

# Sea Floor Spreading

## The Mid-ocean Ridge



# **Vocabulary**

**Sonar**

**Mid-Ocean Ridge**

**Sea Floor Spreading**

**Subduction**

**Deep Ocean Trench**

Harry Hess :  
American Geologist

A young boy with dark hair and round glasses, wearing a purple t-shirt, is looking towards the camera with a slight smile. He is standing next to a textured, brownish wall. The text "No! Harry Hess, not Harry Potter!" is overlaid on the bottom left of the image.

No! **Harry Hess**, not  
Harry Potter!

# Sea-Floor Spreading



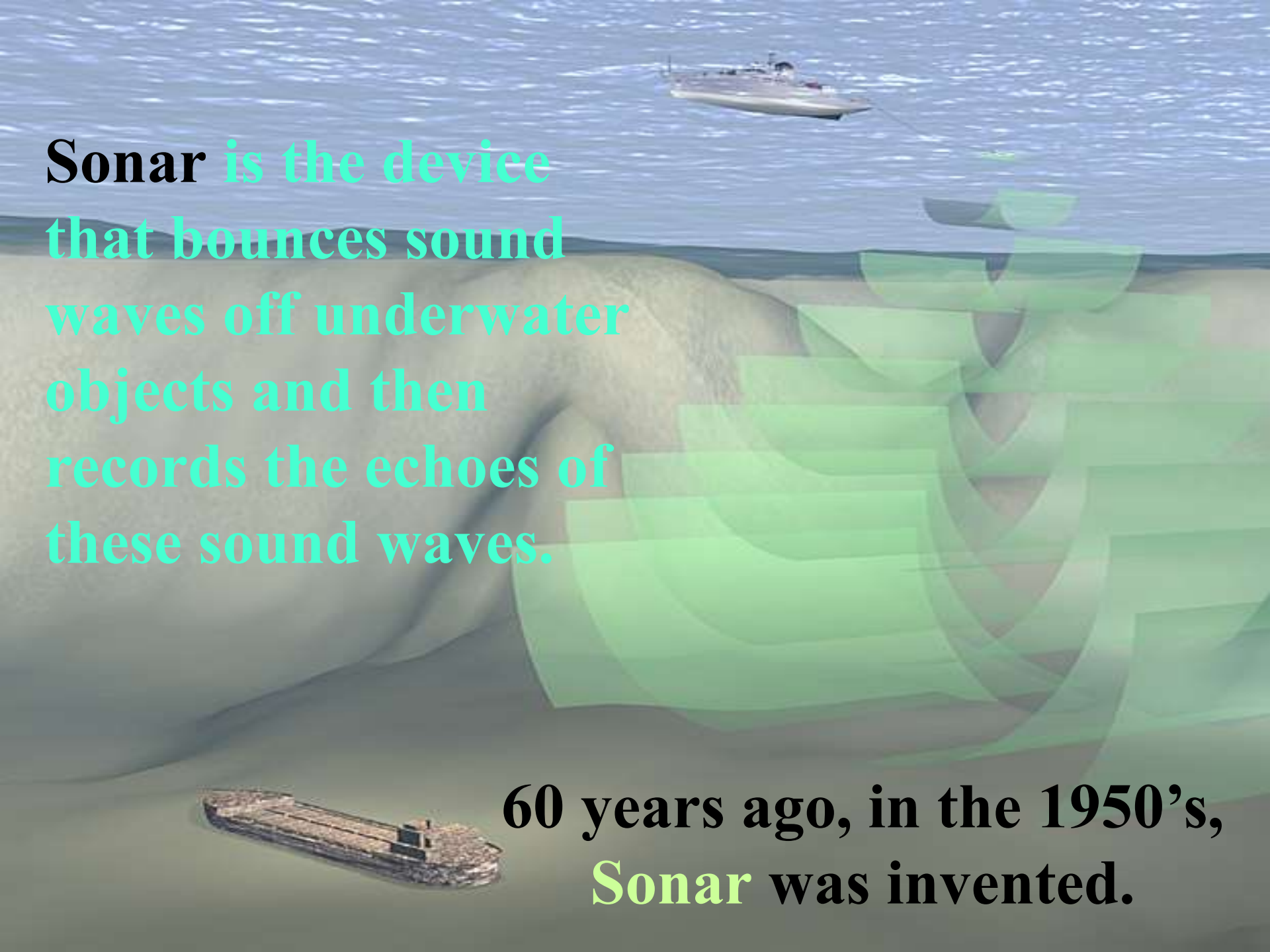
- Harry Hess



# Who Was Harry Hess?



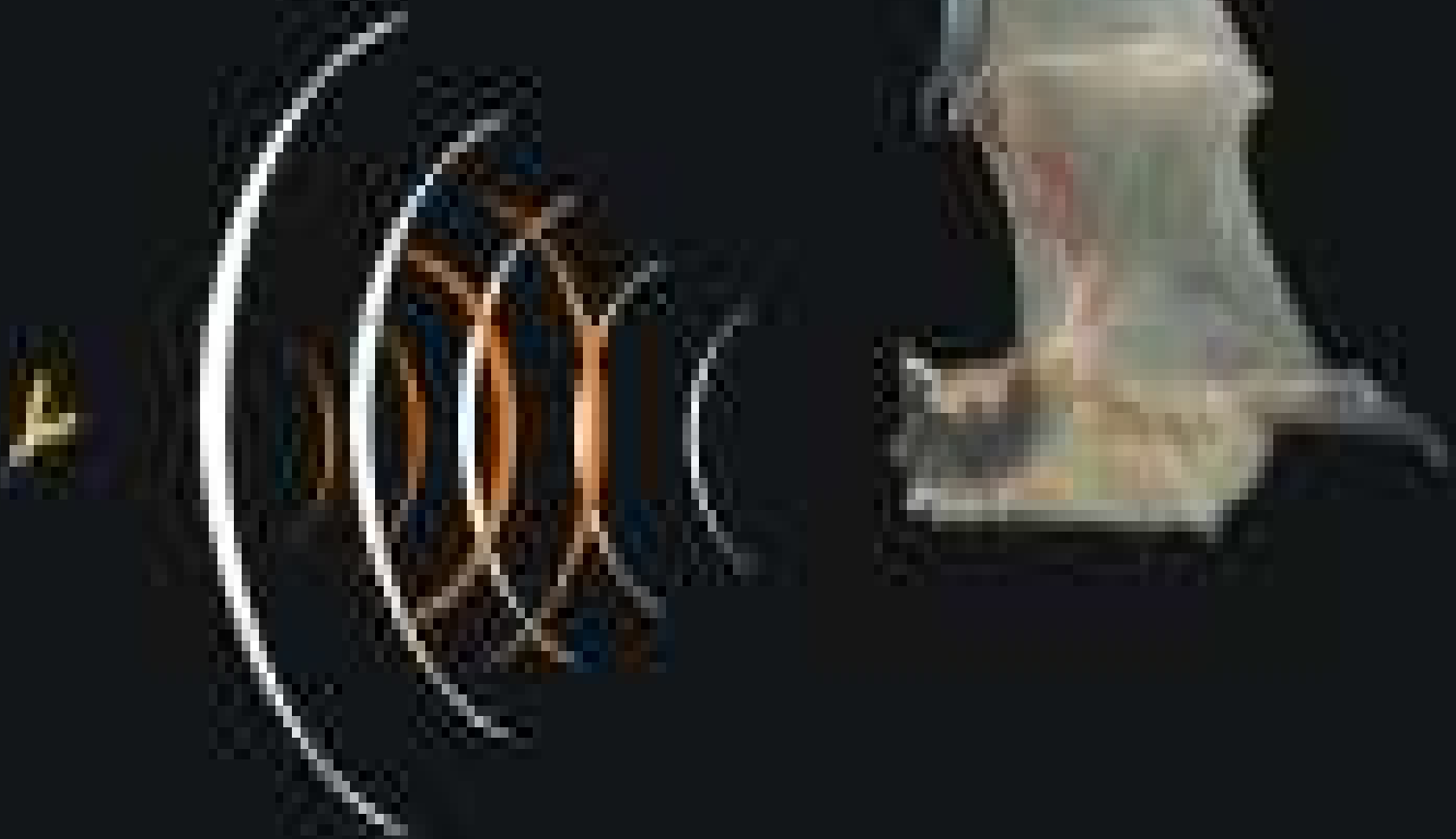
- An American geologist who studied mid-ocean ridges.
- He suggested that the ocean floors move like conveyor belts, carrying the continents along with them.



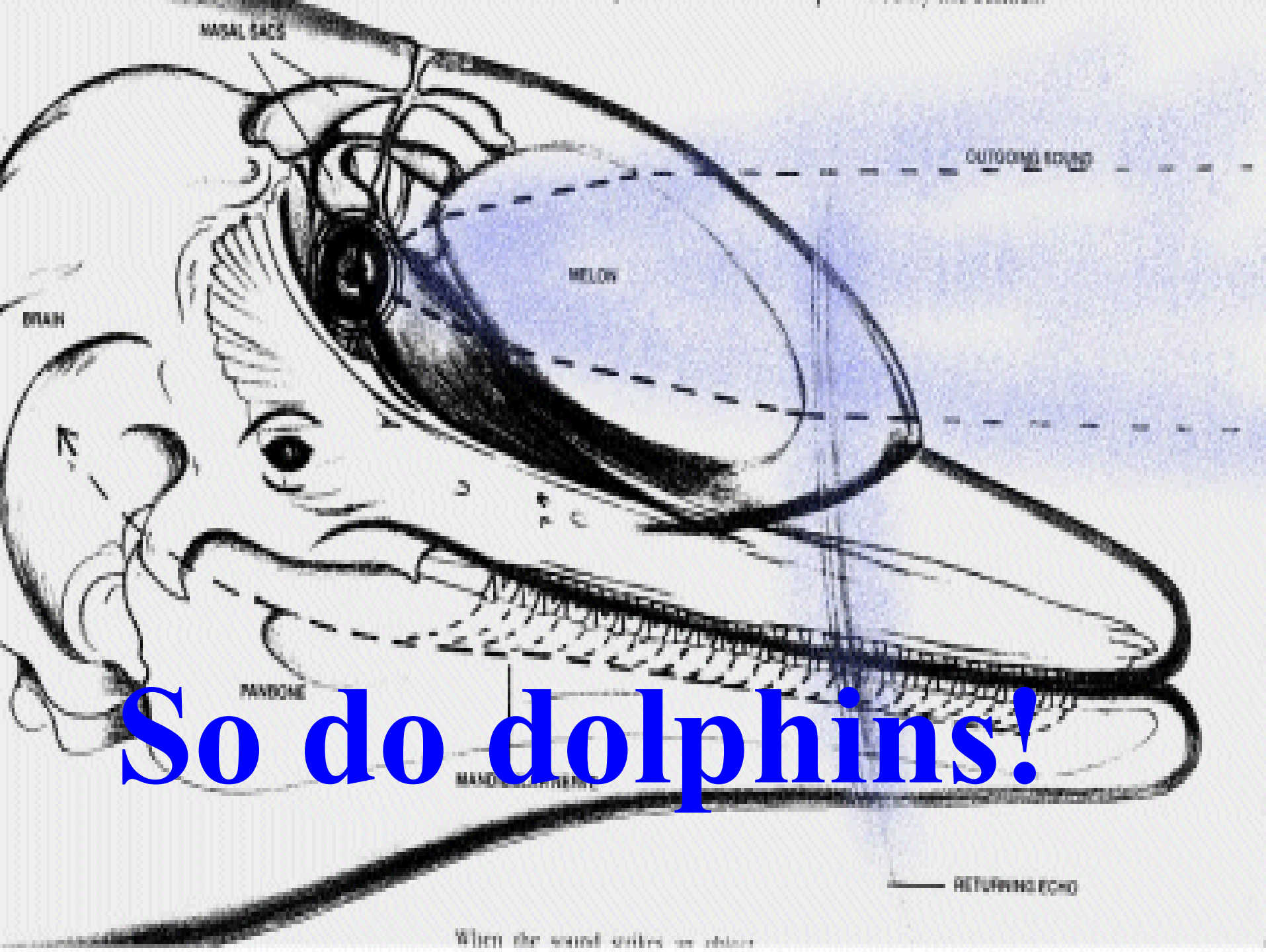
**Sonar is the device that bounces sound waves off underwater objects and then records the echoes of these sound waves.**

**60 years ago, in the 1950's, Sonar was invented.**

**Bats use it!**







**So do dolphins!**

When the sound strikes an object



**So does Ocean Man**

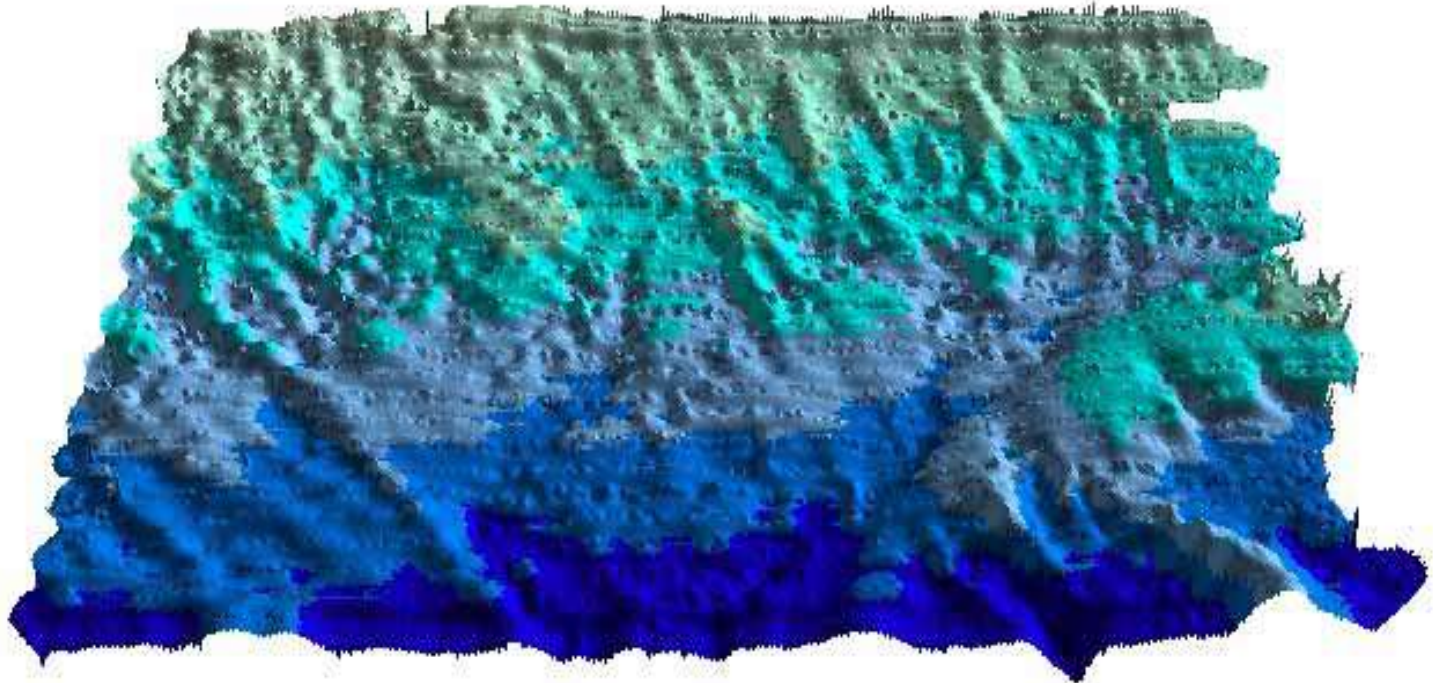


**Sonar**

# Sonar brought Wegner's theory back to life!



**Sonar made it possible for us to observe the ocean floor.**



A satellite-style map of the Atlantic Ocean. The ocean is depicted in various shades of blue, with a prominent, dark, winding line running down the center, representing the Mid-Atlantic Ridge. The surrounding landmasses are shown in yellow and green. The text is overlaid on the lower portion of the map.

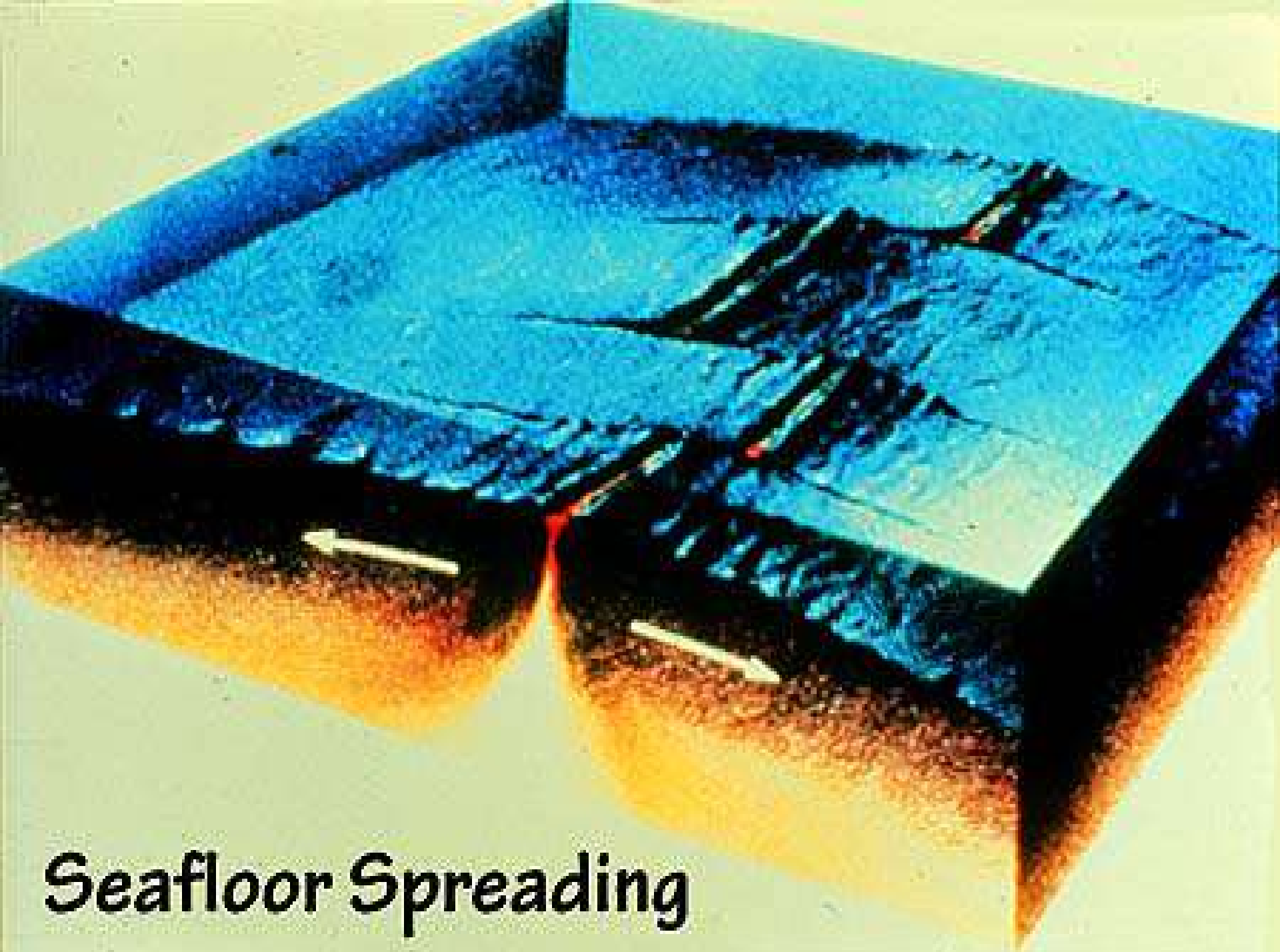
Soon, scientists observed a large **mountain chain** running down the center of the Atlantic ocean.

A world map with a blue and yellow color scheme. The continents are colored in shades of yellow and orange, while the oceans are in various shades of blue. A prominent blue line, representing the Mid-Ocean Ridge, runs through the center of the Atlantic Ocean, around the Indian Ocean, and through the Pacific Ocean, illustrating its global extent.

They quickly found that the **ridge** ran around the world!

**Mid-Ocean Ridge**  
is an undersea mountain  
chain where new ocean floor  
is produced.

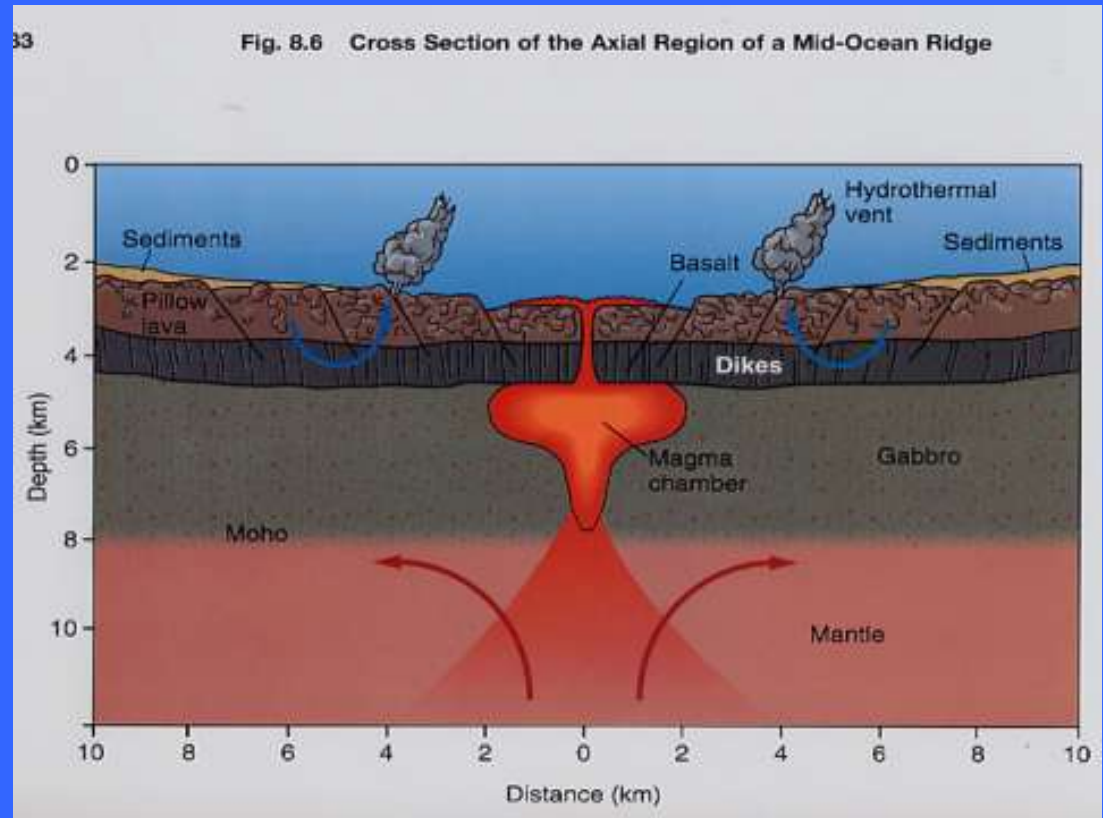




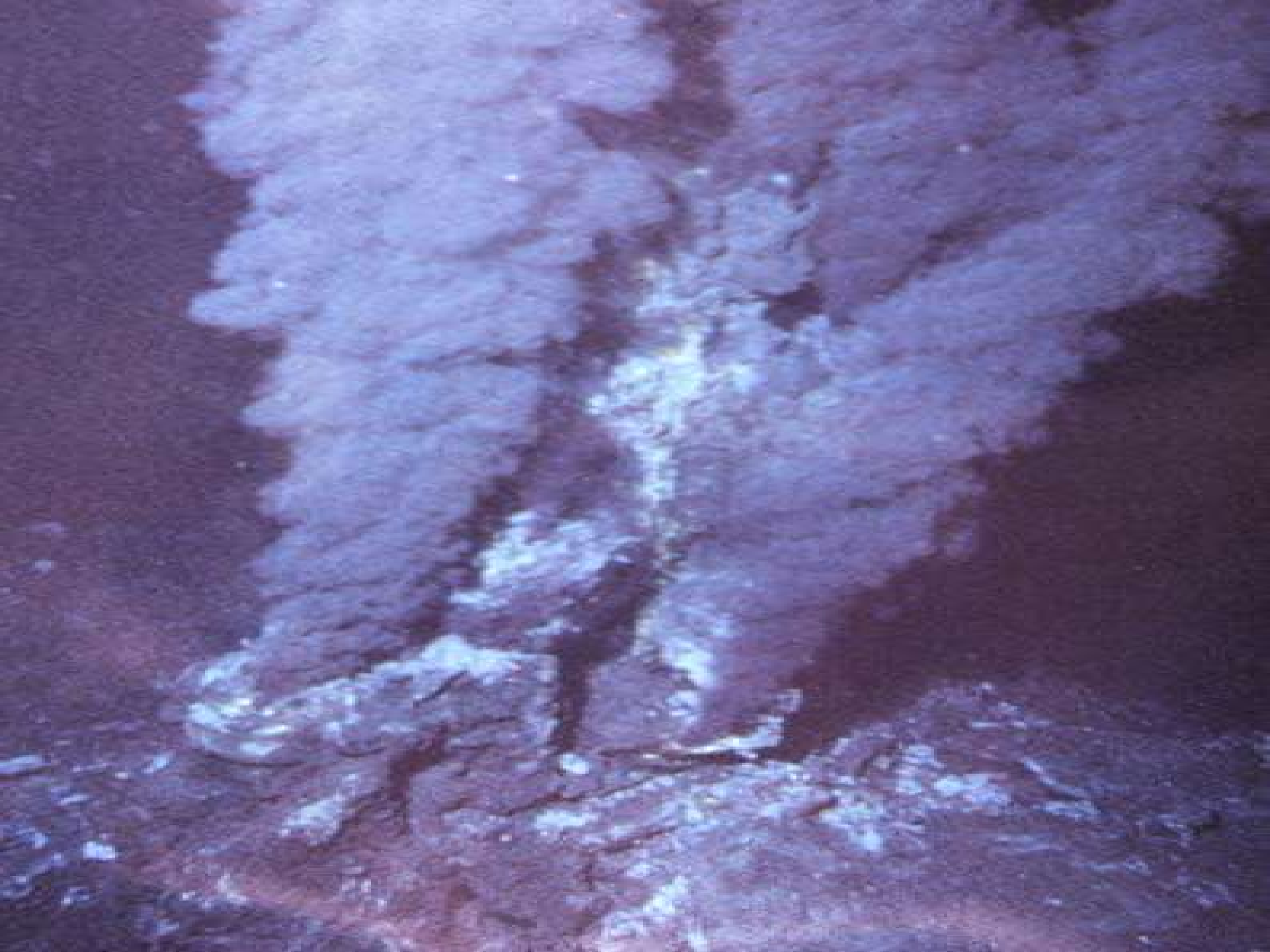
**Seafloor Spreading**

# Sea-Floor Spreading

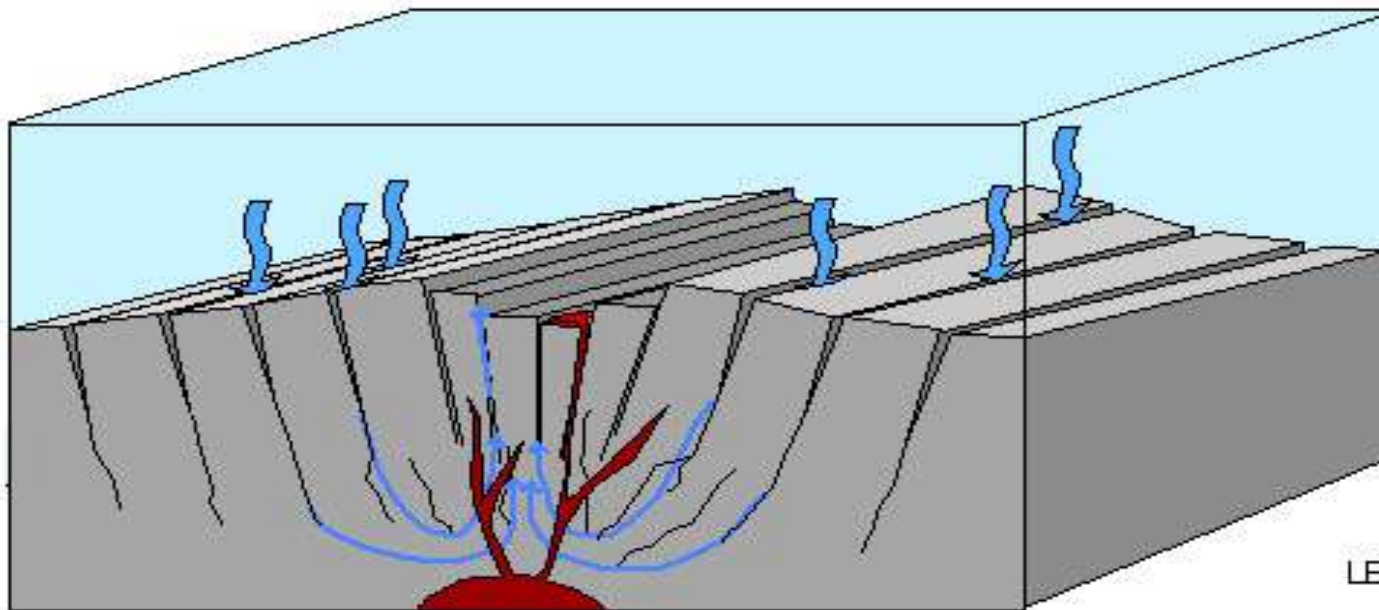
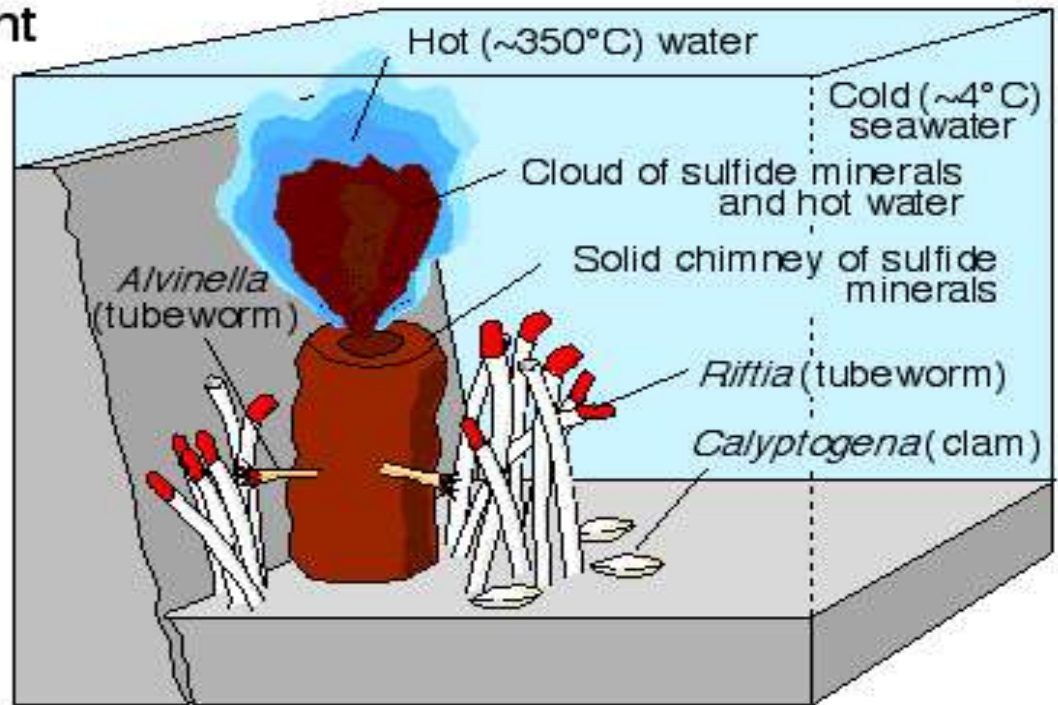
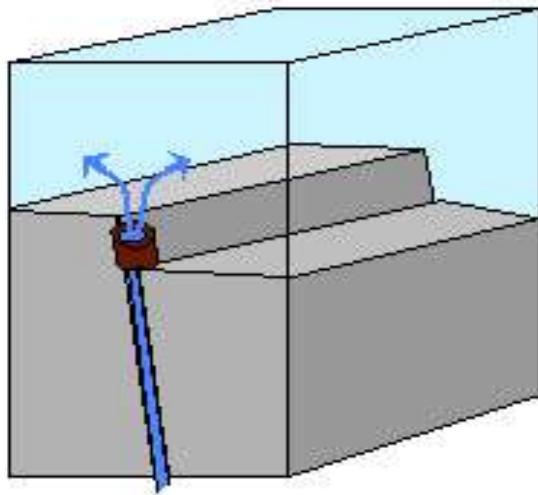
The process by which molten material adds new oceanic crust to the ocean floor.



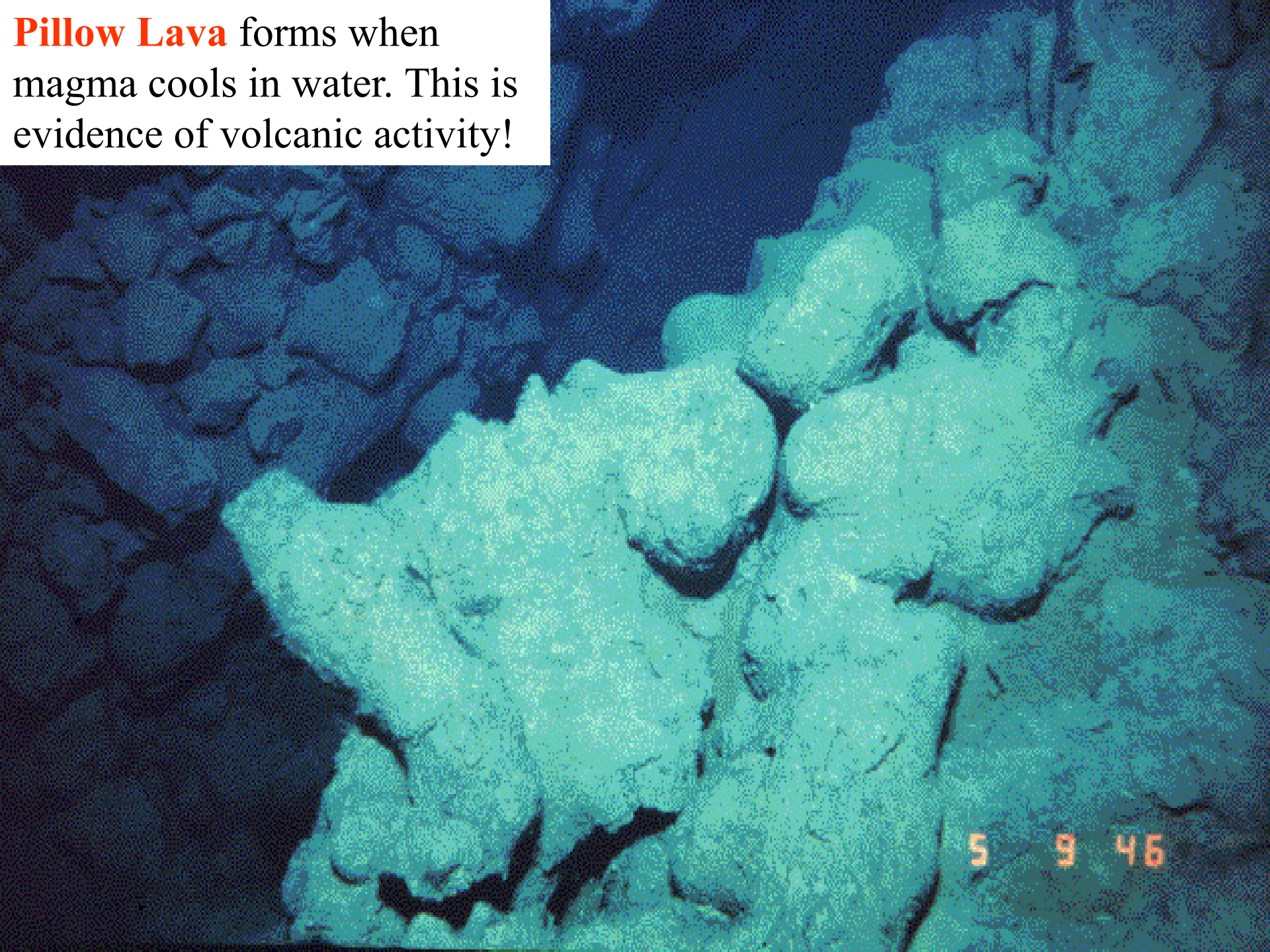




# A Mid-Ocean Ridge Vent or "Black Smoker"



**Pillow Lava** forms when magma cools in water. This is evidence of volcanic activity!





**Earth's  
magnetic  
field** →

**Positive magnetic  
anomaly**

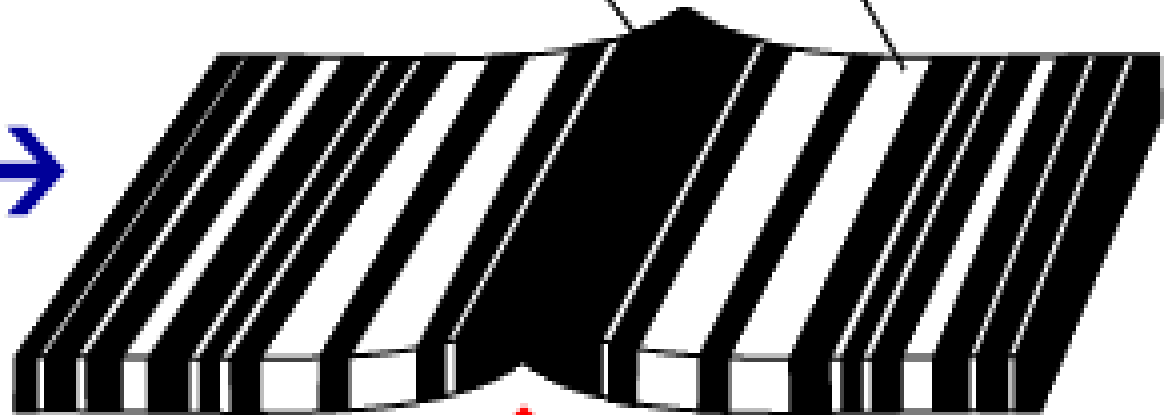
**Negative magnetic  
anomaly**



**If the sea floor  
is spreading  
the rock  
should show  
symmetrical  
magnetic  
stripes  
moving away  
from the ridge** →

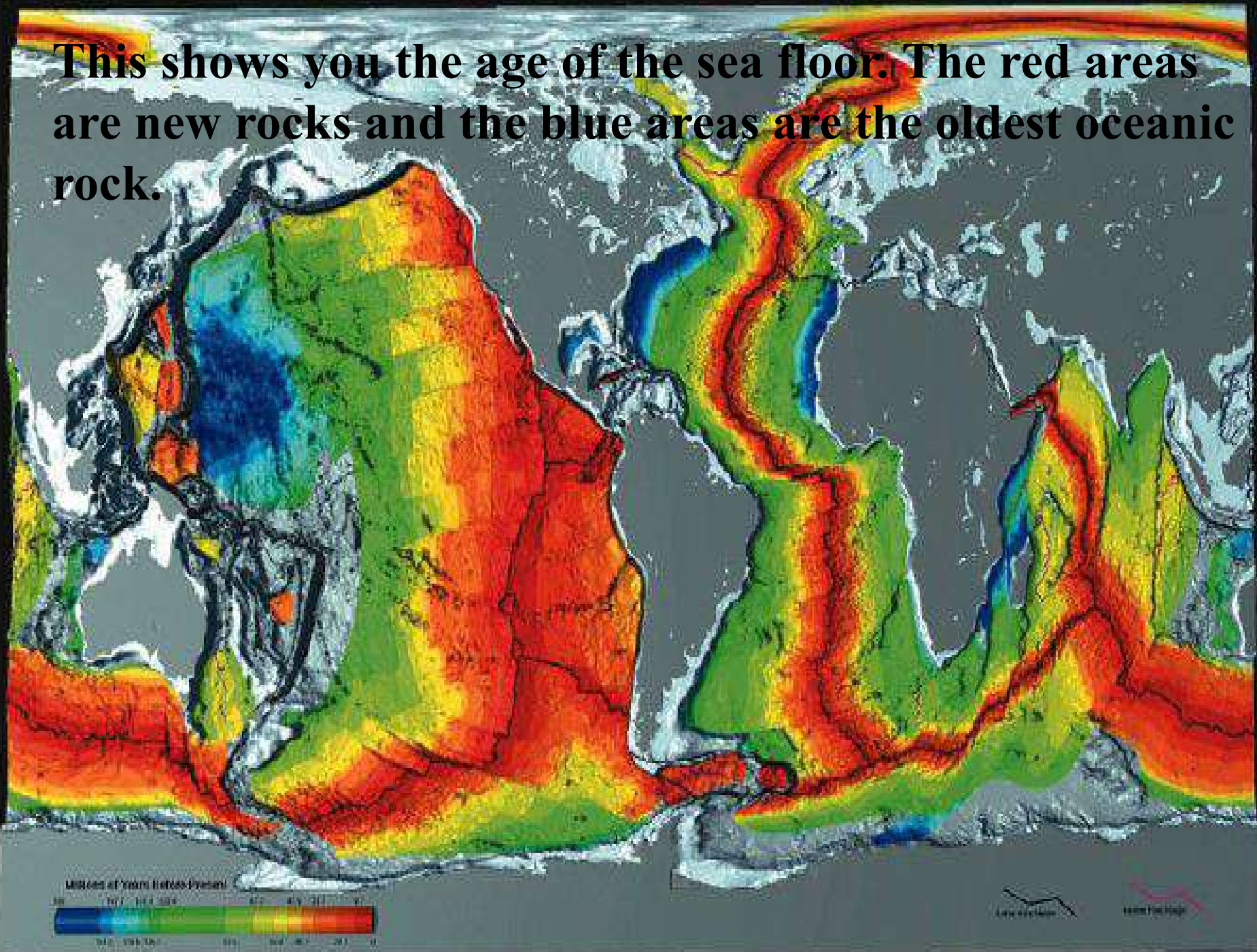
**Positive**

**Negative**



**↑ Magma**

**This shows you the age of the sea floor. The red areas are new rocks and the blue areas are the oldest oceanic rock.**



GREENLAND

# Iceland is spreading open on the Mid-Atlantic Ridge!



ICELAND

Krafla

Reykjanes

Nesjavelli

REYKJANES RIDGE

800



Active zones of rifting and volcanism



Volcanic systems



Central volcanoes

Can you see where the **Mid-Atlantic Ridge** bisects Iceland?  
This is a **rift valley**!



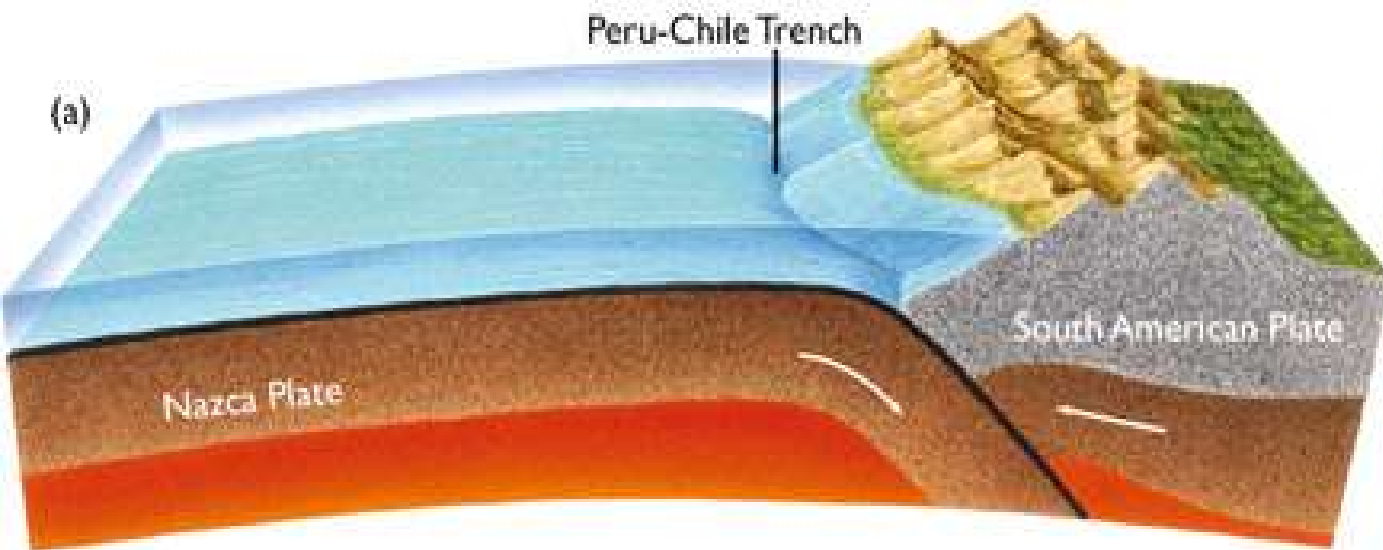
# Sea Floor Spreading

- **Sonar**
- **Mid-Ocean Ridge**
- **ocean is spreading open!!!**
- *pillow lava*
- *magnetic stripes*
- *Drilling rock samples*

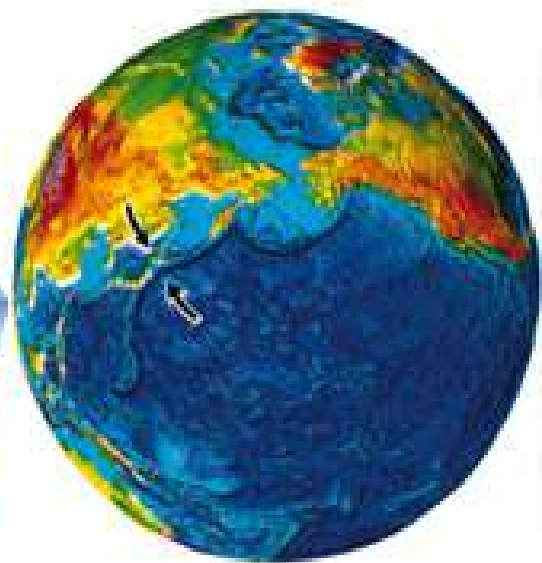
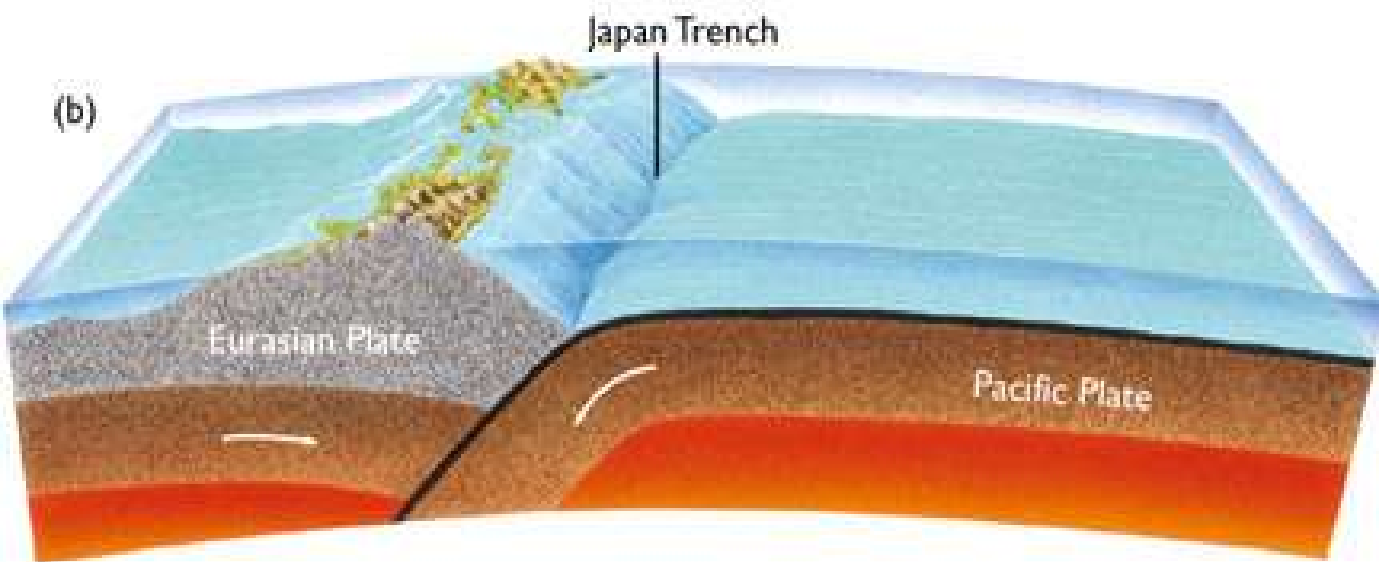
**If new crust is being added to  
Earth's surface, is Earth  
getting bigger?**



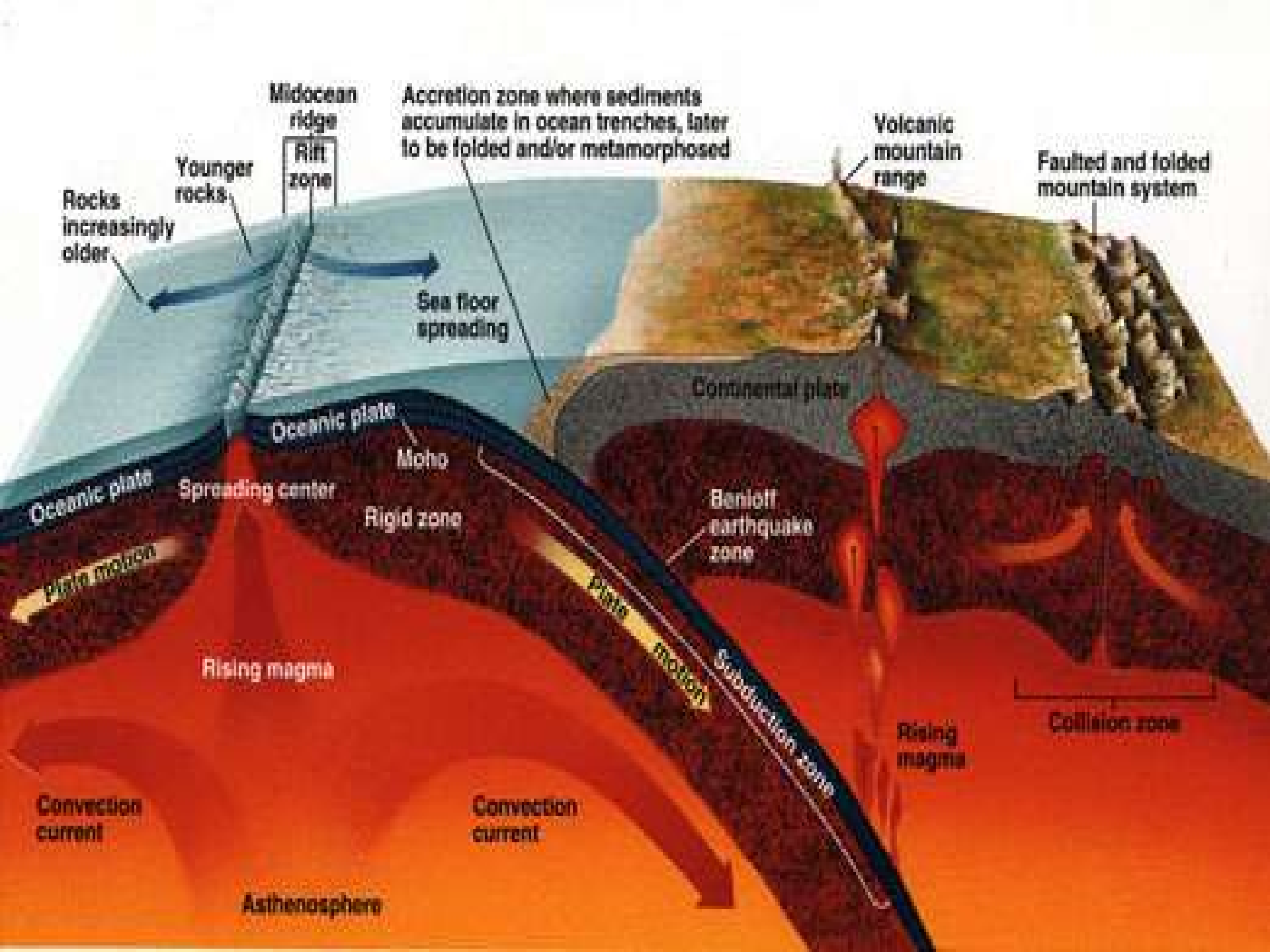
**Subduction** is a process where the ocean floor sinks back into the **mantle** at a **deep ocean trench**.

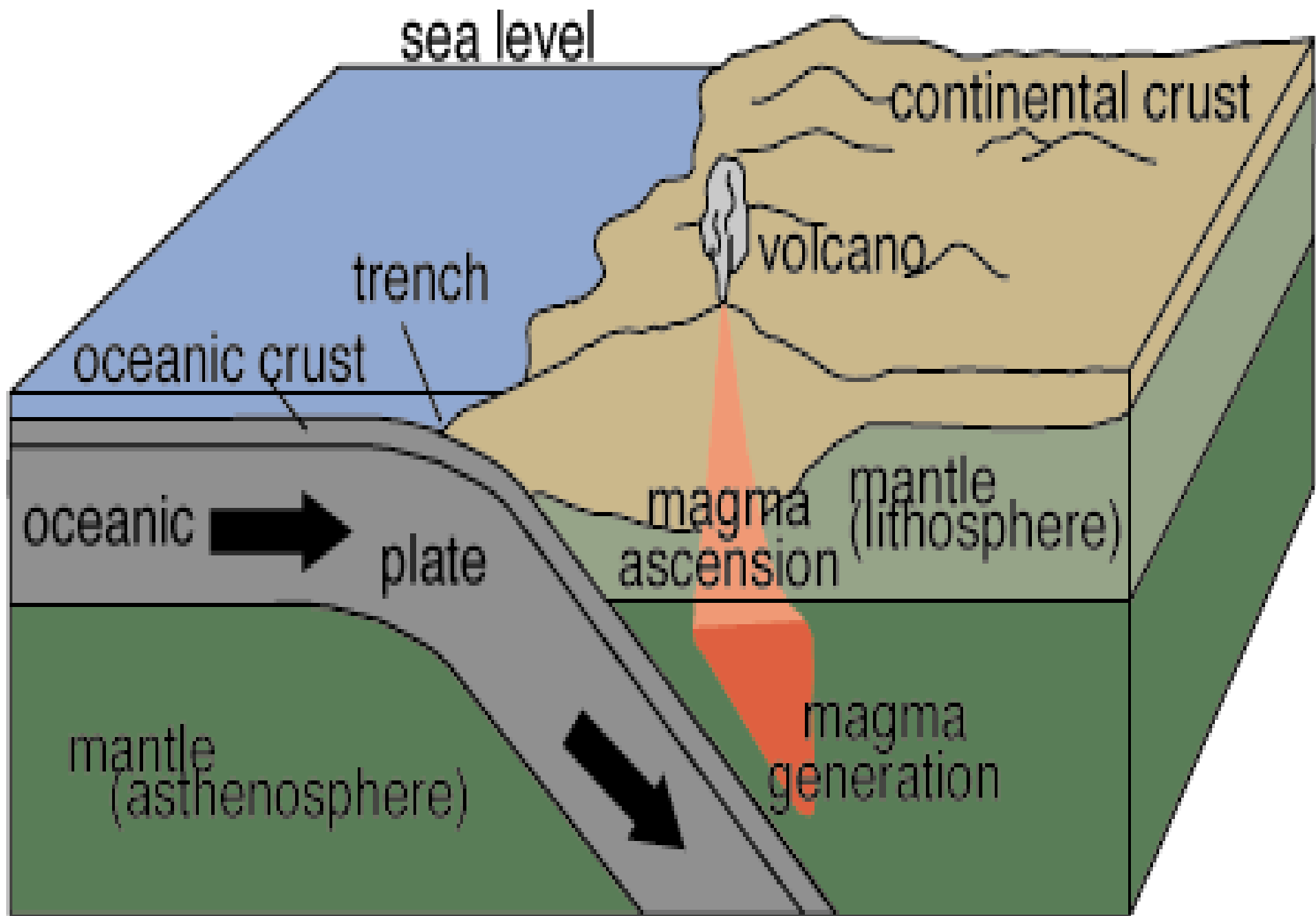


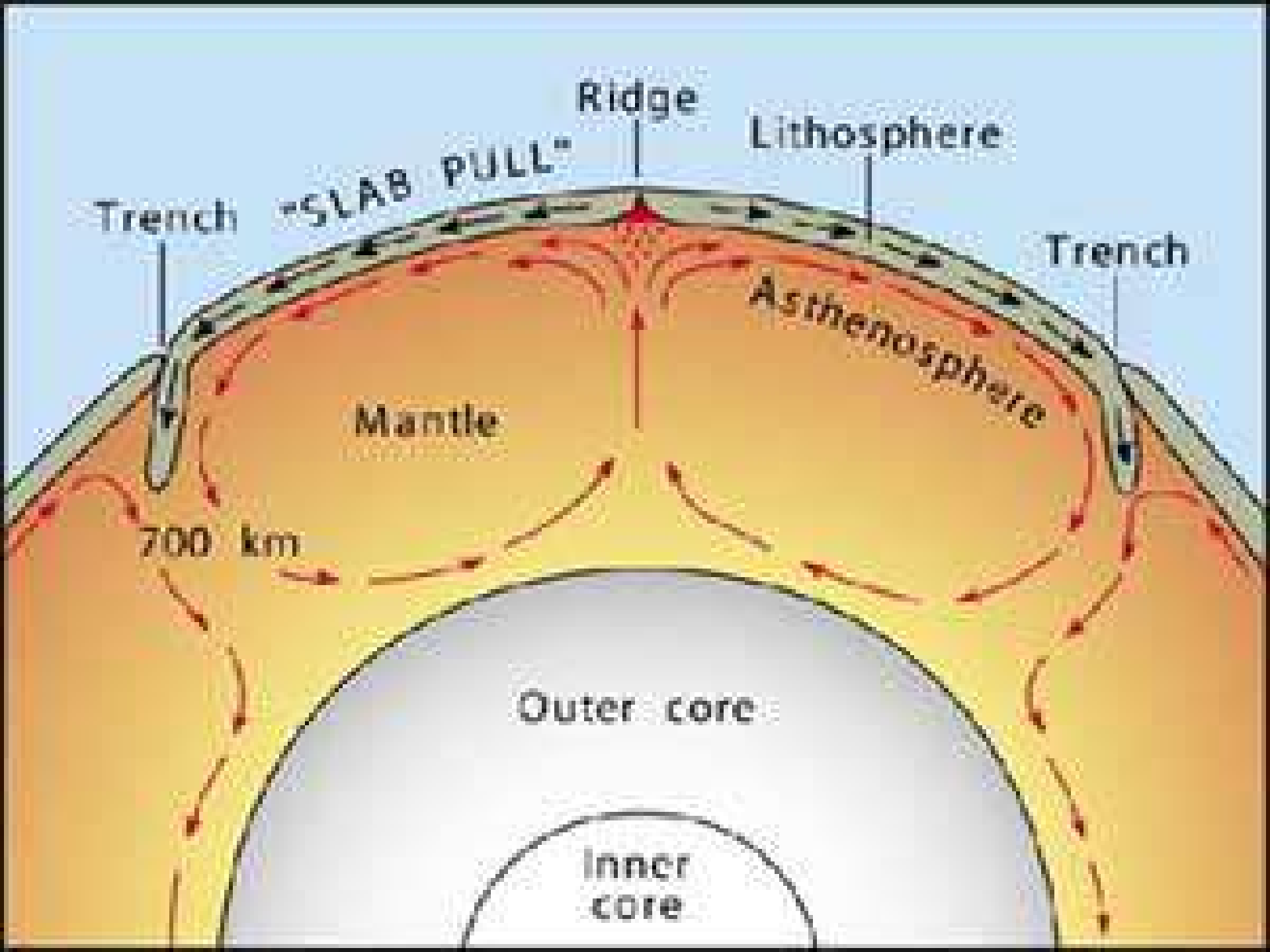
**Subduction of an ocean plate beneath a continental margin forming a volcanic belt**

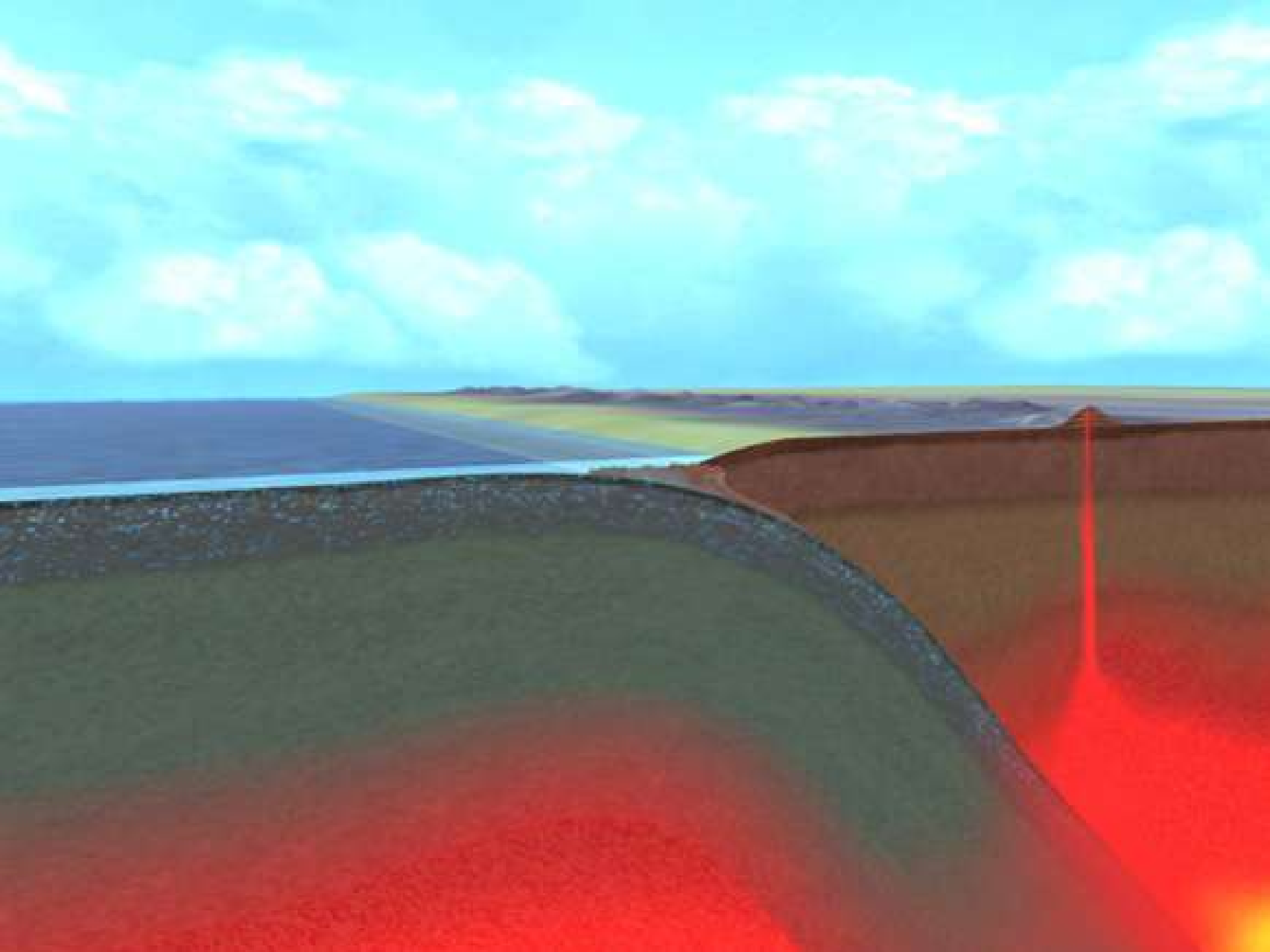


**Subduction of an ocean plate beneath another ocean plate forming a volcanic arc**

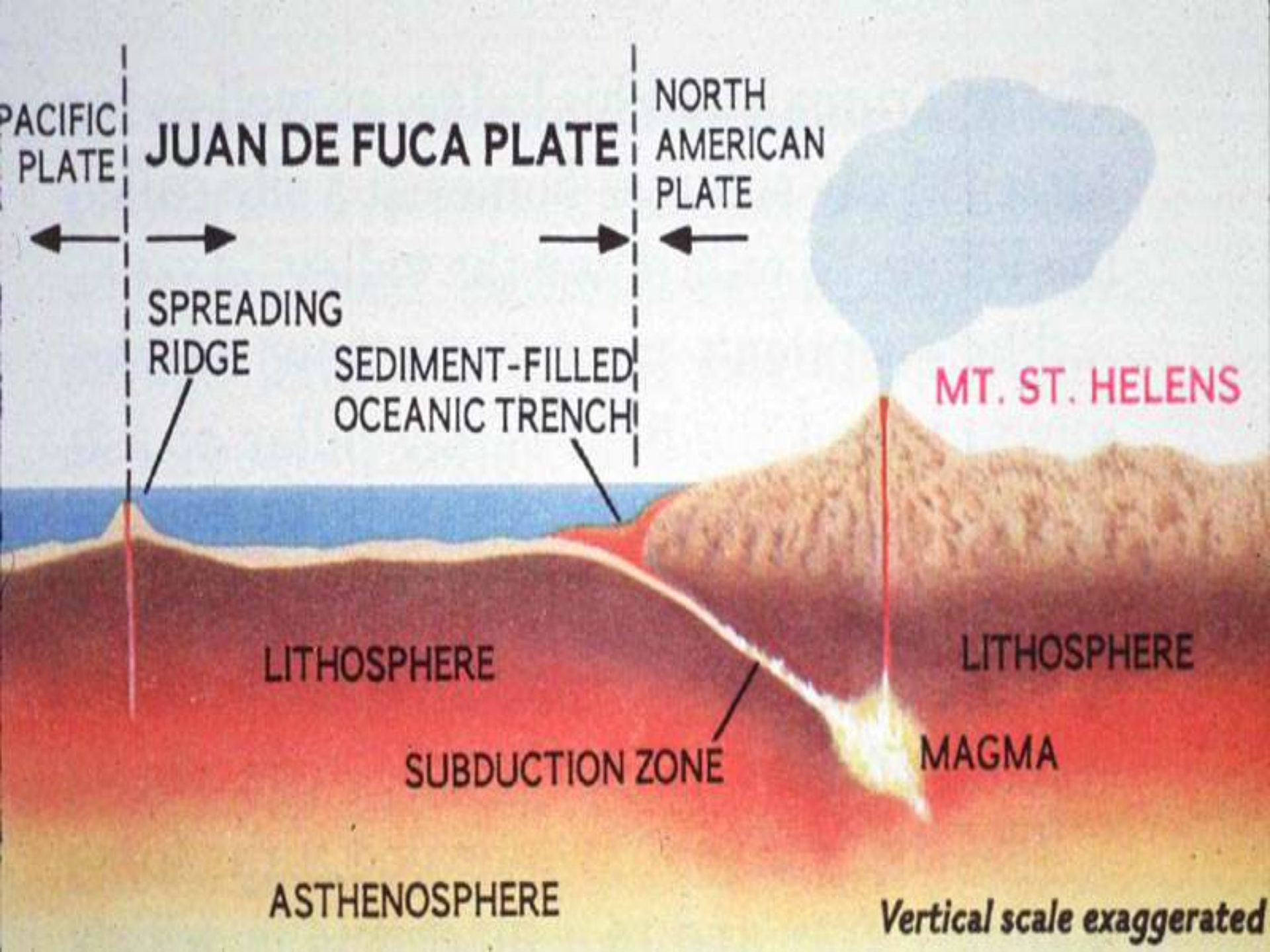




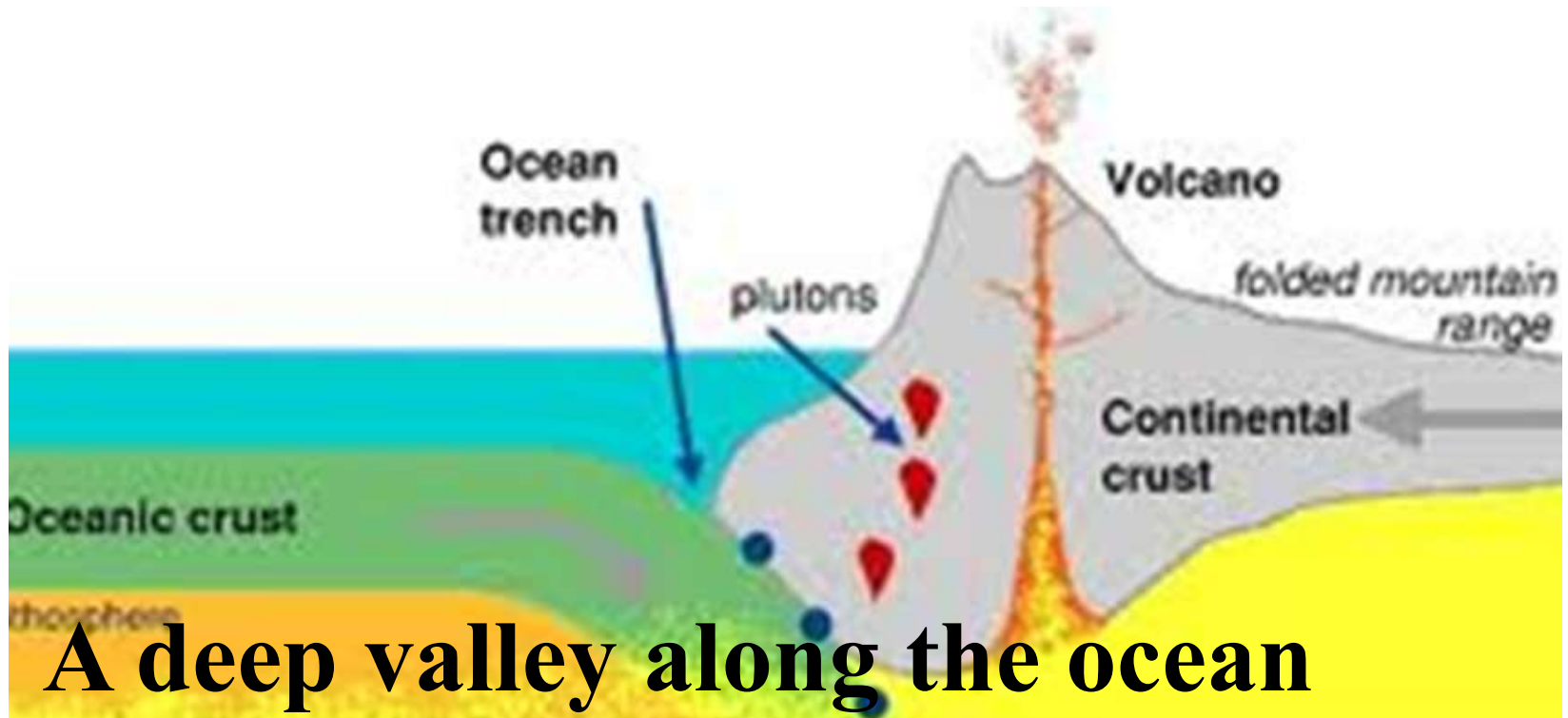








# Deep Ocean Trench



**A deep valley along the ocean floor, beneath which oceanic crust slowly sinks toward the mantle.**