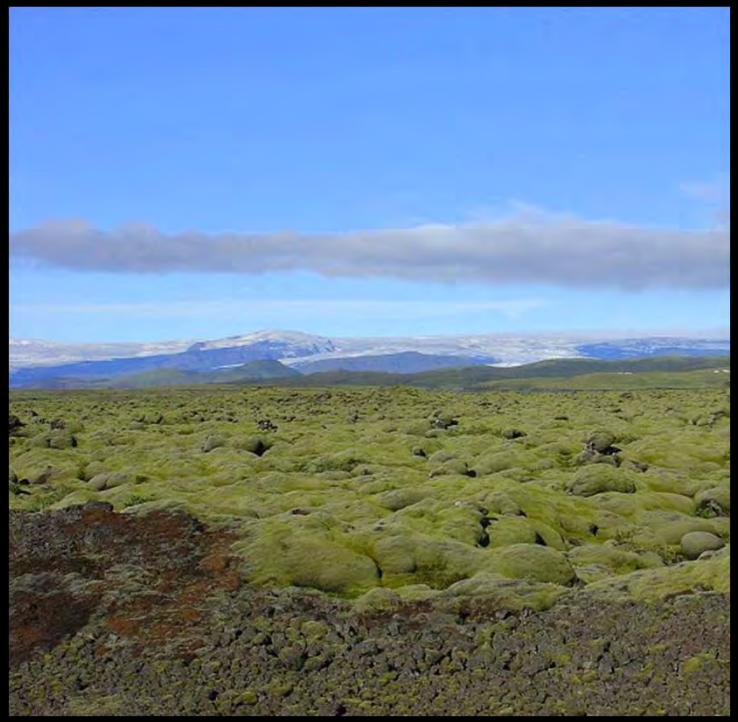
Volcanoes

Presented by: Ms. Burke
Department of Civil and Environmental Engineering
University of California, Los Angeles

CCMS 6th Grade Earth Science

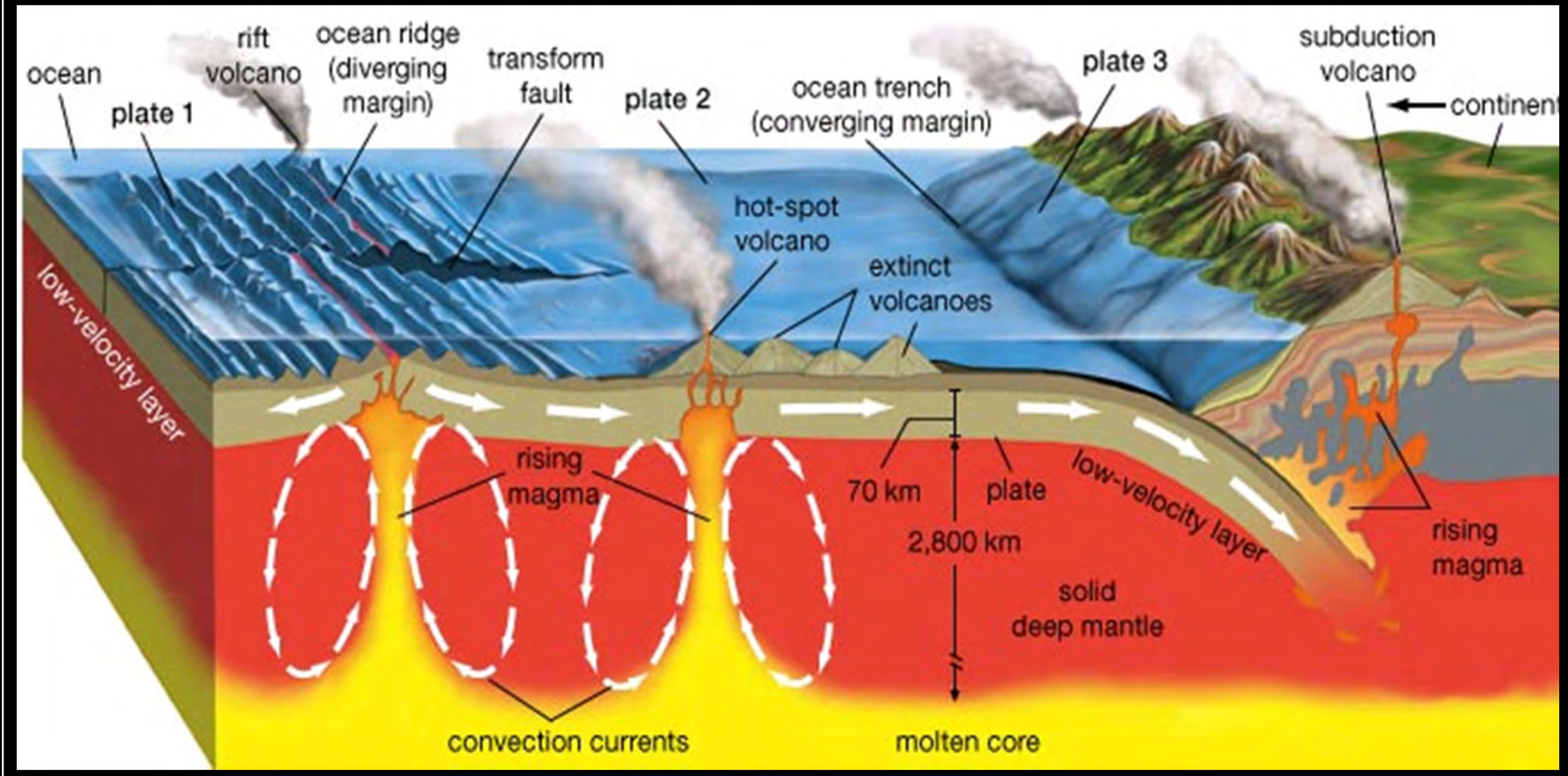
Eruption Videos

- Hawaii
  - Kilauea Video



- Iceland
  - First pictures from the new crater at Eyjafjallajök

Volcanoes and Tectonic Plates

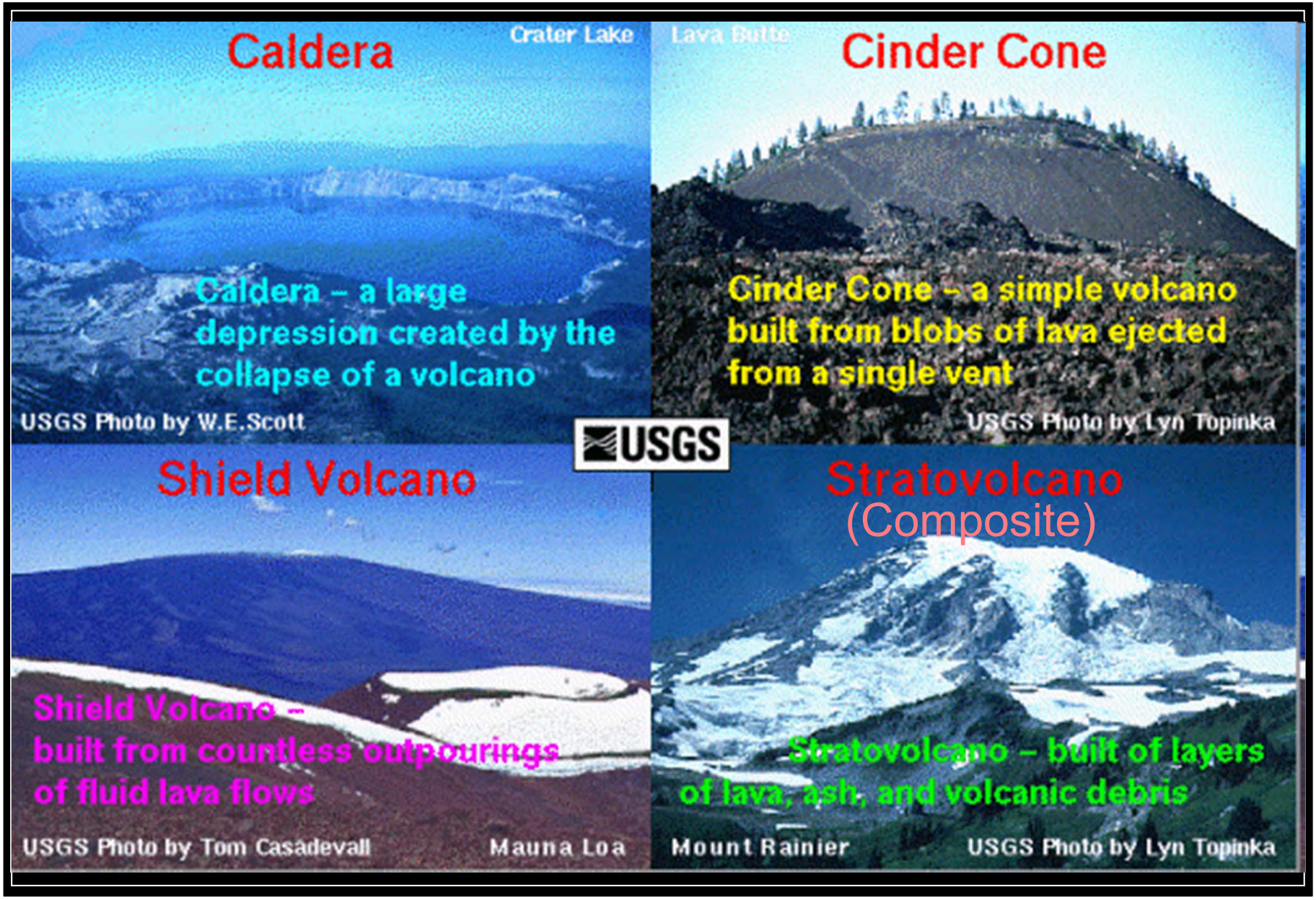


* Map locations of volcanoes and the tectonic plates to see what patterns emerge

Science Questions:

- Are most volcanoes located near edge or near the center of the tectonic plates?
- Are there certain types of plate boundaries where you are more likely to find volcanoes?
- "Ring of Fire": type of plate boundary surrounding it?? most common type of volcano found there??
- BIG QUESTION: Is there a connection between the type of plate boundary and the type of volcano found there?

- Using your map & the map on page 159:
- Label each type of plate boundary (convergent, divergent, transform) with a different color
- Label each type of volcano (composite, cinder cone, shield) with a different color
- Draw arrows at each boundary to indicate the direction of plate motion
- Create a legend for your map



Types of Volcanoes (simple version)

Why are there different types?

- They are made from different materials
- Recall the different types of plates:
  - Oceanic
  - Continental
- Are they made out of the same “stuff”?

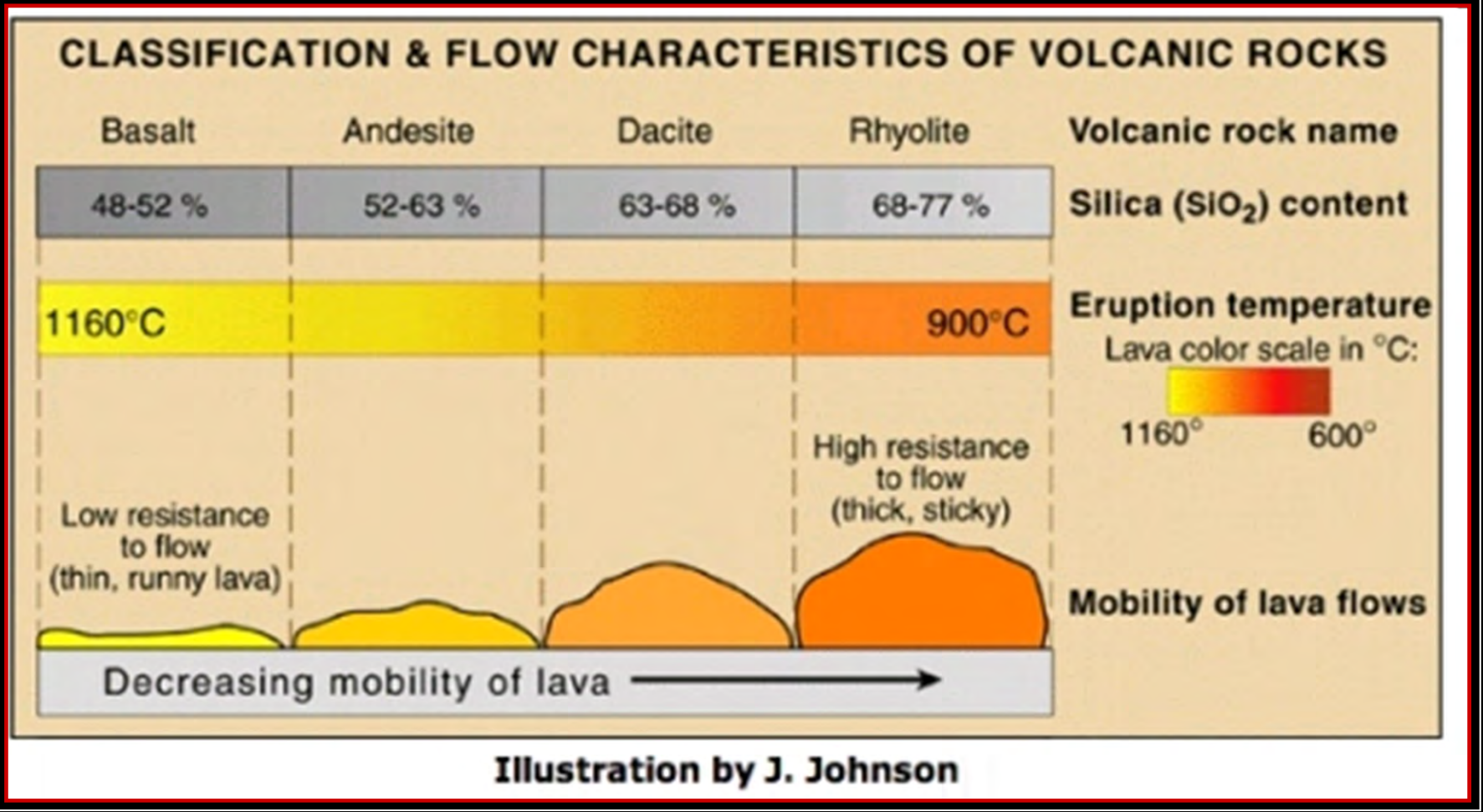
*Viscosity lab activity

Viscosity: measure of a fluid's resistance to flow

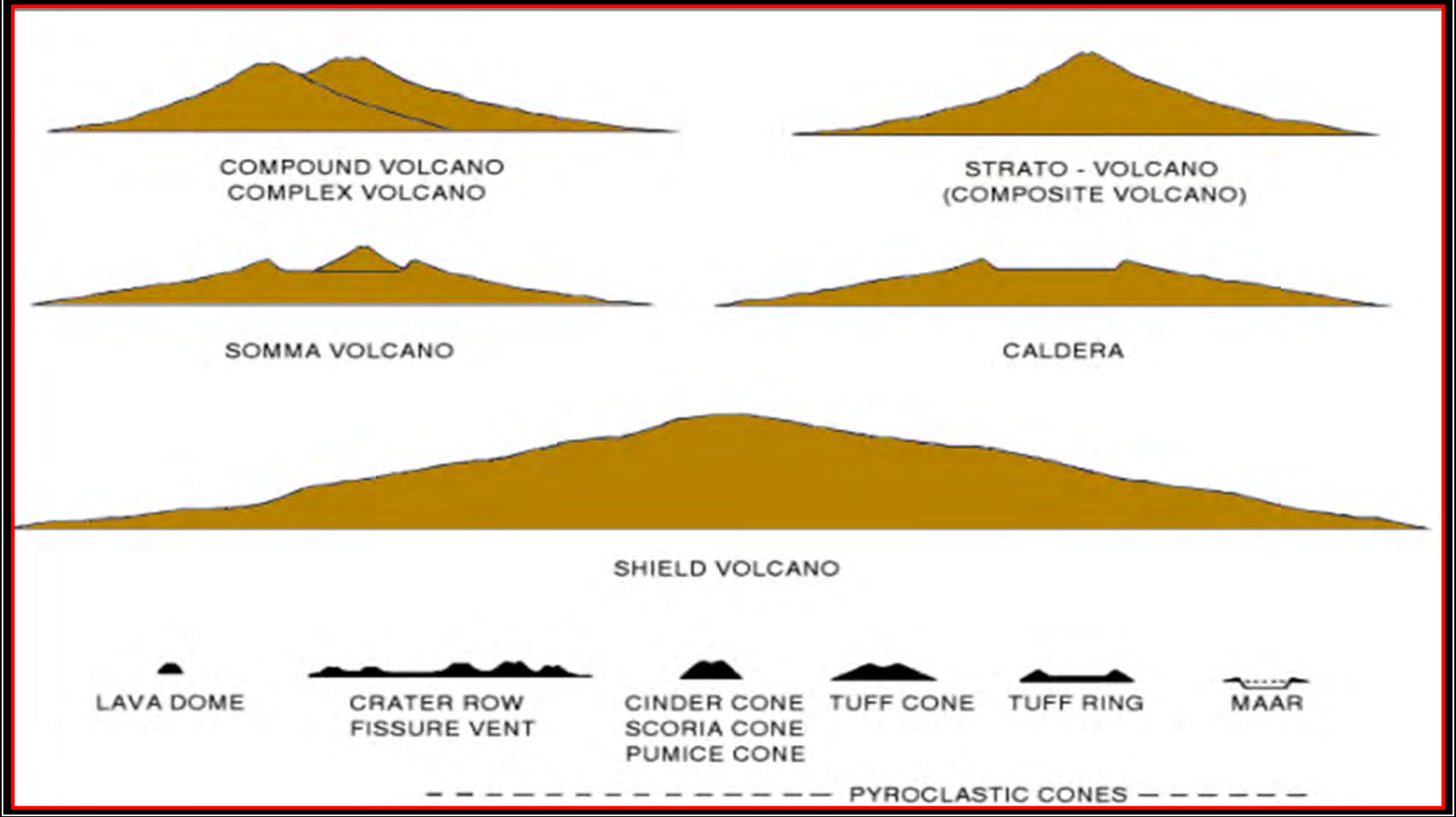
- Determined by the composition of the fluid
  - (what it is made of)

- The oceanic and continental crusts have different compositions.
  - Oceanic Crust is primarily Basalt
  - Continental Crust is mainly Granite
  - These materials have different *densities* when solid and different *viscosities* when molten

Lava types and their viscosities:

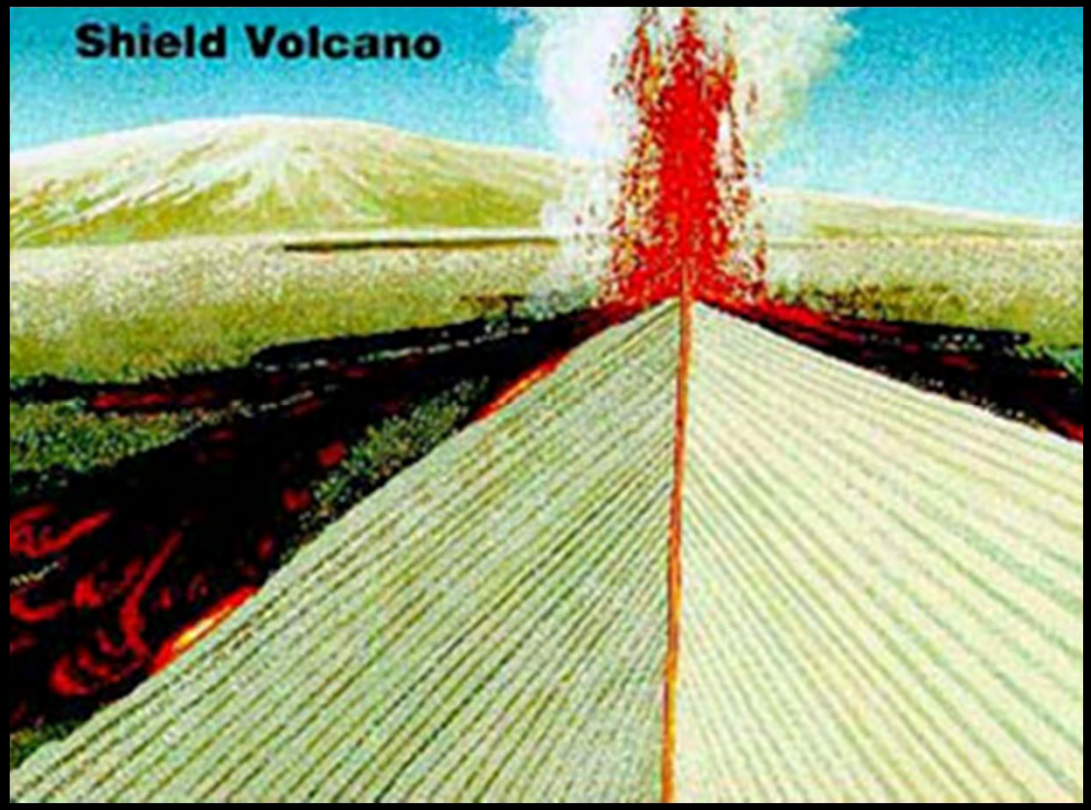


Relative Size of Volcano Types



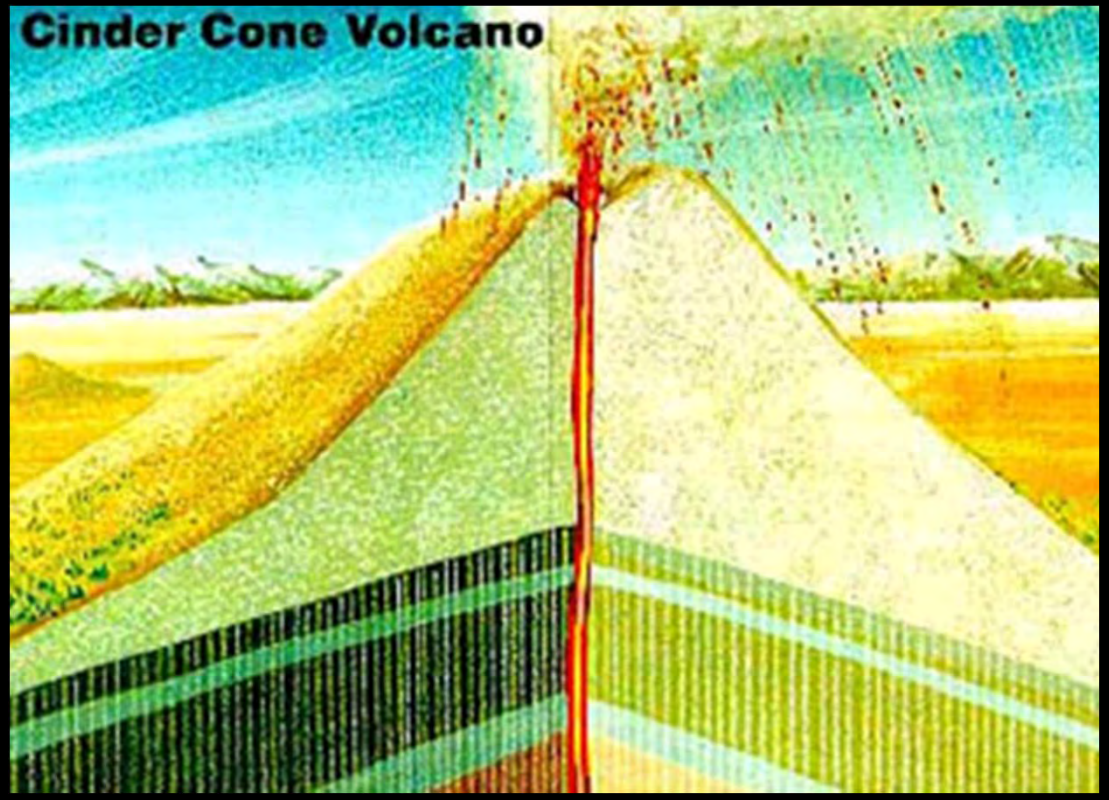
Shield Volcanoes (low viscosity)

- Shield volcanoes form from eruptions of *flowing* lava. The lava spreads out and builds up volcanoes with broad, gently sloping sides. The shape resembles a warrior's shield.



Cinder Cones (medium viscosity)

- Cinder cones are very small cone-shaped volcanoes built from *erupting* lava that breaks into small pieces as it *blasts* into the air. As the lava pieces fall back to the ground, they cool and harden into cinders that pile up around the volcano's vent.

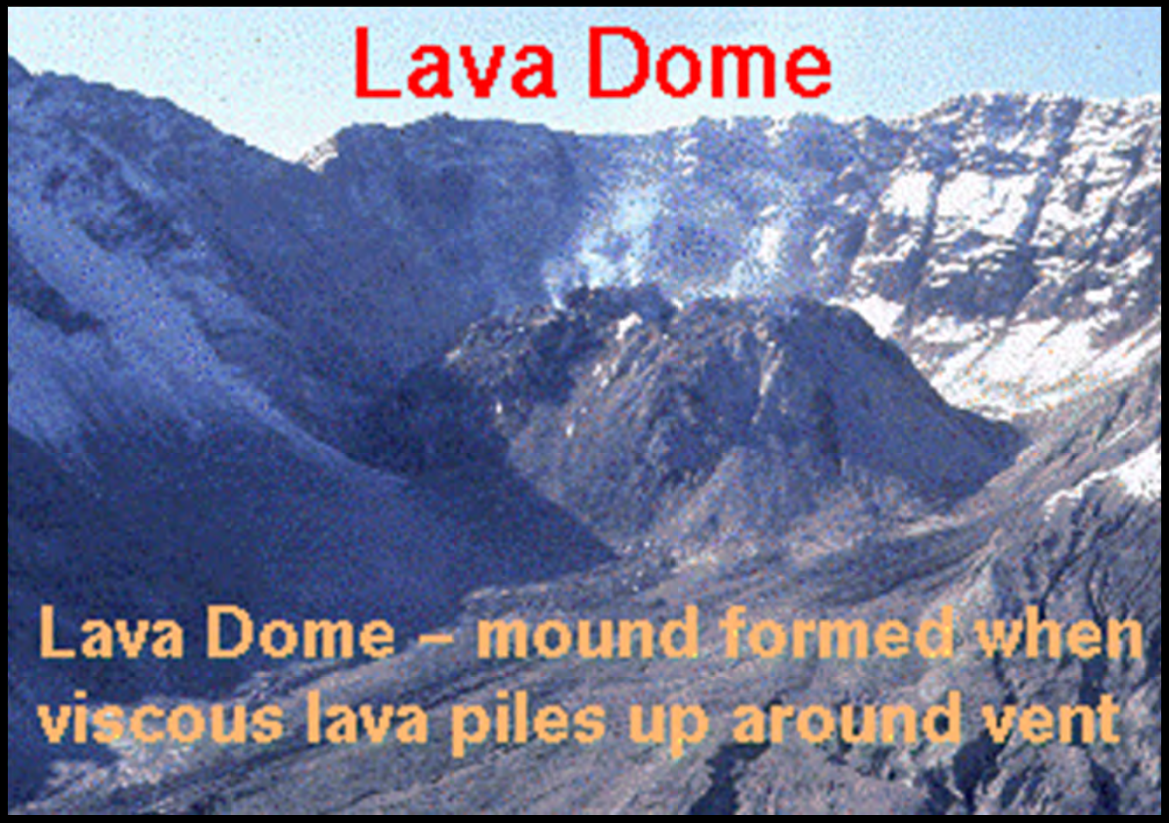


Composite (high viscosity)

- Composite volcanoes are built from *eruptions* of lava and tephra that pile up in layers, or strata, much like layers of cake and frosting. These volcanoes form symmetrical cones with steep sides.

Dome (super high viscosity)

- Lava domes are formed lava too viscous to flow far, so the lava piles over and around its vent. They grow largely by expansion from within.
- They often form in calderas of stratovolcanoes following large eruptions.



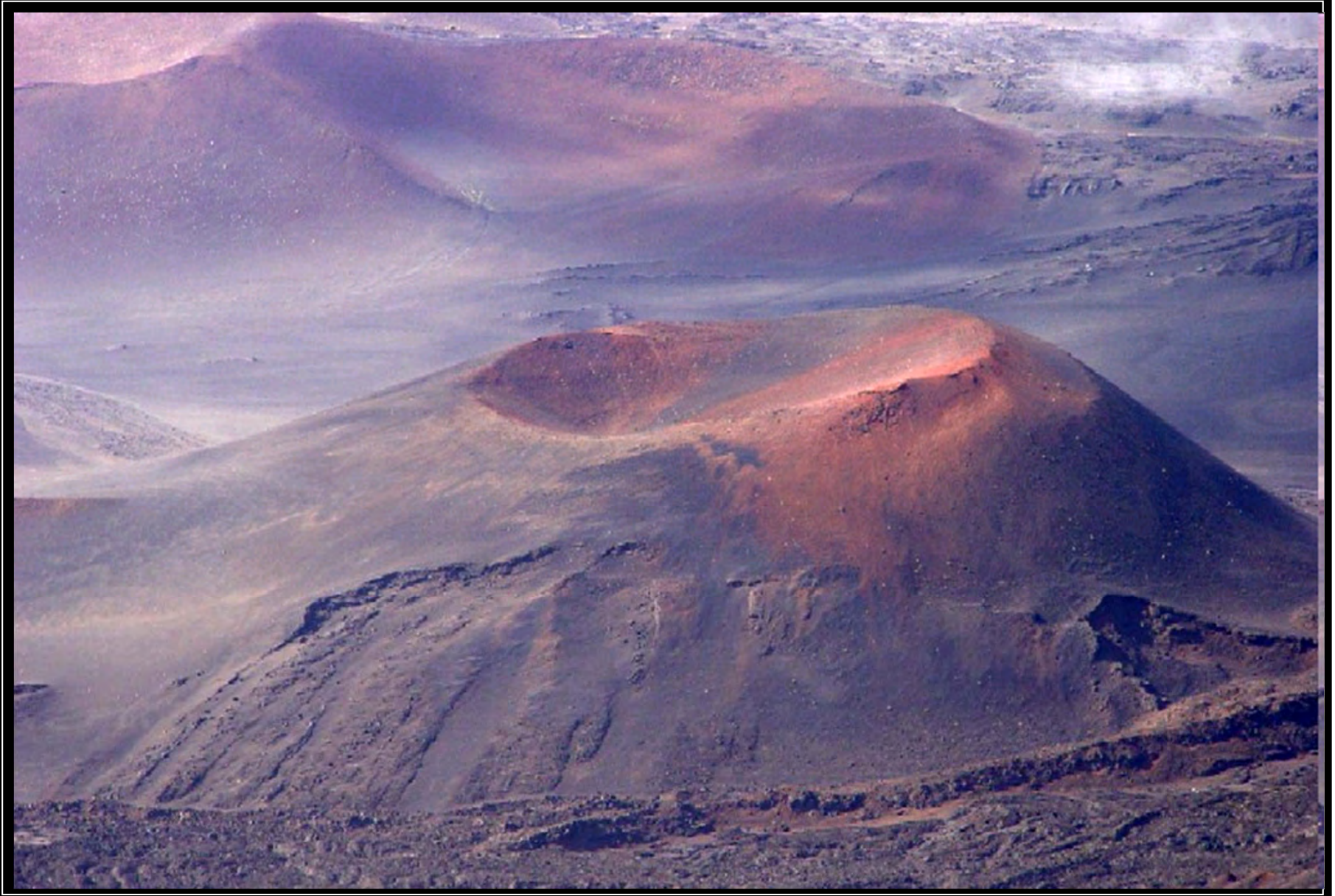
Name that Volcano!

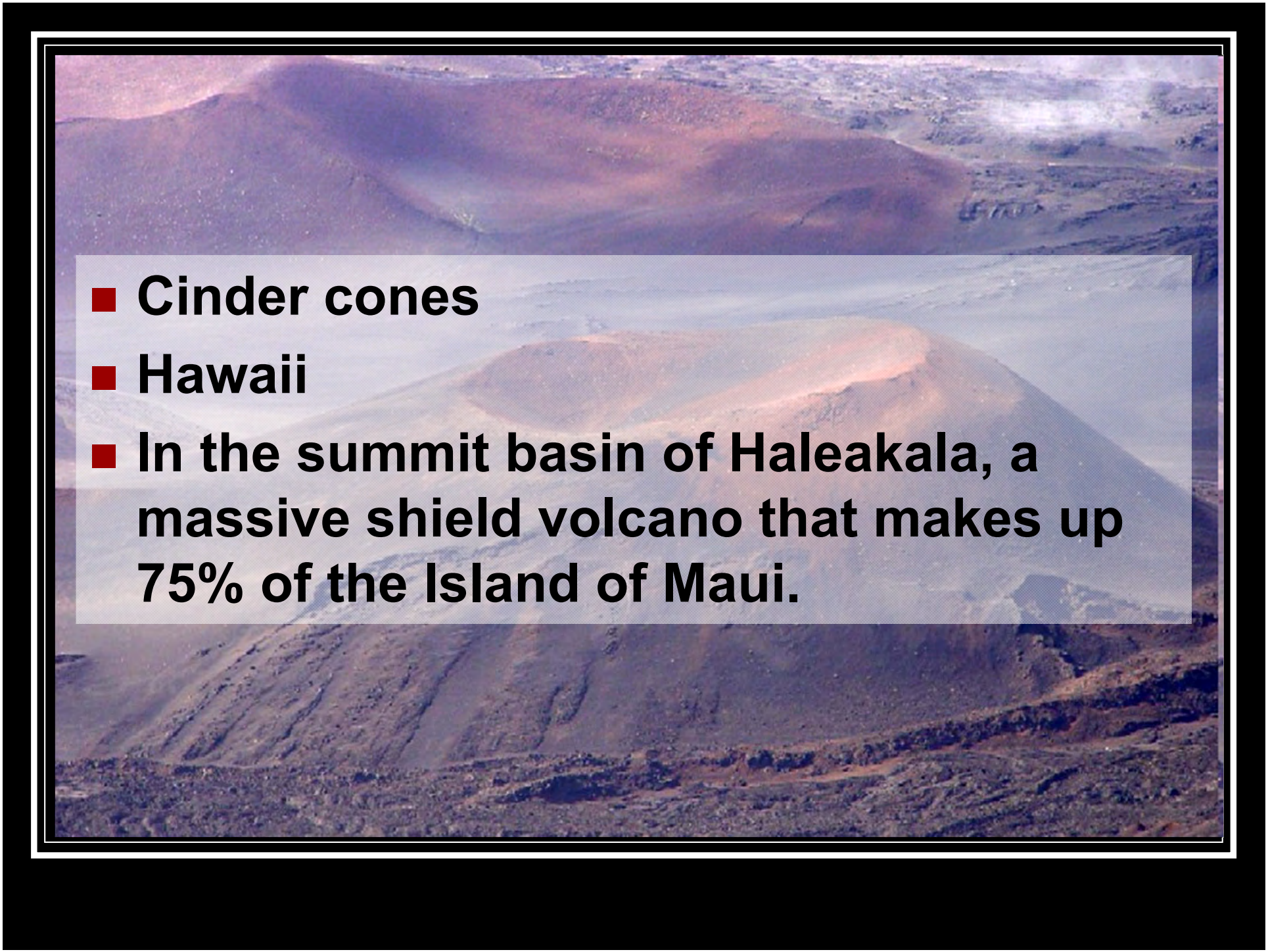
- Identify:
  - Type
  - Plate Tectonic setting
  - Viscosity (high, medium, low)

of the following volcanoes…

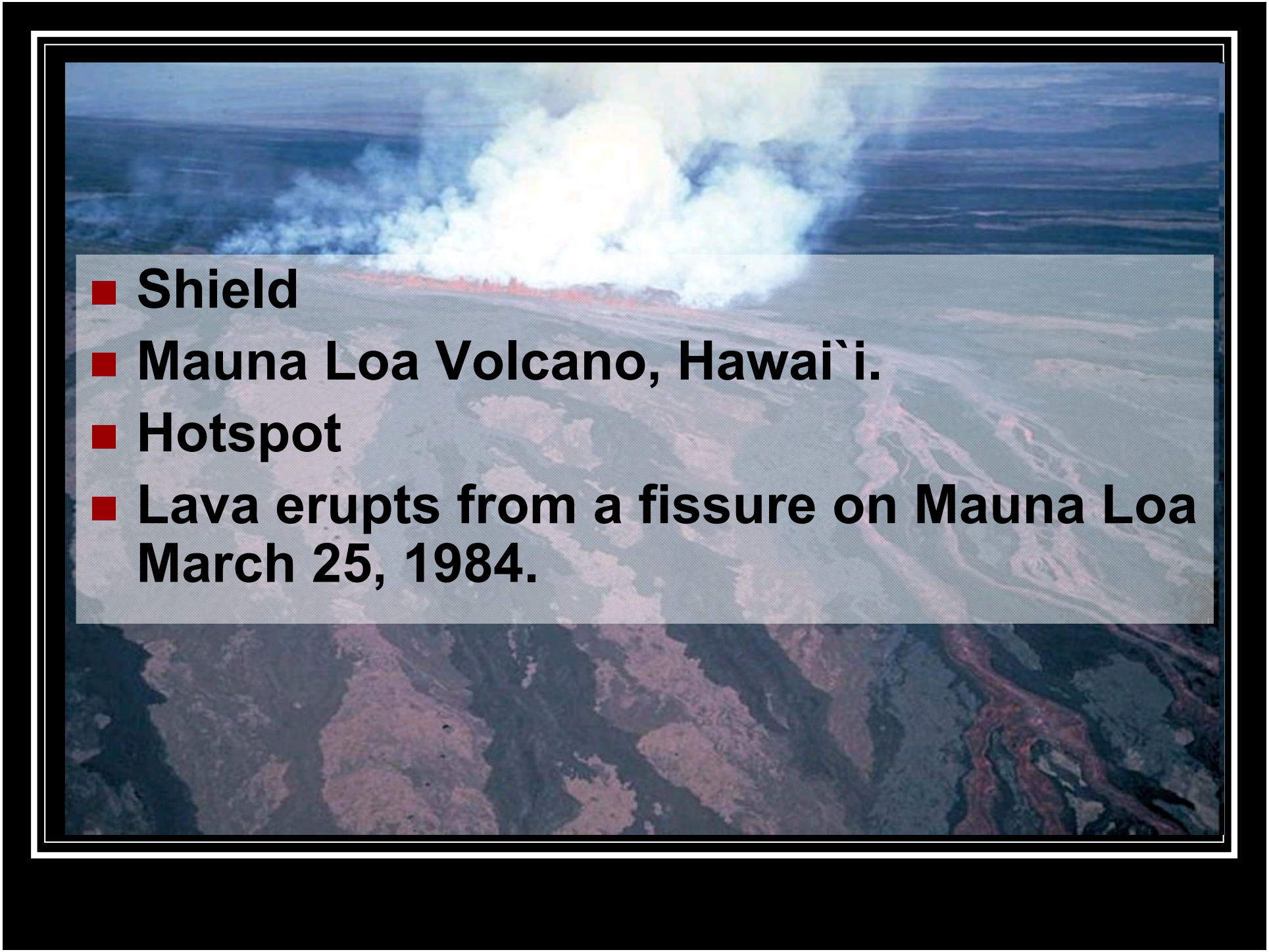

Composite
Mount Fuji, Japan
Convergent boundary


東海道 十三
五十三次
沼津

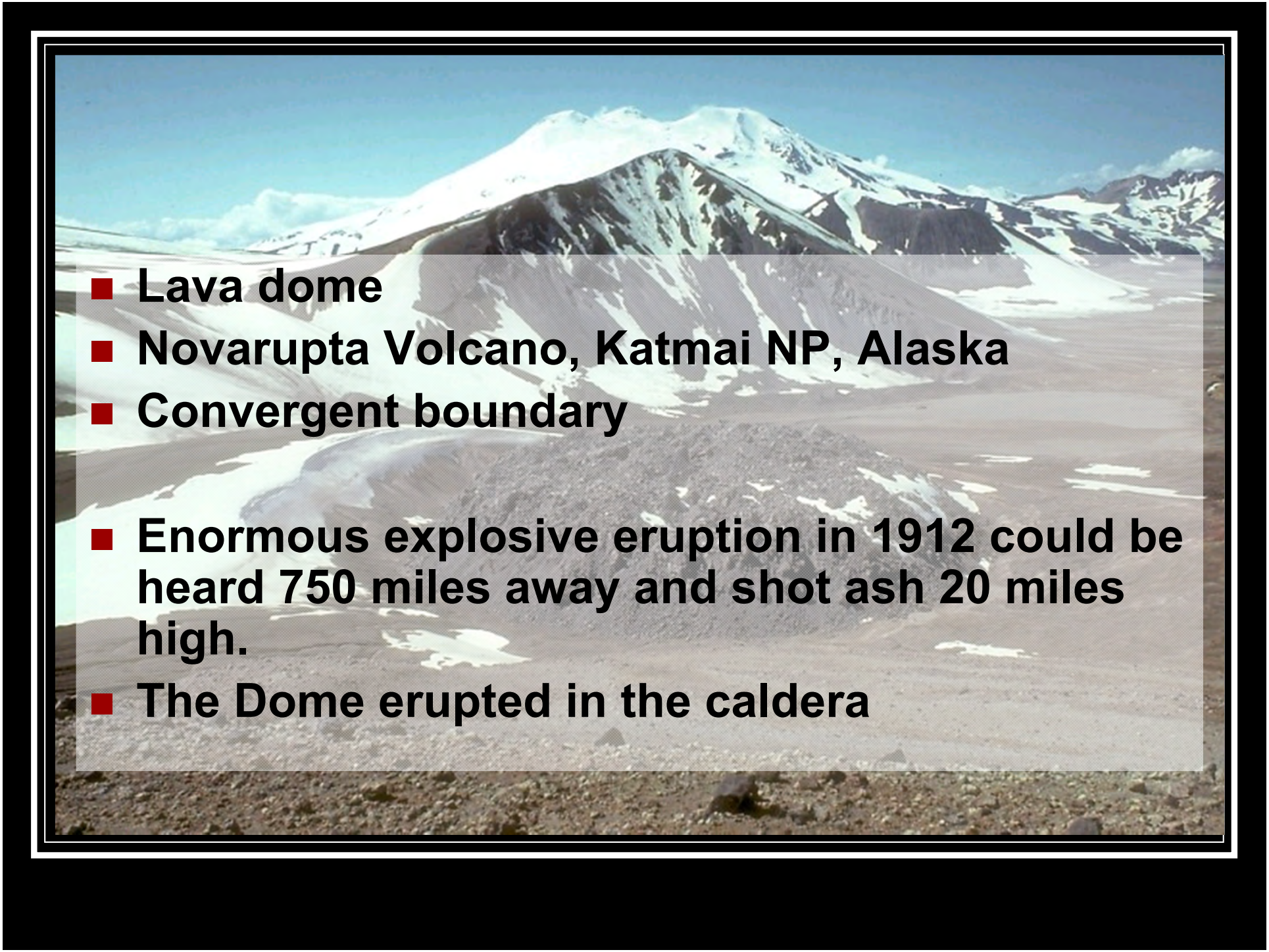




- Cinder cones
- Hawaii
- In the summit basin of Haleakala, a massive shield volcano that makes up 75% of the Island of Maui.



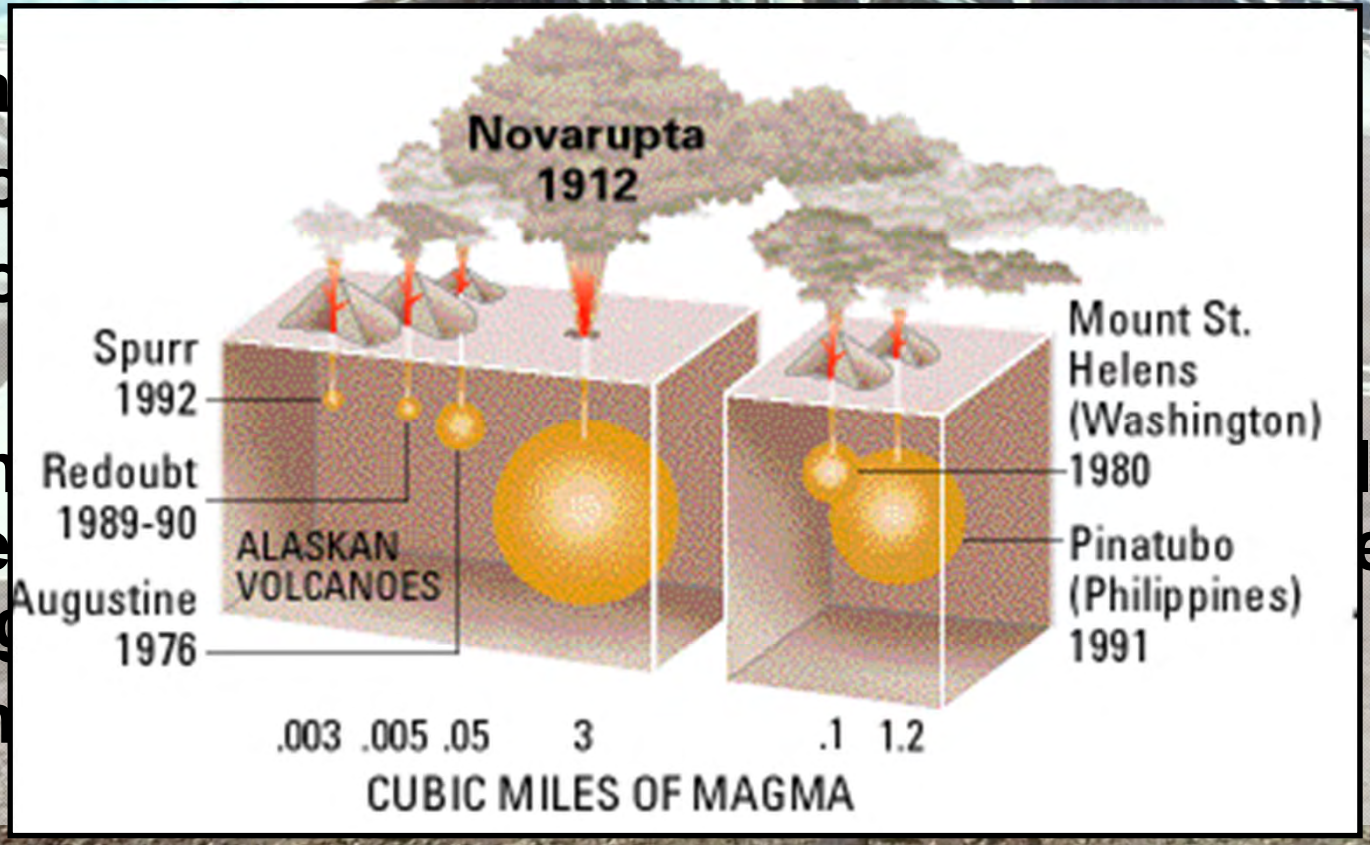
- Shield
- Mauna Loa Volcano, Hawai`i.
- Hotspot
- Lava erupts from a fissure on Mauna Loa March 25, 1984.



- Lava dome
- Novarupta Volcano, Katmai NP, Alaska
- Convergent boundary

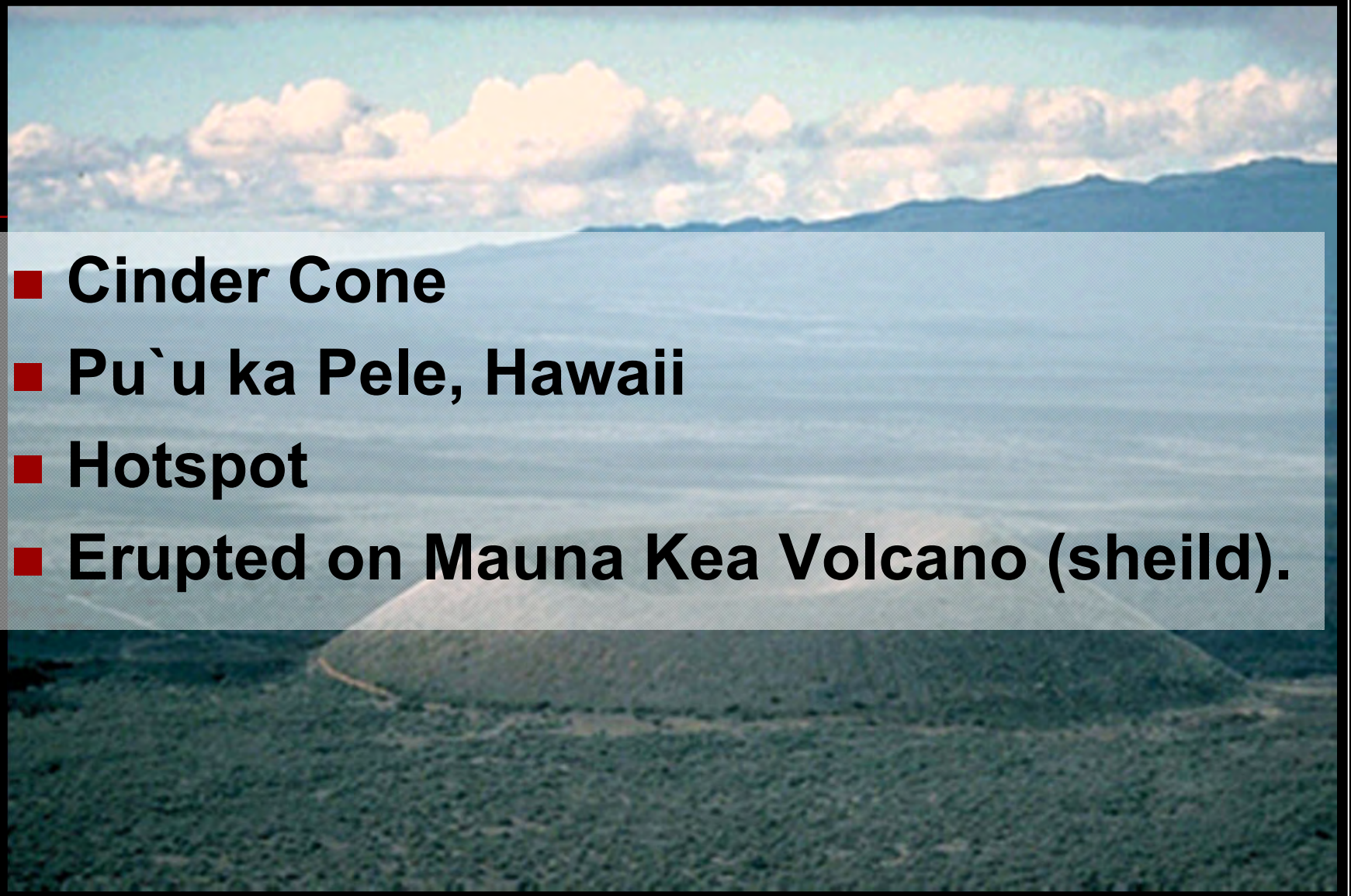
- Enormous explosive eruption in 1912 could be heard 750 miles away and shot ash 20 miles high.
- The Dome erupted in the caldera

- La
- No
- Co
- En
  he
  hig
- Th



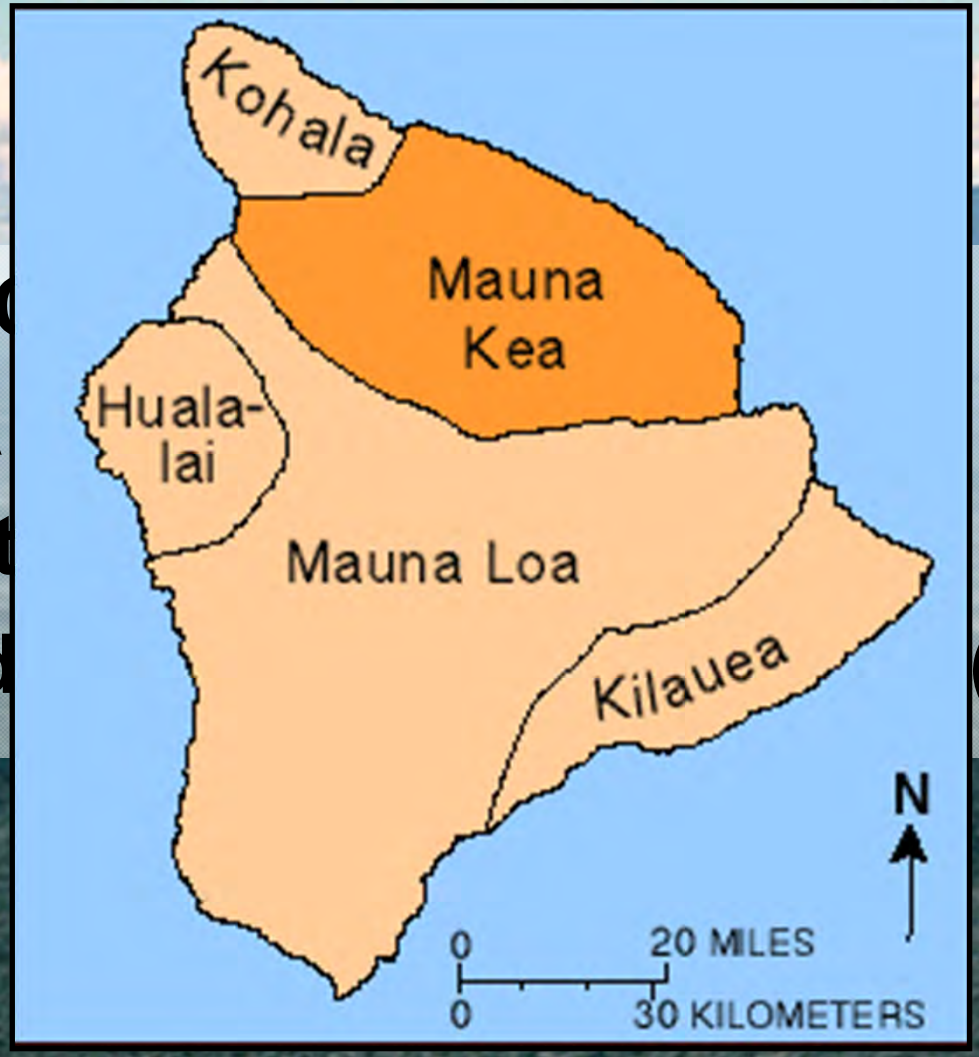
ld be

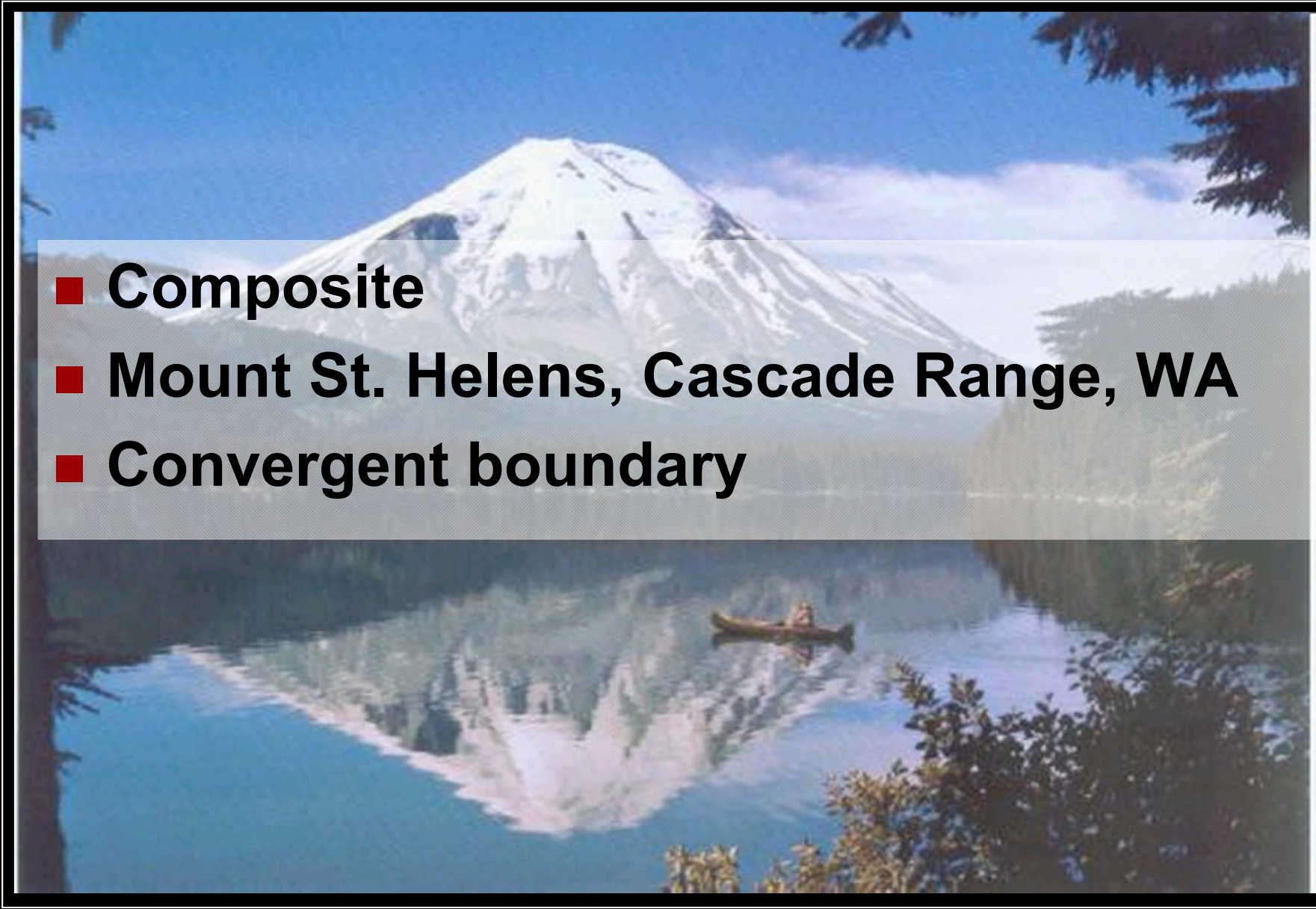
es



- Cinder Cone
- Pu`u ka Pele, Hawaii
- Hotspot
- Erupted on Mauna Kea Volcano (sheild).

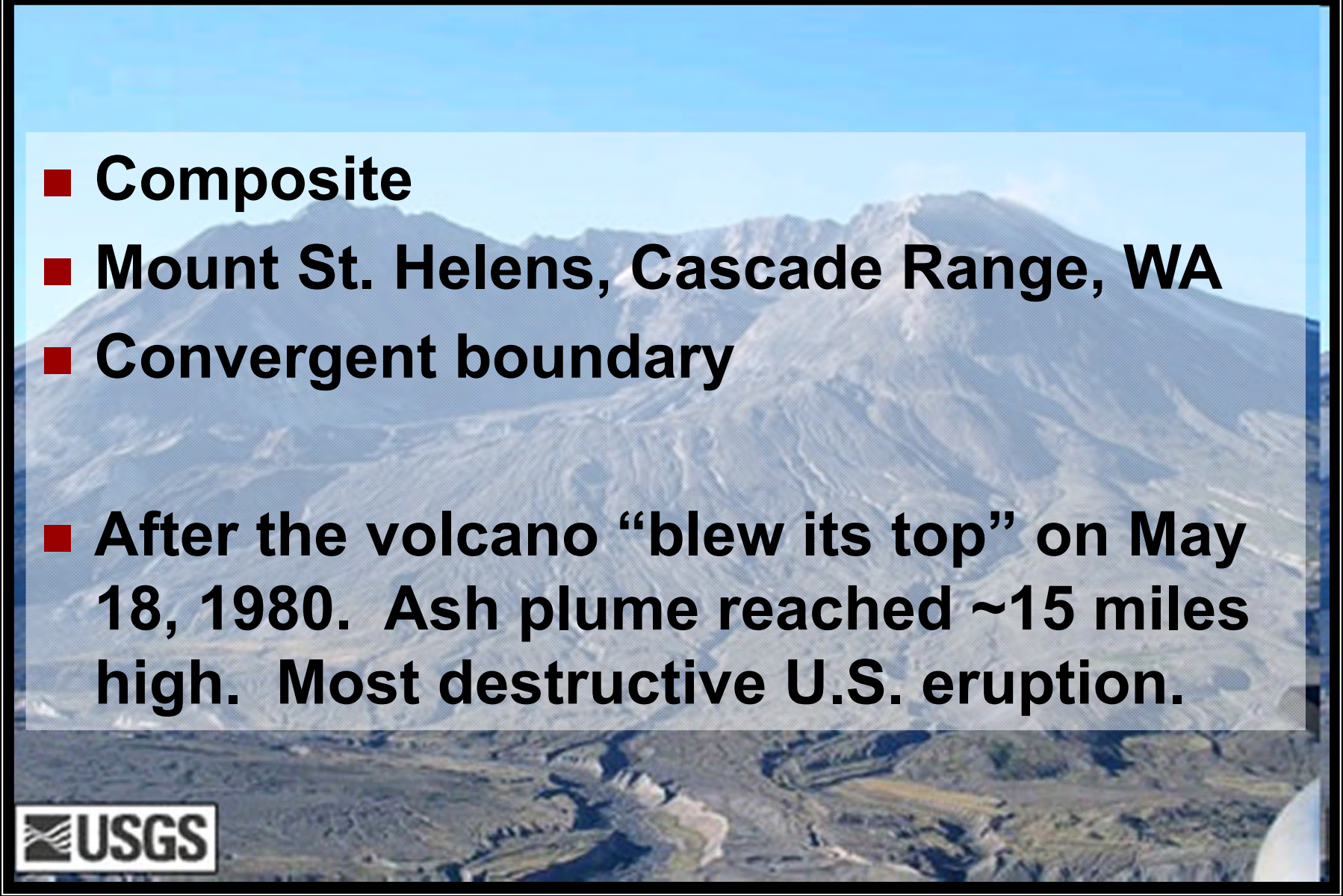
- Cinder C
- Pu`u ka
- Hotspot
- Erupted (sheild).





- Composite
- Mount St. Helens, Cascade Range, WA
- Convergent boundary

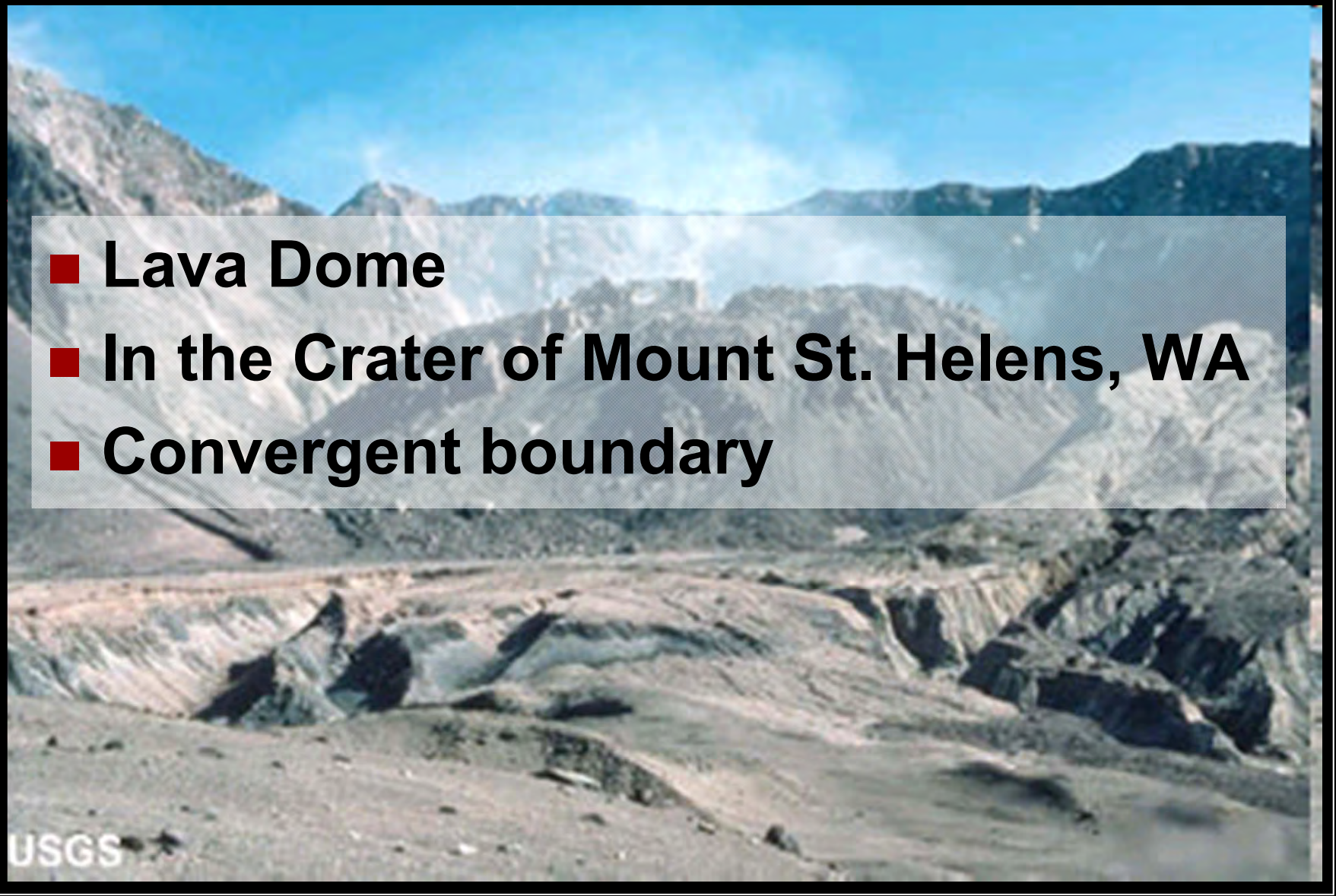

USGS



- Composite
- Mount St. Helens, Cascade Range, WA
- Convergent boundary

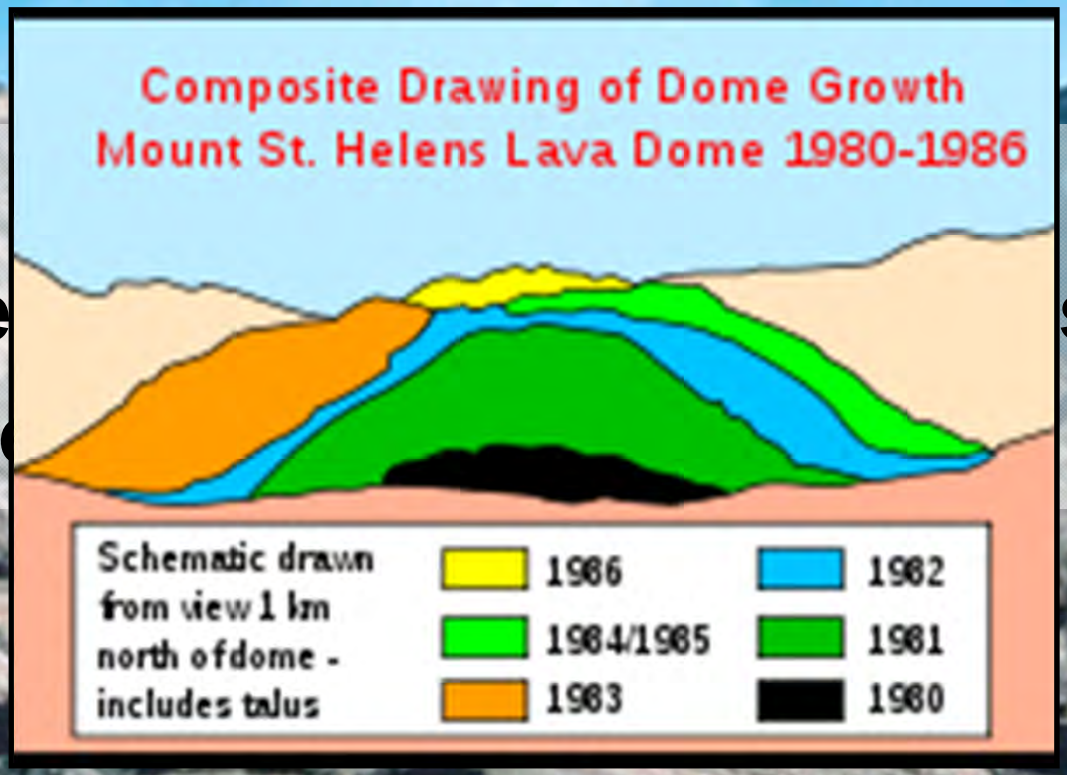
- After the volcano “blew its top” on May 18, 1980. Ash plume reached ~15 miles high. Most destructive U.S. eruption.


USGS


Lava Dome
In the Crater of Mount St. Helens, WA
Convergent boundary
USGS

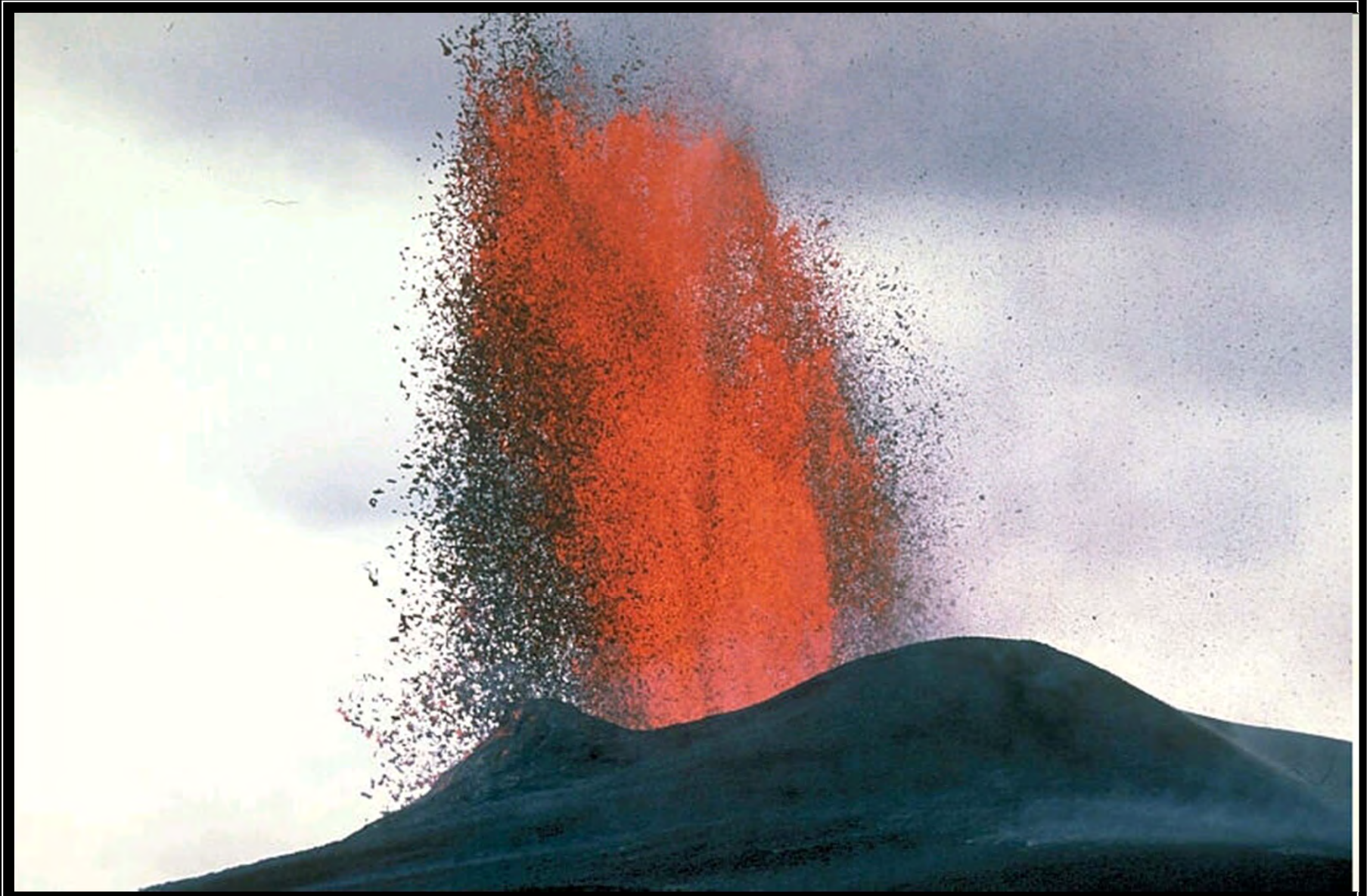
- Lava
- In the
- Conv

s, WA



USGS


2005
Lava
In the
Conv
, WA
USGS

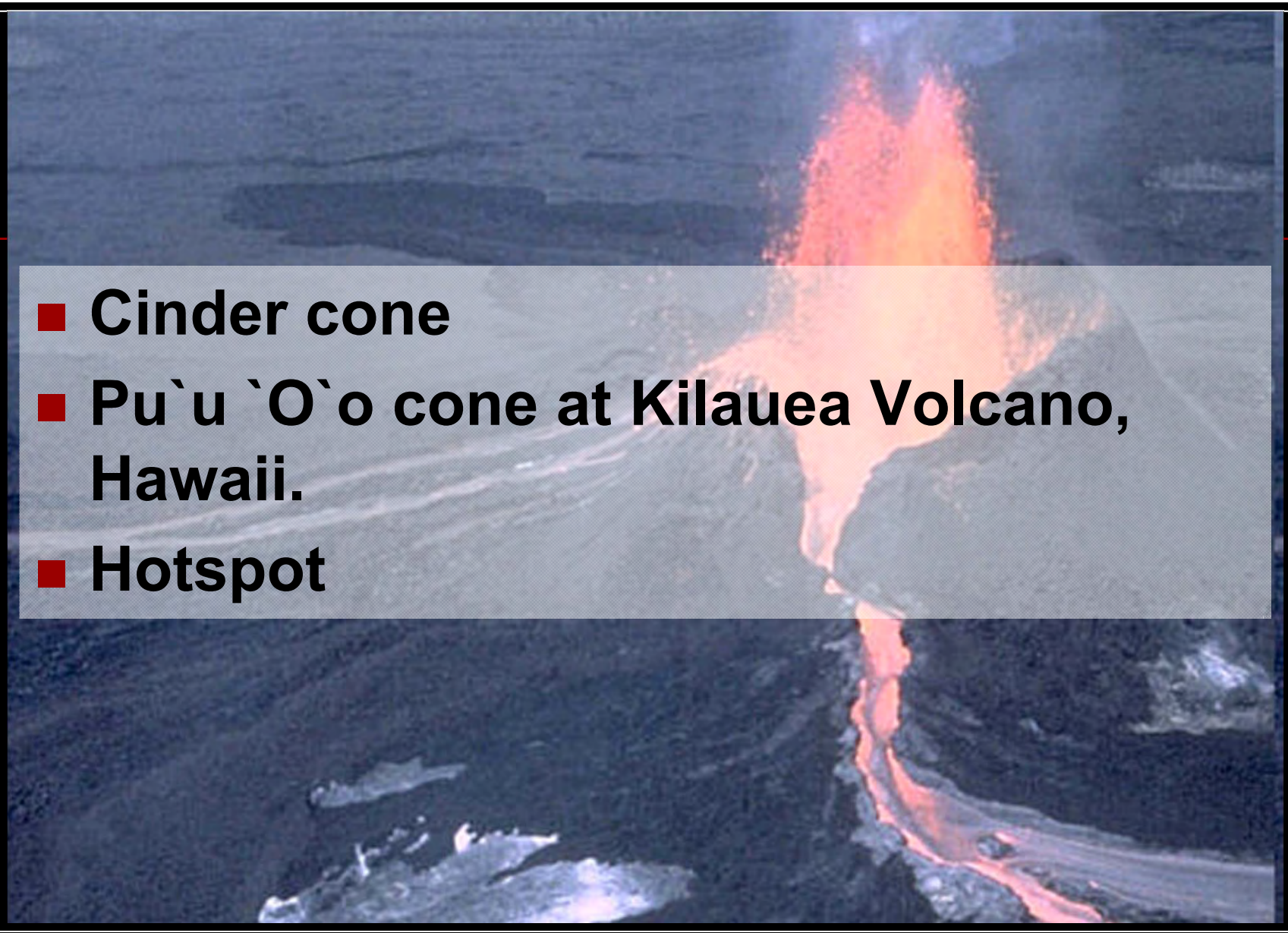



Cinder cone
Pu`u `O`o cone at Kilauea Volcano, Hawaii.
Hotspot

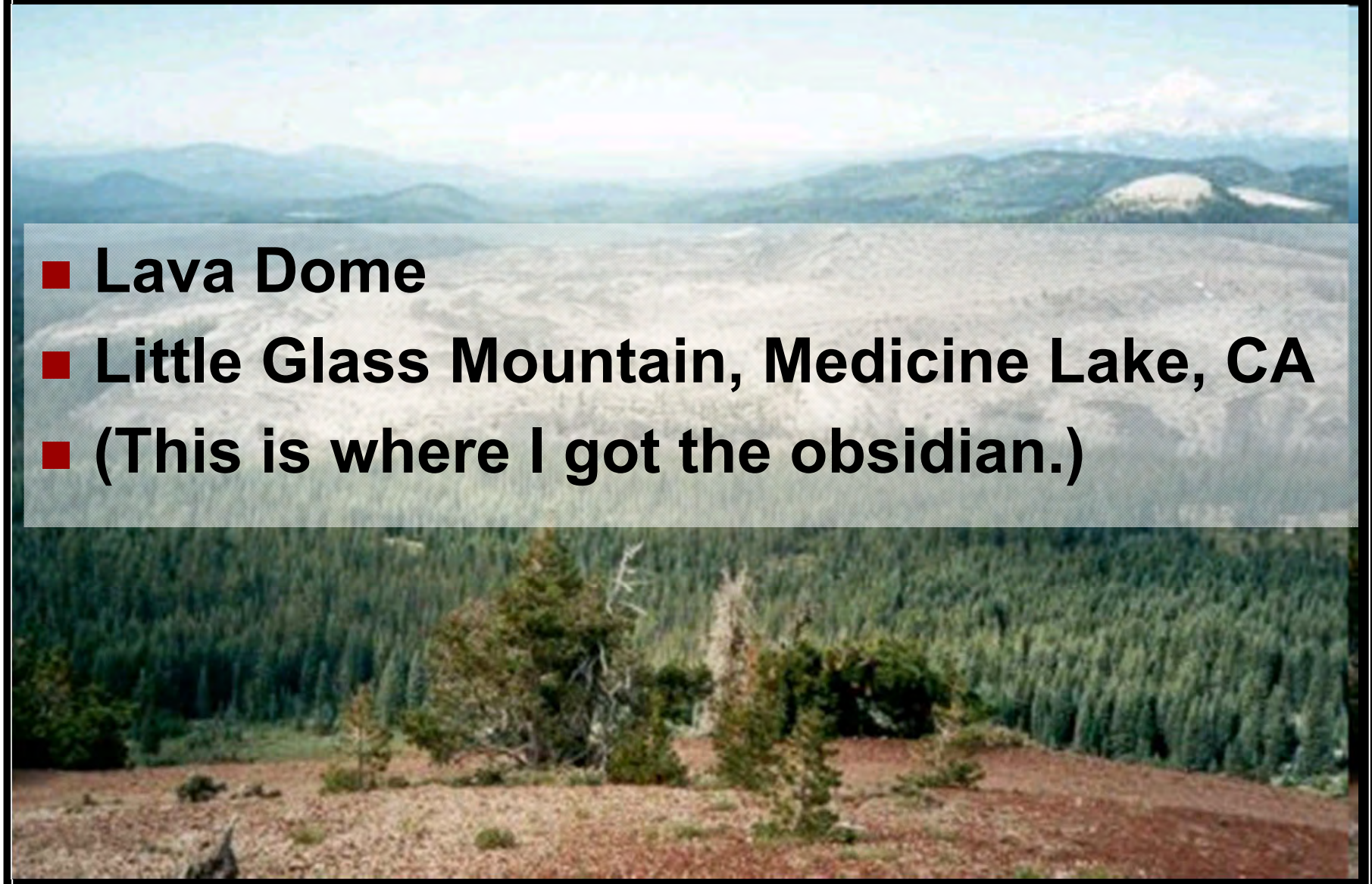

Composite
Arenal Volcano, in Costa Rica
Convergent boundary


Composite
Colima Volcano, Mexico.
Convergent boundary
Colima is the most historically active volcano in Mexico.


Lava Dome (Obsidian flow)
Long Valley Caldera, California.
Caldera collapsed after a huge eruption 760,000 years ago, 50 times bigger than Mt. St. Helen's.
Domes formed in the caldera following a series of explosive eruptions in the Mono-Inyo Volcanic Chain.

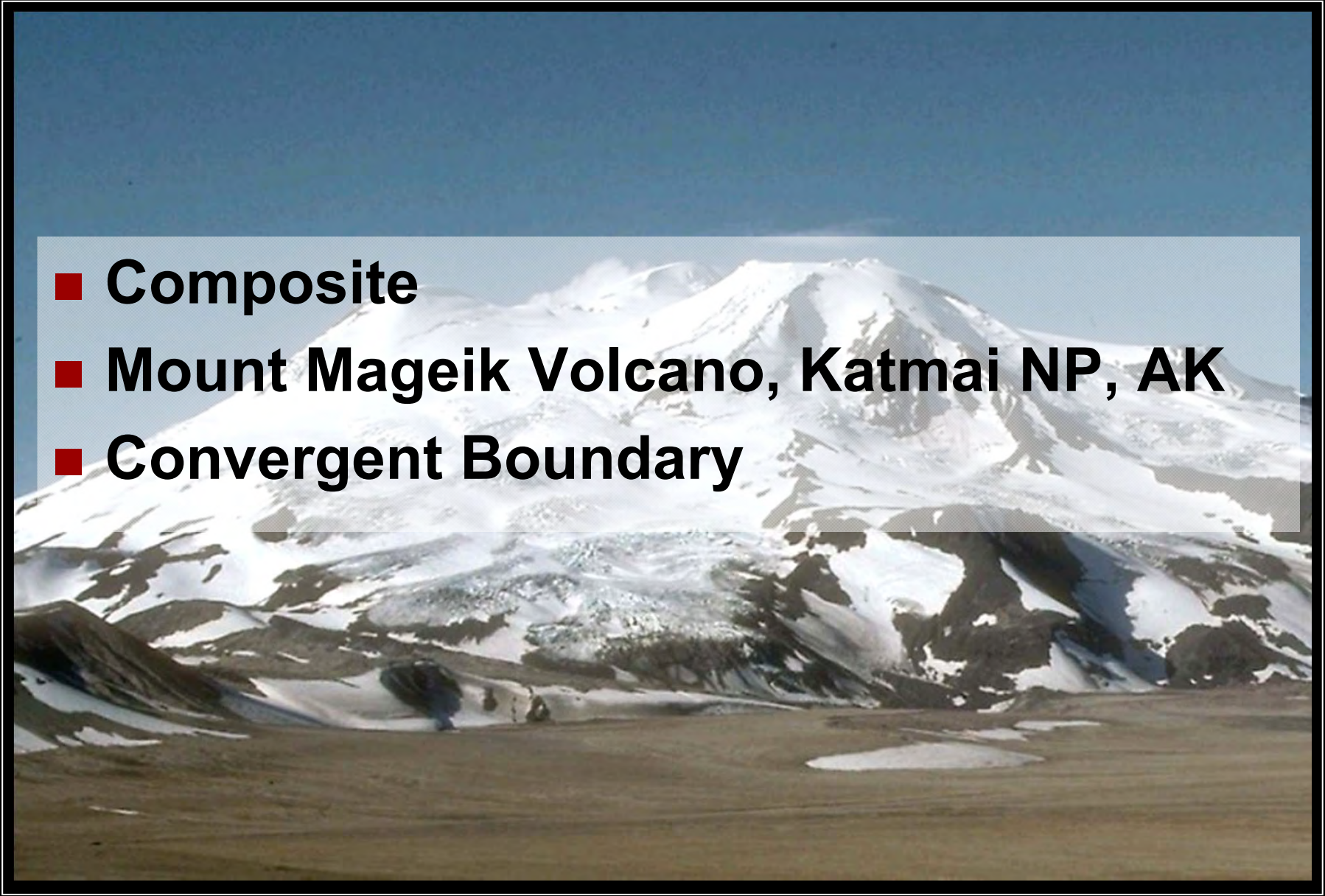


- Cinder cone
- Pu`u `O`o cone at Kilauea Volcano, Hawaii.
- Hotspot



- Lava Dome
- Little Glass Mountain, Medicine Lake, CA
- (This is where I got the obsidian.)

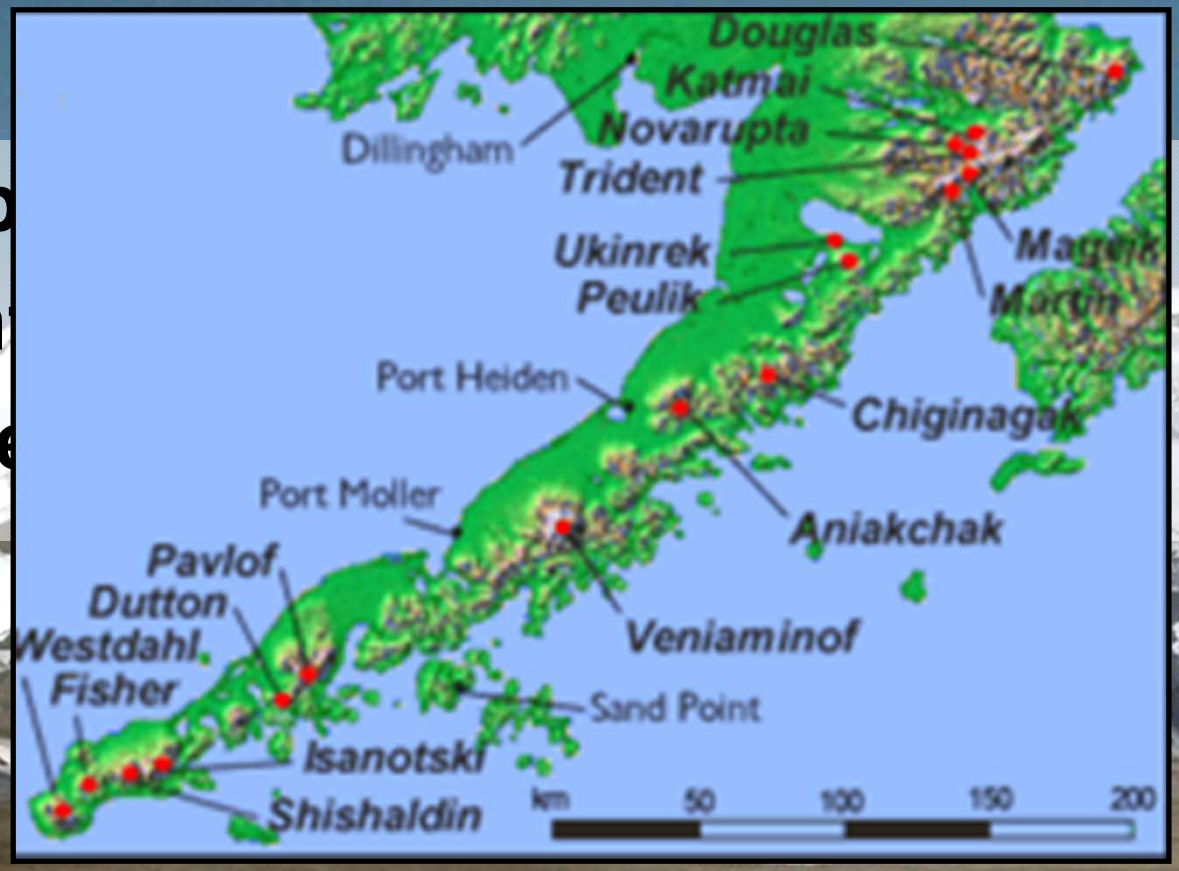
- Cinder cone
- Little Lake, (Mohave Desert) California.

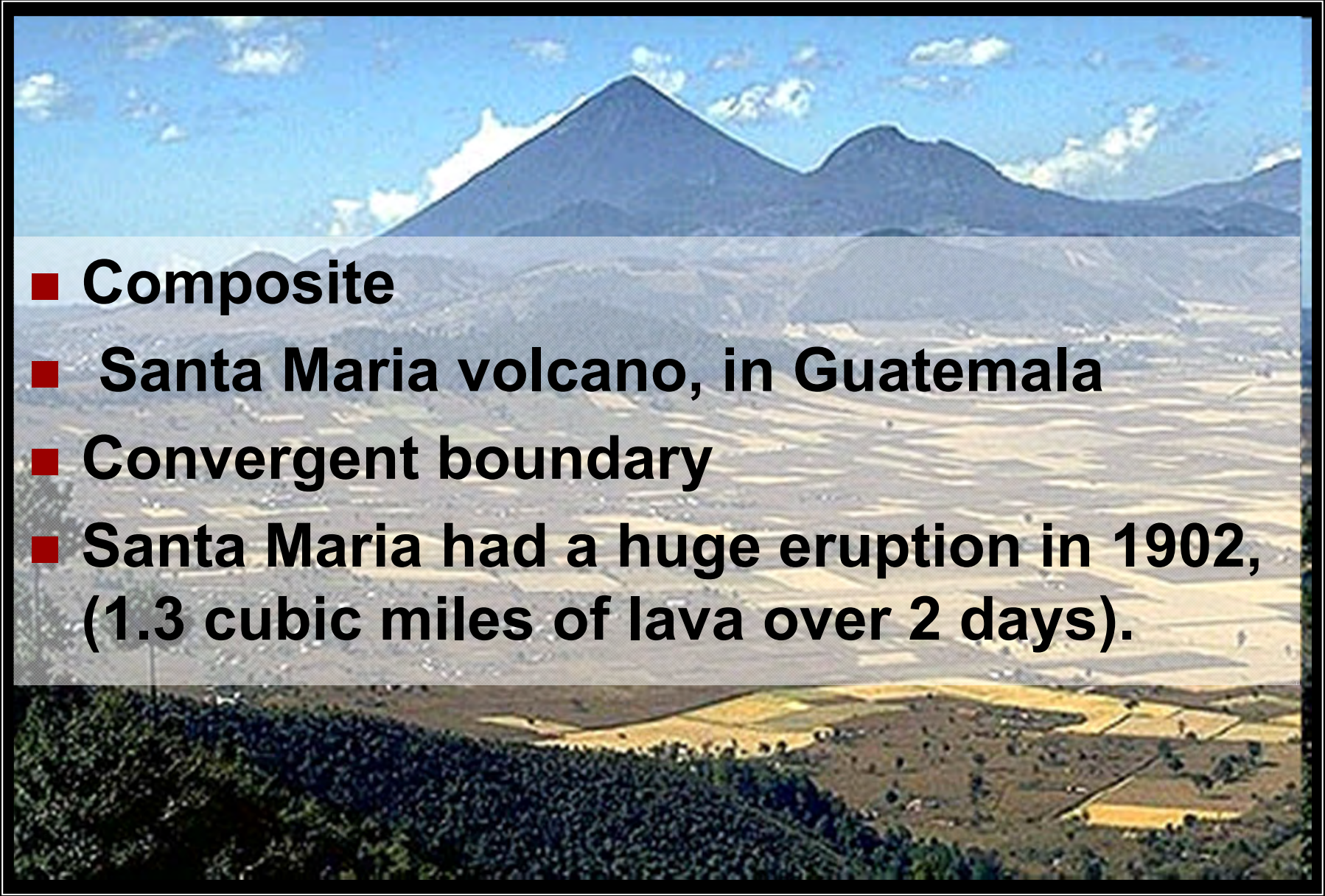


- Composite
- Mount Mageik Volcano, Katmai NP, AK
- Convergent Boundary

- Comp
- Mount
- Conve

AK

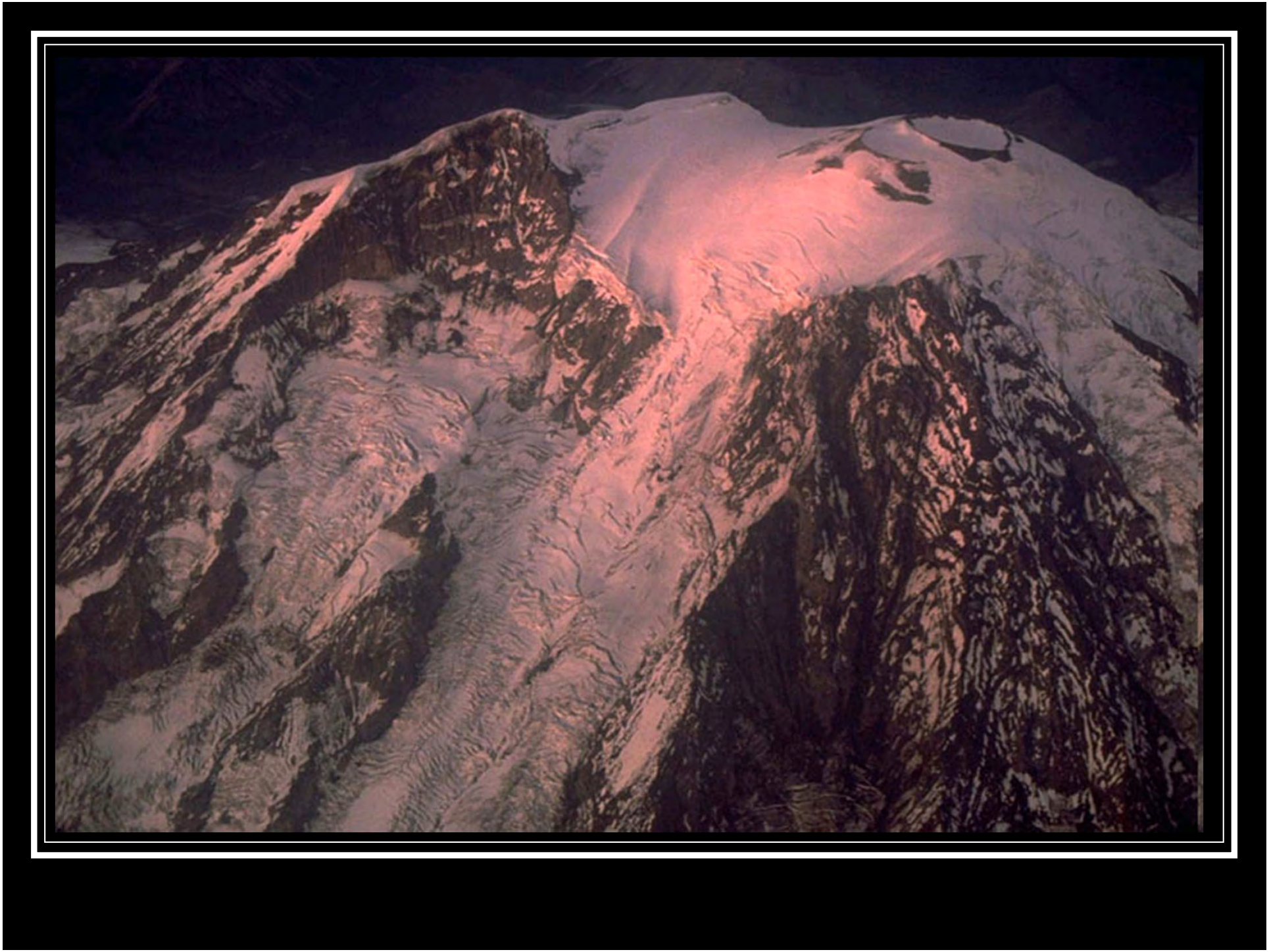




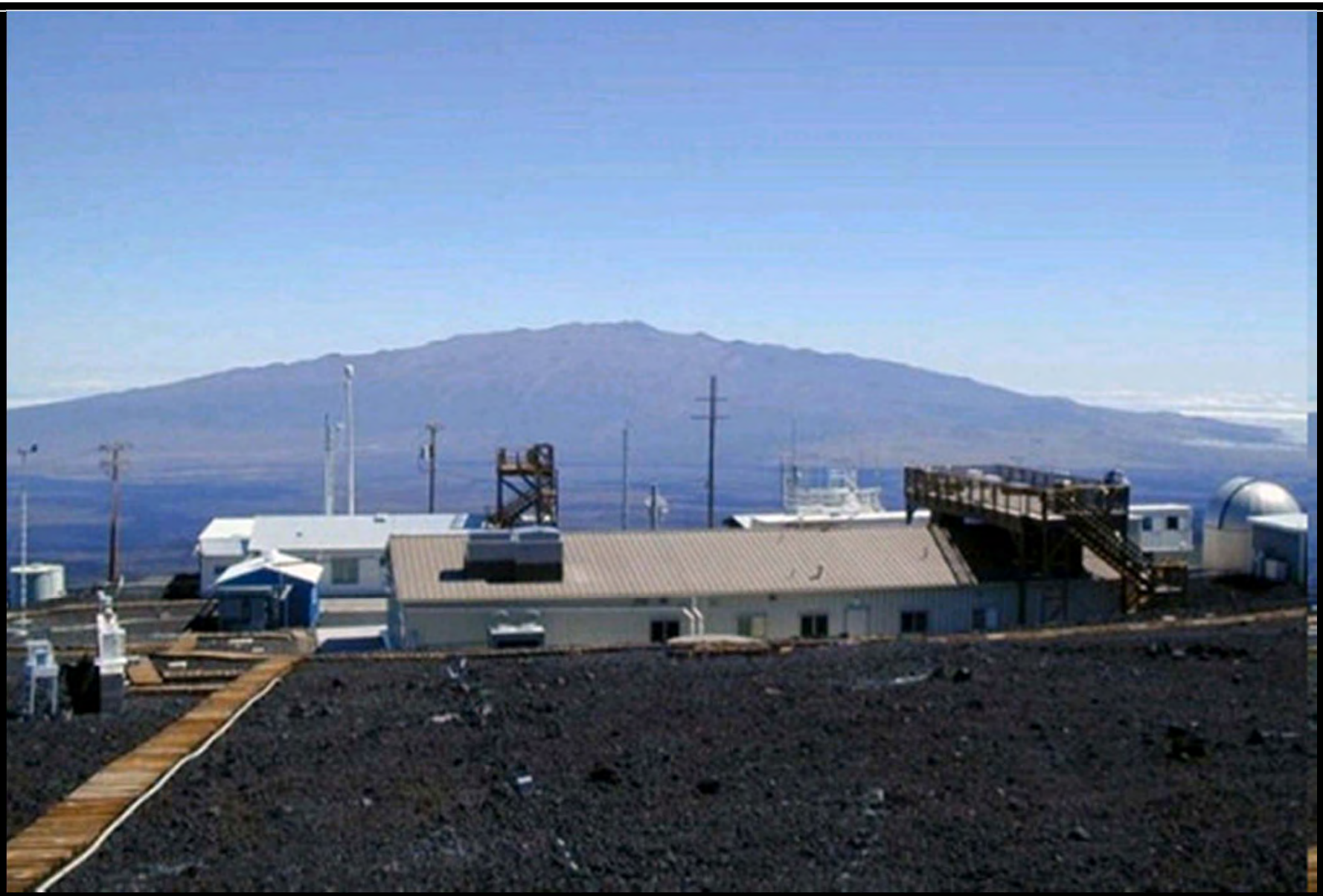
- Composite
- Santa Maria volcano, in Guatemala
- Convergent boundary
- Santa Maria had a huge eruption in 1902, (1.3 cubic miles of lava over 2 days).

- Cinder cone…

  and
- Shield Volcano
- Mauna Loa, Hawaii
- Hotspot

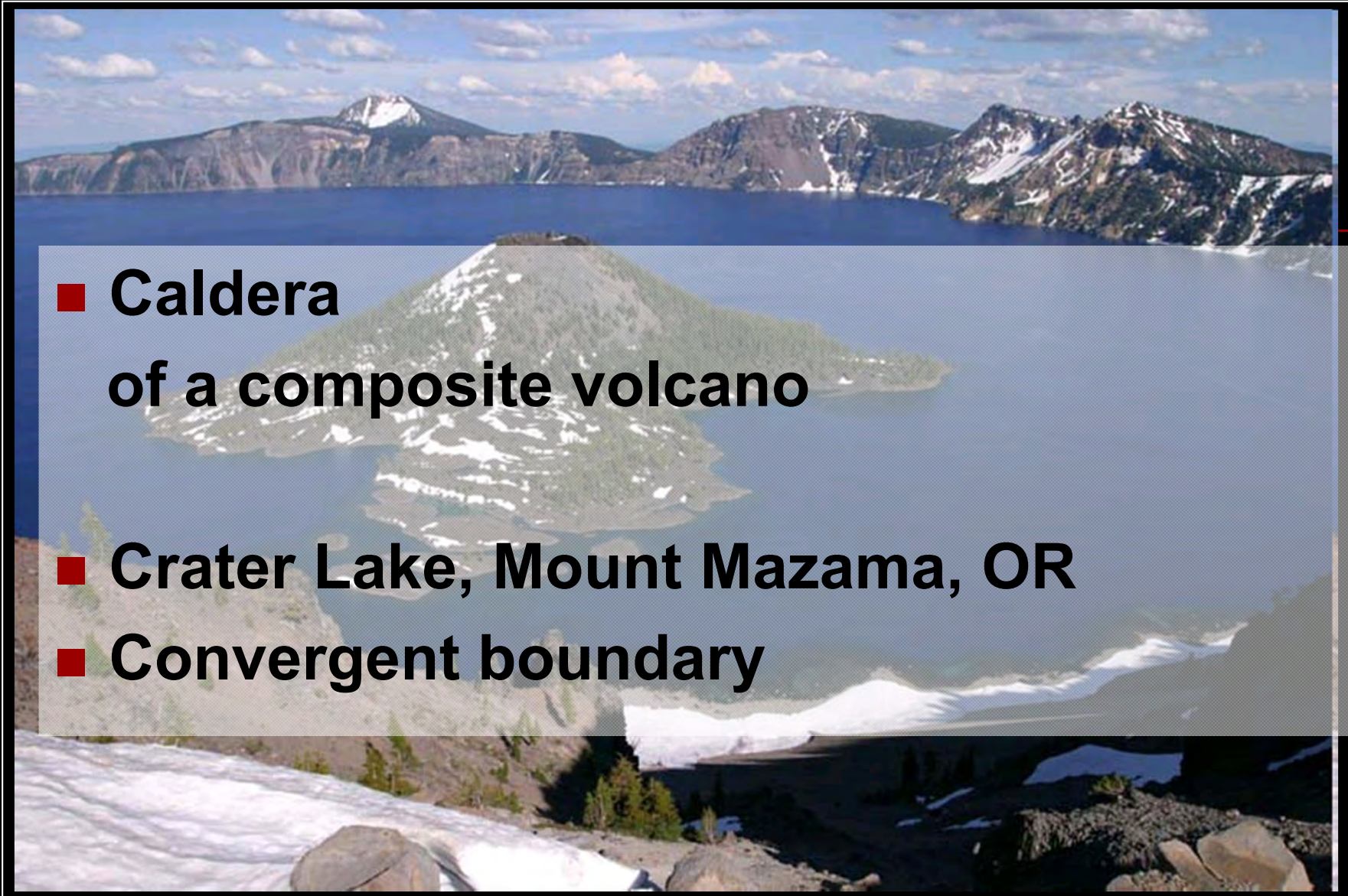



Composite
Mt. Rainier, WA.
Convergent boundary

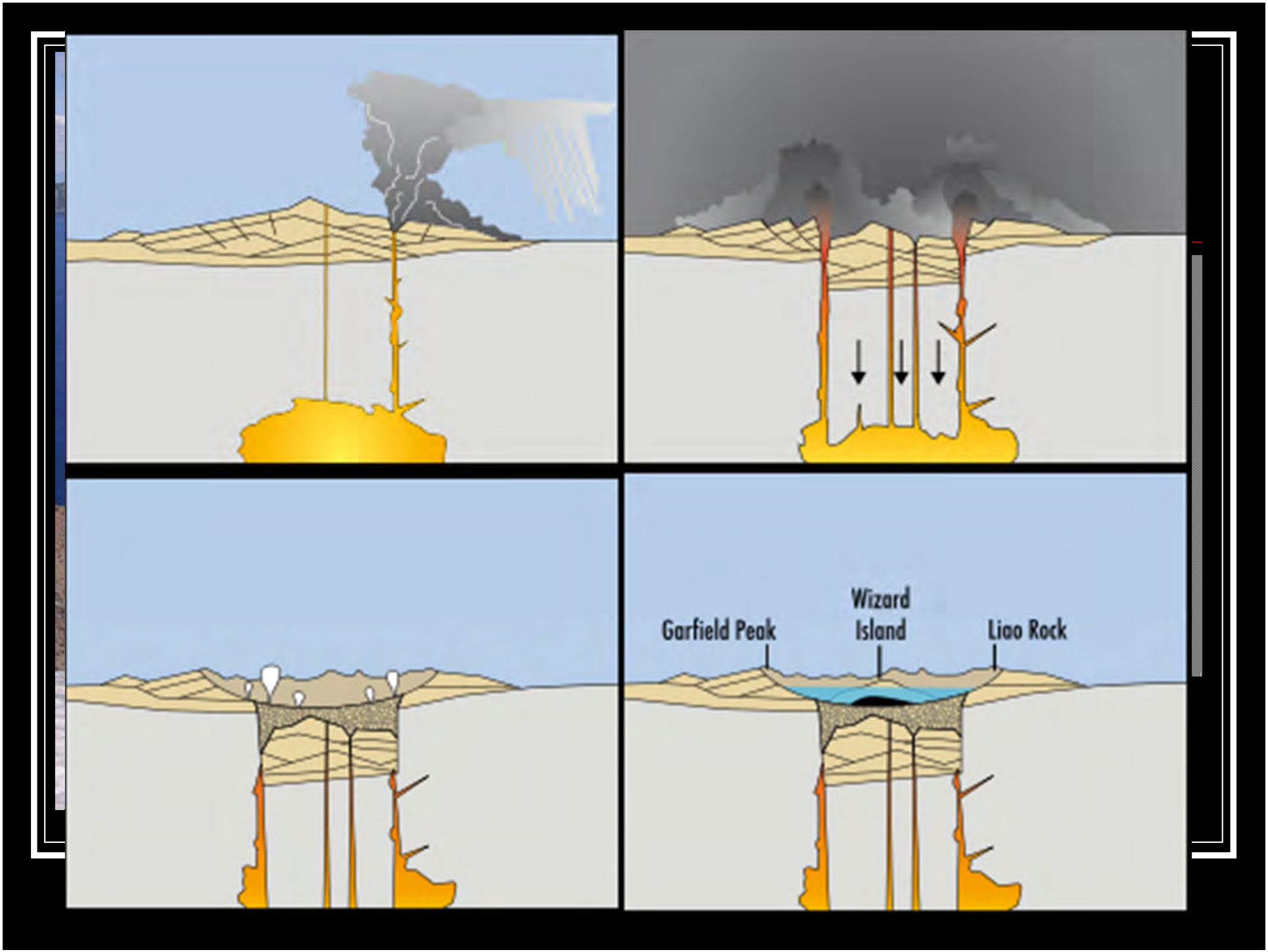


- Shield
- Mauna Kea volcano, Hawaii
- Hotspot


Cinder Cone,
Mojave Desert, CA



- Caldera
  of a composite volcano
- Crater Lake, Mount Mazama, OR
- Convergent boundary


Garfield Peak
Wizard Island
Liao Rock