DISASTER MANAGEMENT

Emergency phone numbers
Police 100
Fire 101
Ambulance 102, 104, 108

TOPICS COVERED

- DEFINITION OF DISASTER
- TYPES AND EXAMPLES OF DISASTER
- DISASTER MANAGEMENT
- ASIATIC DISASTER PREPAREDNESS CENTER
- CAUSES, EFFECTS AND MITIGATION METHODS OF
  - Earthquakes
  - Cyclones and floods
  - Landslides

DISASTER

- Calamity
- A process causing great loss and misfortune
- Some are rapid and some are slow like drought
- The effect may be temporary, or may last long
- All cause loss of life and property

TYPES AND EXAMPLES OF DISASTER

NATURAL

- LANDSLIDES,
- VOLCANIC
- ERUPTIONS,
- EARTHQUAKES AND TSUNAMI,
- CYCLONES AND FLOODS,
- LIGHTENING
- TORNADOES,
- HAIL STORMS
- FOREST FIRES
- AVALANCHES

MAN-MADE

- All kinds of accidents , road, train, nuclear power plants, gas leaks, oil leaks
- Wars, terrorist attacks – bomb etc

Disaster Management

Disaster management includes administrative decisions and operational activities that involve

- **Prevention**
- **Preparedness**
- **Mitigation**
- **Recovery and Rehabilitation**.

Disaster risk management **involves all levels of government & Nongovernmental and community-based organizations**

All individual participation is required

Disaster prevention

- Some can be prevented but not all!

Floods by Planting trees, proper drainage systems

All man made disasters can be prevented.

Disaster Preparedness

- All of the activities that are carried out prior to a catastrophe in order to facilitate the use of available resources, relief, and rehabilitation in the best possible fashion

  Example:
  - Construction of Cyclone shelters in cyclone prone areas
  - Allocation of funds
  - Creating emergency stocks of food
  - Training people to tackle disaster
    - First respondent should be trained – about SAR, First aid etc. This reduces loss of life tremendously.

  SAR: Search and Rescue operations

Asian disaster preparedness center (ADPC)

- Organization involving four countries - India, Srilanka, Bangladesh and Thailand

Functions:

- Provides information about disasters
- Gives courses on Disaster Management
- Employs & trains professionals for disaster management
- Creates awareness
- Funds disaster management programs

Disaster Mitigation

- Steps taken to contain or reduce the effects of an anticipated or already occurred disastrous event.

(Prevention and steps taken in advance to reduce the effect of disaster)

Example:

Earthquakes – do not construct in earthquake prone areas

Cyclones and floods– Install warning systems and evacuate people in time

Tornados – Construct basements and go into when there is a warning

Post Disaster

- Rescue and Recovery
  - For example people trapped from flooded areas or under collapsed buildings need to be rescued
- Emergency Medical Facilities – prevention of diseases
- Food and clothes
- Rehabilitation - Compensation

Causes, Effects and mitigation methods of

- Earthquakes
- Cyclones and floods
- Landslides

EARTHQUAKES

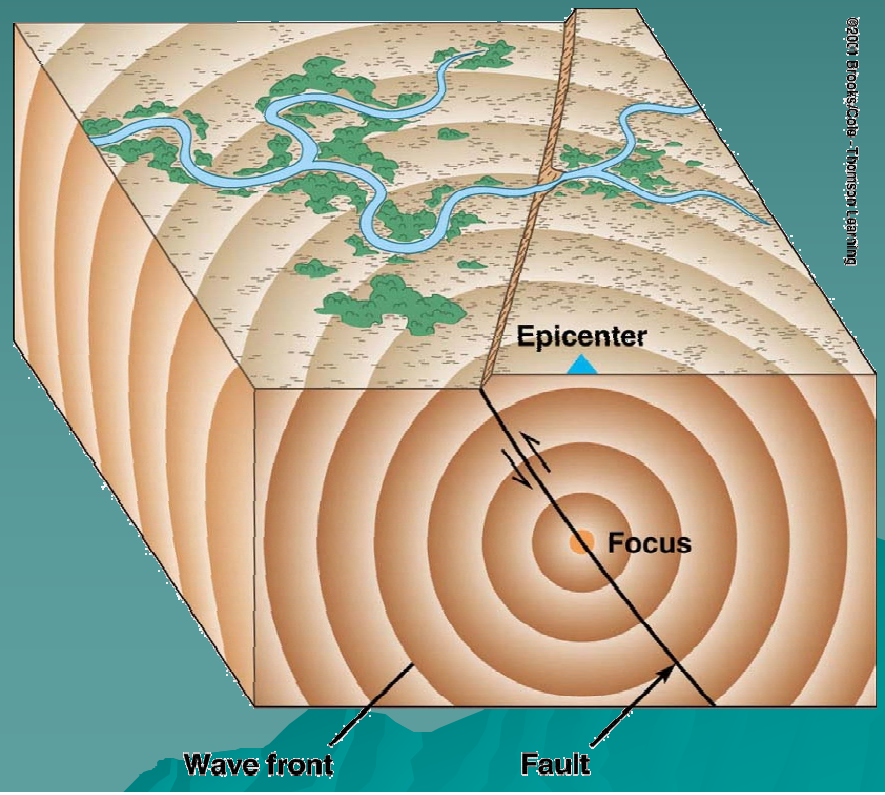
- Biggest ever occurred in Chile on May 22, 1960.

Earthquake

Earthquake is due to sudden release of energy in the earth's crust

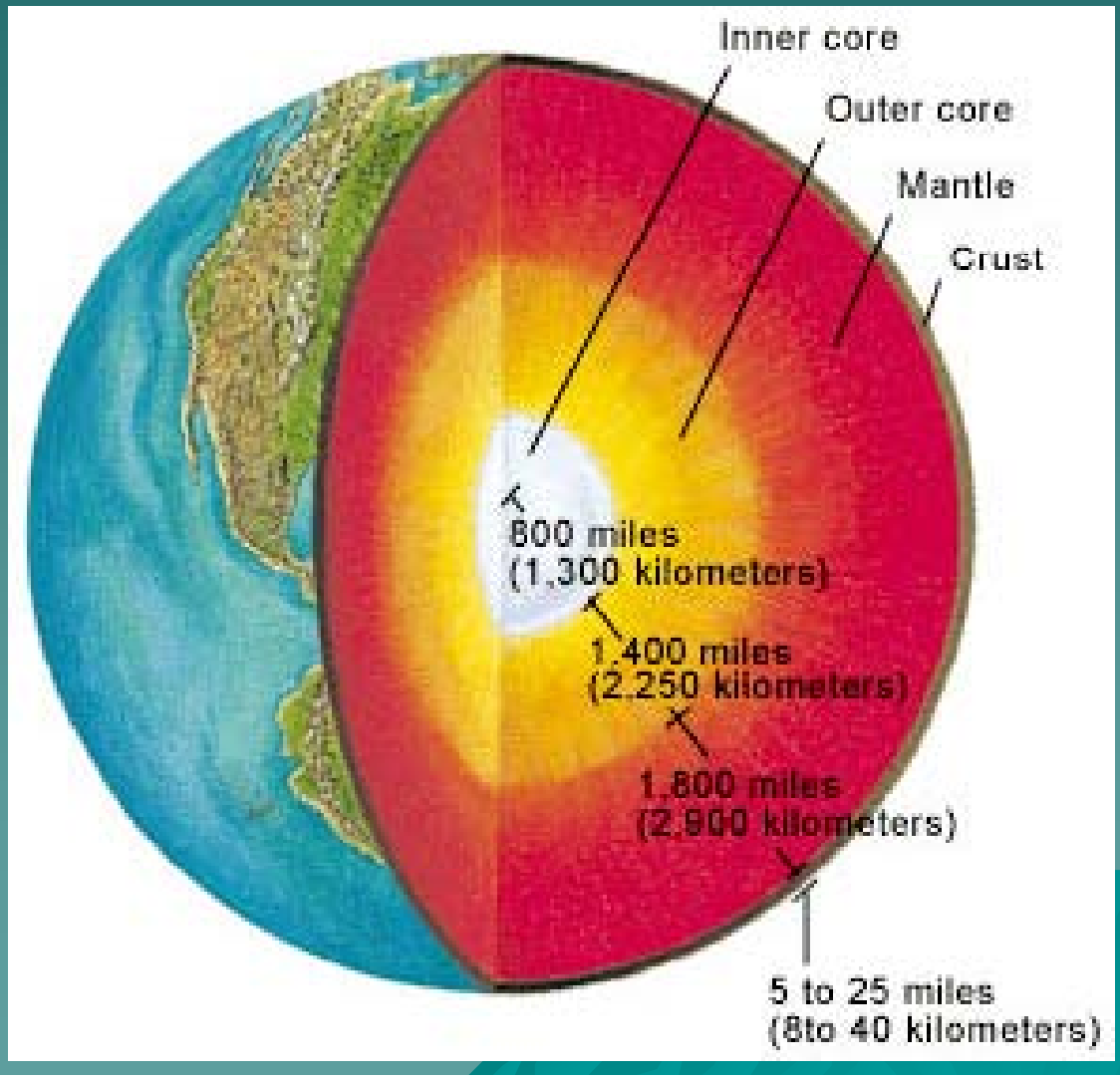
The Focus and Epicenter of an Earthquake:

- The point within Earth where faulting begins is the focus, or hypocenter
- The point directly above the focus on the surface is the epicenter



How do earthquakes occur?

- Look at the structure of earth



How do earthquakes occur?

- Earths crust is made up of several rocky layers –tectonic plates (structured plates)
- Tectonic plates move along their boundaries which causes earthquakes
- Or there are fault zones in these plates, rocks collapsing into them can cause a vibration to give rise to earthquake
- Proof? -Continent drift

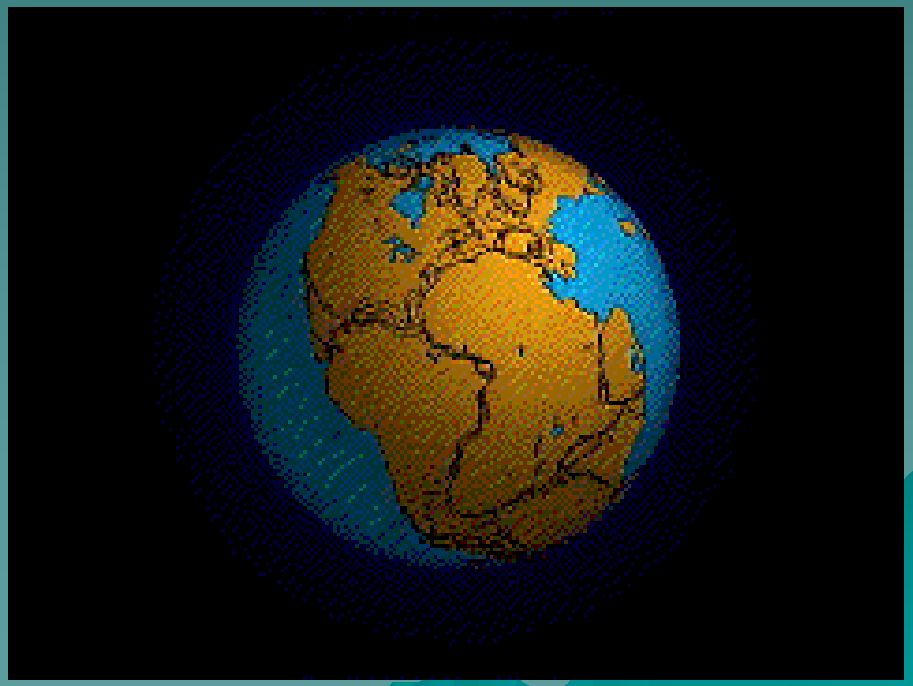
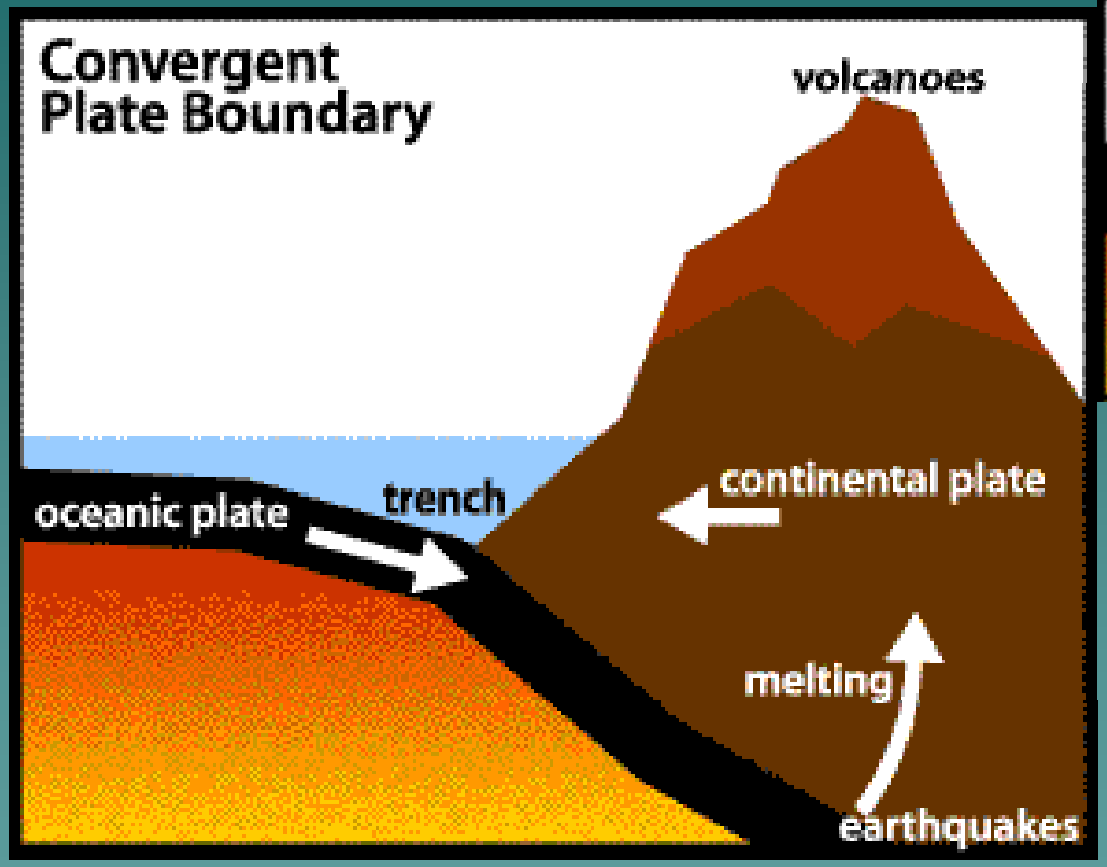
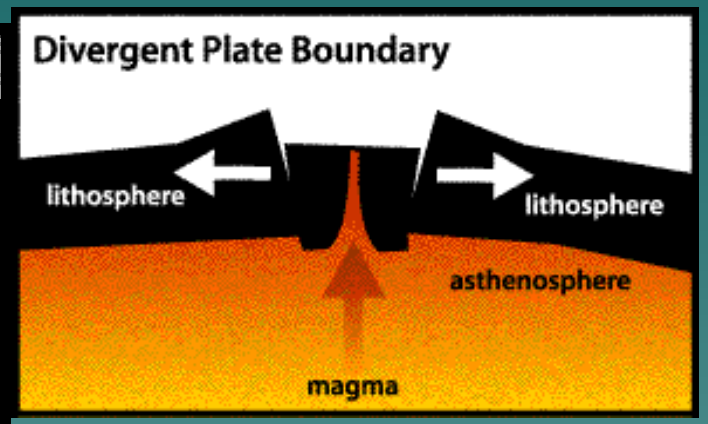
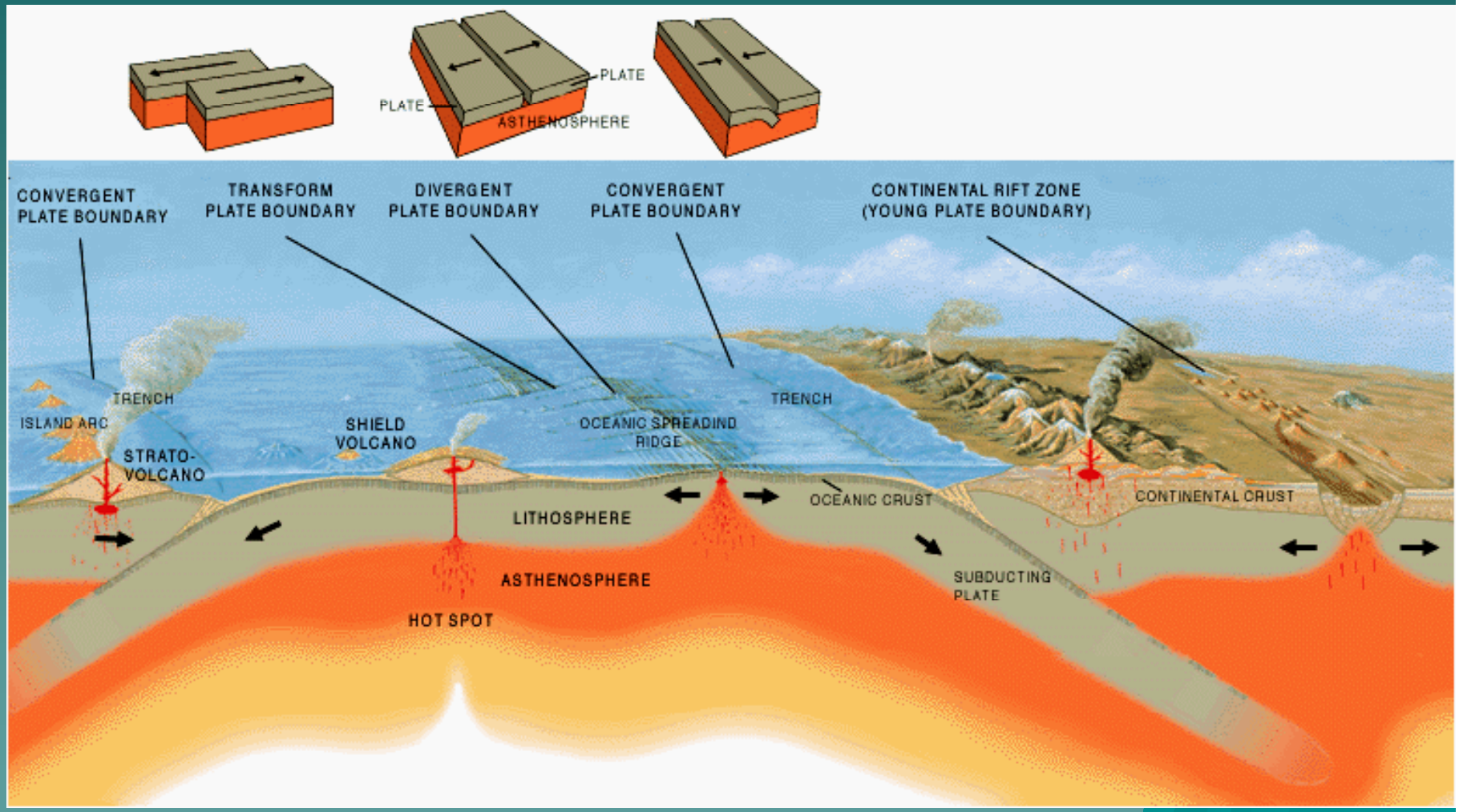


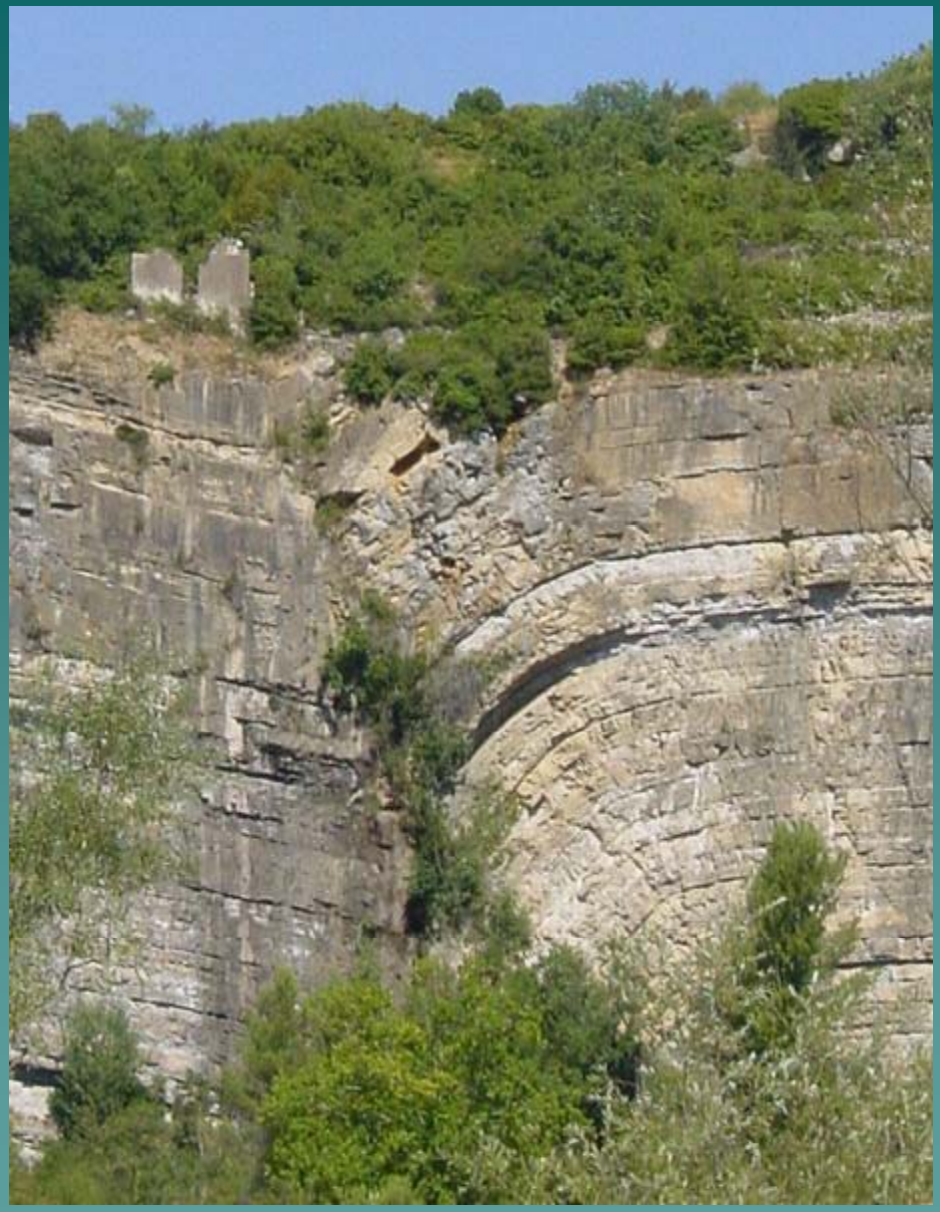
Plate Movements and faults

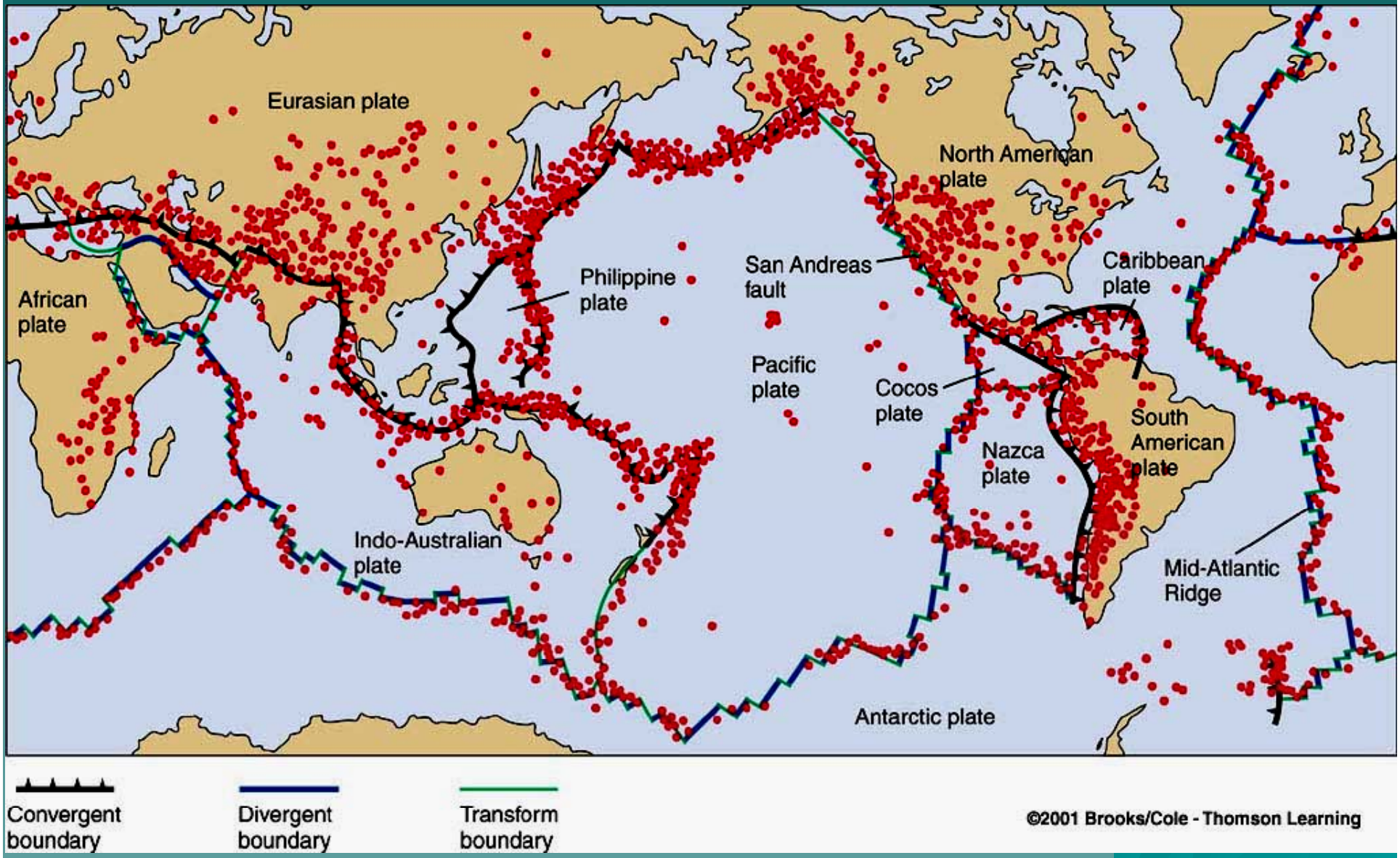




Processes occurring due to plate tectonics






Eurasian plate
North American plate
African plate
Philippine plate
San Andreas fault
Caribbean plate
Pacific plate
Cocos plate
South American plate
Nazca plate
Indo-Australian plate
Mid-Atlantic Ridge
Antarctic plate
Convergent boundary
Divergent boundary
Transform boundary
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Anthropogenic causes

- Construction of dams resulting in big reservoirs of water
- Underground nuclear testing
- Deep well disposal of liquid waste

Effects of earthquakes

- People die or get trapped inside when buildings collapse
- People lose their homes
- Property loss
- Communication loss
- Transport may be affected
- Loss of wildlife and ecosystems
- Dams may break and cause floods

Mitigation methods

- Avoid big dams
- Constructions – major cities expansion should be avoided in earthquake prone zones
- Houses should be designed to withstand earthquakes
  - Heavy reinforcement
  - Vibration absorbents
  - Wooden houses should be constructed instead of concrete ones!?!

As an individual what do you do?

Identify the possible disaster you may face

Before the Disaster	During the Disaster	After the Disaster

Cyclones

- Willy willies in Australia,
- Hurricanes in Atlantic, North east pacific regions
- Rapid wind & Heavy rain

Cyclones

- Occur only in regions where temp. >26 ^{O}C
- Hot vapors form and rise quickly
- Cool when they reach above
- Take circular path due to earths rotation

Effects of Cyclones

- Strong winds causes structural damages
- Trees may fall
- Floods
  - Causes we have already seen
  - Construction of pavements, improper drainage systems, Clearing of forests
- Displacement
- Loss of property
- Crops are destroyed
- Post cyclone infections

To check cyclones and floods

- Construct check dams
- Wind breaks
- Restore wetlands
- Prevent constructions in flood prone areas – instead, afforestation, parks etc..
- Construct elevated houses
- Should plant trees in coastal areas
- Should maintain proper drainage and wide roads for quick evacuation
- River networking?

LANDSLIDES

- Sudden landslides are a danger if occur near human settlements

Landslides

- Natural way of soil regeneration
- A problem only when occurs in regions of human activity

Landslides

- What happens in a landslide?
  - Failure at a slope to hold matter
  - the subsequent transport of the matter, and
  - the deposition of the slide materials.
- Often triggered by heavy precipitation

Can landslides occur everywhere?

- Do not occur everywhere
- Depends on
  - the nature of the underlying rock and soil,
  - the geometry of the slope, and
  - ground-water conditions.

What are the causes of Landslides?

- **Natural causes:**

1. **Wearing**
2. **Undercutting of a slope**
   - **by stream erosion,**
   - **wave action,**
   - **glaciers,**

Causes of land slides contd..

3. **Intense or prolonged rainfall, rapid snowmelt, or sharp fluctuations in ground-water levels,**

4. **Shocks or vibrations caused by earthquakes or construction activity, volcanic eruptions**

5. **Loading on upper slopes, or**

6. **A combination of these and other factors.**

Human activity

such as

- road building,

- Mining, blastings
- Excavations and displacement of rocks

Other Human causes

- removal of vegetation; - deforestation
- interference with, or changes to, natural drainage;
- leaking pipes such as water and sewer reticulation;

Prevention – is it advisable?

- **PREVENTION METHODS ARE THREE TYPES**

  1. Reduction of activating forces

  2. Increasing the forces resisting movement, and

  3.Avoidance or elimination of the slide.

Prevention

1. REDUCTION OF THE ACTIVATING FORCES CAN BE ACCOMPLISHED BY
   - Removal of material from the portion of the slide which provides the driving force
   - Subdrainage to eliminate hydrostatic pressure

Prevention

2. **INCREASING THE FORCES RESISTING SLIDE MOVEMENT**

- **Construction of constraining structures,**
  - **Such as piles, walls, cribs, or toe support fills, and**
  - **Forestation**

Prevention

2. **INCREASING THE FORCES RESISTING SLIDE MOVEMENT**
   - **Solidification of loose granular material**
     - **By chemical treatment.**

Prevention

3. **AVOIDANCE.**

   - **Relocation of the proposed highway or structure to avoid unstable terrain,**

   - **Complete removal of an existing slide; bridging the unstable area.**