

What does a Geologist do?



- Adapt or develop technology to explore and understand our planet and its neighbors

Look for signs of water on Mars!



Goals of Mars Rover Missions

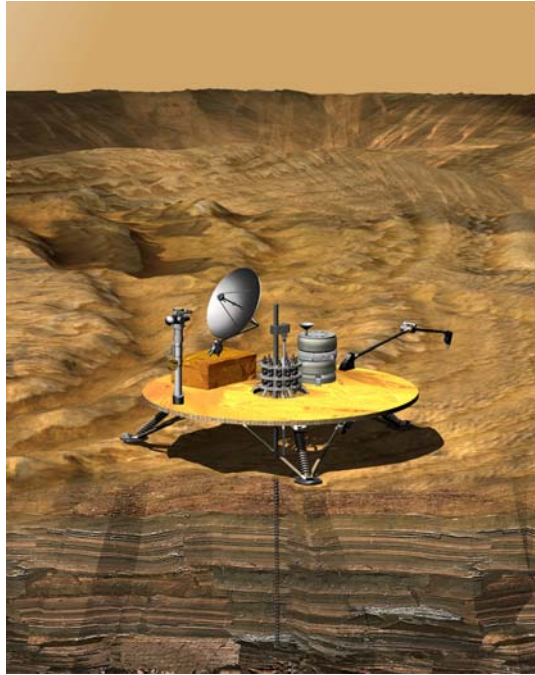
- ☐ Determine whether Life ever arose on Mars
- ☐ Characterize the Climate of Mars
- ☐ Characterize the Geology of Mars
- ☐ Prepare for Human Exploration



Matt Golombek
Planetary Geologist
Jet Propulsion Laboratory

<http://jpl.nasa.gov/videos/mer/mer20081222/mer20081222-640.mov>

Design next
generation
Mars
spacecraft?



Identify and protect water resources



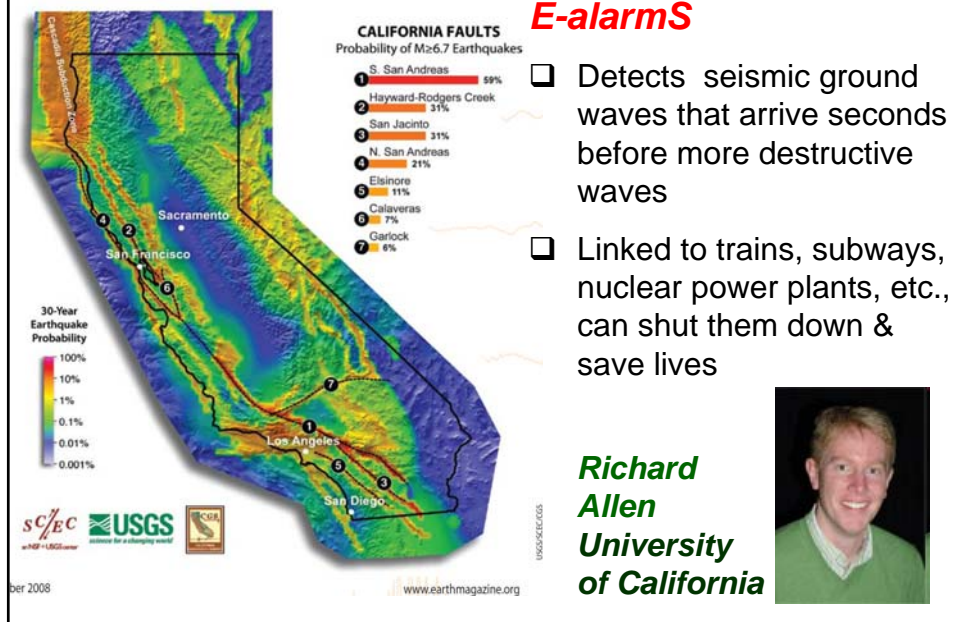
Hydrogeology is a hot field

- ☐ Most drinking water in Wisconsin is groundwater
- ☐ We must keep this resource clean
- ☐ The Wisconsin Geological and Natural History Survey is on top of this issue

John Attig
Geologist
Wisconsin
State Survey



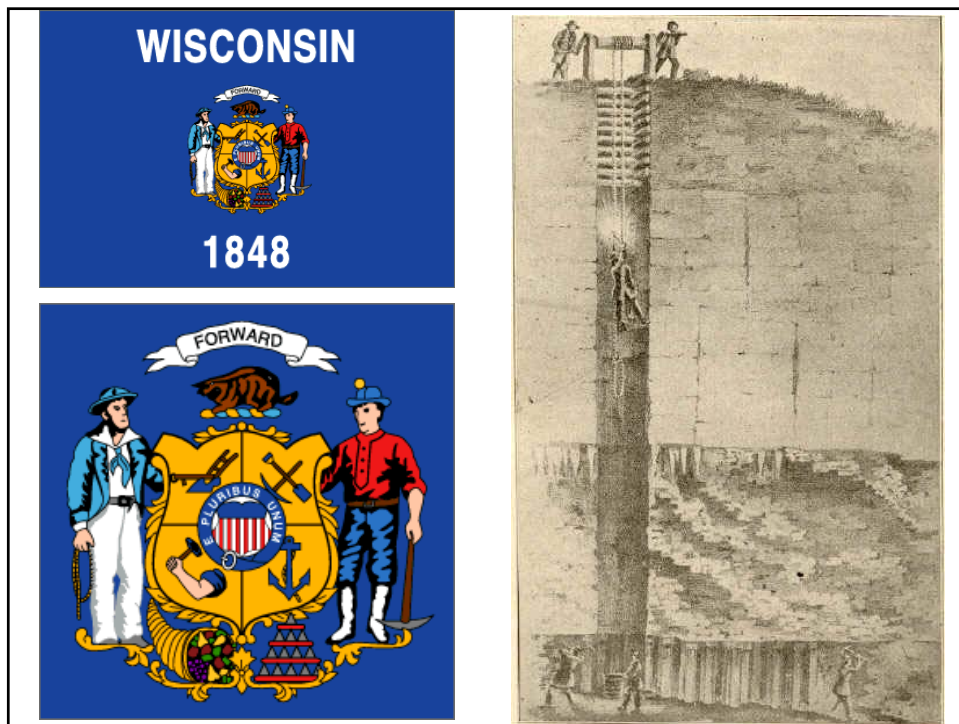
Earthquake early warning systems



Where does this material come from?



- Motor, wheels- **Aluminum**
- Body- **Iron + Chromium (steel)**
- Windows, lights- **Silica glass**
- Battery- **Lead, Lithium**
- Wiring, electronics- **Copper**
- Tires, plastic parts- **Petroleum**
- Paint- **Various minerals**
- Fuel- **Petroleum**
- **Geologic Resources**
 - **Metals**
 - **Nonmetals**
 - **Fossil Fuel**



• Energy Sources

- Biomass: renewable source
 - wood

- Fossil fuel: nonrenewable resource
 - petroleum
 - natural gas
 - coal

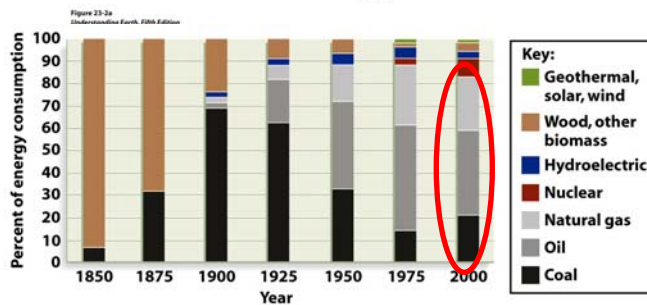
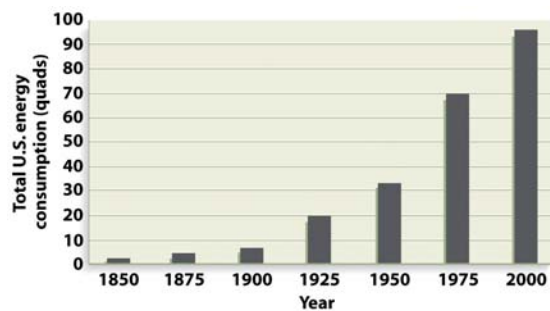


Figure 23-2b
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**World's largest business
(where most geologists work)**

Find and evaluate energy resources

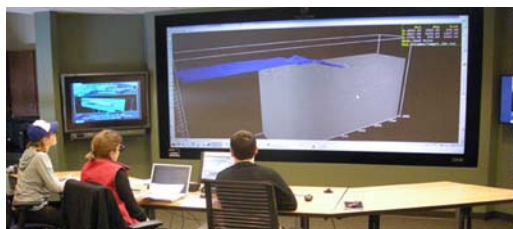


Petroleum Exploration

- ❑ Largest employer of geologists
- ❑ Vital to short-term future

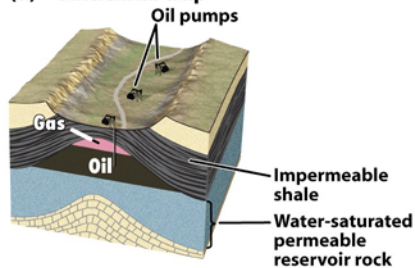


Kuwana Pietras
UW Madison alumna
Exploration Geologist
BP Corporation

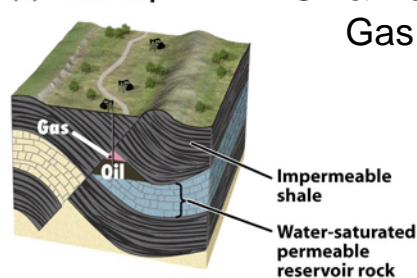


UW-Madison 3-D Visualization Lab

(a) Anticlinal trap

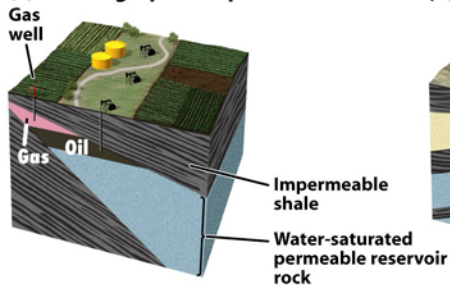


(b) Fault trap



Oil & Natural
Gas ?

(c) Stratigraphic trap



(d) Salt dome trap

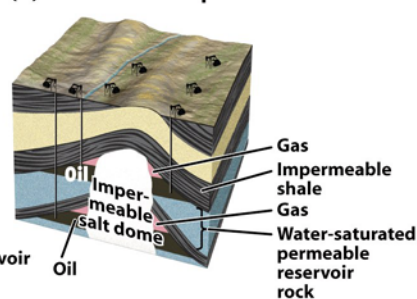


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“...each day brings further evidence that the ways we use energy strengthen our adversaries and threaten our planet.”



“We will restore science to its rightful place,
.....We will harness the sun and the winds and
the soil to fuel our cars and run our factories.”

Proven oil reserves at end of 2004
Billions of barrels (bbl)
(% of world total)

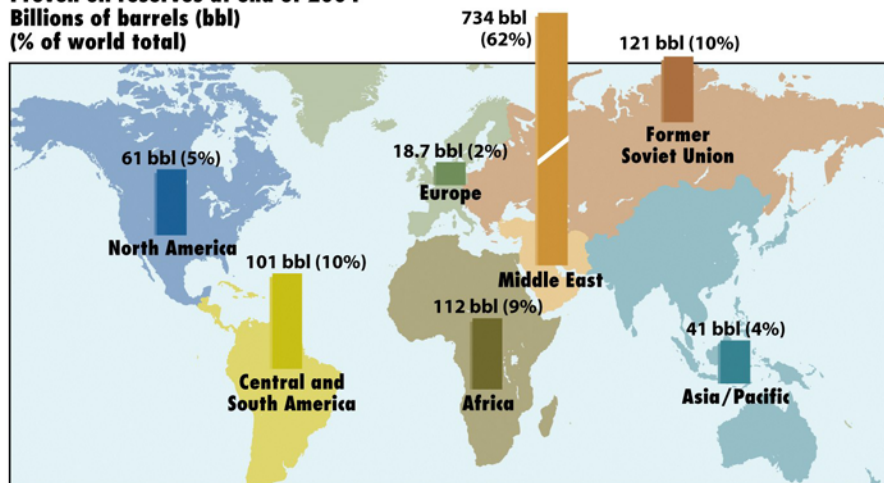
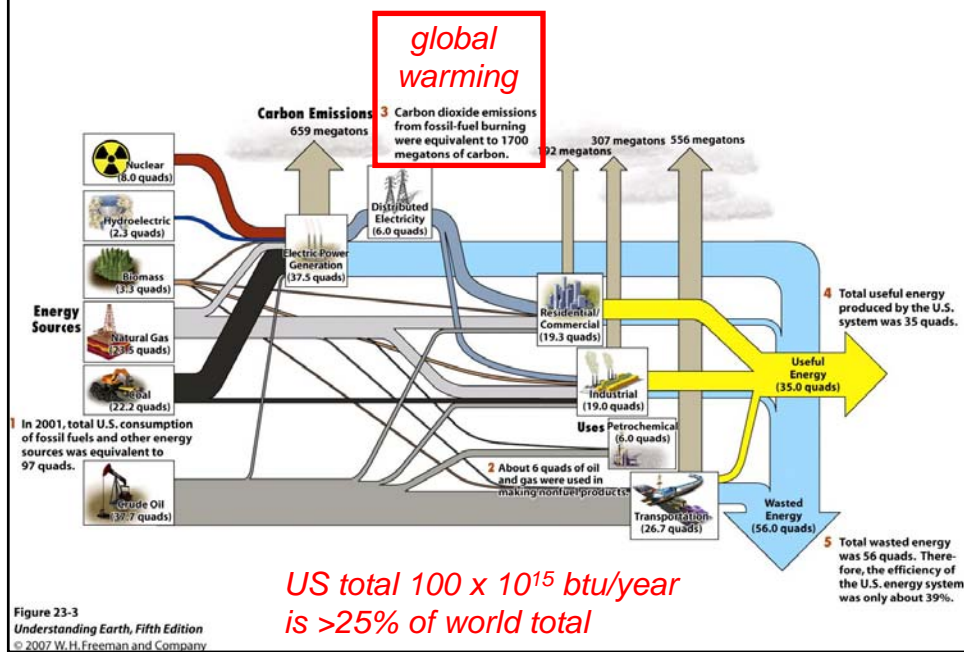
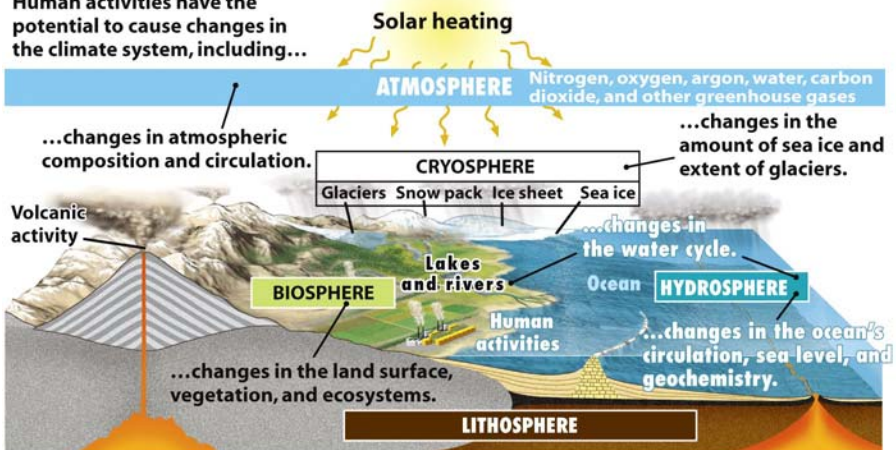


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An economy tied to the carbon cycle



Human activities have the potential to cause changes in the climate system, including...



- Options to modify reliance on carbon

- Limited by availability of fossil fuels
- Availability of alternatives

- Reserves
 - discovered
 - mined economically

- Resources
 - entire amount
 - reserves + all other

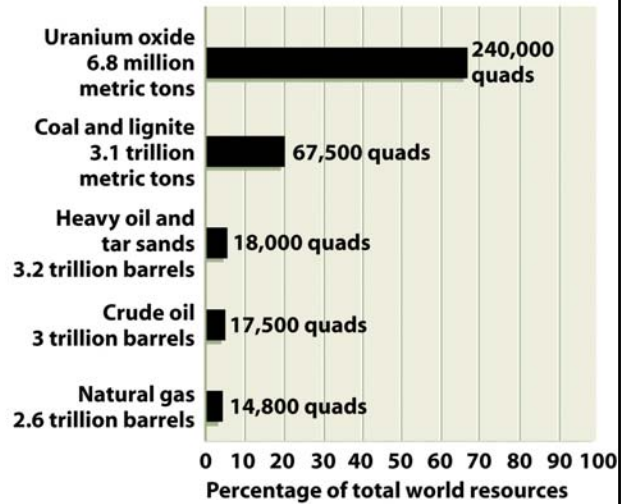
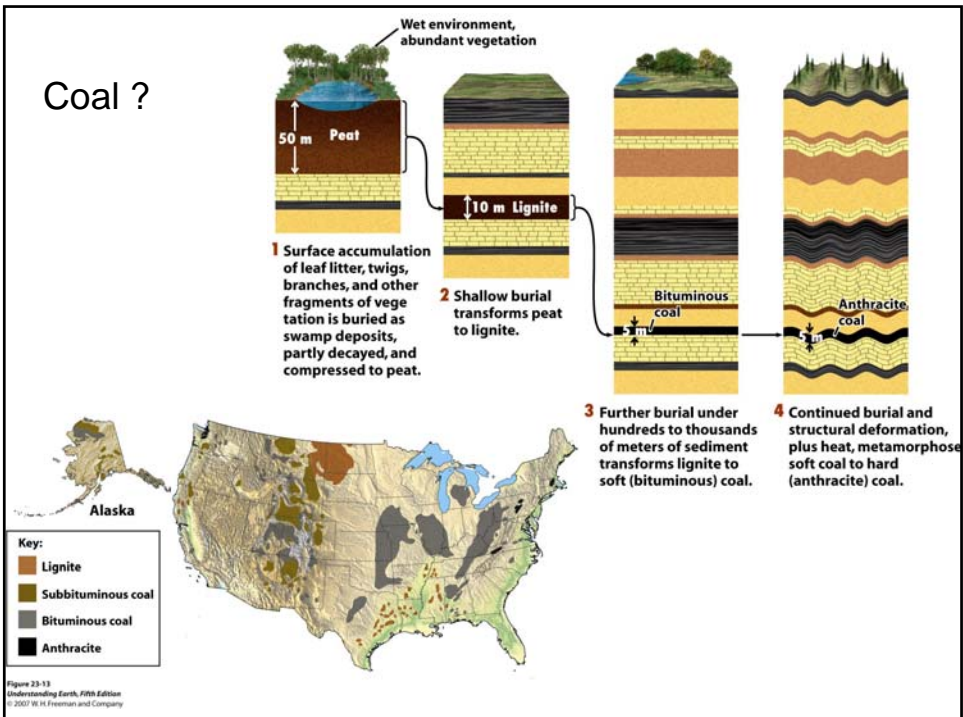
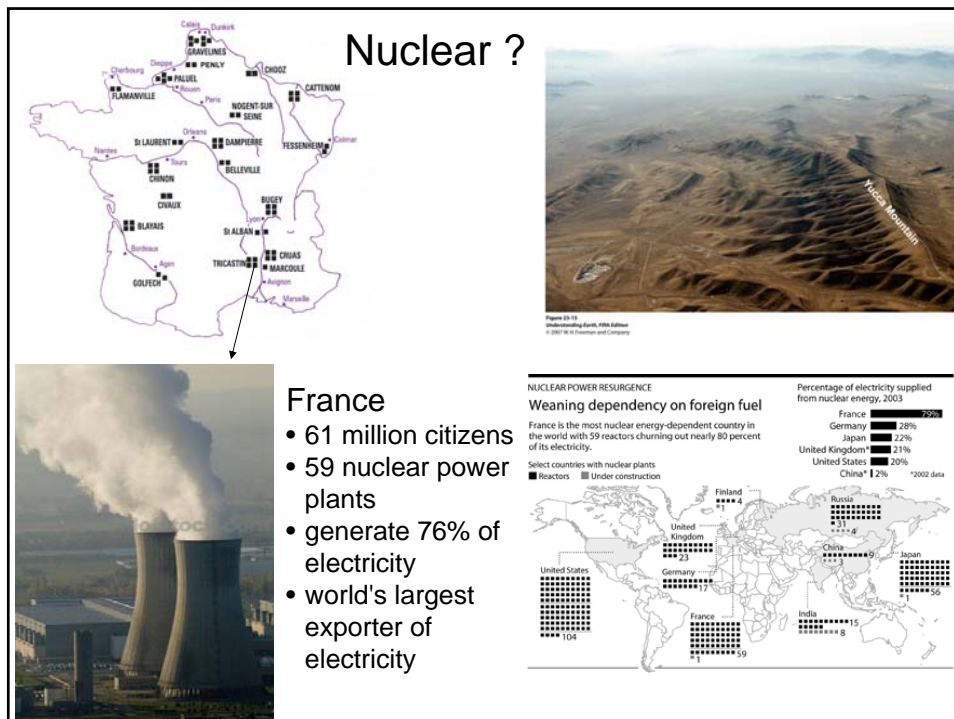
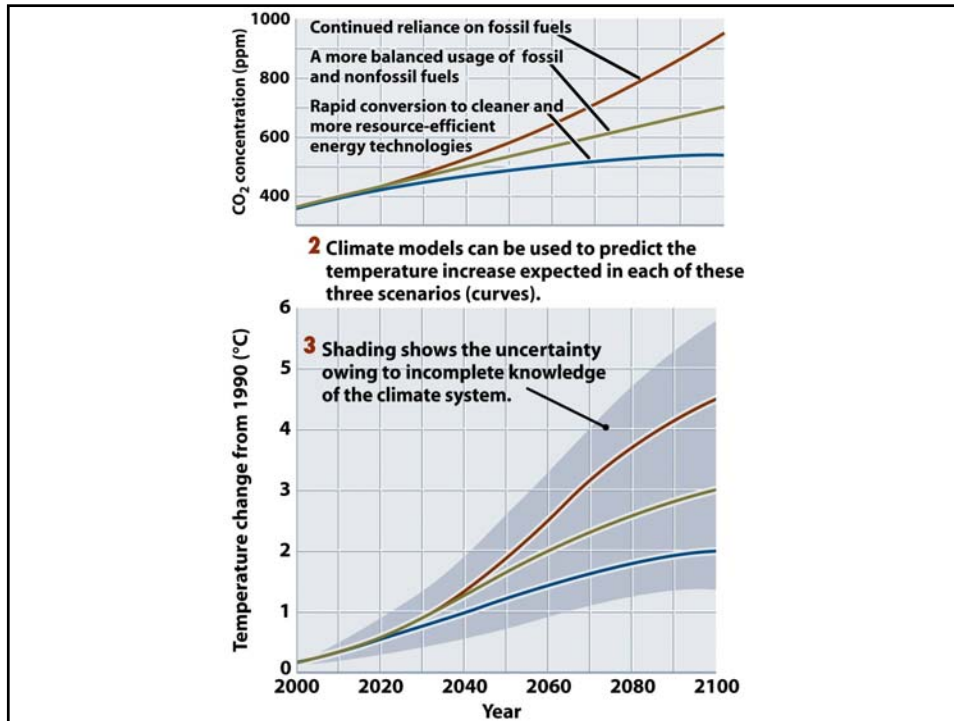


Figure 23-5
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Coal ?





Find and evaluate energy resources



Geothermal Energy

- ☐ The positive side of volcanoes
- ☐ Inexpensive
- ☐ Clean
- ☐ Virtually inexhaustible



Cathy Hickson
Chief Geologist
Magma Energy Corporation

<http://www.magmaenergycorp.com/s/Home.asp>