Geological map of the Velay area, after Boivin P. et al., 1993





Caption of the map of the Velay area after Boivin P. et al., 1993









<u>Stop 2</u> : Suc de Monac



The open pit of cpx-amphibole-trachyte, view from the south way

Vertical joint (prismation) in the amphibole-trachyte





<u>Stop 3</u> : Le Peylenc









Composition Weight % Mineral Olivine [SiO₄] (Mg,Fe)₂ 60 - 70% Nesosilicate Opx, Orthopyroxene [Si₂O₆] (Mg,Fe)₂ total Inosilicates Cpx, Clinopyroxene 25 - 30% [Si₂O₆] CaMg, [Si₂O₆] NaAl plagioclase [Si₂Al₂O₈]Ca, [Si₃AlO₈]Na Al rich phase 5 - 10%. MgO (Al₂O₃,Fe₂O₃,Cr₂O₃) spinel (oxide) grenat [Si₃Al₂O₁₂] (Mg,Fe)₃

Harzburgite: predominantly composed of olivine plus orthopyroxene, Dunite: contains more than 90% olivine,

Earth mantle ascending under a Mid Ocean ridge melts incongruently:

First, Al-rich phase and Cpx preferentially enter the melt phase, leading to alkali-basalt compositions; then, increasing melting of Opx and Olivine leads to less alkali-rich compositions such as MORBs,

These basalts create the new oceanic crust, which is rapidly hydrated by ocean water.

In a subduction zone, dehydration of the descending slab allows incorporation of water in the upper mantle, leading to a drastic decrease of its solidus temperature.



Fractional crystallization illustrated by X, T° (P=cte) phase diagrams for:



Fractional crystallization illustrated by a zoned crystal of plagioclase.

andesite collected from the Chalupas caldera in Ecuador By Dr. Lisa Hammersley



Trachyte collected from the Suc de Monac



California State University, Sacramento http://www.csus.edu/indiv/h/hammersleyl/



Fractional crystallization illustrated by the evolution of rock compositions in a volcanic suite









Columnar jointing of volcanic rocks



Approfondissement







Summary:



Pattern: crystal growth is not possible everywhere: only in the place where nucleation occured