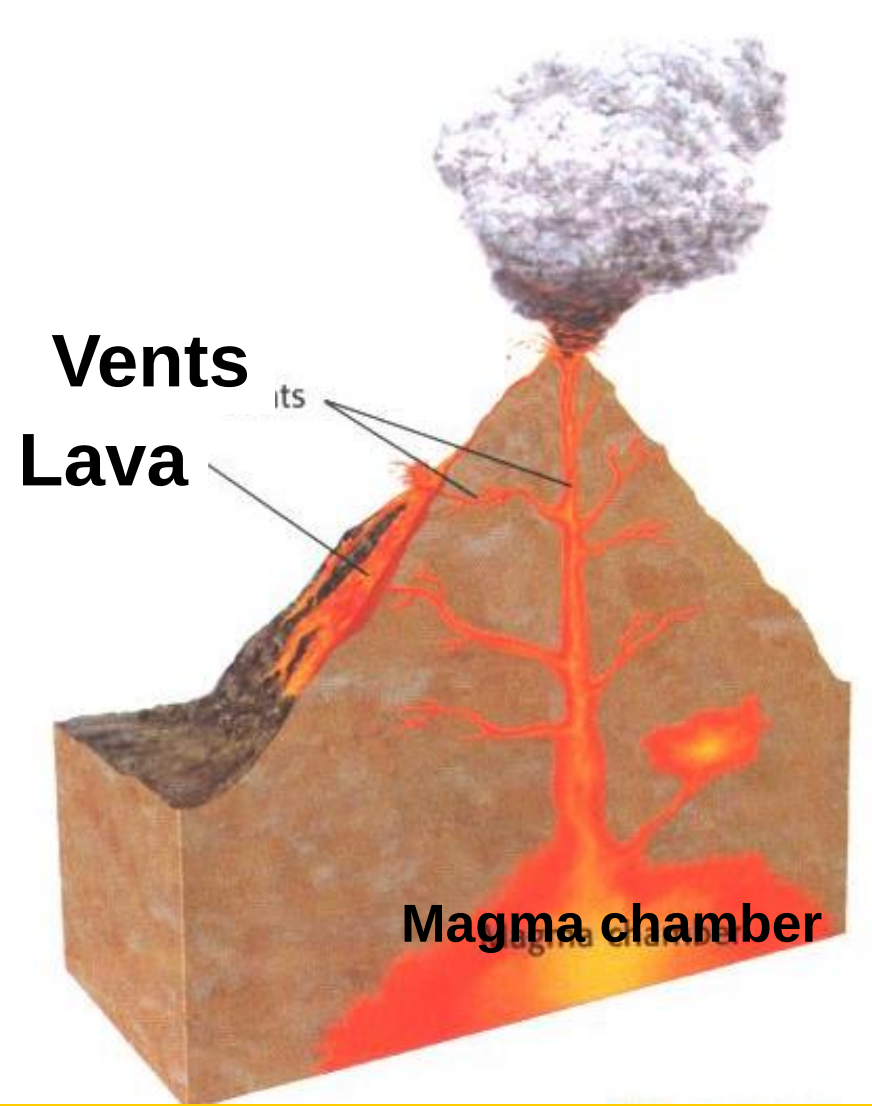
**Tungerahua Volcano, Ecuador**
*Picture by Alcinoe Calahorrano*

# Volcanoes

# Volcanoes

A release of magma onto Earth's surface near a vent

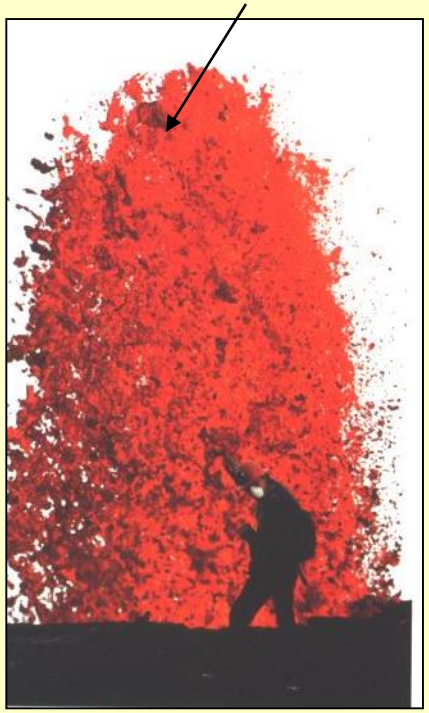


# Volcanic Eruptions

- Nonexplosive Eruptions

*Lava flow*

*Lava fountain*



- Explosive Eruptions

*What is **Lava**?*

-magma that flows onto the Earth's surface

# The Composition of Magma Determines whether it is explosive or not!

- High 

content
  - More likely to be 

!!!
- High 

content
  - More likely to be 

!!!
  - ***Why****?*
    - Silica has a thick, stiff consistency
      - Flows slowly
      - Tends to Harden in the volcano's vent

# What Erupts from a Volcano?

**Lava can be thick or thin.**

Blocky lava

Pahoehoe

Aa

Pillow lava

# What Erupts from a Volcano?

## Pyroclastic material

- **Rock** fragments created by **EXPLOSIVE** eruptions
  - •magma explodes from volcano and solidifies in the air
  - •existing rock is shattered by powerful eruptions

Volcanic blocks

Volcanic bombs

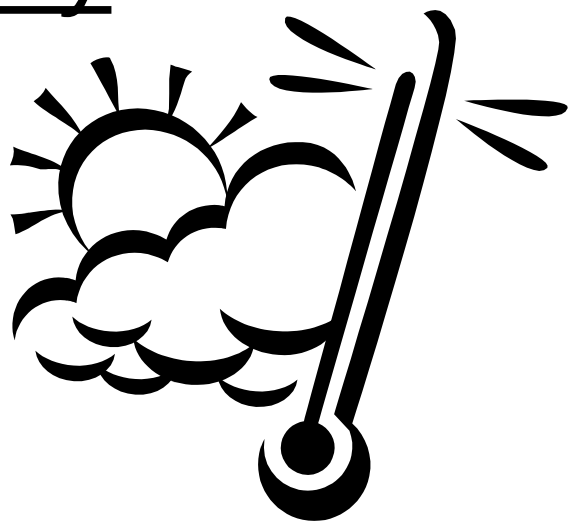
Lapilli

Volcanic ash

# How do volcanoes affect the Earth?

## Flows and Fallouts

- hot ash can flow <u>really quickly</u>
  - Knock down buildings
  - Dam rivers (flooding/drought)
  - Kill crops and livestock



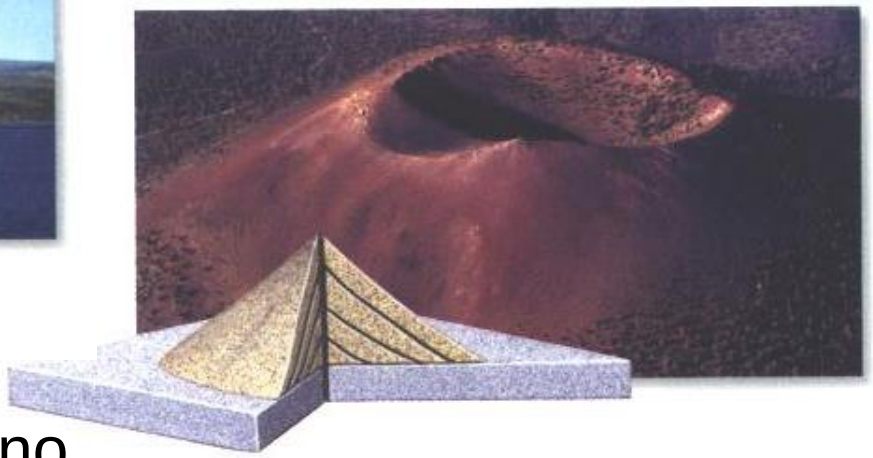
## Climatic Changes

- Ash & Gases can block sunlight
- Drop average global temperature noticeably

# Types of Volcanoes

Shield volcano

Cinder cone volcano

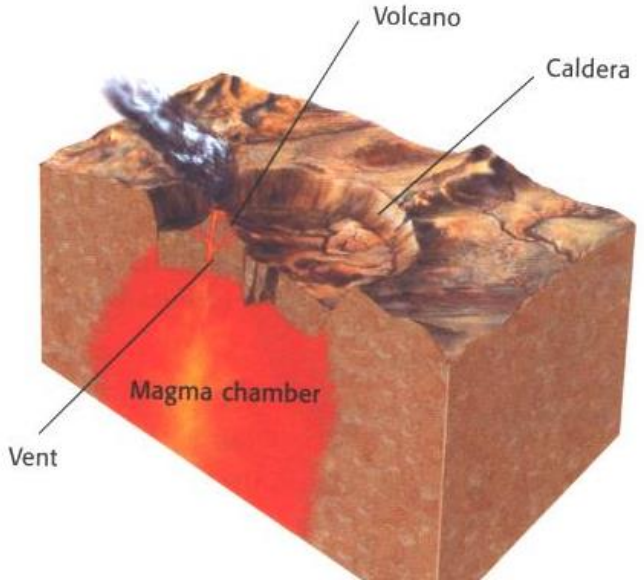


Composite volcano

# Craters, Calderas, and Lava Plateau


## Crater

- From explosions of material out of the vent and the collapse of material back into vent




## Caldera

- Much larger depression that forms when magma chamber empties and its roof collapses

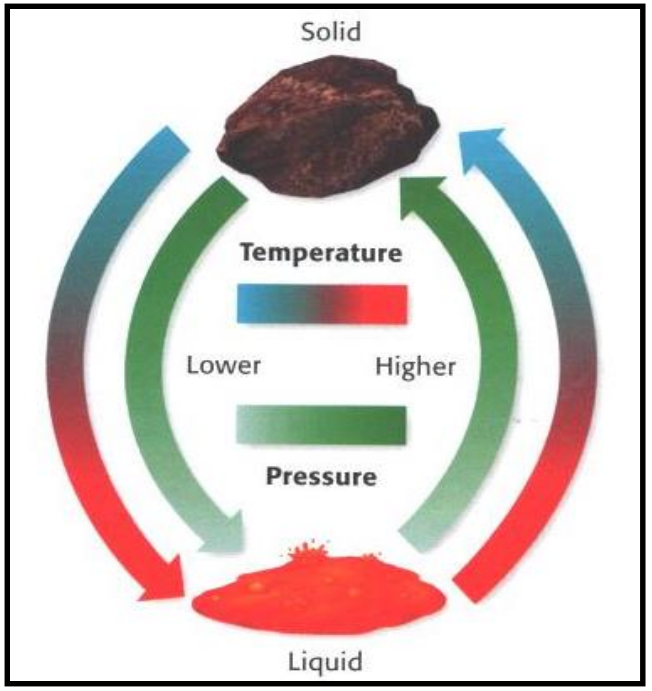
## Lava Plateau

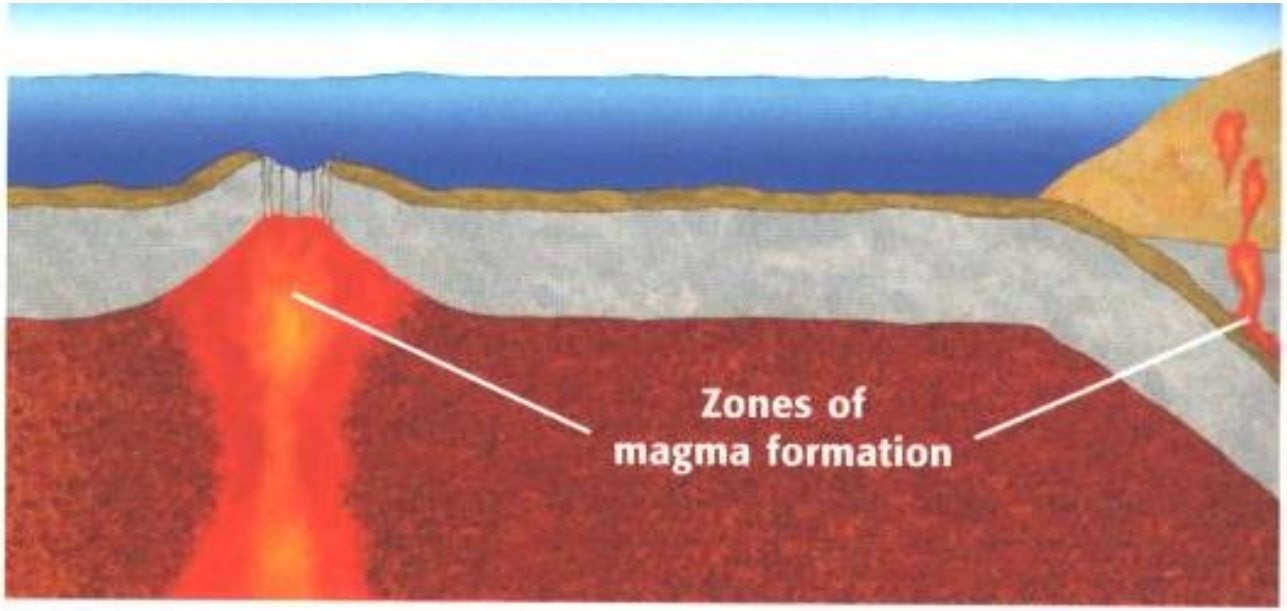
- Forms when lava erupts from long cracks, or fissures, and spreads out evenly (thousands of km)

# What causes volcanoes?

## The Formation of Magma

- Mantle rock melts when the temperature increases or the pressure decreases.

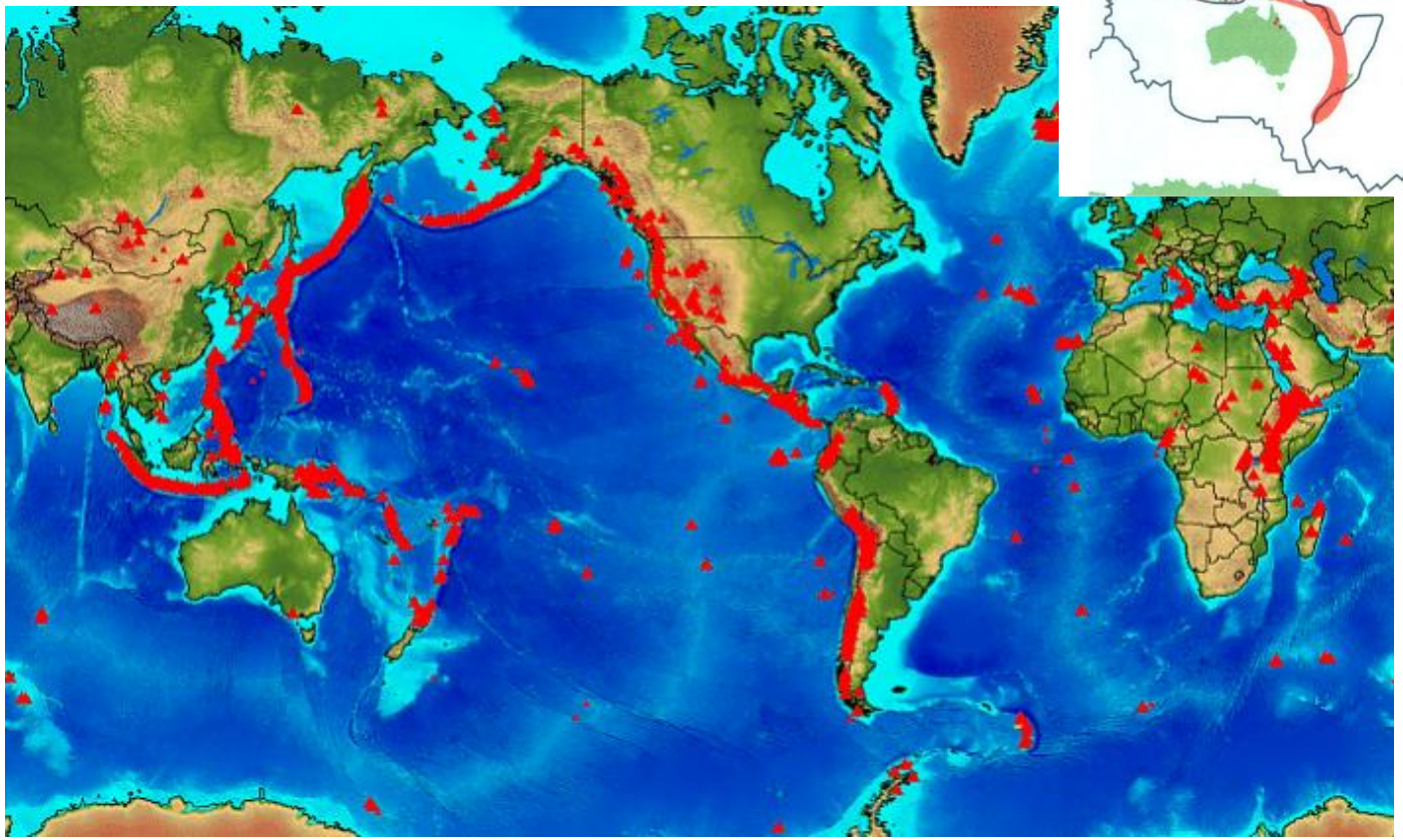


# What causes volcanoes?

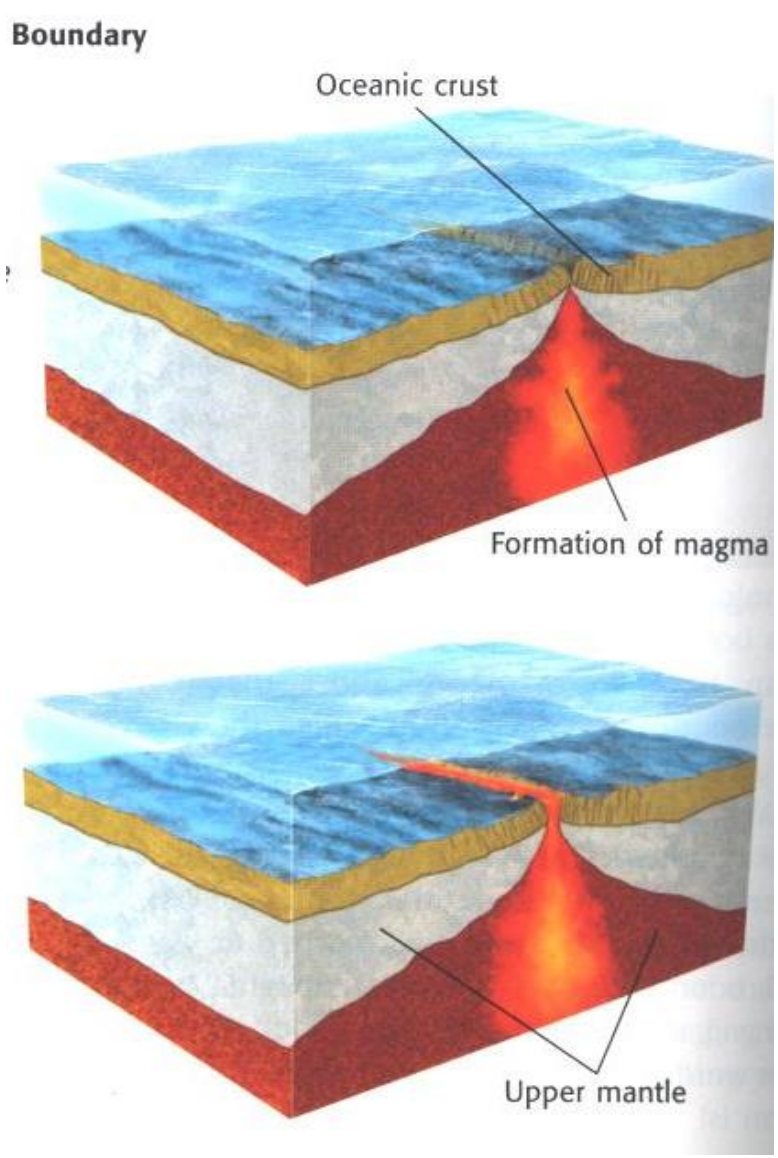

## Where Volcanoes Form

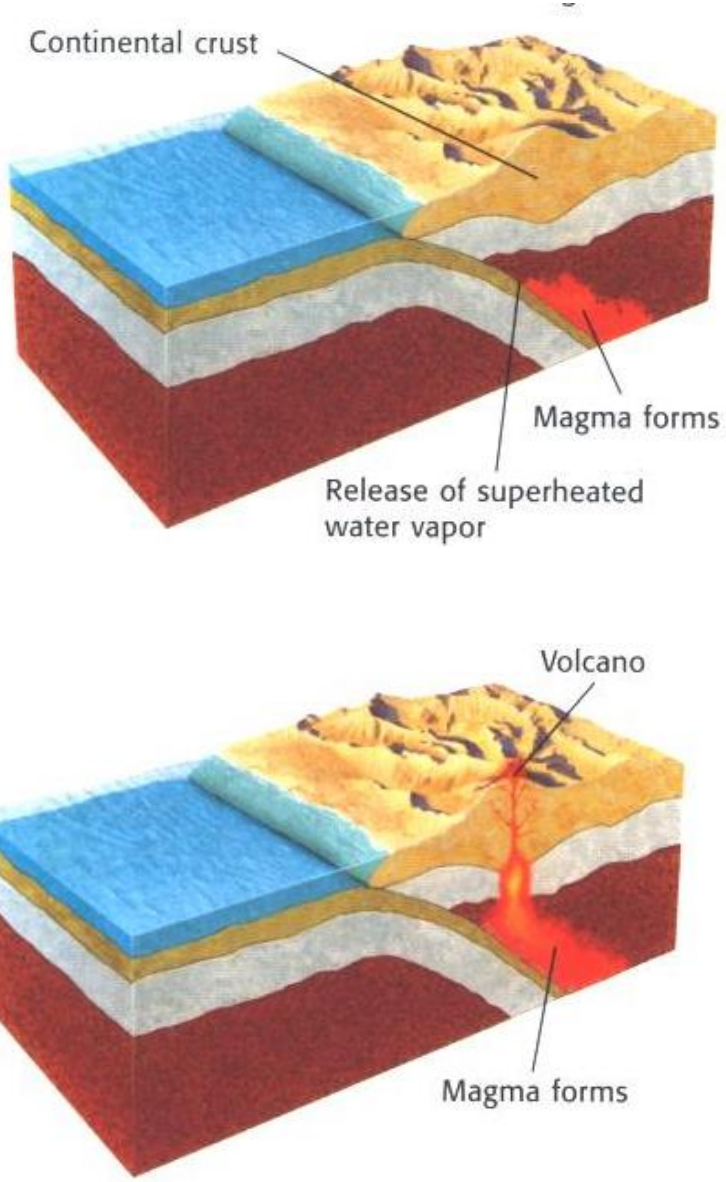
- Tectonic Plate Boundaries!!!



~75% world's active volcanoes in Ring of Fire

# What causes volcanoes?

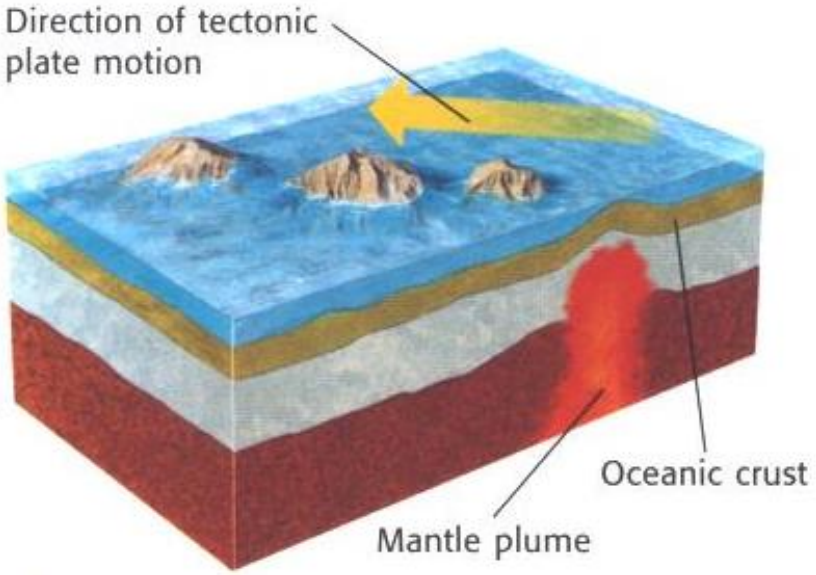


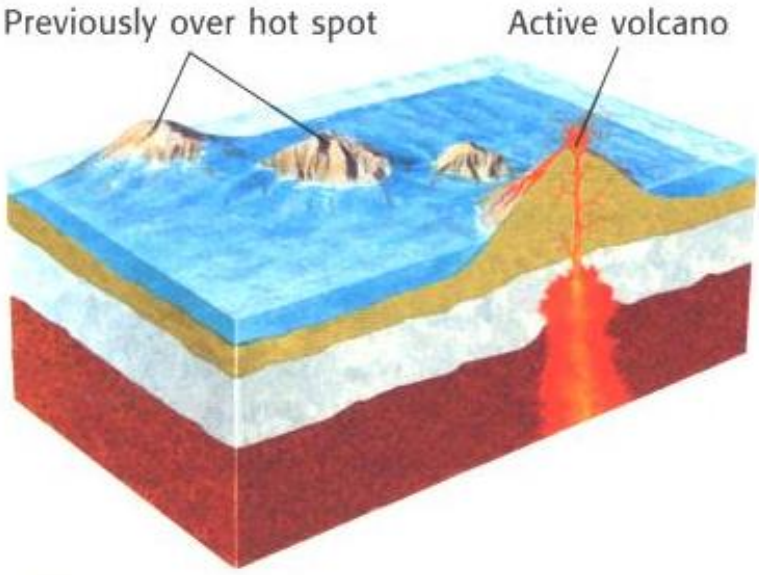



# What causes volcanoes?

## Hot Spots

Areas beneath crust where magma plumes rise and punch through the surface



# How do volcanologists predict eruptions?

- Measuring Small Quakes
  - Before eruption, increase in number & intensity
- Measuring Slope
  - Bulges may form with magma (tiltmeter)
- Measuring Volcanic Gases
  - Outflow of volcanic gases
    - Sulfur dioxide, carbon dioxide
- Measuring Temperature from Orbit
  - Measure changes in temperature over time

# You should not be a Volcanologist if….

Robert McGimsey USGS

A. Ozerov

- You don’t like hiking, backbacking, rockclimbing, etc.
- You are not interested in experiencing extreme temperatures and heights.
- If you don’t like to travel to incredible places and see breathtaking views of the world.