by major rift or fault systems. More voluminous magmas, which are also usually products of much greater degrees of partial melting, form when there is diapiric upwelling of material from the low velocity zone to higher levels in the mantle or lower crust (Green and Ringwood 1967; Green 1970).

Magma types ranging from tholeiitic picrite to olivine melilitite and olivine trachybasalt are assigned to a petrogenetic grid in which the depth (pressure) of magma segregation, the degree of partial melting of the source rock, the water content, and approximate temperature of the magma, are specified. While this model can account for variations in major element abundances and normative mineralogy among basalts, there are variations in abundances of K, Rb, Ba, the rare-earths, etc. (incompatible elements), which are inconsistent with a model involving a constant source composition for all mantle derived basalts. Abundances of incompatible elements in the magmas are partly determined by the source composition at magma segregation but may be further enriched by wall-rock reaction processes in the upper mantle or in the continental crust. Source inhomogeneity appears to be required to account for variations in incompatible element abundances and such inhomogeneity may be a characteristic feature within the low velocity zone, the upper part of which is considered to have 'enriched' and the lower part a 'depleted' pattern of incompatible element contents.

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