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Research Article

THE COMPOSITE DIKES OF MEDIAN TIEN – SHAN

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ABSTRACT
For the first time the term, the composite dike was given by Bailey and Obruchev in 1929 who explained it as repeated injections of dikes of the homogeneous structure. All composite dikes are subdivided into two types: dikes of single-pass introduction and dikes of multiple introduction.
Dikes of the complex structure are widespread within the Chatkalo-Kuramin region. The description of the composite dikes is described by various workers. The composite dikes of Median Tien Shan carried by was dolerite- leucogranite showing cracks of a separation of a northeast extension with steep angle of incidences, to 80^{o}, parallel to a zone of the North Fergana break. Dikes like dolerite- leucogranite is formed by the belts 10-30 km long sated with milkings with a width of belt up to 2.5 km.
The age of this formation is within late Perm 251±3 million years one million years ($^{87}Sr\backslash^{86}Sr$ - 0.709-0.710). One of lines of breeds of a formation is existence of the difficult milkings of two - and a trinomial structure. The overwhelming majority of the difficult milkings is put in the central part by sour breeds (trachyrhyolite, leucogranite porphyries), and regional dolerites. Thus, the following follows from the above:

- Earliest dolerites are confirmed by geological observations and petrological-geochemical data.
- It is possible to assume existence of two magmatic centers in the Kuramin zone.

The first is in the southern or central part of the Kuramin ridge of which the dikes of the Naugarzansky belt and the difficult milkings of a northeast extension in the southern part of the Kuramin ridge (the Burachirsky dike belt) were formed.
The second center is in the Chatkal Range, in the basin of the river of Revashte. Distinctive feature of this belt is the normal alkalinity, low maintenance, some enrichment of chrome, nickel and vanadium.

Keywords: *Composite Dikes, Median Tien – Shan, Kuramin zone, Chadak, Revashte*

INTRODUCTION
Composite dikes are widespread within the Middle Tien-Shan. The description is given in H. M. Abdullaev (1957), O.P.Gorkovy (1964), F. A. Usmanov's works (1962).
For the first time E. B. Bailey proposed the term the composite dike. V. A. Obruchev in 1929 suggested repeated injections of a dike of the homogeneous structure, and multiple variable structure – composite. V. Efremova subdivided all composite dikes, similarly H. M. Abdullaev (1957) and S. (1983) divided composite dikes into two types: dike of single-pass introduction and dike of multiple introduction.

MATERIALS AND METHODS
The materials for this article were collected during the thematic works on the topic "Study of the nature of the relationship and connection of endogenous gold mineralization within the main gold ore fields of the Chatkalo-Kuramin region with dikes and dike formations" in the period from 2010-2015 in the Goskomgeology. To collect materials, 20 outlets were set up in the field for sampling, exploring the area, and carrying out macro and micro petrographic sections. The routes passed through swarms of dykes in the North. Nuratau, Almalyk and other nearby areas. Also, when writing this article, reports were used that were compiled in the USSR (1960, 1975) for a complete understanding of the structure of the district. Materials on complex dikes of the Naugarzan deposit were taken from the materials from Z.A. Buzanskaya (1955). Silicate analyzes of 200 samples were carried out at the Central Laboratory of Goskomgeology (Republic of Uzbekistan). Separate elements such as gold, uranium and other rare

elements were determined by the Plasma Atomic Emission Spectrometer ISPE-9000 Shimadzu in the laboratory of the State Institute of Geodesy of the State Committee of Geology (Republic of Uzbekistan). Also while writing of this article, over 300 microscopic samples were produced and described to identify the results, which is published in the article.

Study area

The composite dikes of the Kuramin zone were studied by us

Geological Structure

The age of this formation is defined on the following geological relationship within late Perm 251±3 million years to one million years ($^{87}Sr\backslash^{86}Sr$ - 0.709-0.710).

We studied the composite dikes of the basin of the river Chadaksay and Revashte.

RESULTS AND DISCUSSION

In the basin of the river Chadaksay three composite dike of a two-term structure and one trinomial meet All the dikes belts were seen extending northeast: in Aktashskom - 60°, in North Guzaksky - 40-45°; Kokinsaysk – 20-40 °. All dikes have steep angle of incidences (60°- 80°) on the southeast.

Figure 1: The dolerite xenolith in leucogranite porphyries of the composite trinomial dike to the north of the field Guzaksay, the Chadaksky ore field.

It is possible to note the formation of the difficult dikes: 1 – dolerites; 2 – microsyenites and 3 – leucogranite-porphyries (Figure 1). Here it should be noted that existence of "andesite" and "microsyenites" between leucogranite-porphyries and dolerites, probably, is due to mixture of sour and main magmas. The proof of it can serve broad development of biotite and quartz to 10-15% - the near contact hybrid breeds. In more detail, these questions will be considered below

Dolerites carrying out circled cracks 100-500 m long. Macroscopically the dolerite has dark grey, sometimes black coloring with micro grain structure. Infrequent, shallow crystals of a plagioclase corresponding andesite (An35-55), diopside and seldom spherical grains of anhedral quartz are in bulk

Microsiyenit are noted in trinomial difficult milking. The breed surface filled with iron hydroxides. At an approximation to a dolerite in trinomial milking, the content of grains of a potassium feldspar and shallow scales of biotite is characteristic of microsyenites.

Leucogranite-porphyries form the central parts of the dikes belts of a northeast extension. These are noted in Kandagansaya, Maydansaya. In Aktashsky and North Guzaksaysky belts sites leucogranite are noted, 5-6 cm and 150-300 m long leucogranite-porphyries have light gray coloring. It is frequent with a reddish

shade, porphyries structure with xenomorphic granular, hypidiomorphic sites a micropegmatitic ground mass. Quartz, potassium feldspar (orthoclase-pertit) and biotite, the quantity of phenocrysts fluctuates from 20-30%. (Aktashsky, Mazarsky dikes belts) to 40-60% (A North Guzarsky belt). Leucogranite of the North Guzaksaysky belt along with best recrystallizational have a larger capacity (7 m). It is expressed in a limonitization, a potassium feldspar, a seritsitization, etc. Besides, leucogranite of the North Guzaksaysky belt contain xenoliths the melanocratic of breeds, upto 5-6 pieces on 1 m ².

In the basin of river Revashte about five difficult milkings of a two term structure are observed, and, at the common northeast extension, change of an extension on the submeridional or northwest is noted. At the common extent to 1.5 km, circled wedging out of regional or central parts, and also change of angle of incidences (50^o -75^o) from the southeast on the northwest is characteristic of them.

Petrology and Geochemistry

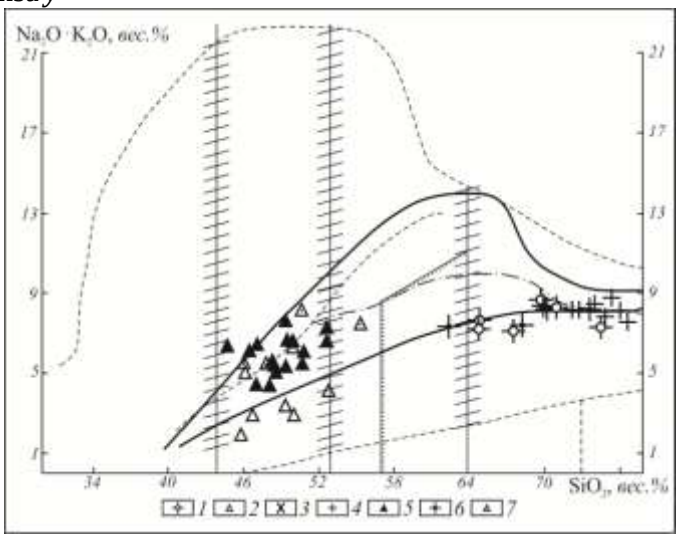

Figure 2: A systematics of breeds of the difficult milkings of regions of the Middle Tien-Shan in coordinates SiO2–(Na2O+K2O)

Revashtesay – 1-leucogranite-porphyries, 2 dolerites; Chadaksay – 3 microsyenites, 4-leucogranite-porphyries, 5 dolerites; Naugarzansay – 6-leucogranite-porphyries, 7 dolerites

Chadak's dolerites and Naugarzansay are high-aluminous (al' – 0.9-1.32) and belong to a potassium and sodium series (Na2O/K2O – 0,6-2,3) seldom potassium (Na2O/K2O more than 4). Eatrhmud coefficient size is a little influenced by change of a causticity whereas on the maintenance of SAO it plays a large role with increase in a causticity sharply. The quantity of SAO (fig. 3a) decreases that can be bound to gradual deoxidation of a plagioclase during evolution of initial melts. “Mikrosiyenit”, arisen in our opinion, due to mixture and hybridism of sour and main magmas The first that it is evident the strong saturation of the silicon dioxide and alkalis SiO2-Na2O+K2O (fig. 2) in the field of subalkaline granites and rhyolites. Breeds are characterized by small prevalence of K_2O over Na_2O (0.64-1.0%) as the sum of alkalis (8.8-9.3%) and are very high-aluminous (Al' – 2.85-3.90) that is expression of their community with dolerites, a contrasting structure. From leucogranite the porphyries composing the central parts of the difficult milkings, "microsyenites" a little what differ that is visually illustrated on numerous charts where both leucogranite the imaging points of "microsyenites" porphyries coincide and possess identical trends. Leucogranite porphyries of Chadaksaya settle down in the field of subalkaline granites (fig. 2), and are characterized by the high maintenance of SiO_2 (72-76%), alkalis around 9% and the low maintenance of MgO, CaO, $FeO+Fe_2O_3$. In these parameters, and also on Na_2O/K_2O relation (0.56-1.33) of these breeds are close to subalkaline granites.

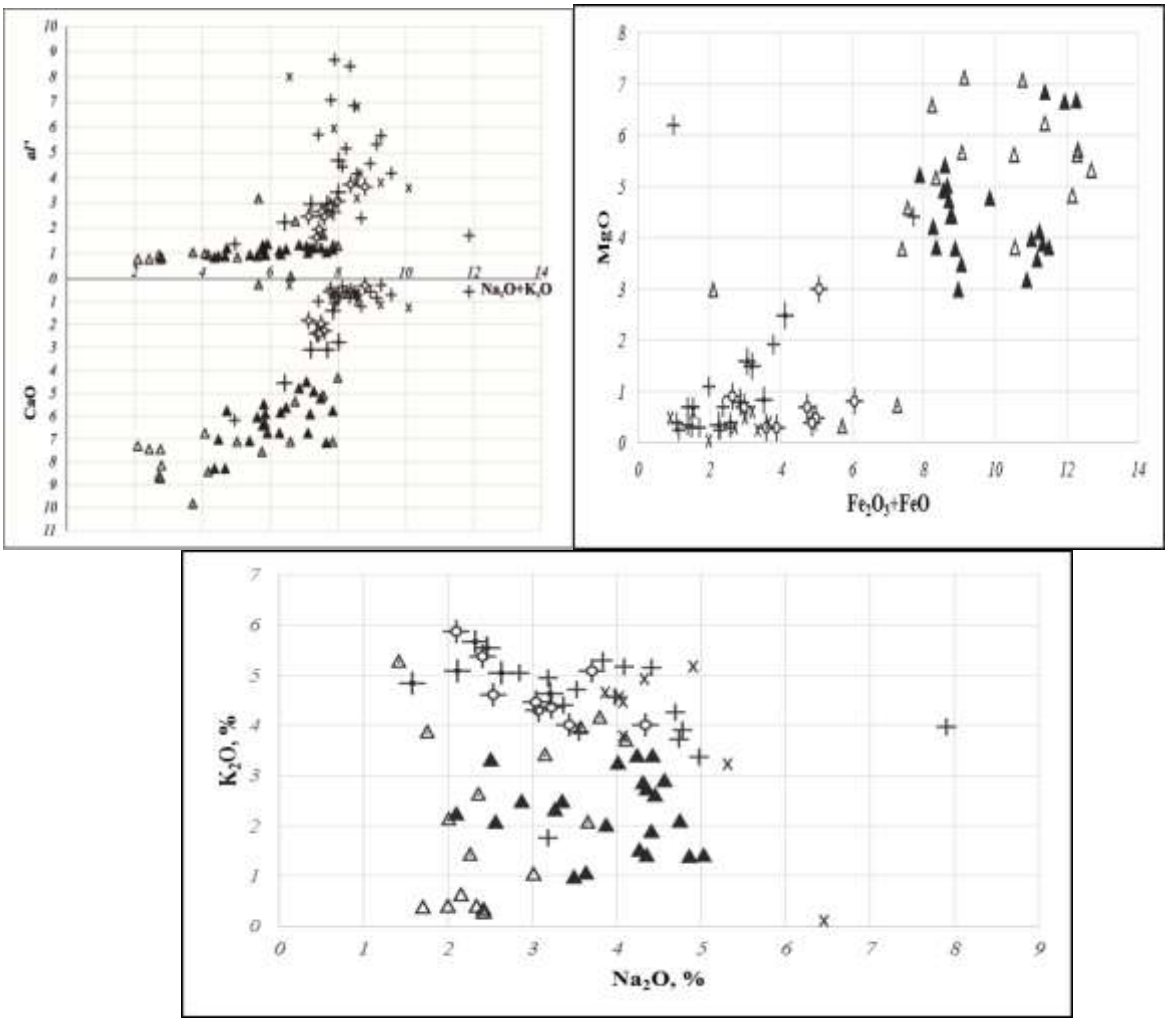

Figure 3. Petrochemical characteristic of the difficult milkings of the Kuramin zone and – dependence of the sum of alkalis (Na_2O+K_2O) on earthmud coefficient (al') and CaO in breeds of the difficult milkings, – MgO ratio to the sum of iron ($Fe_2O3+FeO$) in breeds of the difficult milkings, in – a ratio of Na_2O and K_2O in breeds of the difficult milkings.

Independently from composite Chadaksay according to petrochemical characteristics there are structures of the difficult milkings of Revashte. So, relations of alkalis dolerites are with sodium, and leucogranite porphyries. Besides the composite dike of Revashte differ in behavior from petrology of oxides from Chadak's. Their high iron characters ($FeO+Fe_2O_3$ – 8.0-12%) rather high content of MgO (5,5-6,0%) in dolerites is noted, and leucogranite at a high ferruginosity (3,5-4,5%) have the low maintenance of MgO (fig. 3v). dolerites had the low content of alkalis and high value of calcium oxide, and high content of MgO, FeO, Fe_2O_3 that was reflected in mineral structure of dolerites. Breeds have structure of a plagioclase equal to a Labrador (An60-70), iron and magnesium probably were a part of an accessory magnetite. After majority of iron, magnesium and calcium was bound in dolerites. K_2O was having higher content and simultaneous decrease of quantity of magnesium, iron and calcium.
Distribution of infrequent and dispelled elements in Chadak and Revashte river has many common features though their absolute values are a little variable (tab. 1).

Table 1. Distribution of infrequent and dispelled elements in Chadak and Revashte's has many common features

	Chadak river			Revashte river	
	Microsyenites	Leucogranites porphyres	Dolerites	Leucogranites porphyres	Dolerites
La	45	31	35.6	52.67	13.29
Ce	67.5	44.2	61.6	83.89	26.71
Pr	5.88	4.6	5.56	7.43	3.23
Nd	23.25	17.92	24.1	30.56	15.57
Sm	6.1	4.76	6.86	7.87	5.23
Eu	1.05	0.9	2.51	1.82	2.09
Gd	4	3.12	4.55	5.57	4.00
Tb	0.63	0.48	0.76	0.97	0.79
Dy	3.1	2.5	3.96	5.41	4.79
Ho	0.73	0.6	0.9	1.30	1.11
Er	2.2	1.68	2.41	3.66	2.96
Yb	3.18	2.28	2.6	4.43	3.27
Lu	0.36	0.25	0.27	0.46	0.34
Y	16.5	13.16	22.3	32.33	76.29
Ta	3.15	4.62	1.95	3.10	1.36
Hf	2.2	2.2	1.85	2.64	1.47
Th	27	16.7	4.61	28.56	2.69
Sc	5.18	7.26	20.9	6.88	31.71
Rb	162	127.6	117.1	186.67	14.81
Sr	74.25	182.32	380.5	159.11	362.43
Ba	607.5	604	993	1186.6	381.43
Co	2.35	6.66	23.3	4.53	48.86
Ni	14.28	21.98	43.08	11.23	100.14
Ba/Sr	8.18	3.31	2.61	12.96	1.05
Rb/Sr	2.18	0.7	0.31	2.51	0.04
K/Rb	233	246	214	259.38	538.25
TR_{Ce}	153	107	141	210.08	70.12
TR_Y	26.7	20.95	33.2	51.02	89.55
TR_{Ce}/TR_Y	5.72	5.08	4.24	4.21	0.78
La/Yb	14.15	13.6	13.69	12.05	4.06

As is well-known the behavior of Ba, Rb in magmatic melts is intimately bound with To, and Sr to Ca. And Ba in comparison with Rb collects in high-temperature of KPSh more intensively, than in the bulk (Antipin, 1974).

On the chart K_2O-Ba (fig. 4a), it can be seen that in dolerites and Revashte increase in maintenance of Ba with body height of K_2O is observed and vice versa leads to increase in K_2O The crystal-chemical Ba properties are very close to K and the main mineral the concentrator Ba in sour breeds is KPSh, and Sr

has close connection with a plagioclase (fig. 4b). Direct dependence of increase in maintenance of Ba and Sr with body height of K_2O is visible to sour components and growth of the contents of Ba leads to increase in Sr during formation of dolerites, magma quickly filled the cracks and could not be differentiated from that degree to divide mild litofilny elements (Sr, Ba). Considering the fact that Sr has properties close to Ca, and Ba to K strontium collected in plagioclases, and its contents increases in process of body height of basicity of a plagioclase, and lack of KPSh, led to scattering of Ba in the bulk.

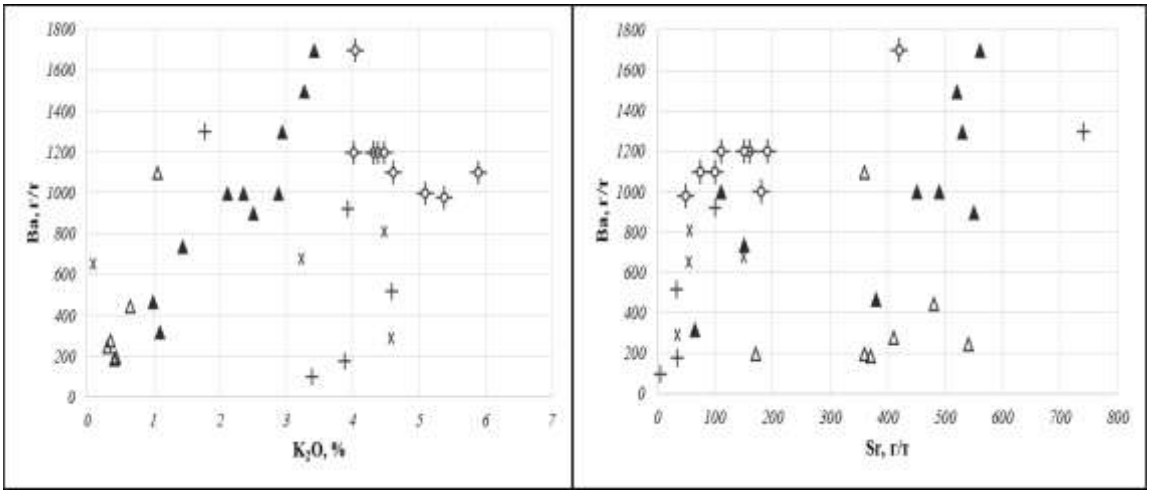

Figure 4: Dependence of Ba (a) and Sr (b) on K_2O in breeds of the difficult milkings of the Kuramin zone.

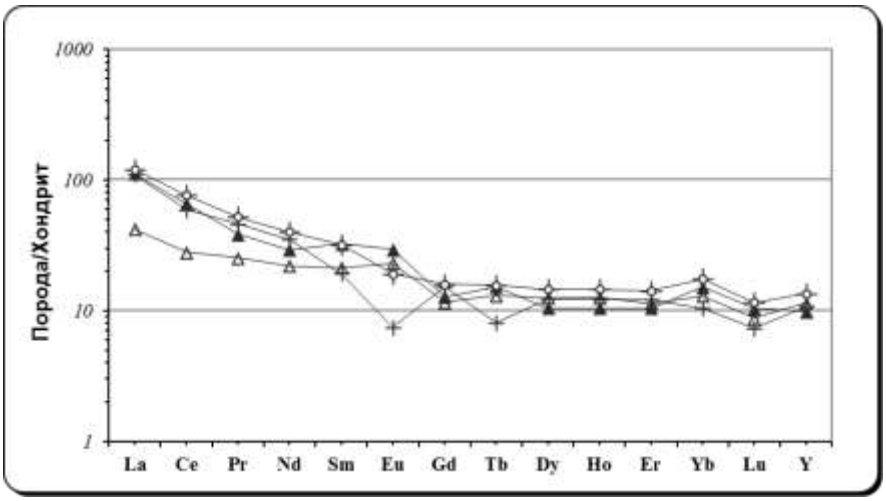

Figure 5: Distribution of rare earth elements in breeds of the difficult milkings of the Kuramin zone.

The behavior of Eu confirms a community of a magmatic source and formation of milkings during crystallization. As dolerites are in early phase of formation during crystallization of dolerites, the majority of Eu was saved up in a plagioclase fig. 5 thereof the total of Eu in a residual melt got significantly reduced.

The common tendency of distribution of RZE in the initial stages of crystallization differentiation, is serial accumulation of RZE, and especially mild, in each subsequent phase.

Numerous geophysical creation of B. A. Chernovsky (1991) and T. N. Dalimov (2010) data convincingly prove about existence of a mantle plume at a depth of 45 km which top edge is determined by the smaller power of crust in the central part of the Middle Tyan- Shan.
It is possible to assume existence of two magmatic centers in the Kuramin zone. One is in the southern or central part of the Kuramin ridge.

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