^{230}Th-^{238}U SERIES DISEQUILIBRIUM OF THE OLKARIA BASALTS GREGORY RIFT VALLEY, KENYA.

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U-Th disequilibrium analyses of the Naivasha basalts show a very small ($^{238}U/^{230}Th$) ratios which are lower than any previously analysed basalts. The broadly positive internal isochron trend from one sample indicates that the basalts may have source heterogeneities, this is supported by earlier work (2).

The Naivasha complex comprises a bimodal suite of basalts and rhyolites. The basalts are divided into two stratigraphic groups each of a transitional nature. The early basalt series (EBS) which were erupted prior to the Group 1 comendites (>20,000 years B.P.) and, the late basalt series (LBS) which erupted temporally between the Broad Acres and the Ololbutot centres (9180-3280 years B.P.) (1).

The basalts represent a very small percentage of the overall eruptive volume of material at Naivasha (< 2%). The analysed samples come from four stratigraphic units in close proximity around Ndabibi, Hell's Gate and Akira areas (appendix 5A). The earliest units occur as vesicular flows (Plb^1, (2) from the Ndabibi plain. These basalts are olivine-plagioclase phyric with the associated hawaiites being sparsely plagioclase phyric. An absolute age of 0.5Ma was estimated for these basalts (3). The next youngest basalts flows (Plb^2, (2)) occur as younger tuff cones in the Ndabibi area and are mainly olivine-plagioclase-clinopyroxene phyric with one purely plagioclase phyric sample. The final phase of activity at Ndabibi resulted in much younger tuff cones consisting of airfall ashes and lapilli tuffs. Many of these contain resorbed plagioclase phenocrysts with sample number 120c also being clinopyroxene phyric (2).

The isotopic evidence for the basalt formation is presented in (2) but briefly the following conclusions and data are as follows:

i) The two basalt groups (EBS and LBS) and hawaiites have indistinguishable Sr-Nd isotope ratios of 0.70446-0.70550 and 0.51276-0.51251 respectively.

ii) The lead isotope data in contrast distinguishes the three groups with the hawaiites and LBS having the most and least radiogenic $^{206}Pb/^{204}Pb$ ratios respectively. The $^{207}Pb/^{204}Pb$ ratios are more radiogenic than the majority of OIB sources.

iii) $^{87}Sr/^{86}Sr$ ratios are the more radiogenic than any of the other analysed Kenyan basalt.

U-Th disequilibrium occurs at a 2σ confidence level in 75% of the Naivasha basalts analysed, ranging from 4 to 65% excess ^{230}Th relative to ^{238}U. In light of the results presented elsewhere (4), these results are taken to indicate primary radionuclide ratios. All the basalt samples show a depleted ($^{230}Th/^{238}U$) < 1, corresponding to K values of 0.5 to 0.7 (5), indicating that recent fractionation of uranium from thorium has occurred. Figure 1 shows a ($^{238}U/^{232}Th$)-($^{230}Th/^{232}Th$) diagram for the Naivasha basalts with other basalt complexes shown for reference. The Naivasha basalts plot to the left of the equiline above the Naivasha comendites, and display some of the lowest ($^{238}U/^{230}Th$) ratios measured in any basalt to date.

The internal isochron for SB28 is shown in figure 2. The steep positive slope indicates that this sample indicates the presence of source heterogeneities. The thorium isotope systematics are strongly influenced by binary mixing

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^{230}Th-^{238}U SERIES DISEQUILIBRIUM BASALTS; S Black *et al.*

probably with the observed Kenyan basement samples. The olivine trend is given as no ^{238}U analysis was successfully conducted. SB 28 is almost hawaiitic in composition and is clearly an admixture between crust and primary magma and thus gives no adequate age.

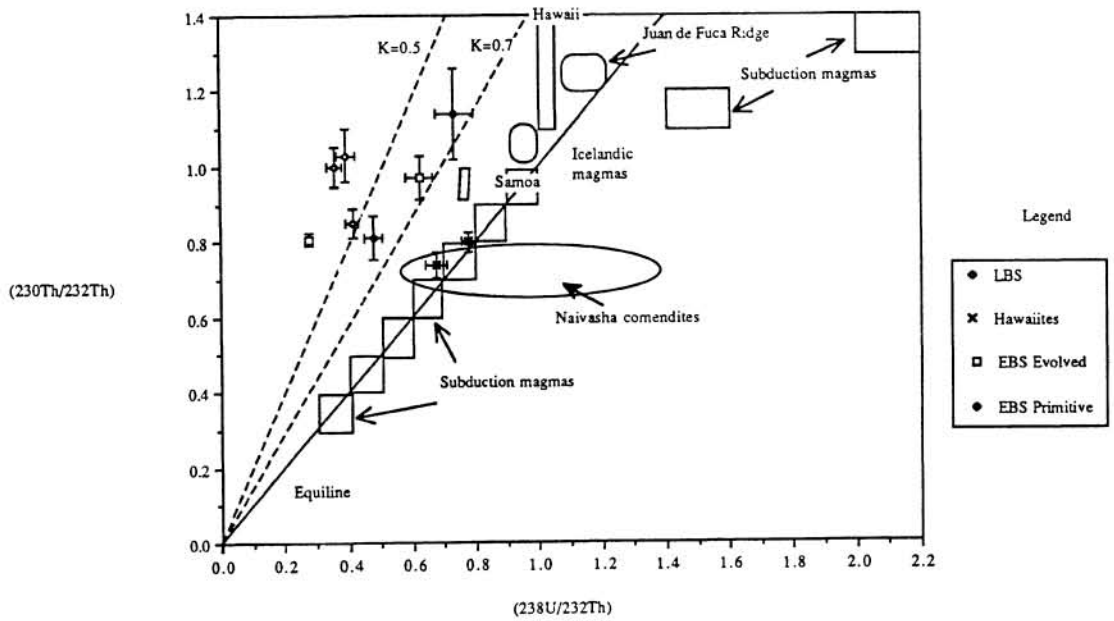

Figure 1. ($^{238}U/^{232}Th$)-($^{230}Th/^{232}Th$) diagram for the Naivasha basalts with other data shown for reference.

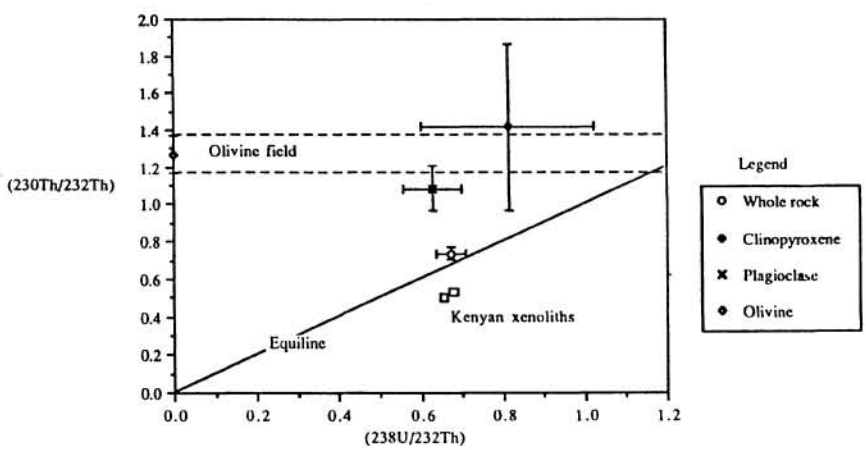

Figure 2. ($^{238}U/^{232}Th$)-($^{230}Th/^{232}Th$) internal isochron diagram for SB28. The olivine field is shown as no U analysis was conducted on it.

REFERENCES (1) Clarke *et al.* (1990) BGS Rep. (2) Davies and Macdonald (1987) J. Pet, 28, 979-1008. (3) Bliss (1979) PhD Univ. Lancaster. (4) Black PhD Univ. Lancaster. (5) Condomines *et al.* (1988), EPSL, 90, 243-263.

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