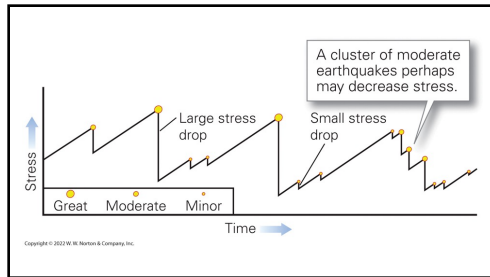
Note: Please don't upload to the web because of copyright concerns.



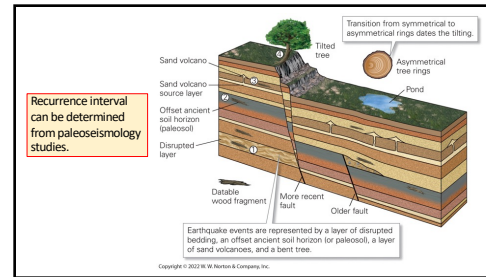
1



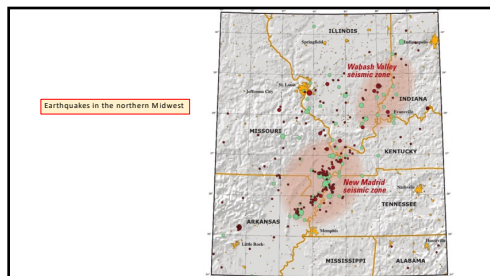
2



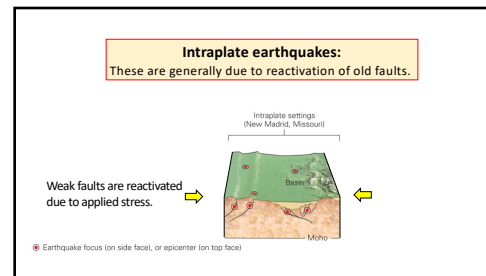
3



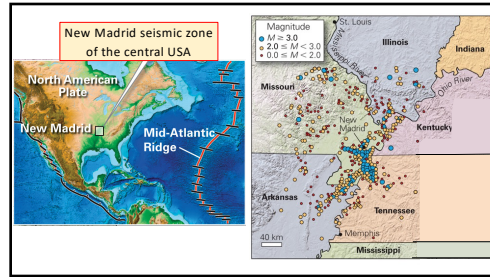
4



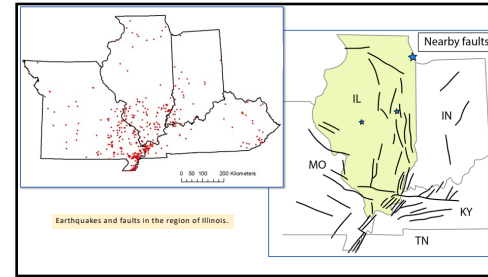
5



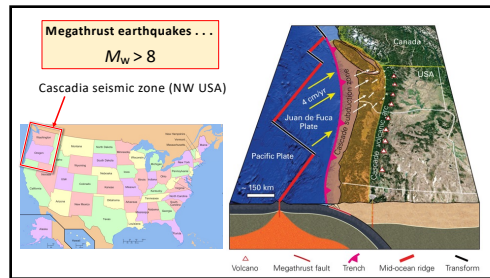
6



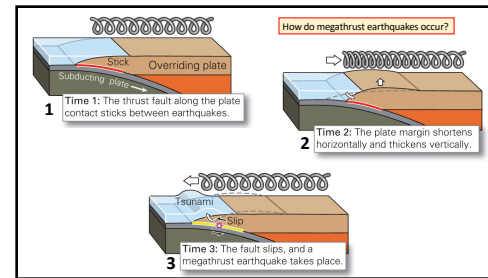
7



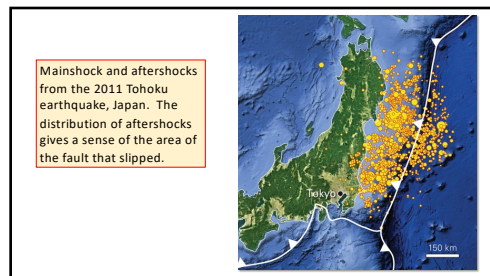
8



9



10

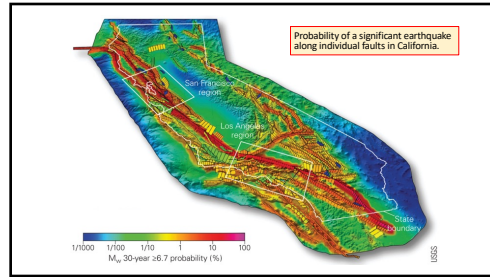


11

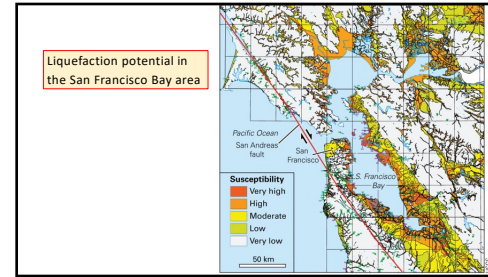
What can we do to mitigate earthquake hazard?

- Earthquake hazard maps (e.g., identify places with higher probability of earthquakes).
- Earthquake zoning (e.g., avoid locations subject to landslides or liquefaction).
- Emergency action plans (e.g., evacuation routes; fire-fighting strategy; etc.)
- Earthquake early warning systems (i.e., alarms trigger gas-line shut off; train stoppage; etc.)
- Earthquake-resistant design (i.e., for buildings; bridges; slopes; etc.)
- Earthquake-resistant retrofitting (i.e., reinforce existing buildings)
- Individual precautions

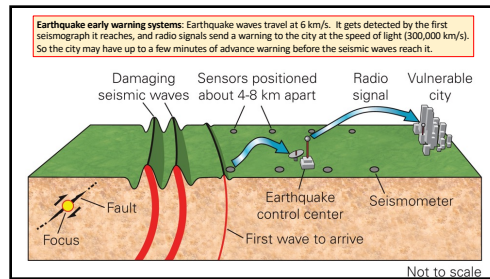
12



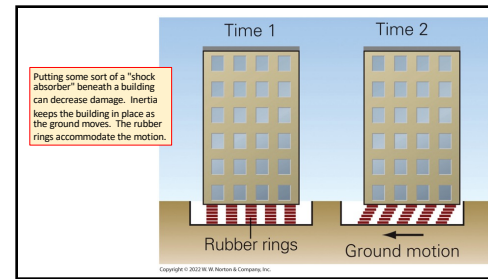
13



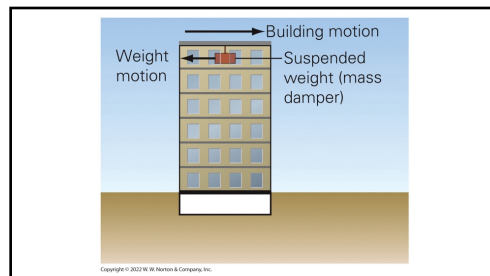
14



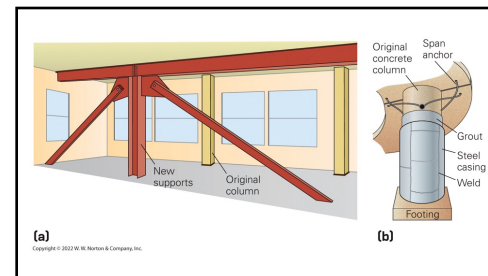
15



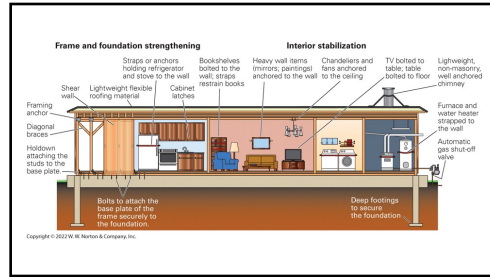
16



17



18



19



20

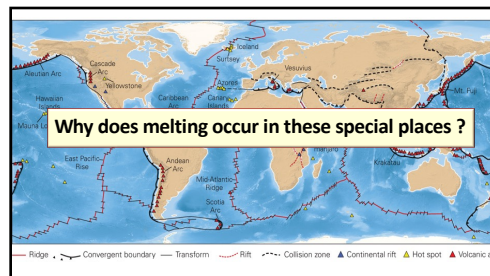


21

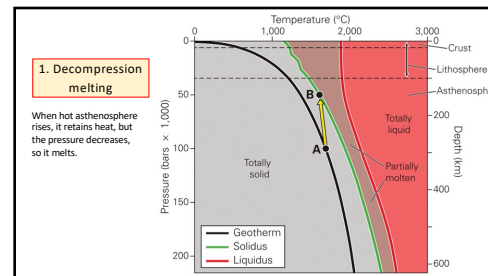
Volcanoes outline . . .

- Where do volcanoes occur, and why.
- Intrusive vs. extrusive environments.
- What comes out of a volcano?
- Styles of volcanic eruptions.
- Volcano hazards.
- Disaster mitigation.

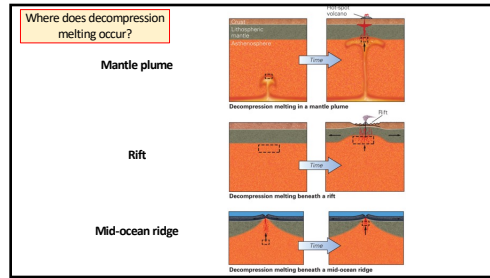
22



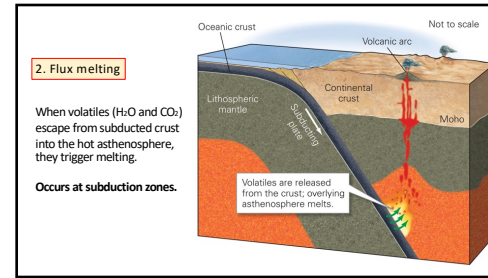
23



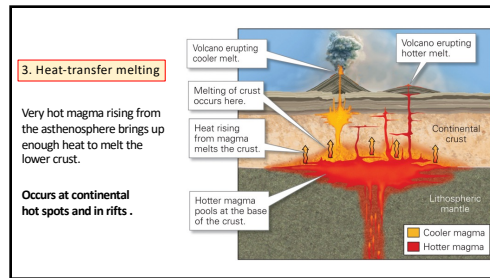
24



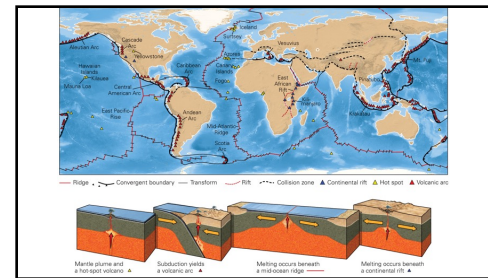
25



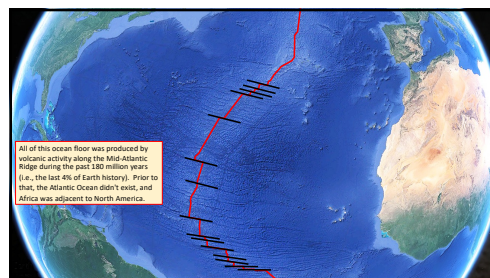
26



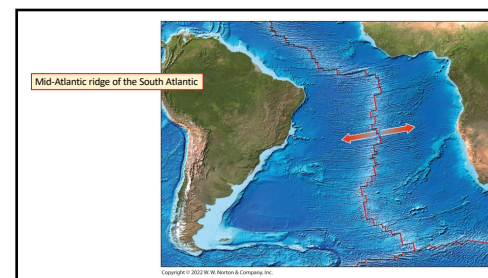
27



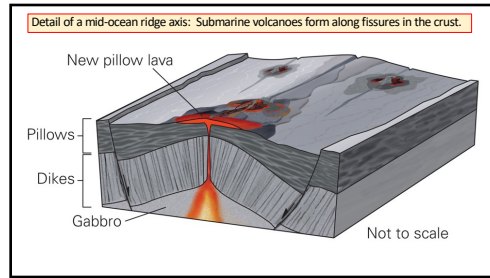
28



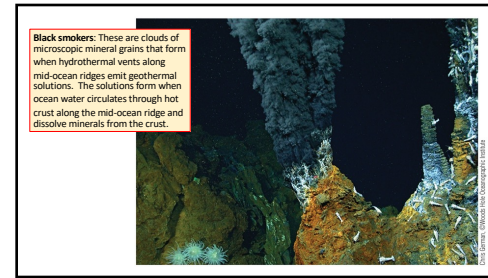
29



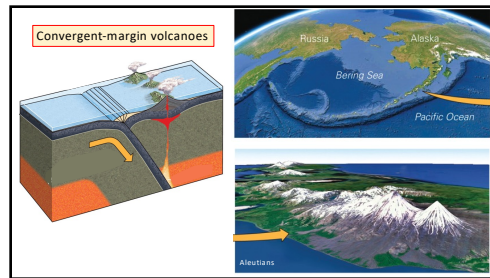
30



31



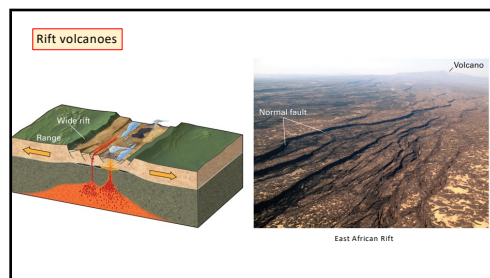
32



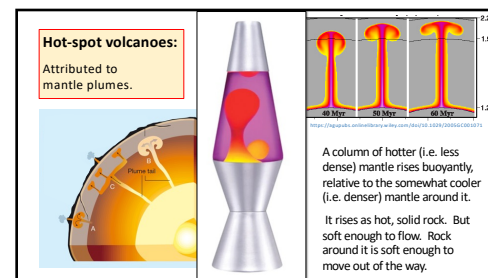
33



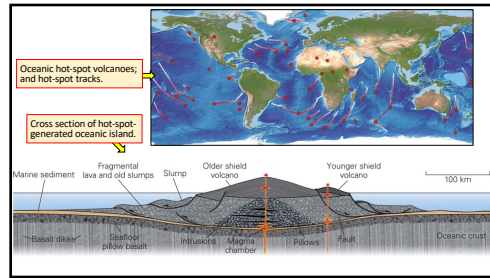
34



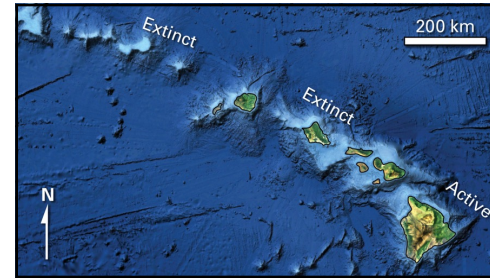
35



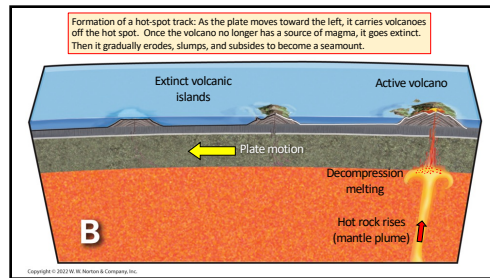
36



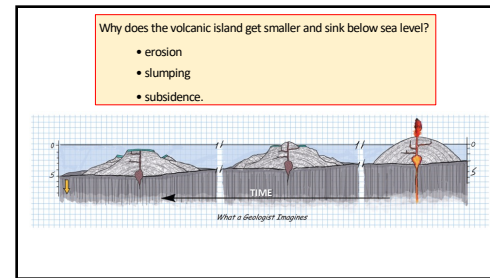
37



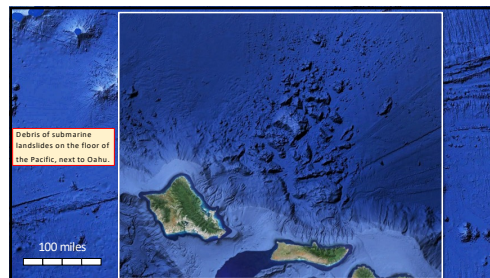
38



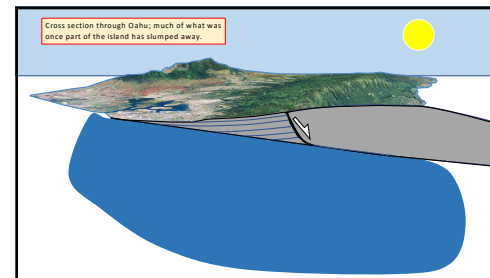
39



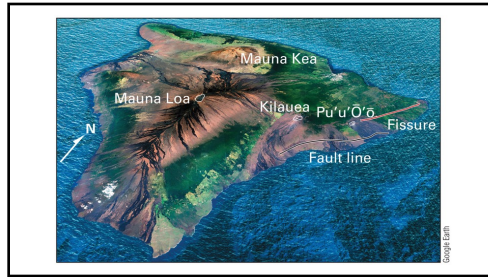
40



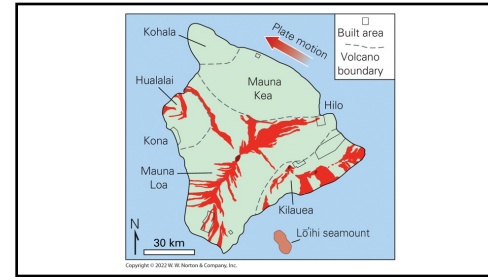
41



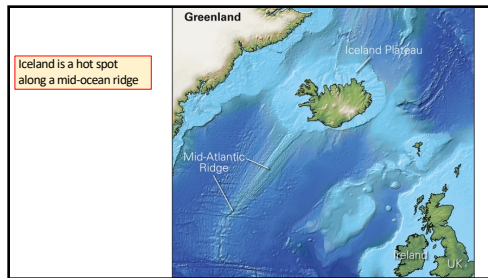
42



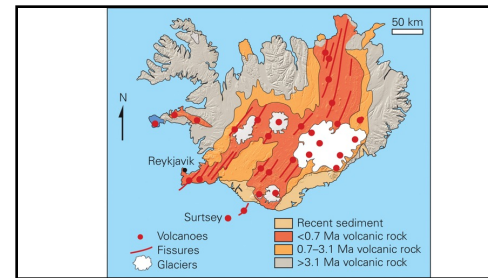
43



44



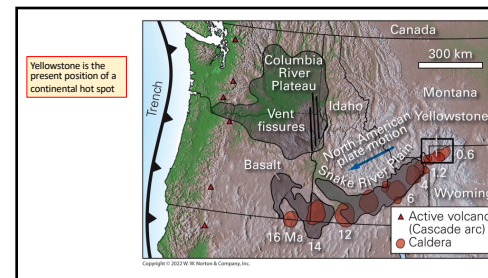
45



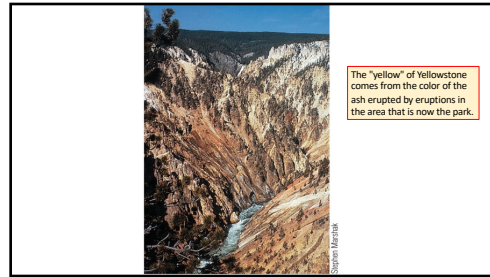
46



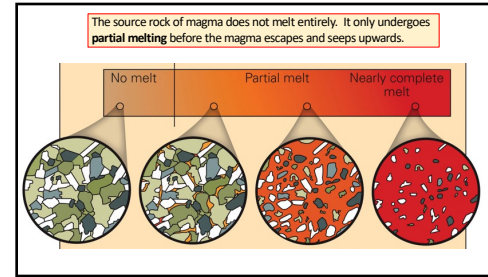
47



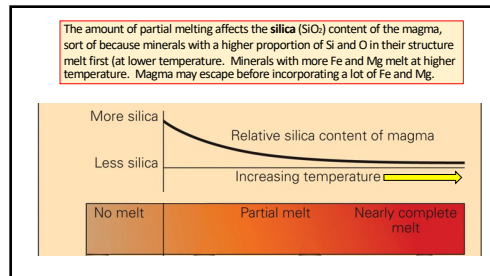
48



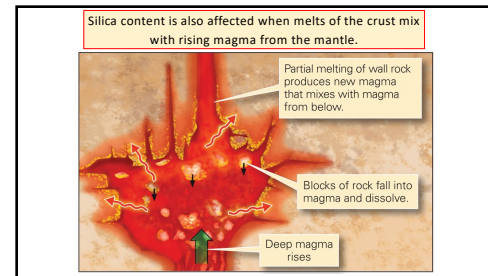
49



50



51



52

Magma is classified based on the proportion of **silica (SiO₂)** that it contains. The silica content largely controls the type of eruption.

The Four Categories of Magma

Felsic (or silicic) magma	67-76% silica*	Rhyolite
Intermediate magma	53-66% silica	Andesite
Mafic magma	46-52% silica	Basalt
Ultramafic magma	38-45% silica	

*The numbers provided are "weight percent," meaning the proportion of the magma's weight that consists of silica.

53