

# Earthquakes & Volcanoes

Pressure Release

# Earthquakes

- Earthquakes are the shaking of the ground caused by the sudden movement of large chunks of rock along a fault.

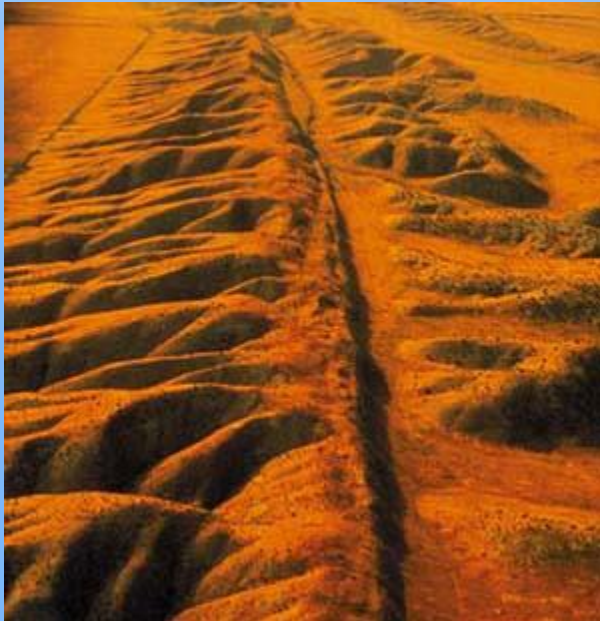


Acknowledgement: GNS Wellington

Damage caused by a fault trace during the 1987 Edgecumbe earthquake

# Earthquakes

- ▣ **Stress builds up along the fault lines until the rocks slip past each other releasing the energy.**





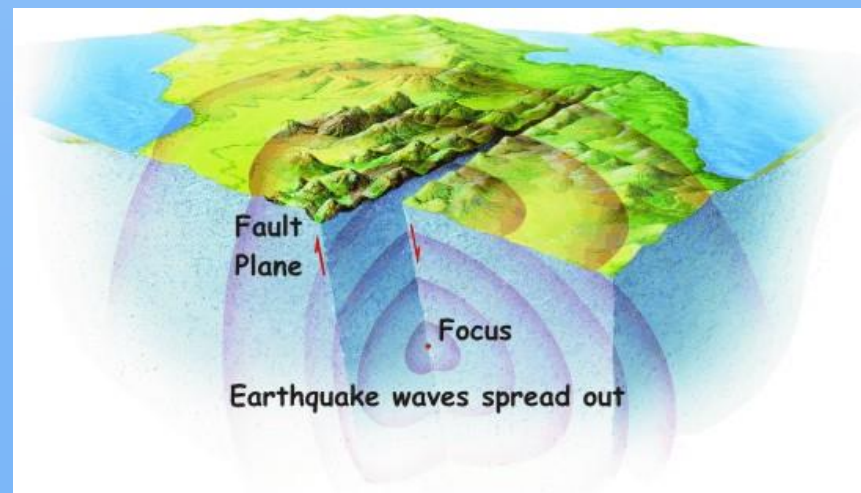
# Stress?

- The stress comes from the build up of liquids under pressure. The heat comes from nuclear reaction deep in the Earth's core.



# Earthquakes

- The energy from an earthquake moves through the ground in waves. The closer to the epicenter the stronger it feels.
- The energy for earthquakes comes from the heat within the Earth.



# Faults

- ▣ A fault is a break in the Earth's surface.



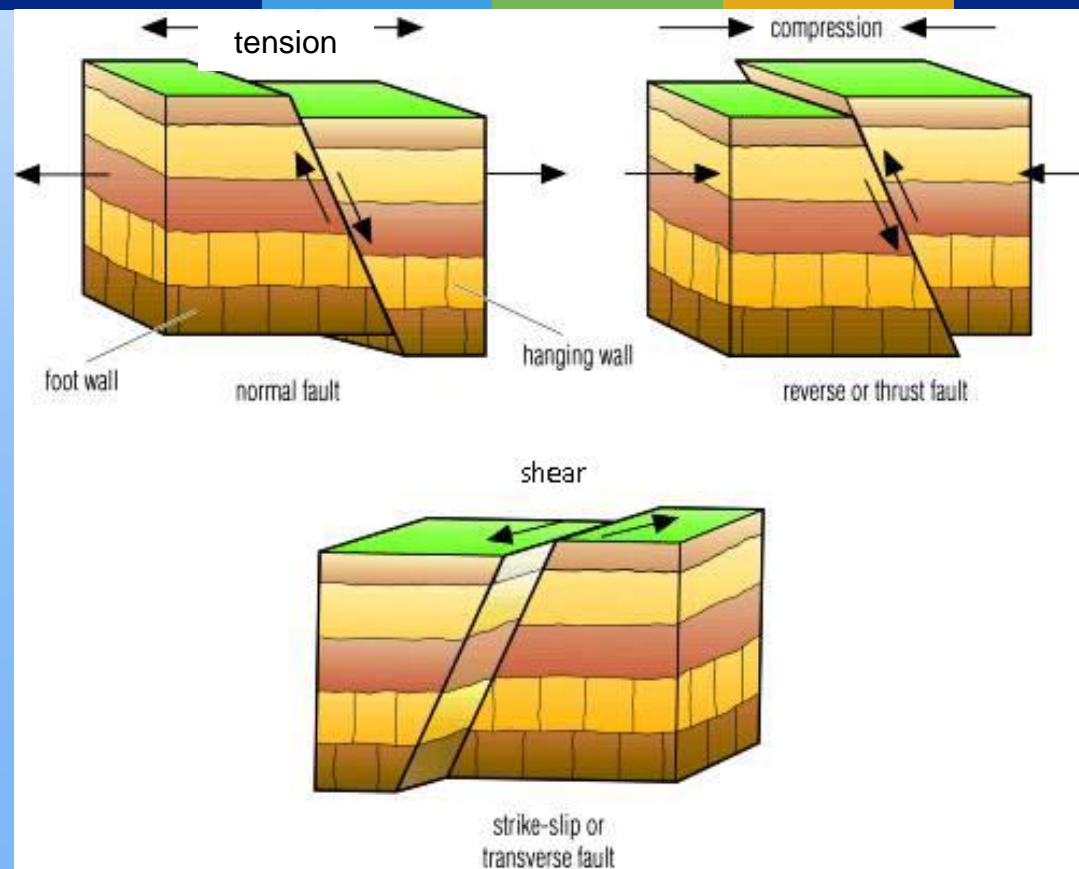


# Types of Earthquake Faults

**Normal** – The earth moves apart  
(caused by tension)

**Reverse** – The earth pushes into itself  
(caused by compression)

**Strike-slip** – The earth moves alongside itself.  
(caused by shear)



# Earthquakes

- The strength of the earthquake is due to the amount of stress built up and the distance the rocks move past each other.





# The Richter Scale

- The Richter Scale measures the strength of earthquakes.

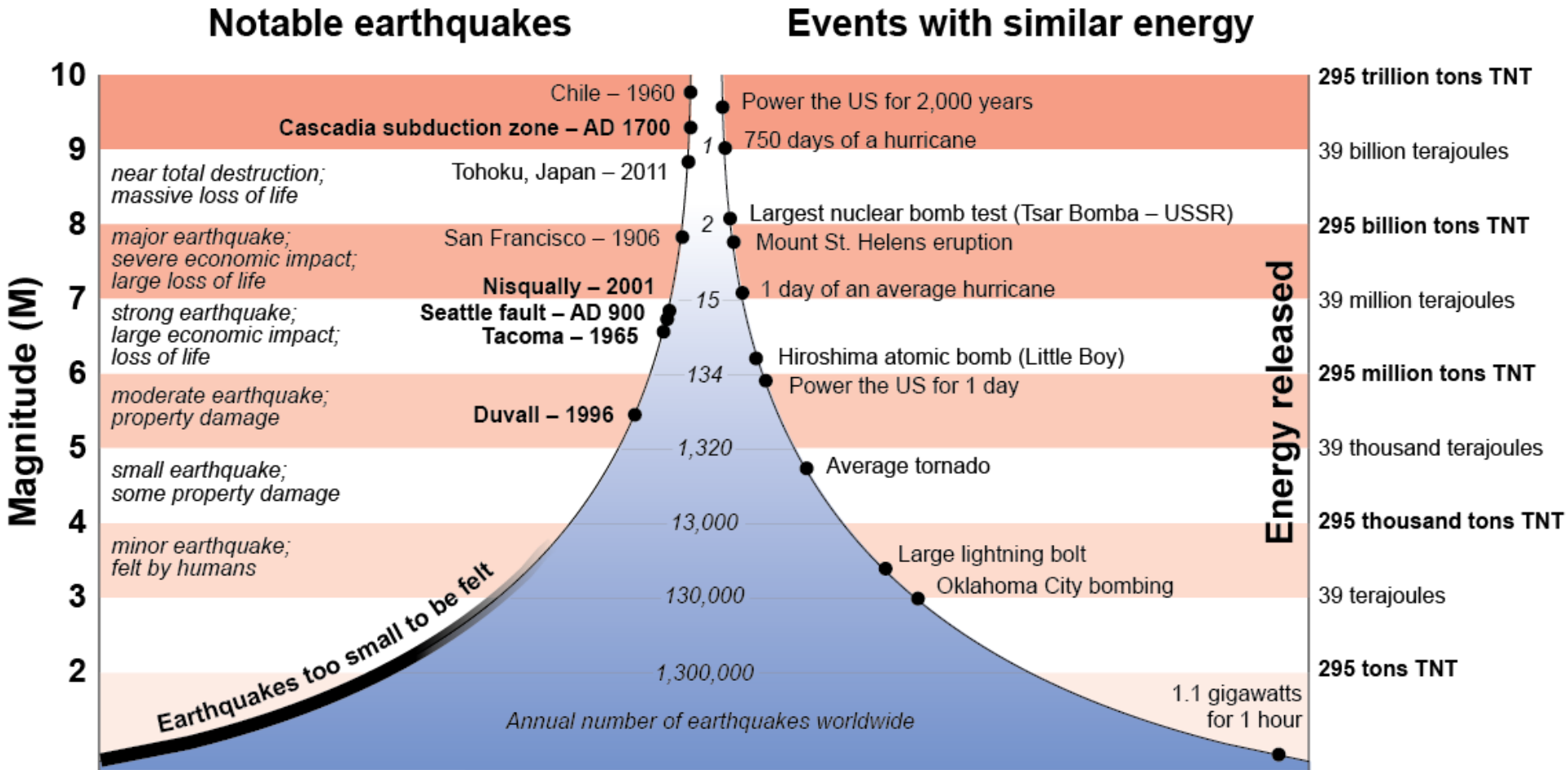
## RICHTER SCALE of earthquake energy:

Each level is **10** times stronger than the previous level

	<u>Description</u>	<u>Occurrence</u>	<u>In Population</u>	<u>Movement</u>
1	SMALL	DAILY	every minute	small
2	SMALL	DAILY	every hour	small
3	SMALL	DAILY	every day	small
4	SMALL	DAILY	every week	moderate sudden
5	MODERATE	MONTHLY	every 10 years	strong sudden
6	MODERATE	MONTHLY	every 30 years	strong sudden
7	MAJOR	MONTHLY	every 50 years.	severe sudden
8	GREAT	YEARLY	every 100 years	very severe
9	GREAT	YEARLY	every 300 years	very severe
10	SUPER	RARELY	every 1000 years	extreme

# Strength of Earthquakes

## Earthquake energy and frequency



Earthquake data and frequency from USGS at <http://earthquake.usgs.gov/earthquakes/eqarchives/year/eqstats.php>

Energy released and events from <http://alabamaquake.com/energy.html> and [http://en.wikipedia.org/wiki/Orders\\_of\\_magnitude\\_\(energy\)](http://en.wikipedia.org/wiki/Orders_of_magnitude_(energy))

XII Damage total; waves seen on ground; objects thrown into air

# Volcanoes

- ▣ Volcanoes are openings in the Earth's crust where molten rock, rock fragments and gases erupt.





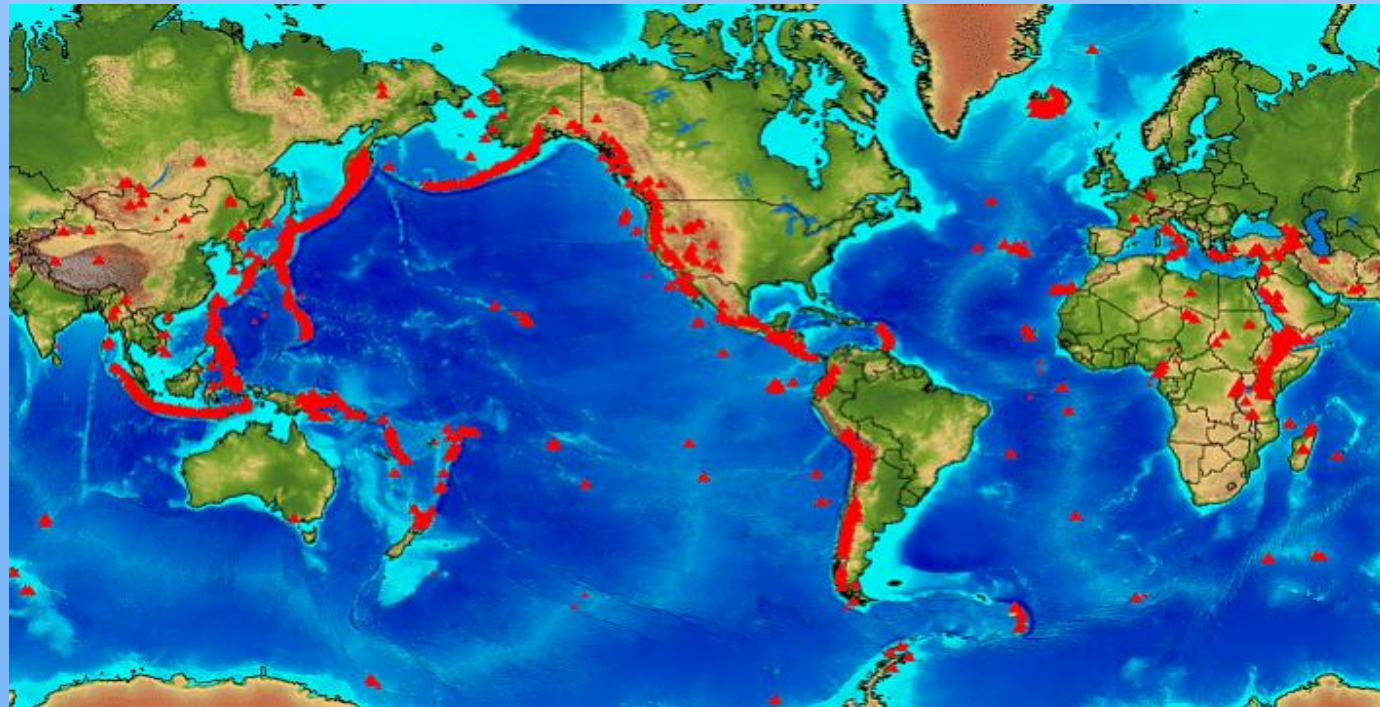
# Volcanoes

- ▣ Volcanoes are formed along tectonic plate boundaries and over hot spots which are areas where the Earth's crust is thin.



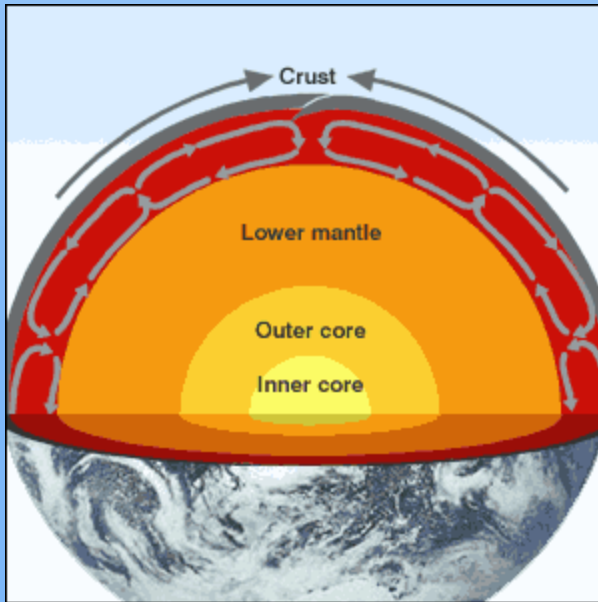
# Volcanoes

- About 75% of all the Earth's active volcanoes are in an area known as the Ring of Fire which surrounds the Pacific Ocean.



# Volcanoes

- Volcanoes are relieving stress of the earth the same as earthquakes. The difference is that magma comes to the surface.





# Types of Volcanoes

1. **Cinder cone** – steep sided volcanoes
2. **Shield** – broad and flat volcanoes
3. **Composite** – Violent, combination of the other 2 types of volcanoes.

