

Alkalic Rocks

Best, Chapter 6

Petrology

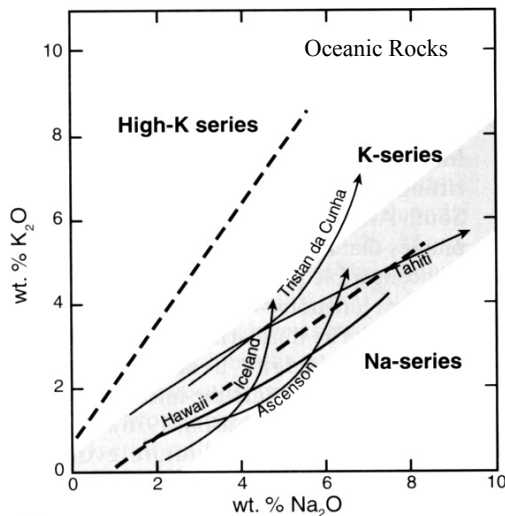
- They have high alkali concentration relative to Si
- Ne appears in the norm
- Contain feldspathoids, alkali amphibole, alkali pyroxene and many unusual minerals
- High concentrations of incompatible trace elements (Zr, Nb, Rb, Ti, P, etc.)

Classification

- Common volcanic series
 - Basalt-basanite-hawaiite-trachyte-phonolite
- Other volcanic types
 - Nepheline, kimberlite, lamprophyres
- Common coarse-grained types
 - Syenite, ijolite, theralite, carbonatite

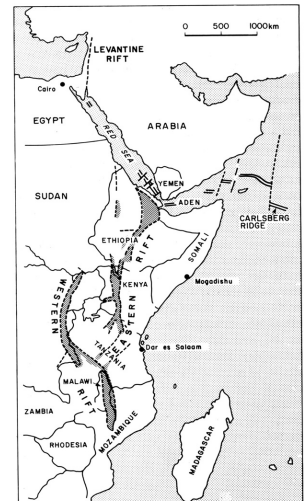
Oceanic Alkalic Rocks

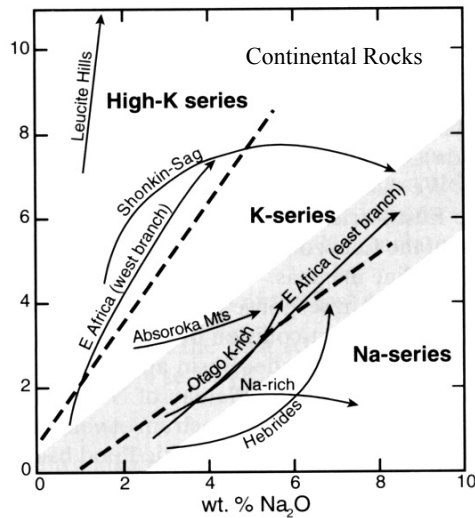
- Tholeiitic to alkaline series
 - Galapagos
 - Hawaiian Islands
- Alkaline association
 - Tristan da Chuna
 - Tahiti



Continental Alkaline Rocks

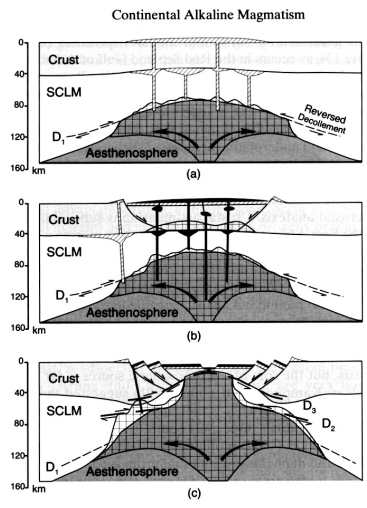
- East African Rift zone
- Carbonatite-nephelinite
- High-potassic series
- Kimberlite
- Mantle xenoliths





East African Rift Zone

- Continental rift system
- Magmatism for the past 70 my
- Ethiopia – transitional basalts
- Kenya – basalt, nephelinite, Carbonatite
- Tanzania – Oldoinyo Lengai carbonatite, nephelinite
- Uganda & Kenya – alkali basalt, trachyte, phonolite
- Malawi & Mozambique - Carbonatite



Carbonatite-Nephelinite

- Commonly occur in rift zones
- Activity begins with silicate magma and ends with carbonatite
- Alkaline pyroxenes are common (aegerine)
- High-T alteration of host rock yields nepheline, k-spar, Na-amphiboles, Na-pyroxenes, biotite and carbonate

Highly Potassic Series

- $K_2O/Na_2O > 3$
- Leucite is a major phenocryst
- Typical minerals are leucite, phlogopite, diopside
- Typical rock is wyomingite

Kimberlite

- Primary source for diamonds
- Contain other high-P crystals
- Occur on stable continental platforms
- Potassic ultrabasic rock
- Occur in diatremes
- Minerals: olivine, enstatite, Cr-diopside, phlogopite, garnet, Mg-ilmenite

