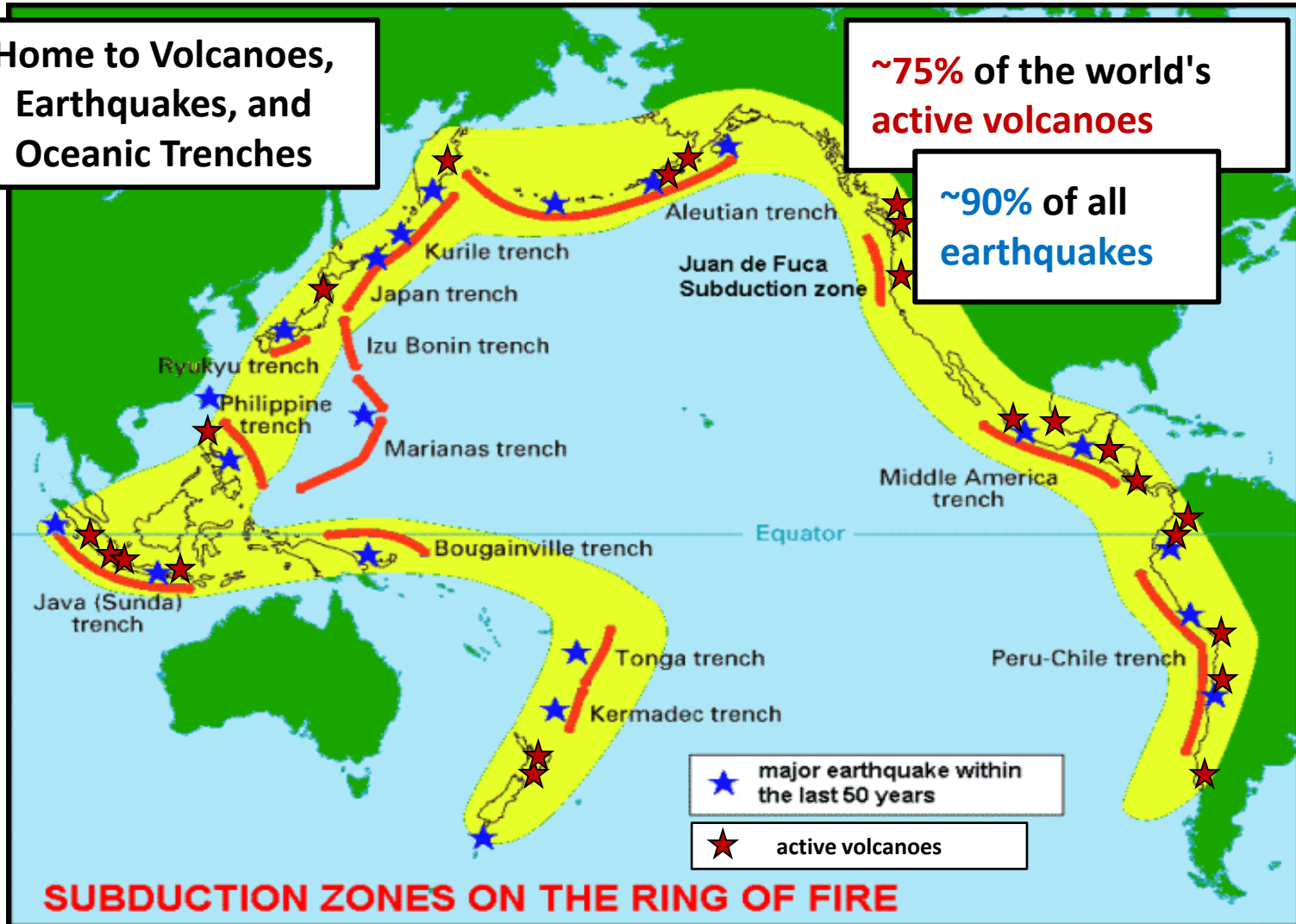


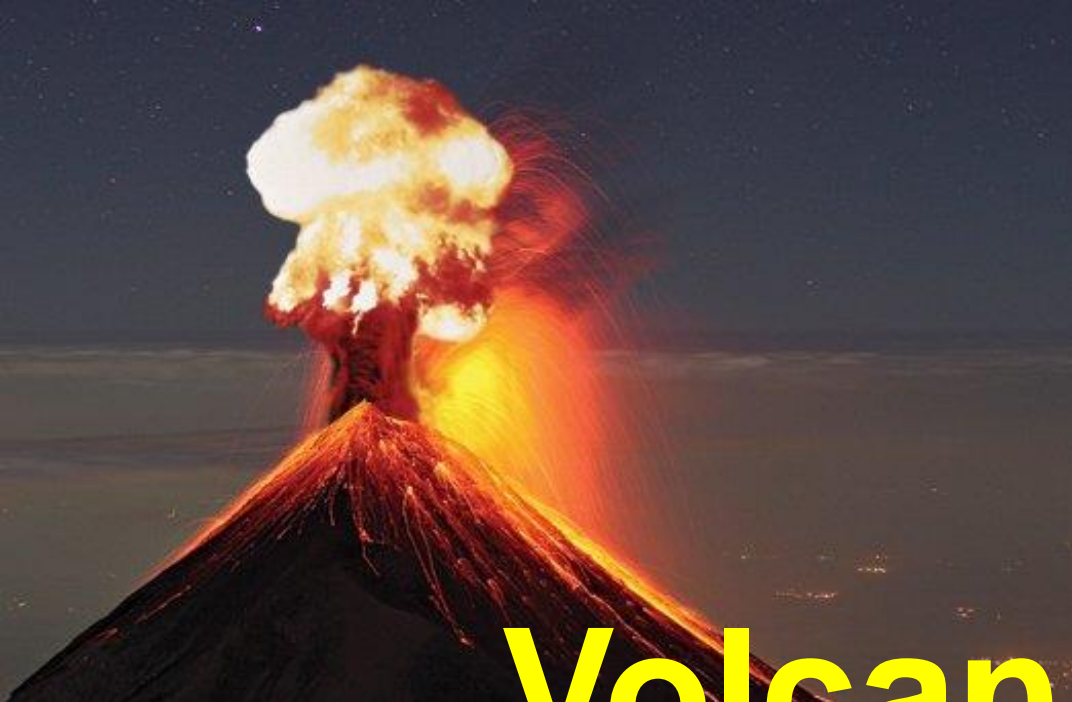
# The Pacific Ring of Fire

Home to Volcanoes,  
Earthquakes, and  
Oceanic Trenches

~75% of the world's  
active volcanoes

~90% of all  
earthquakes



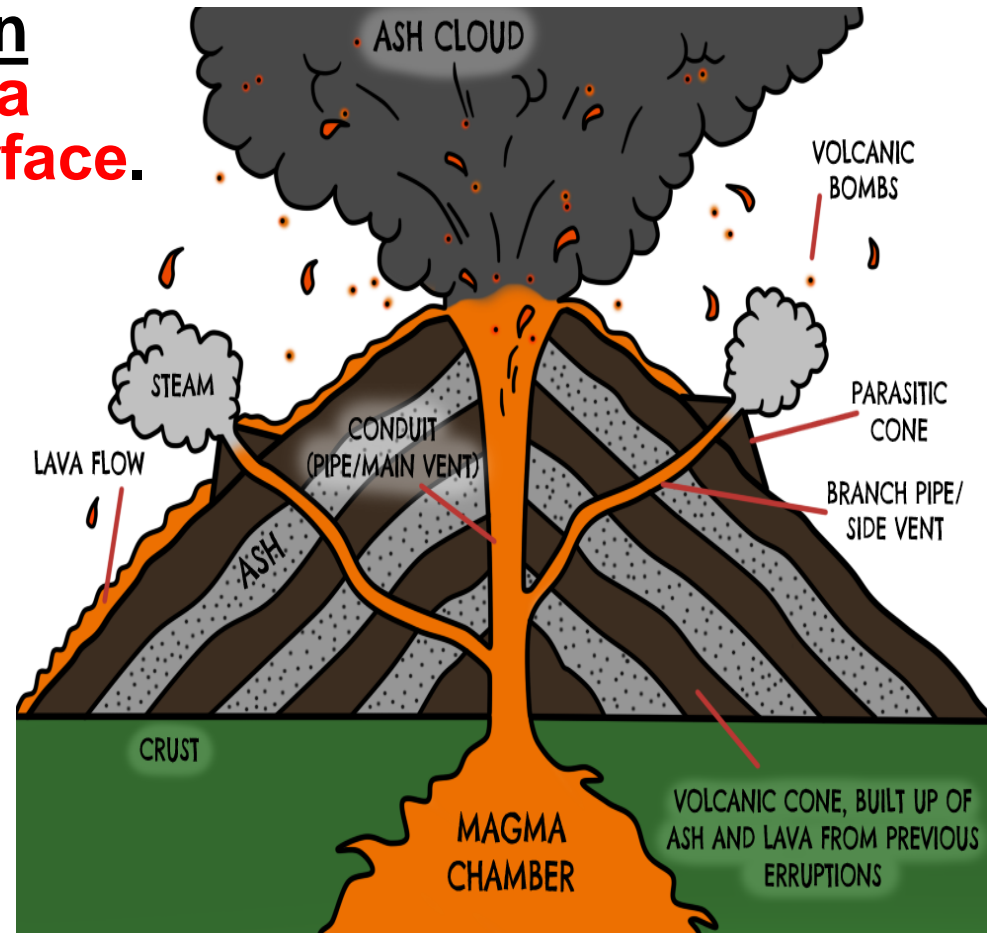


# Volcanism



# What is Volcanism?

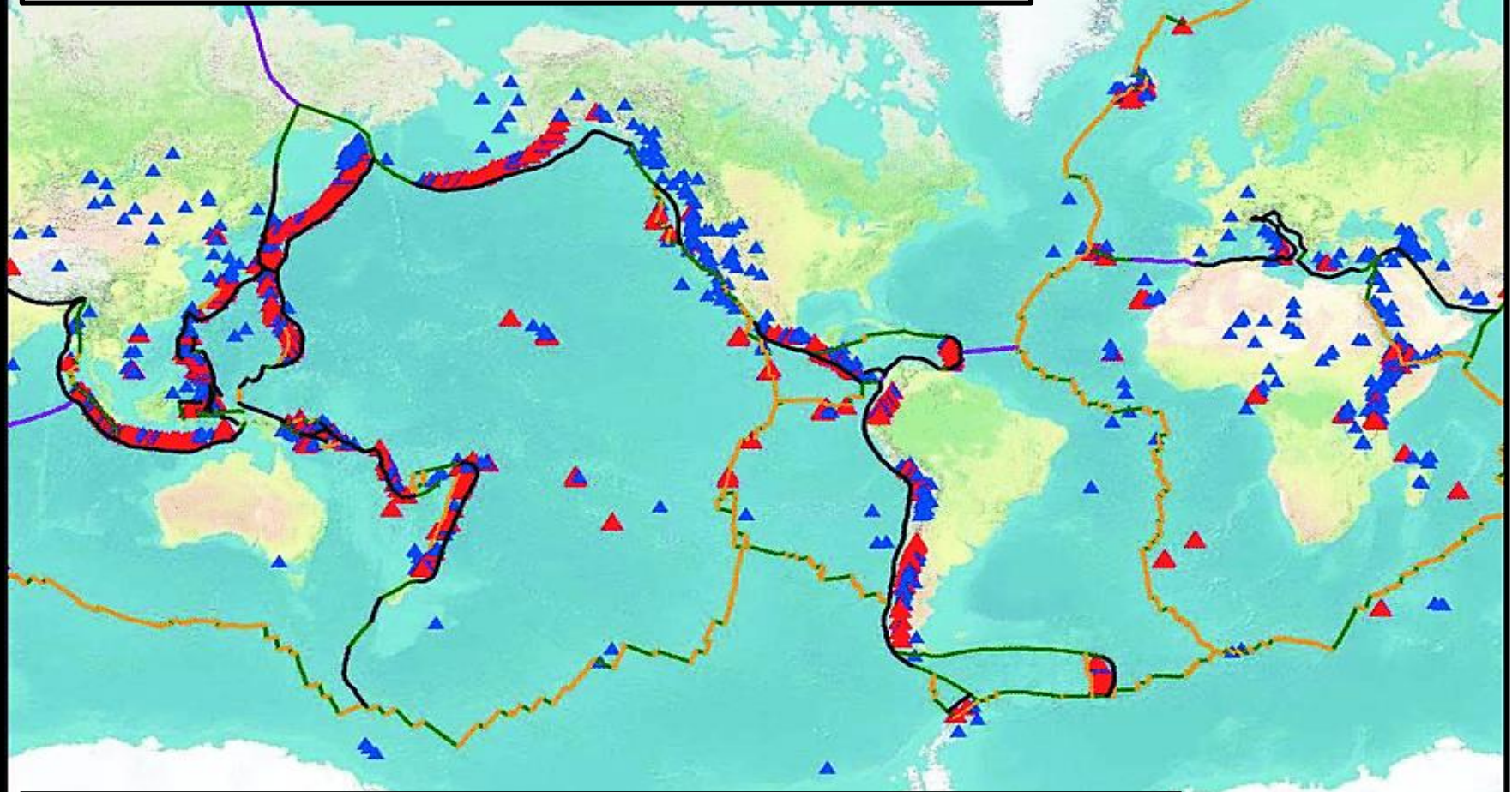
- A volcano is a mountain that forms when **magma reaches the Earth's surface**.
- Magma develops and collects in areas called **magma chambers**.
- Magma is less dense than the solid rock around it.
- Magma can also easily migrate (flow) if a structural zone allows movement.
- When a **rupture on the crust** is present, magma rises to the surface and escapes, resulting in **volcanism**.





# Volcano Distribution

during the current geological epoch



**△ Activity since 1900, △ Activity since ~11700 YA**

0 5,000 km

# Volcanic Activity

- **Active** - activity present in the last few centuries:
  - Mauna Loa, HI (1984)
  - Mt. St. Helens, WA (1980)
- **Dormant** - “quiet” for the last hundreds to thousands of years, but still have potential to erupt:
  - Mt. Elbrus, Russia (~2000 years ago)
- **Extinct** - no eruption in historical times, unlikely to erupt again, no longer have magma supply:
  - Castle Rock, Edinburgh, Scotland (~350 million years ago)







# Currently erupting volcanoes

2022-11-05

[www.volcanodiscovery.com](http://www.volcanodiscovery.com)

-  : in eruption
-  : minor activity



**47 volcanos are active RIGHT NOW!**

# Notable Volcanoes

- **Mt. Etna, Italy**  
Continuous eruption  
for almost 110 years!



- **Kilauea, Hawaii**  
Largest observed lava lake

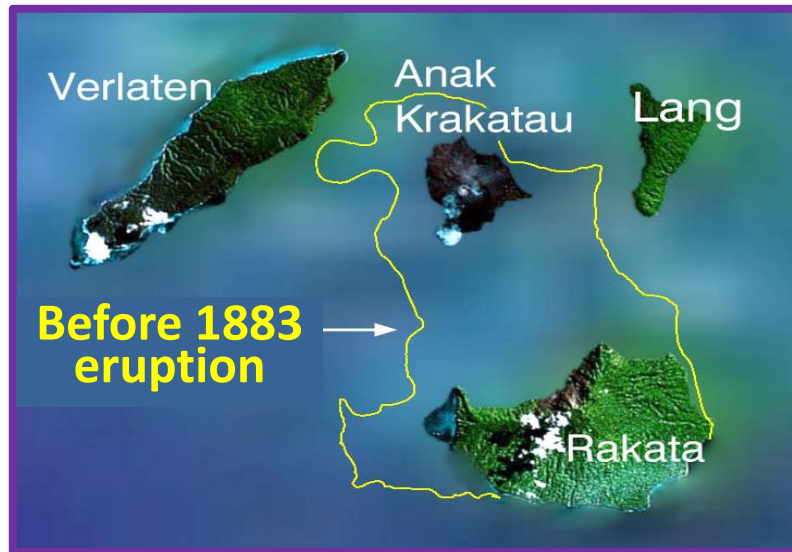
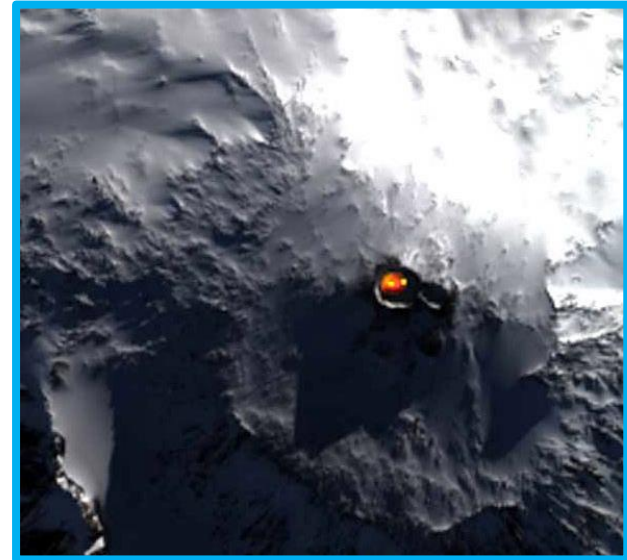




# Notable Volcanoes

## Mt. Erebus, Antarctica •

Southernmost active volcano on Earth.



NOW

THEN

## • Krakatoa, Indonesia

1883 explosive eruption produced huge tsunamis as well as loudest sound ever heard in modern history.





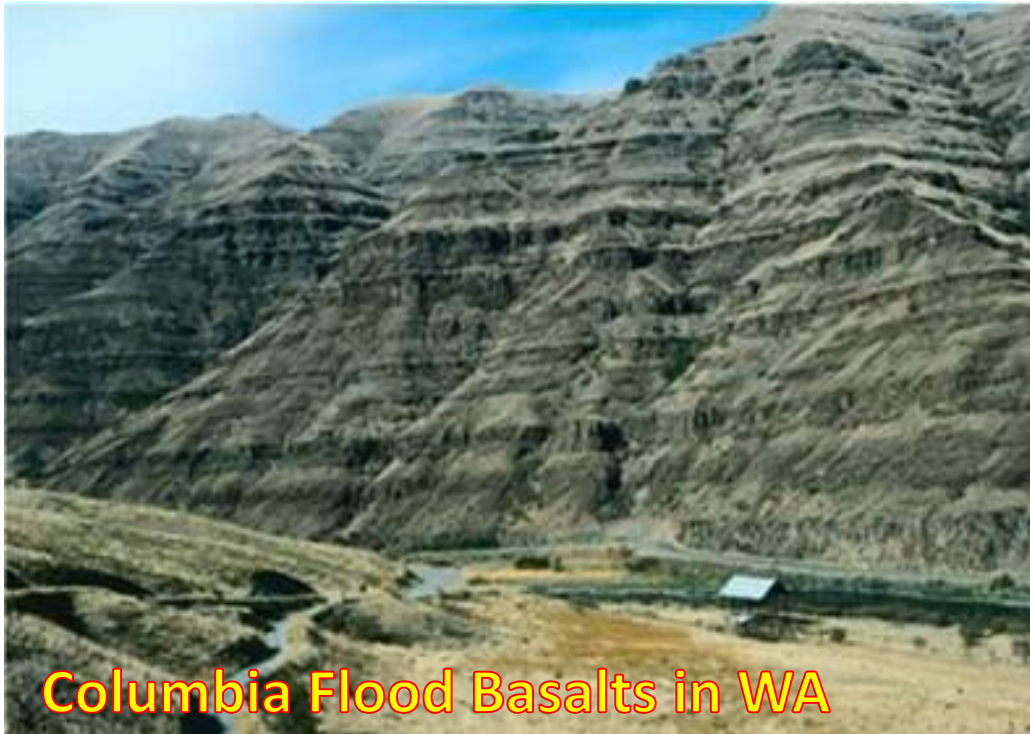
# Volcanic Eruption: Non-explosive

- Most volcanoes erupt basalt, a fluid **low viscosity lava** that erupts *effusively* (quietly) and forms *flows* with occasional *fountains*.



- **Higher viscosity lava** with low gas content produces bulging lava *domes*.

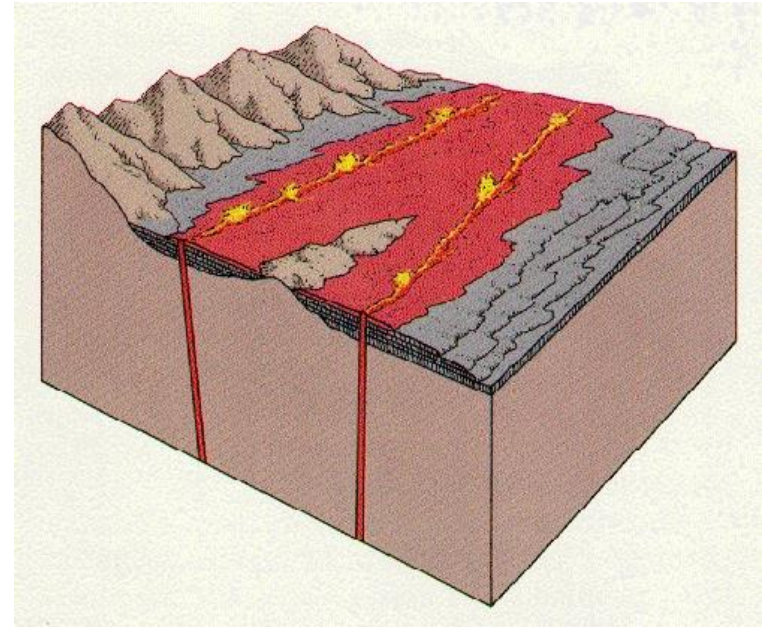
# Flood Basalts



Columbia Flood Basalts in WA

- Multiple, “quiet” eruptions
- Lava *plateau* forms
- Flood basalt volcanism has been connected to major mass extinction events in the past.

- Large (10-100 square miles) outpourings of very low viscosity basaltic lava





# Volcanic Eruption: Explosive

Very high viscosity magma prevents the release of volcanic gases; gases accumulate, and the magma pressure builds up... until it is blasted out in an explosion!



Explosive eruptions can send rocks, dust, gas and pyroclastic material **up to 20 km** into the atmosphere.

# Explosive Eruption Diagram

