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Ba , Sr , Rb CONCENTRATION OF MARINE PHILLIPSITES

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I N T R O D U C T I O N

A previous study of K-Ar and U-Th-Io in phillipsites distributed in a marine Pacific core has been interpreted by the growth theory of the mineral following burial. (BERNAT et al.,1970)(1). This concept has been studied further by analyses of Ba,Sr and Rb in phillipsites from the same core.

ANALYTICAL TECHNIQUE

The Ba,Sr and Rb were measured by the isotope dilution method. Before dissolution spikes are added to 20 to 100 mg of phillipsites (in HF + HNO_3). After complete dissolution, an aliquot of the solution is directly loaded on the Re or Pt prebaked filaments. The measurements were made on a solid source 30 cm radius mass spectrometer, equipped with an electron multiplier , $10^{10}\Omega$ resistor and strip chart recorder . The blanks are : Ba, 70 ng ; Sr, 4 ng ; and Rb 2 ng. The precision is about 2% for each element.

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RESULTS AND COMMENTS

The analytical results are given in Table 1 and plotted in Fig.1 versus the depth. Rb and K are constant with some random variation. Perhaps there is a slight K increase with depth . Sr varies by a factor of about three but with no consistent trends.

Ba displays a regular depth decrease with two anomalous levels at 200 and 600 cm. The surface values for Ba are similar to these found by SHEPARD et al.(2) in different phillpsites from surface deposits.

A) We may compare the Ba decrease to the U and Th decrease shown by BERNAT et al .(1)This phenomenum was interpreted by a continuous growth of phillipsites in the first 50 cm of the deposit. If such a growth model is valid, we may explain a course of events as follows. During it's growth, phillipsite is exposed to homogeneous and excess amounts of K,Rb and Sr, in interstitial waters (or from altered phases).Their oncentrationsin the water varies little. However the Ba and Th supplies are limited and phillipsite does not accomodate these elements in this post depositional growth.

The high reactivity of these elements wich results in the formation of highly insoluble coumpounts should minimize a diffusion from the phillipsite.

Such an argument can be applied also to a continuous equilibration of phillipsite with pore water. However, no data are available on pore water.

B) The two Ba anomalies are interesting because at this level BERNAT et al. have shown an excess in radiogenic Ar^{40} content of phillipsite. These authors have interpreted this excess by some impurities of detrital phases. The level at 200 am supports this point of vue , if we take K feldspath to be the impurities . The composition of K feldspath being on the average 6 000 ppm Ba, 1 500 ppm Sr, 400 ppm Sr and 15 ppm Rb it can be easily found by calculation that 3% or 5% of impurities of K feldspath can give the above results. The 600 cm level can be explained also if we remember that Sr is very variable in K feldspath and can be less that 200 ppm in some cases DUPUY (1970)(3)

By balance effect,theses impurities can account for the small variations of Sr and Ba, they must not effect significantly the Rb content.

REFERENCES

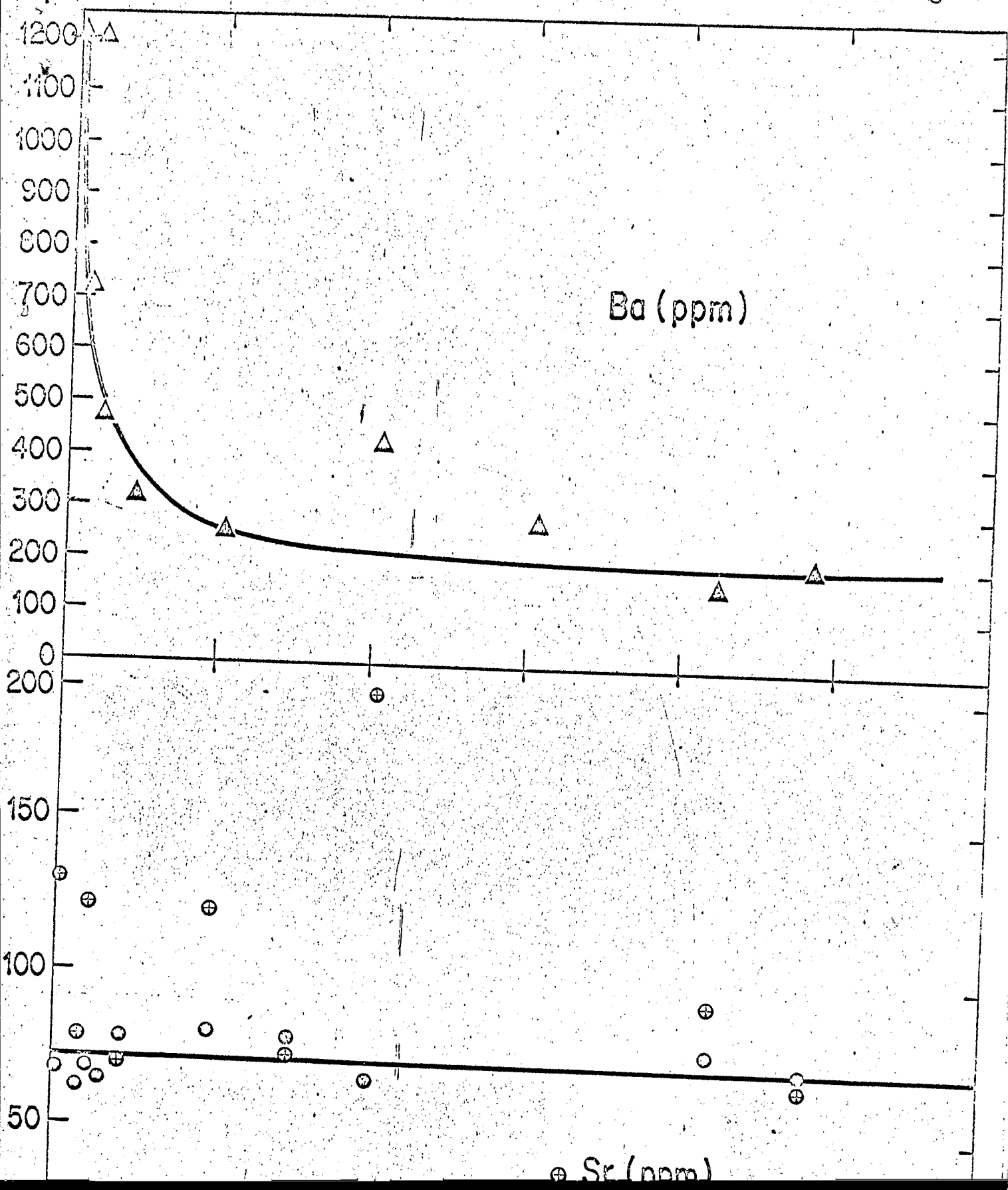
(1) BERNAT M., BIERI R.H. , KOIDE M., GRIFFIN J.J. and GOLBERG E.D.
Uranium Thorium Potassium and Argon in marine phillipsites.
Geo. Cosmo. Acta, Vol.34, pp.1053-1071, 1970 .

(2) SHEPARD R.A. and GUDE A.J. and GRIFFIN J.J.
The Amer.miner. Vol.55, nov-dec. 1970.

(3) DUPUY C.
Contribution à l'étude des fractionnements géochimiques des alcalins des alcalino-terreux et du gallium au cours des processus magmatiques.
Université de Montpellier 1970 , Thèse d'Etat.

TABLE 1 : SOME MINOR TRACE ELEMENTS IN PHILLIPSITE FROM LSDH 96

DEPTH+ (cm)	Na %	K %	Ca %	Rb ppm	Sr ppm	Ba ppm	U ppm	Th ppm
0 - 3 G							0.69	3.0
3 - 6 G	2.97	4.76	0.96	68	127	1212	-	2.5
12-15 G						710	0.49	1.4
15-18 P		4.73		61	80	1190		
20-25 P	5.24			65	121	475	0.59	1.9
30-35 P	2.28	5.	1.19	66			0.46	2.9
42-48 P	3.78	5.05	1.15	77	70	328		
100-105P	2.15	5.21	0.7	80	119	265	0.28	0.6
151-157P	2.42	5.23	0.8	71	71		0.25	0.9
200-205P	2.21	5.05		65	191	420		0.65
302-307P	2.64	5.31	0.68			286		0.79
420-427P		4.85	0.82	78	91	171		
482-487P		5.60		67	66	206	0.32	0.90
600 P		5.45	0.56	79	90	503		0.90


1200
1100
1000
900
800
700
600
500
400
300
200
100
0
200
150
100
50
Ba (ppm)
⊕ Sr (ppm)