Announcements

- Reading for Mon: p.269-276
- Agenda for today:
  - Lecture
  - Talk about review session on Wed
  - Poster?
  - Course evaluations
  - Eduardo's presentation
  - Lab tours?

Ocean Intraplate Volcanism

Ocean islands and seamounts commonly associated with hot spots

May originate in MOR's and then migrate

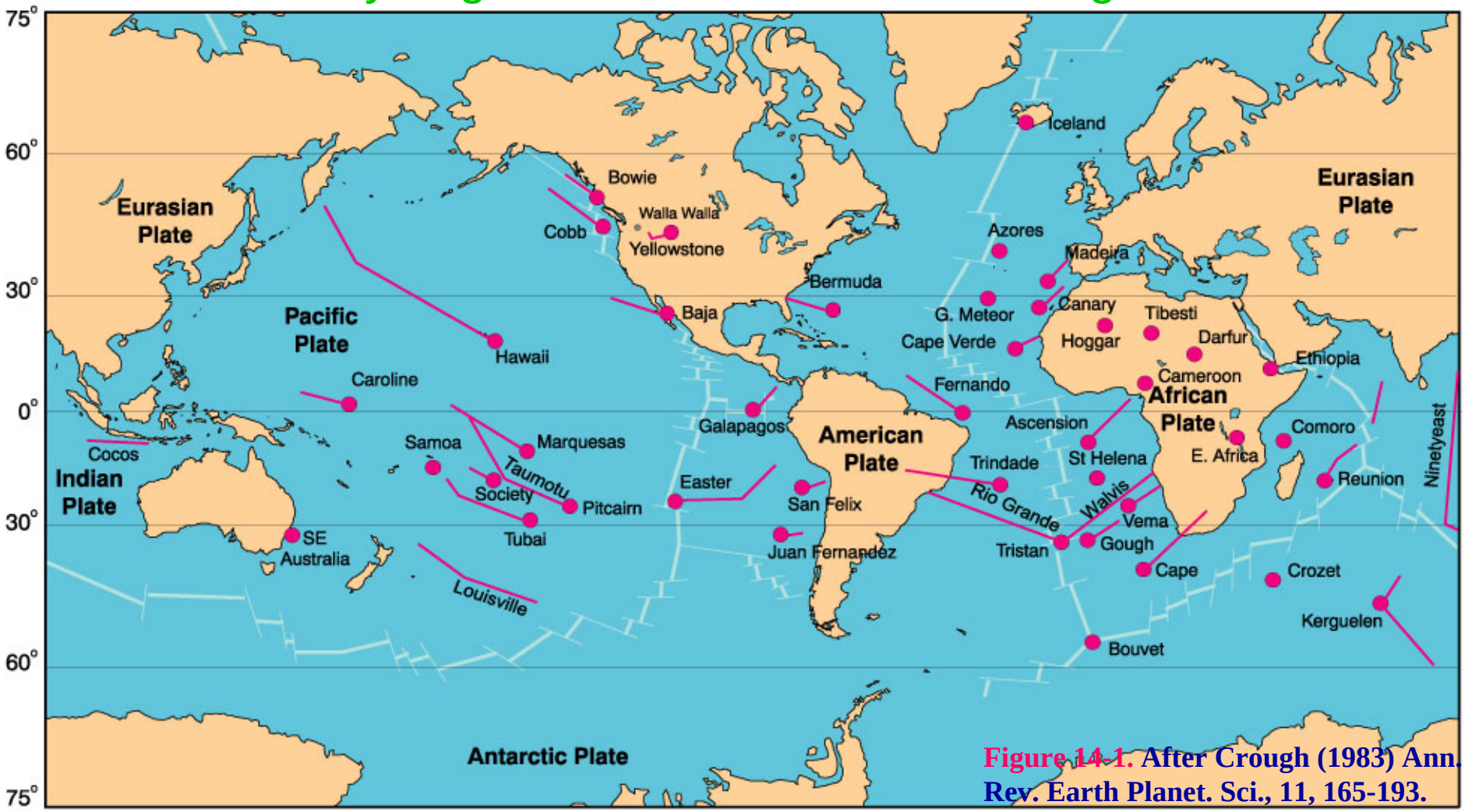
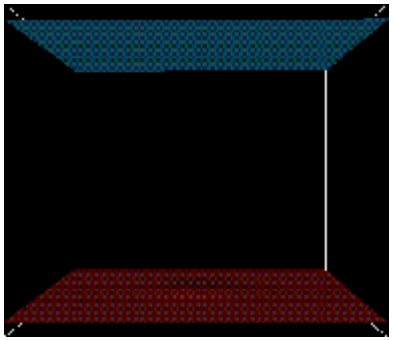
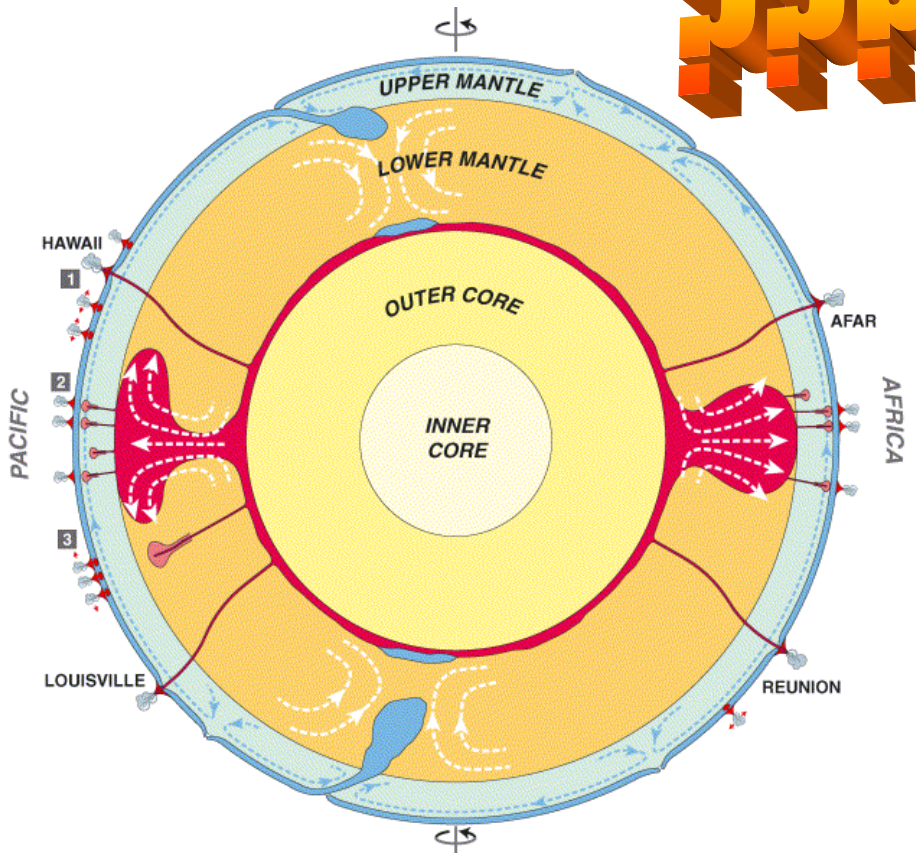


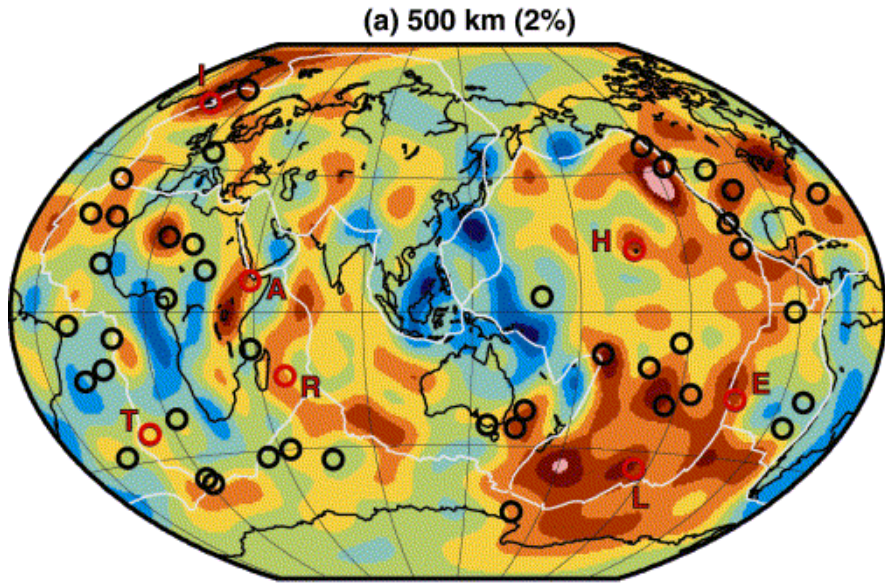
Figure 14-1. After Crough (1983) Ann. Rev. Earth Planet. Sci., 11, 165-193.

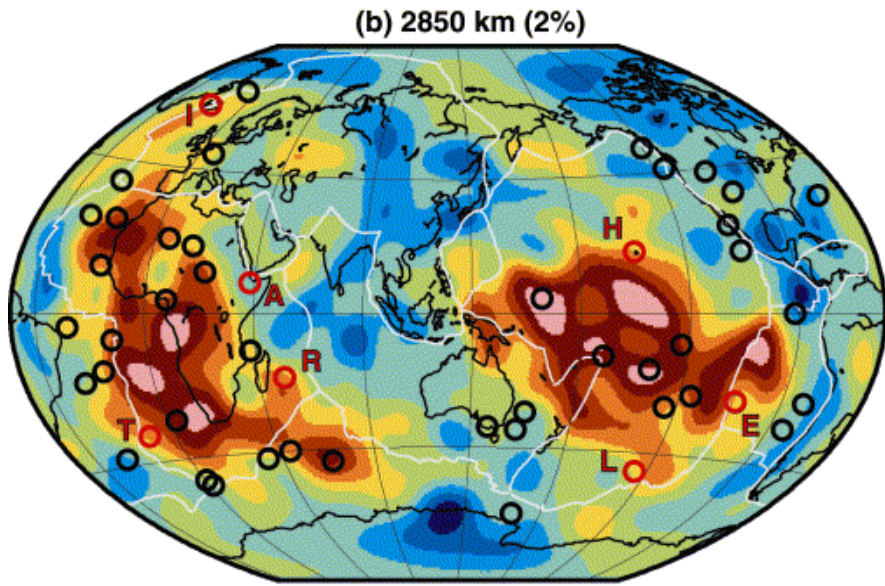
Ocean islands and seamounts

Commonly associated with hot spots

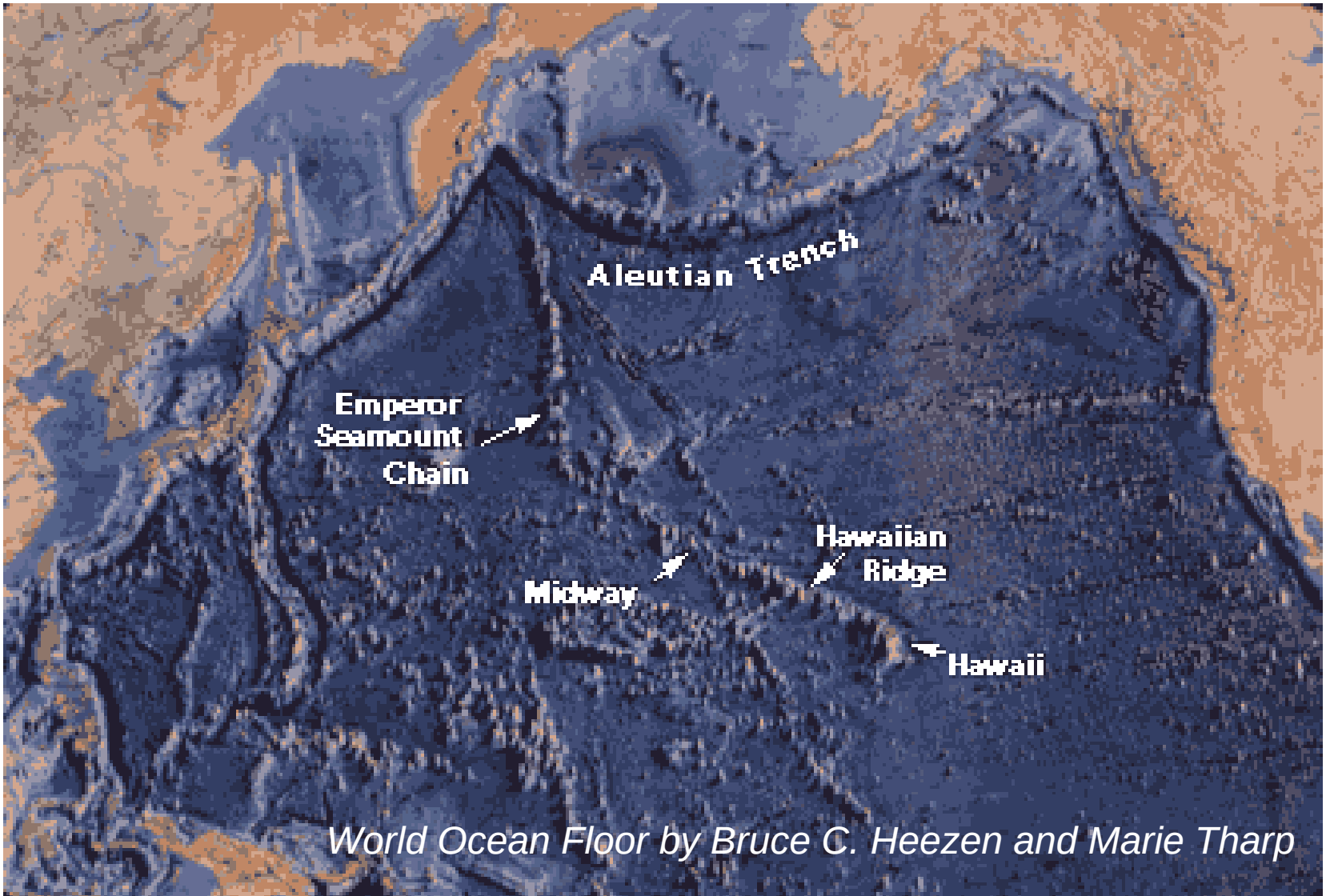




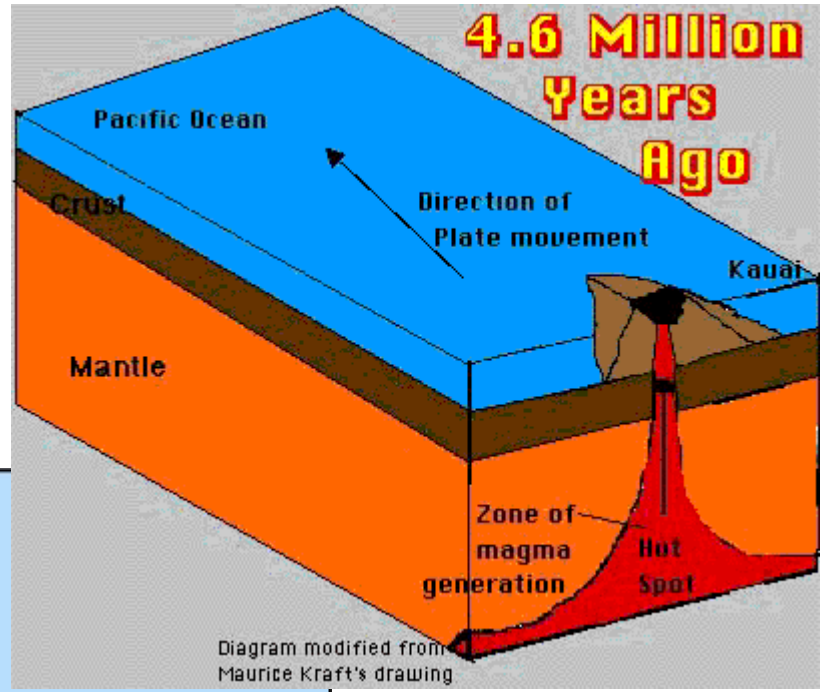




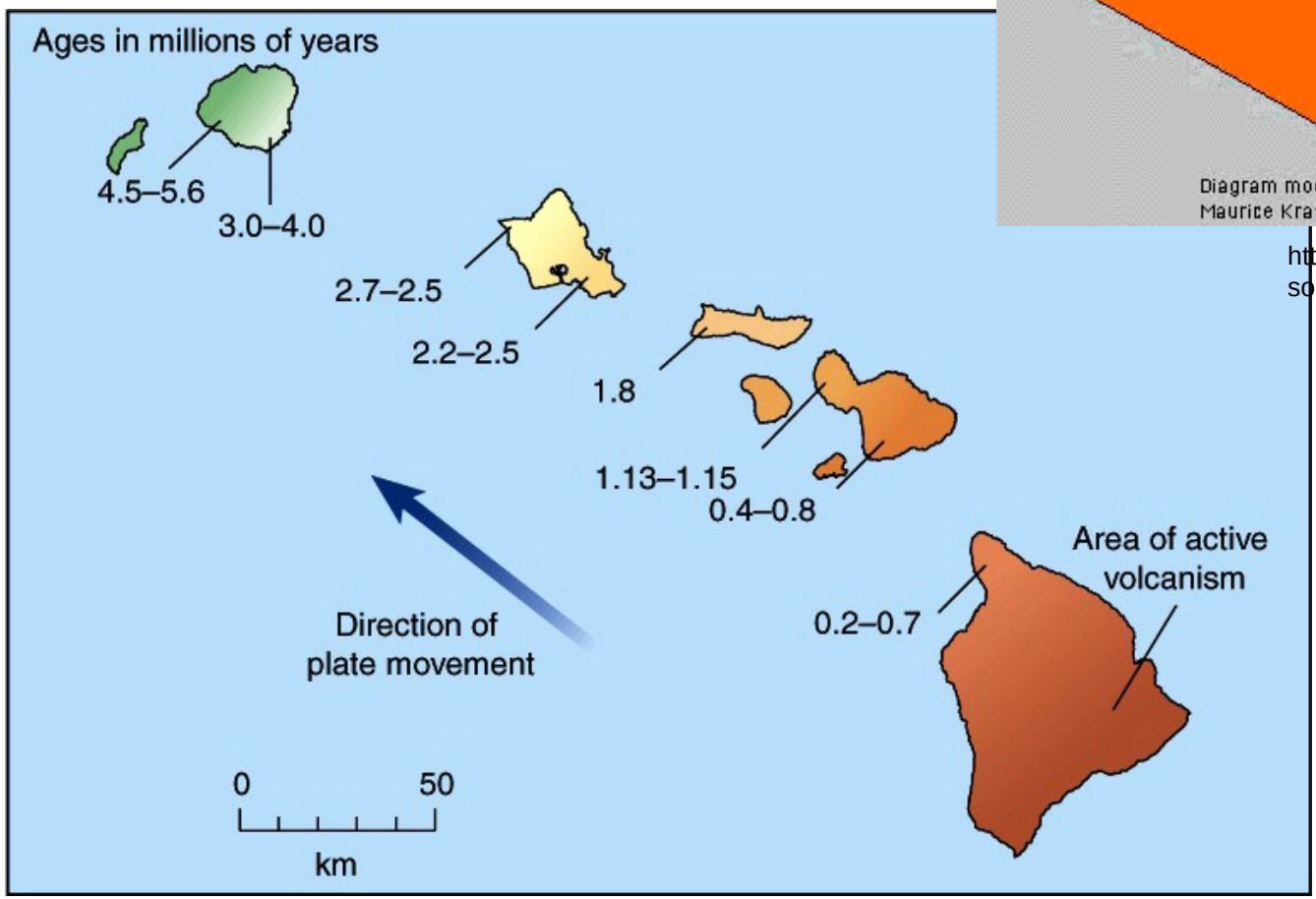
A history of plate motion over the mantle? Are hotspots stationary?



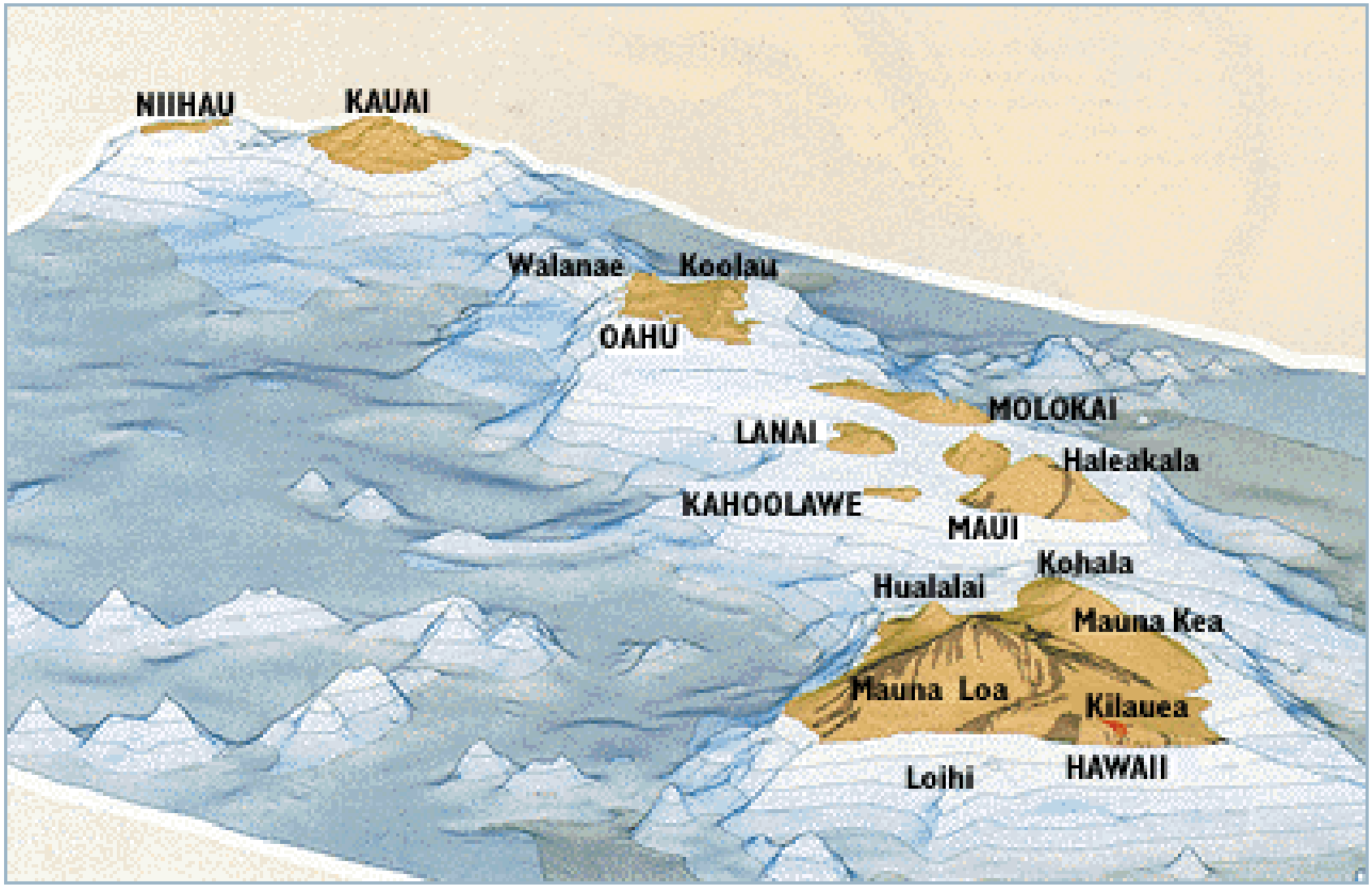
Age of the Hawaiian Islands



http://volcano.und.nodak.edu/vwdocs/vwlessons/lessons/Hot_Spot/Formation.html

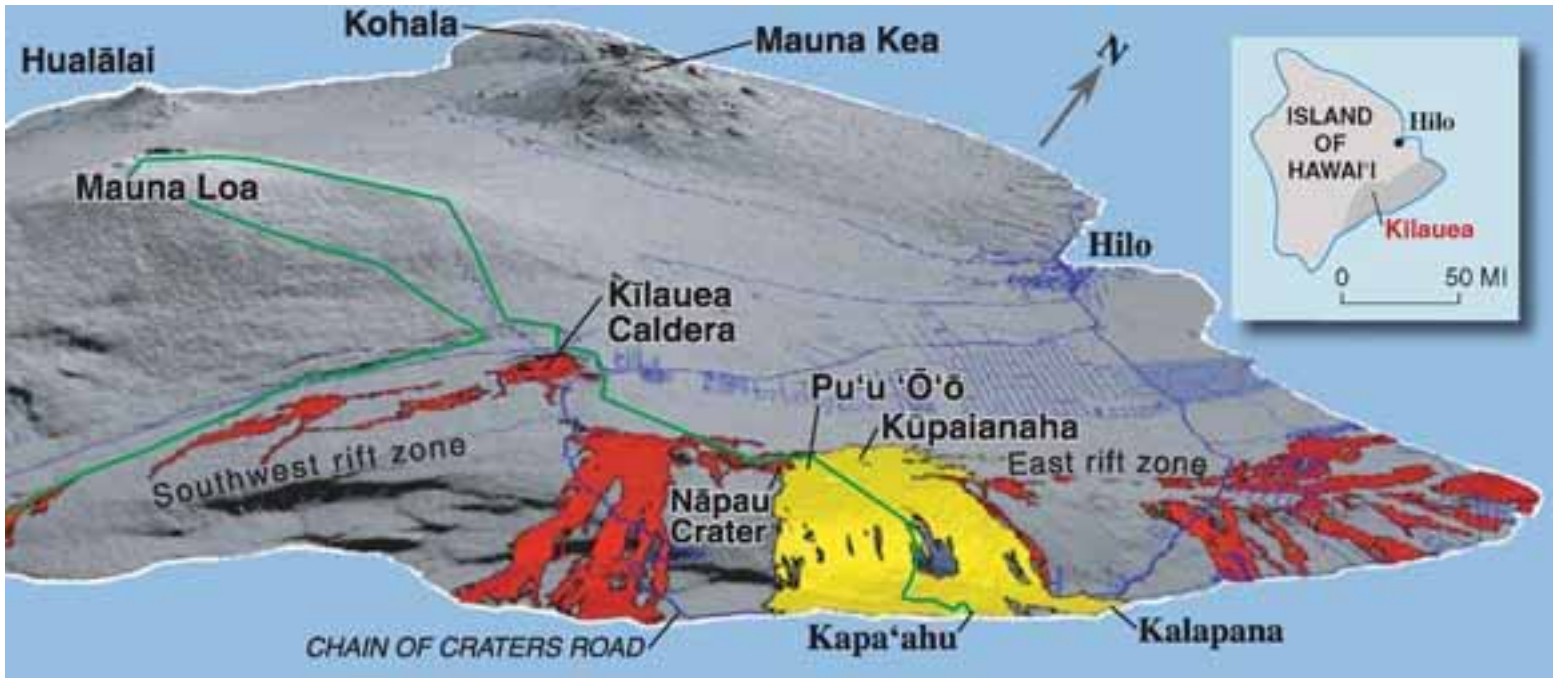


Bathymetry and active or dormant volcanoes



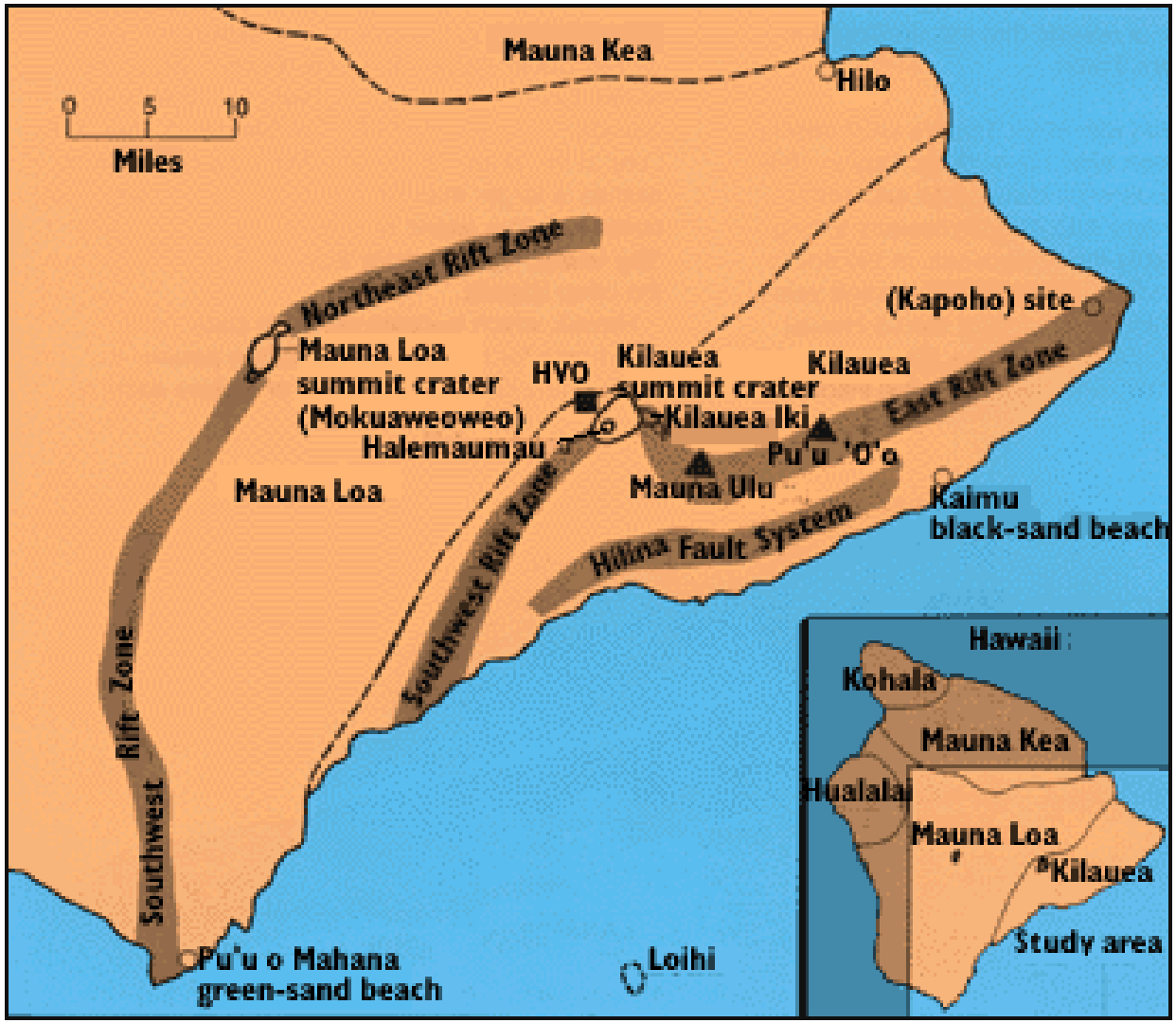
USGS HVO

Recent eruptive activity



USGS HVO

Rifts in Mauna Loa and Kilauea



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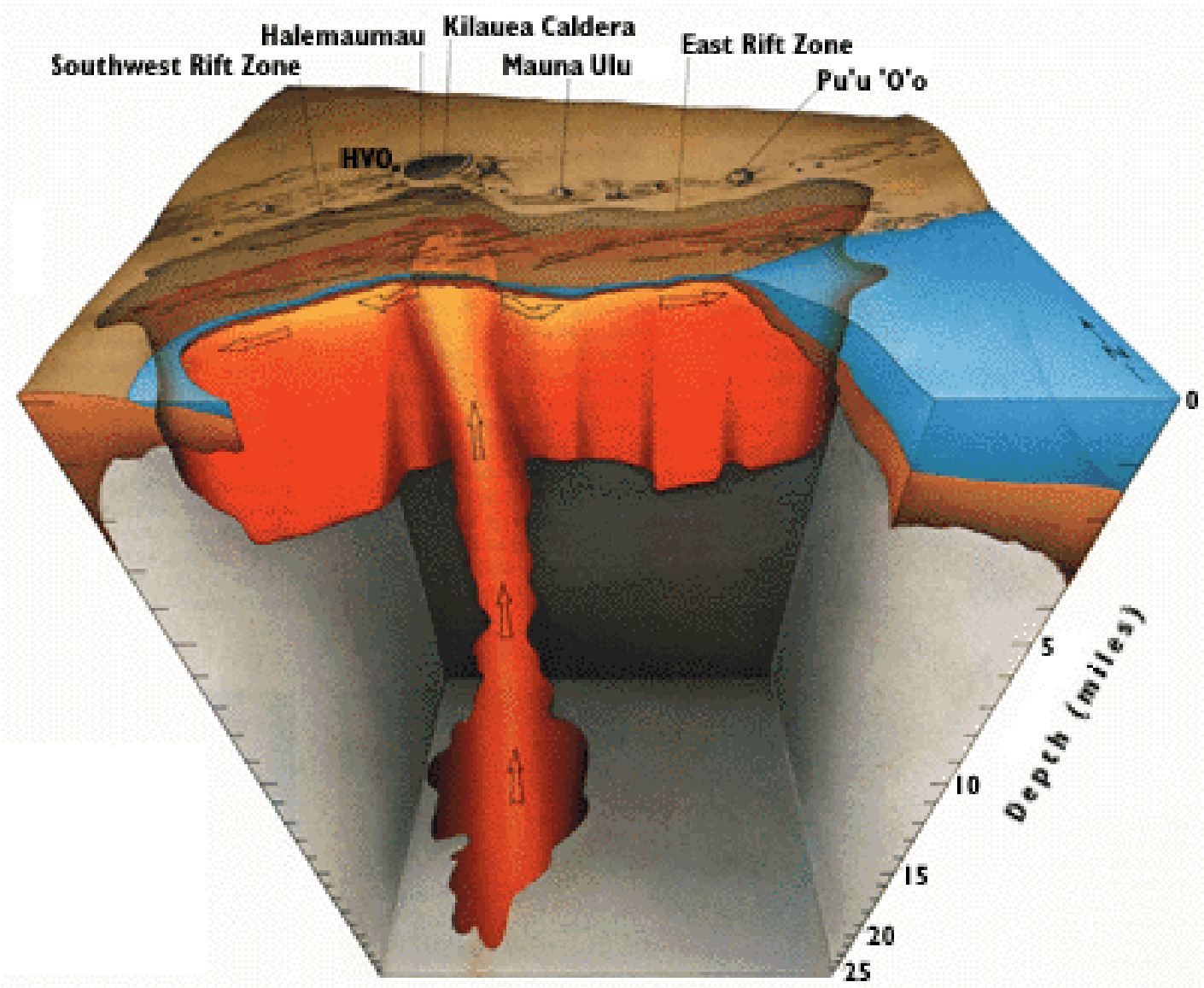
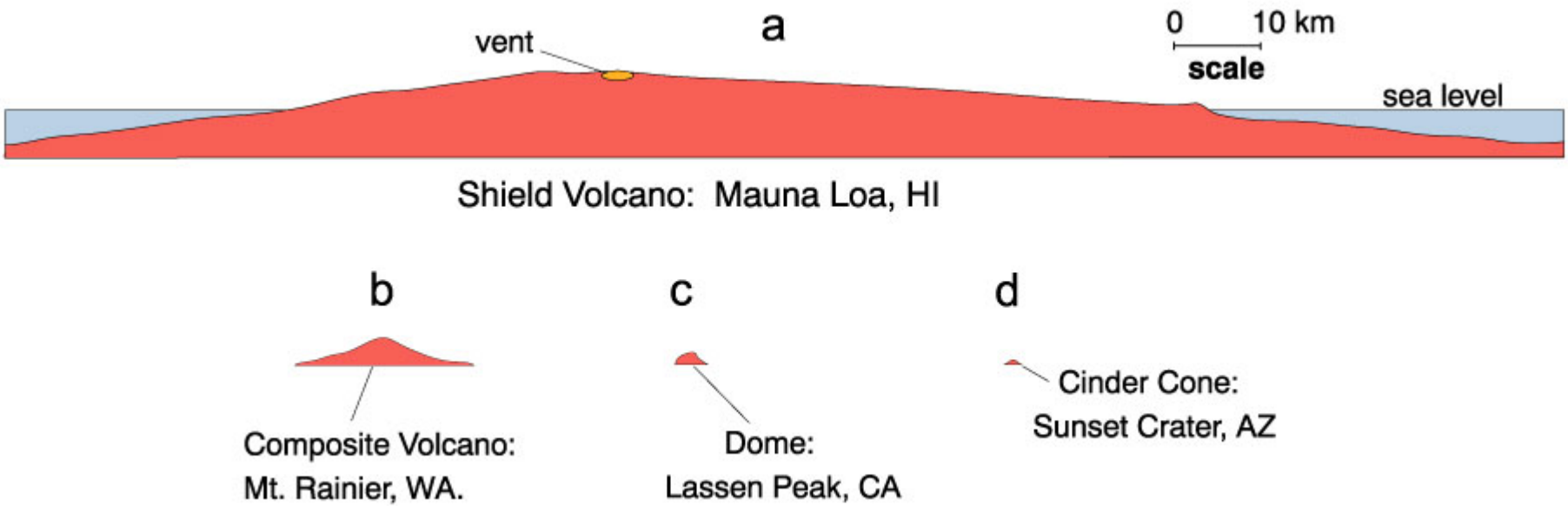
Magma reservoir and conduits in Kilauea



USGS HVO

Structures and Field Relationships



Volcanic landforms associated with a central vent (all at same scale).

Mauna Loa

Types of OIB Magmas

Two principal magma series

- Tholeiitic series (dominant type)
  - Parental ocean island tholeiitic basalt, or OIT
  - Similar to MORB, but some distinct chemical and mineralogical differences
- Alkaline series (subordinate)
  - Parental ocean island alkaline basalt, or OIA
  - Two principal alkaline sub-series
    - silica undersaturated
    - slightly silica oversaturated (less common series)

Alkali vs. Silica diagram for Hawaiian volcanics:

Seems to be two distinct groupings: alkaline and subalkaline

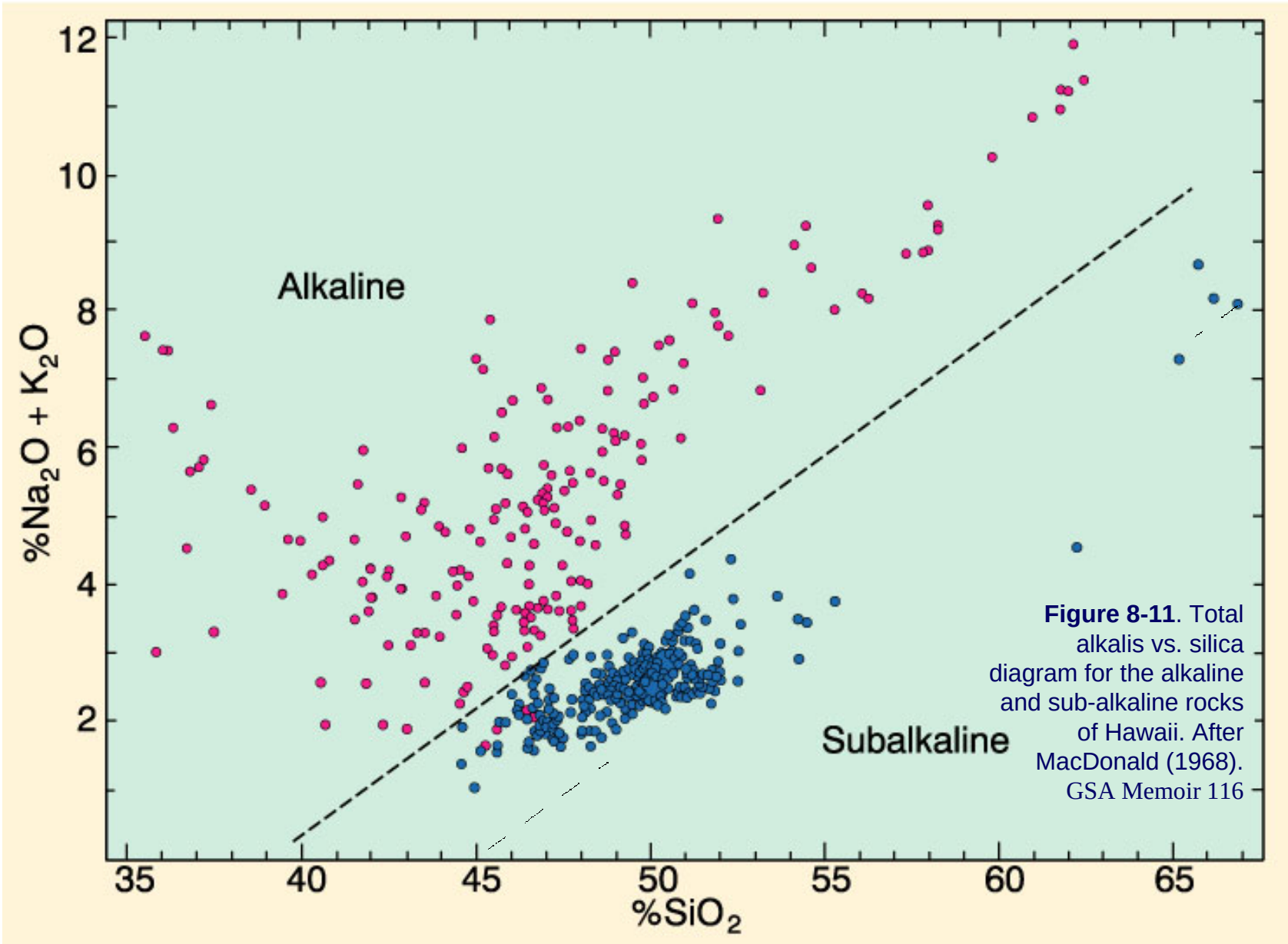


Figure 8-11. Total alkalis vs. silica diagram for the alkaline and sub-alkaline rocks of Hawaii. After MacDonald (1968). GSA Memoir 116

Building a Hawaiian Volcano

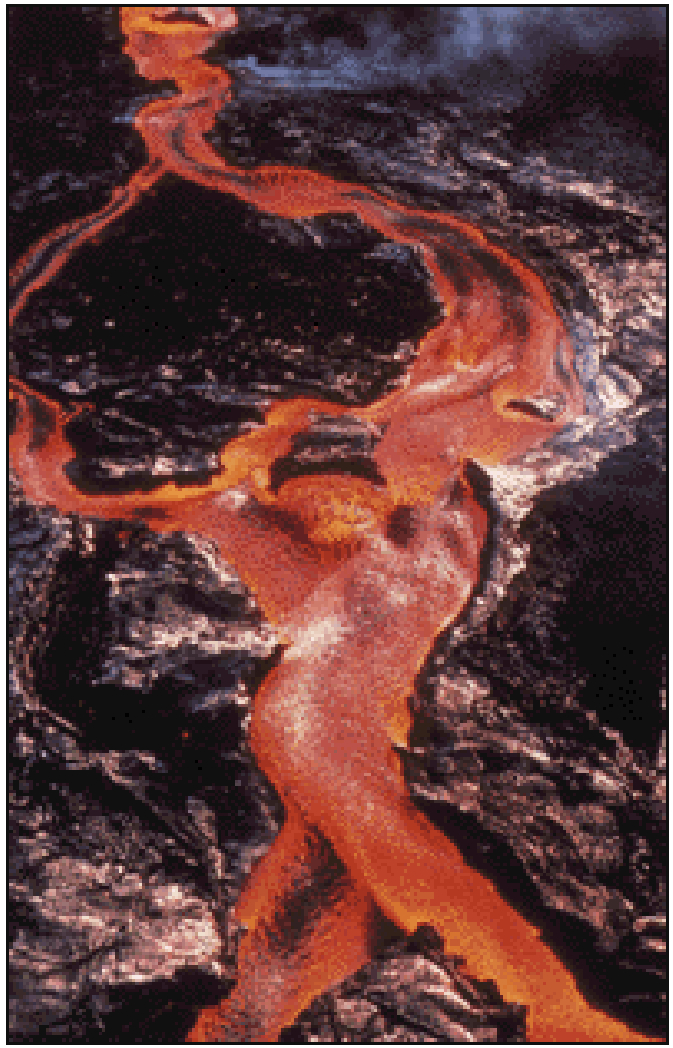
Cyclic pattern to the eruptive history

1. Pre-shield-building stage somewhat alkaline and variable
2. Shield-building stage begins with tremendous outpourings of tholeiitic basalts (98-99% of total volume)

Building a Hawaiian Volcano

3. Waning activity more alkaline, episodic, and violent (Mauna Kea, Hualalai, and Kohala). Lavas are also more diverse, with a larger proportion of differentiated liquids
4. A long period of dormancy, followed by a late, post-erosional stage. Characterized by highly alkaline and silica-undersaturated magmas, including alkali basalts, nephelinites, melilite basalts, and basanites

Lava flows and fountains most common



USGS HVO

Keoua's troops caught in a pyroclastic eruption in 1790

<1% explosive eruptions