Mineralia slov.
16 *(1984), 1, 115—119*

Alkaline ultrabasic rocks and associated silicocarbonatites in the NE part of the Transdanubian Mts. (Hungary)

ISTVÁN HORVÁTH, LÁSZLÓ ÓDOR

Hungarian Geological Institute, 1143 Budapest XIV, Népstadion u. 14, Hungary

(2 figs. and 2 tables in the text)

Received October 12, 1983

Алкалические ультраосновные породы и с ними связанные силикатокарбонатиты в северной части Задунайских холмов (Венгрия).

Алкалические ультраосновные породы и с ними связаные силикато — карбонатиты были установлены в районе между горами Веленце и Буда. Представляют самостоятельные дайки или обнажаются в виде роя даек в верхне карбонских гранитах или в верхне пермских и верхне триасовых карбонатах. Их обнажение на поверхности в настоящее время известно только в упомянутых горах; остальные обнажения были обнаружены скважинами. Толщи известных обнажении этих дискутированных пород имеют северо-южное простирание, что входит в соотношение с залегающими элементами отдельных даек, которые измерялись на обнажениях (изображение № 1). Мощность даек колеблется в пределах 0,2—5 м. Всего было установлено больше чем 40 даек. Их наличие потверждает начало рифтогенеза в период верхнего мела.

Alkaline ultrabasic rocks and associated silicocarbonatites in the NE part of the Transdanubian Mts. (Hungary)

Alkaline ultrabasic rocks and associated silicocarbonatites have been found in the area between Velence and Buda Mts. The rocks occur in single dykes or create dyke swarms within granite of Upper Carboniferous age or Upper Permian and Upper Triassic carbonate host rock. Beside the surficial outcrops, further bodies are known from drillings. The entire zone of occurrences creates a N-S trending belt. Thicknesses of single dykes vary between 0.2—5 m the number of dykes found hitherto exceeds 40. Alkaline ultrabasics point to beginning rifting during Upper Cretaceous time.

The existence of alkaline lamprophyres described below has not been known previously in Hungary.

The occurence of this rock association is important because it may indicate a special geotectonic setting — the early phase

of continental deep faulting or perhaps that of a rifting event in late Upper Cretaceous time.

This rock association has been found in the area between the Velence and Buda Hills as single dykes, dykelets or dyke swarms in Upper Carboniferous granite and Upper Permian to Upper Triassic carbonates. Their outcrops are only known in the Velence and Buda Hills the other occurrences are from deep drillings. The zone of all occurrences in the area has a N—S strike, which is similar to that measured in the outcrops. (Fig. 1.) The thickness of the dykes is from 0.2—5 m. More than 40 dykes and dykelets have so far been found in the area.

The petrological characteristics are as follows: This lamprophyric rock association consist of many varieties of rocks differing more or less from each other. The monchiquite can be considered the basic rock type in the area investigated. Its outcrop can be studied in the Velence Hills. On the base of its composition an extreme end member of this association is a silicocarbonatite which was indentified studying core samples (St-1. Di-1.).

These alkaline ultrabasic rocks are of dark grey and reddish brown colours, of porphyritic structure and they often contain ocelli of carbonate and silicate composition, as well as glass. They sometimes show flow structure. The rocks are often strongly altered.

The mineralogical composition of the

Fig. 1. Location map of the alkaline ultrabasic dykes. 1 — outcrops, 2 — drill holes, 3 — mesozoic carbonates, 4 — paleozoic schites, 5 — upper carboniferous granite

rocks is shown qualitatively on Table 1. The microprobe data showed the olivine to be of 85—90 % forsterite content. It is always of phenocryst appearance. The olivine can be found in every variety of rock, generally as pseudomorphs — it is substituted by the following alteration products or infillings: serpentine, smectite, sericite, dolomite and ankerite. The clinopyroxenes of diopsidic composition and the Ti rich phlogopites — which often have biotite rim-appear as phenocrysts and can be seen in the groundmass as well as in the ocelli. Some of the ocelli contains biotite. The variable amount of carbonate minerals is the product of the primary magmatic crystallization — the carbonates are emplaced in the groundmass, in the place of olivine and clinopyroxene phenocrysts and in the ocelli. There are rock varieties where sodalite, melilite and garnet appear and in some of the ocelli alkalic amphibole, aegirine and analcime can also be identified.

The main petrochemical features of the investigated rock suits follow roughly outlined (Table 2).

Chemical composition of some of the rock studied

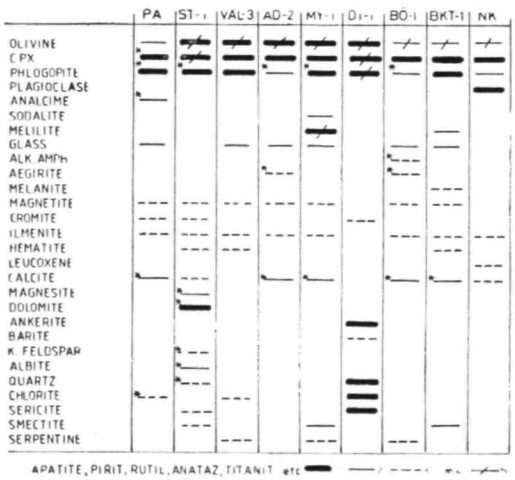
Table 2

	Pá	St-1.	Vál-3.	Bkt-1.
SiO_2	36.2	28.8	38.3	34.3
TiO_2	2.21	1.99	2.13	1.67
Al_2O_3	9.51	6.39	7.84	8.59
Fe_2O_3	4.74	2.57	4.13	4.72
FeO	6.10	6.33	6.17	3.13
MnO	0.20	0.29	0.13	0.18
CaO	13.80	12.60	9.73	17.20
MgO	11.50	13.10	17.90	8.32
Na_2O	1.22	0.83	0.66	0.33
K_2O	1.84	3.24	1.52	1.55
P_2O_5	1.38	0.97	1.14	0.10
CO_2	5.54	20.40	1.64	10.90
$+H_2O$	3.59	2.50	4.52	4.50
$-H_2O$	1.08	0.31	3.48	3.57

For localities see Fig. 1.

The minetralogical composition of dyke rocks

Table 1



Explanation: 1 — over 15 %, 2 — between 5—15 % lower than 5 %, 4 — the mineral can be found in the ocelli too, 5 — occurs as pseudomorph. For locality see Fig. 1

The silica content may be from 29 up to 42 %, the alkali content ranges from 2—5 %, the rocks are always potassic in character. The water content is from 1—4.5 %. The total iron content in FeO is from 9—12 %. The MgO, in agreement with the mineralogical composition varies from 8—18 %. The rocks have high content of volatile and for instance the CO_2 content of monchiquite type rocks ranges from 1—10 % and that of silicocarbonatites from 20 to 28 %. This rock association has specific trace elements content. The distribution of rare earth elements (Fig. 2) and in certain cases the high content of Nb and Th are worth mentioning because of their diagnostic value. The total content of rare earth elements in these rocks reaches up to 800—1000 ppm. The deep — seated origin of CO_2 has been proved by carbon isotope data. The δ 13 C ‰. PDB is

from —1 to —5 ‰, with a mean of —3 ‰ which is characteristic for deep seated igneous rocks and carbonatites and distinct from the values of the surrounding sedimentary carbonate rocks. As a conclusion it can be stated that by the data of the different geological and instrumental analyses the unusual appearence of monchiquite, silicocarbonatite, polzenite, alkaline picrite porphyry and in one place microgabbro (Nk) in this area is now established. The K-Ar radiometric method from fresh phlogopite has given the following values for 2 occurrences: 69 and 77 m. y. which indicate late Creta-

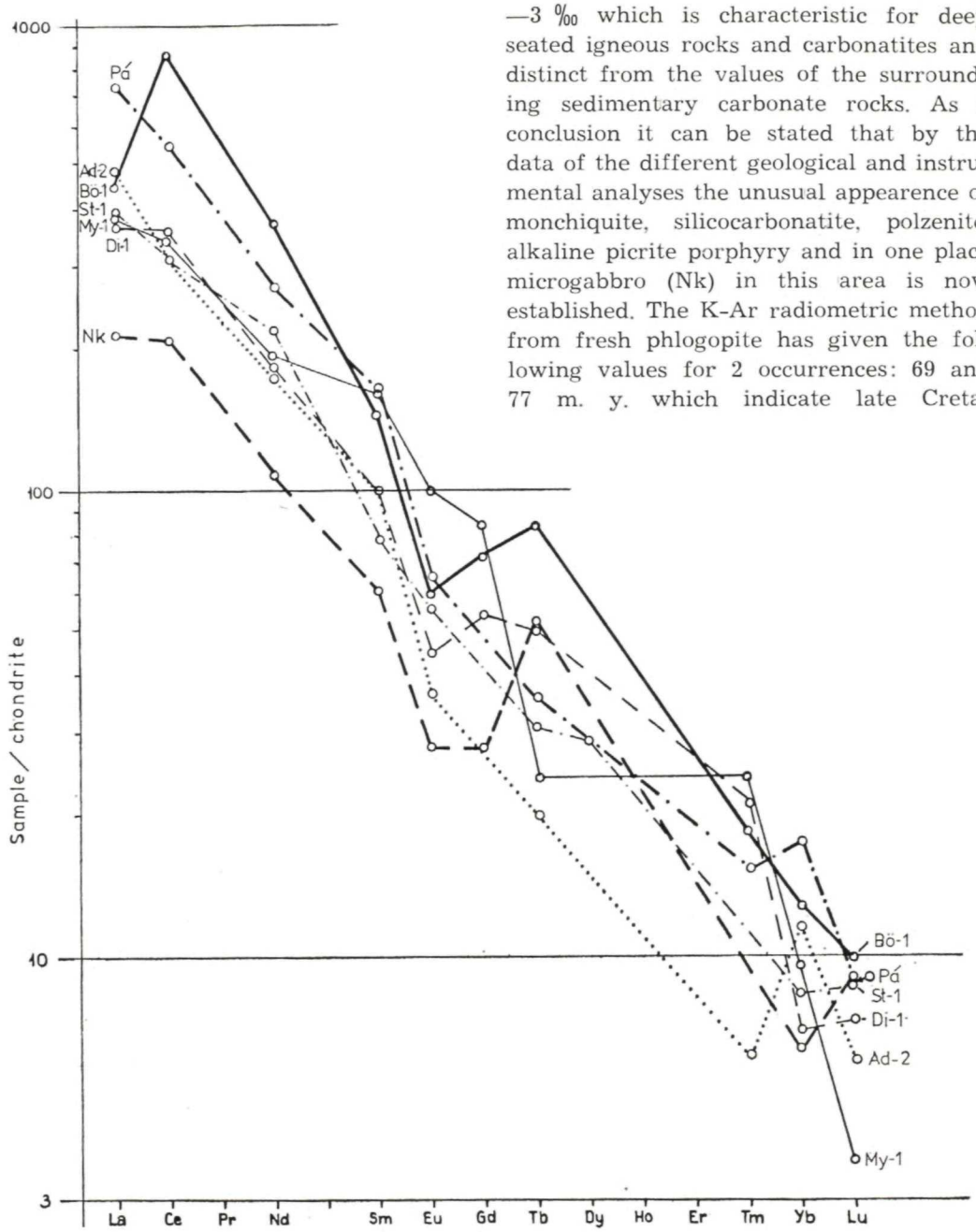


Fig. 2. Chondrite normalized REE pattern for the alkaline ultrabasic dykes. INAA made by J. Bérczi (Technical Univ. of Budapest). See Fig. 1 for localities

ceous period. These age data seem to be reliable but the understanding of the position of this type of magmatism in the structural development of the area needs further studies. It is known from the literature that among the dyke rocks of the alkaline — ultrabasic — carbonate association rocks similar to those described above are widespread. They also seem to appear independently from each other along major linear tectonic features.

The intrusive formations of this dyke rock association were not found so far in the studied area.

Alkalické ultrabazické horniny a s nimi späté silikokarbonatity v severovýchodnej časti Zadunajských vrchov (Maďarsko)

ISTVÁN HORVÁTH — LÁSZLÓ ÓDOR

Alkalické ultrabazické horniny a s nimi späté silikokarbonatity sa zistili medzi vrchmi Velence a vŕškami Buda. Tvoria izolované dajky, resp. vystupujú v podobe roja dajok vo vrchnokarbónskych granitoidoch, príp. vo vrchnopermských a vrchnotriasových karbonátoch. Ich výskyty na povrchu sú dnes známe iba v uvedených vrchoch. Ostatné výskyty boli zistené vrtmi. Zóna známych výskytov sledovaných hornín má priebeh S—J, čo je v súlade s úložnými pomermi dajok meraných vo východoch (obr. 1). Mocnosť dajok varíruje od 0.2—5 m. Celkove sa zistilo vyše 40 dajok.

Výskyt uvedených hornín je dôležitý najmä z geotektonického hľadiska, pretože indikuje počiatočné štádiá vzniku hlbokých zlomov v kontinentálnej kôre, resp. počiatočné štádiá riftogenézy v období vrchnej kriedy.