Study of genesis of masteroon intrusive bodies(Northwest of Aligudarz)

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Abstract

In a region of lorestan county (Northern Aligoudarz) intrusive bodies with upper cretaceouse age have been formed; that altogether have northwest- southeast trend. The rocks of these bodies have composite within the range of granite to granodiorite and are intensely mylonitized by later tectonic events .These mass granitoides have intruded within a series of rock units which causes the formation of a contact metamorphic aureole in them. The oldest existent rock units included a thick sequence of alternated shale and sandstone of upper Triassic- Jurassic age, which have possessed a mild metamorphic. Therewith , the above thick rock sequence shows contact metamorphism by emplacement of intrusive bodies in some place , which its reflection is the formation of semi-schists, cordierite hornfels and schists. These rocks compositionally belong to the Calc-alkaline and based on computer-criteria, in orogenic belt, follow the tectonically regime of the VAG. The studies shows that the required vapor pressure for the formation of igneous bodies have been 1.5-2 kbr and the forming temperature sets between 700 to 750°C these mass granitoides are S- type granites and depth of their. Forming is upper 30 km.

Key word: *Trend, Metamorphism, Calcalkaline, VAG, Tectonical regim , Granitoid*

Introduction

Masteroon granitoid bodies with the coordination (coordinates latitude) of (33° 25' ,33° 33' N and 49° 27', 49° 46' E)is located in 15 km, north of Aligoudarz city and north east of Lorestan province. This mass is part of the accessory plain of internal Mesozoic in the Sanandaj-Sirjan zone from the perspective of plate tectonic subdivision (fig 1). These penetrating masses including some big and small ones, which are investigated in this paper. The igneouse rocks generally have been injected shale and sandy formation in jurassic area, and are belonged to the cycle which is shown by enclosing masses of Broujerd, and Hamedan. the composition of these stones are varied from the biotit-bearing granodiorite, with medium grain size to granite and they are porphyry in some regions. The tourmaline aplitic granite and Pegmatite in the contact of the intrusive Granodiorite in north, and west north of Aligoodarz are next levels of granite penetrating, and the Quartz veins which cross the Slates and Jurassic shale's is the last level of this penetrating (intrusive) cycle. The purpose of this paper is investigating the tectonomagmatic environment and penetrating mass forming situation, which one of them is called Masteroon granitoid body, in the west of Kondor village, and the other one which his called the Khorhe granitoide body, is in the first 5 km of the Aligoudarz–Khomein road and is crossed by this road. Here we call these various types by Masteroon granitoid bodies.

Discussion

In the west north part of Sanandaj-Sirjan, ie(Sanandaj,Sahnd,Hamedan ,Shahrekord ,and the region between Broujerd and Golpaigan, it is impossible to survey the laramian orogenic phase (Bellon and Broud,1975). The influence of this in the case study are some penetrating (intrusive) masses in shale and sandstone of jurassic, which had great impacts on them and usually convert them. This metamorphic complexes from penetrating masses toward the extreme layer are made of black hornfels, metamorphic sandstone, and sub mature micaceouse schist with vein and veinlet of Silisic and cordierit and silimanit bearing micaschist and at last slate and directed shale, and a little part of submature schist (Shahrokhi,1381).

According to the results of radiometric age defining by the (Rb-Sr) method (Masoudi,1997), the mass replacing age of Arak of granitoid body which is located in the north part of Masteroon mountains, is 99 mil years and the smaller ones and pegmatite are about 52 mil years. Thus the replacing age of Masteroon granitoid bodies in west of Kondor village could be same with the last cretaceous time, and its differential-magmatic products are occurring simultaneous with the following Paleocene- Eocene era (Lotfi and Shahrokhi, 1382).

A microscopic view on the petrology of this penetrating (intrusive) mass shows the many various facies:1-Biotit and muscovite bearing granodiorite, which is the main stone of granitoeid mass (pic 1) 2-Pegmatite Granodiorit, with a hypidiomorphic texture and mylonitic fabric (pic, 2) 3-Biyotite and muscovite mylonitic bearing aplite granitic as post magma differential with mineralized Siliceous vein and veinlet which are generated from Granite magma, under the influence of tectonic stress and got the mylonitic fabric characteristics (Shahrokh,1381)(pic 3).

The diagram (Cox, 1989), Alkali complex against SiO2 (fig 2) and (Winchester and Floyd,1976)diagram (fig3) were used in chemical naming of the above samples.

Based on this, all the samples are placed in a range from granite to granodiorit. To determine the magma type which is forming the Granitoid mass, the triple (Irvin and Barragar, 1971) diagram of AFM was utilized. And all the samples were placed in the range of Calcoalkaline (fig 4). According to this, preface about magma type situation, and in order to determine the tectonomagmatic intrusive masses environment, the Rb cationic diagram was used against the Y +Nb (Pearce et al, 1989).All the samples were placed in the range of VAG or the volcanic arc district (fig 5). And the Rb (Condie, 1970) diagram was used against Sr. In order to determine the magma depth and according to that, the magma forming depth was determined higher than 30 km (fig 6).

In order to determine the granitoid mass forming temperature different methods have been used triple of Q-Qr-Ab diagram (Bowen, 1958) .The amount of each one of these was compared and estimated by the norms, and then they were transferred to the diagram. Based on this ,all the samples were placed in the temperature range of 700 C to 750 C (fig 7).And also it is possible to determine the transferred granitoid mass forming temperature using (Waily, 1978)diagram.

The presence of biotit as the only mafic mineral in this intrusive mass and crossing the Granite Solidos arc, with the temperature of 720 C and the pressure of 1.5 bar it is concluded that in the pressure of 1.5 to 2 bar biotit has been crystallized from the melted Granite with 720 C. (fig8)

And also using the ACF diagram (fig 8) it is possible to express the Granite types. All the samples are placed in the range of S type granite. Other instances Of chemical analysis and data are confirming the sedimentary origins of underlined Masteroon granitoid bodies (fig 9).

Conclusion and suggestions

The replacing age of the Masteroon granitoid bodies is the late of the Cretaceous area to the early years of Paleocene which are related to Laramian orogenic.

The petrology composition of this mass is Granite to Grandiorite and its magma is of the Calco Alkaline, and belongs to the volcanic arc district and sedimentary origins. The mass forming temperature is 700˚C to 750˚C and the forming depth is more than 30 km .For more precise studies in field surveys the intrusive mass and type of area's fault and their numbers is investigated carefully. If possible the exact age of intrusive mass is determined by radio isotope methods.

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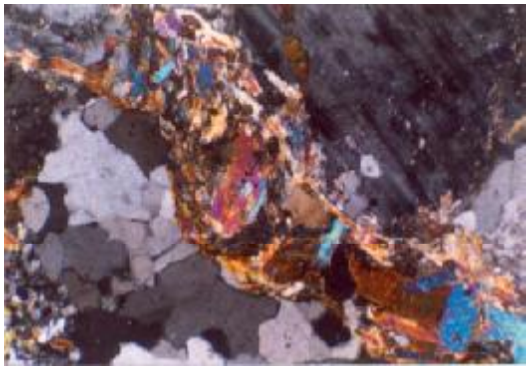
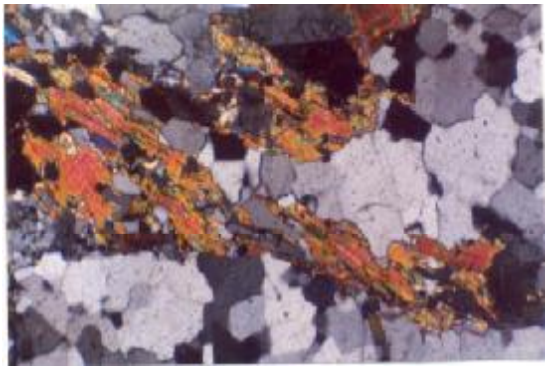
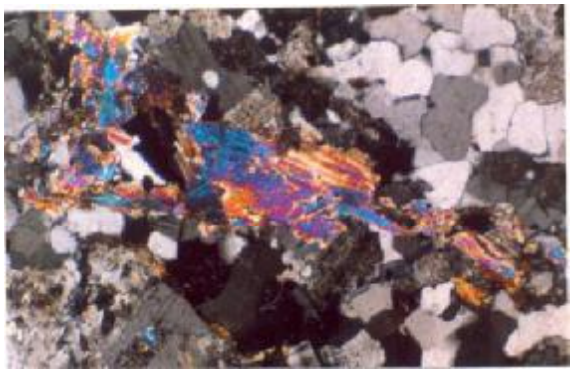


Picture1: View of the mylonitic fabric in granodiorite X(6.3*12.8)PPL



Picture2: view of the mylonitization in pegmatoidy granodiorite in which mica series mylonitic fabric take control and that location is clear quartz grains intergrowth truly X (6/3*12/5)PPL.



Picture3: view of mylonitic fabric and series orientation of muscovite minerals in granitic aplite. In this picture quartz grains intergrowth, crystal of microcline, potassic feldspar, Albit are observable. X (6/3*12/5)PPL

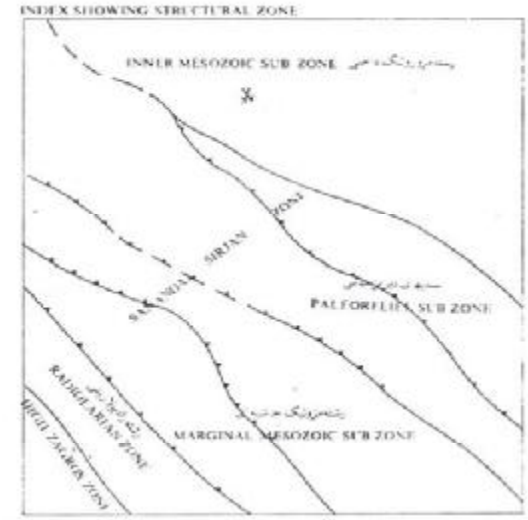


Figure 1: Aligoudarz divided region to sub-structural zone (Sohaili et al, 1371) and situation of Masteroon granitoid bodies.

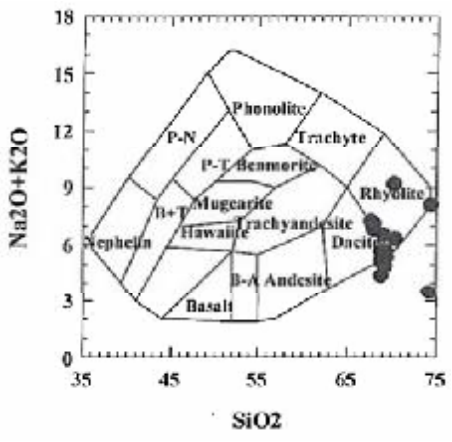


Figure2: Cox diagram, 1989

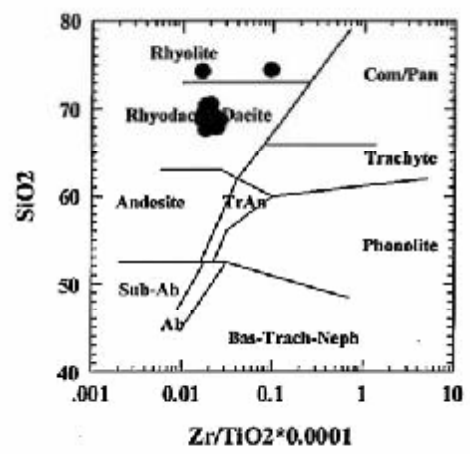


Figure 3: Winchester and floyd diagram (1976)

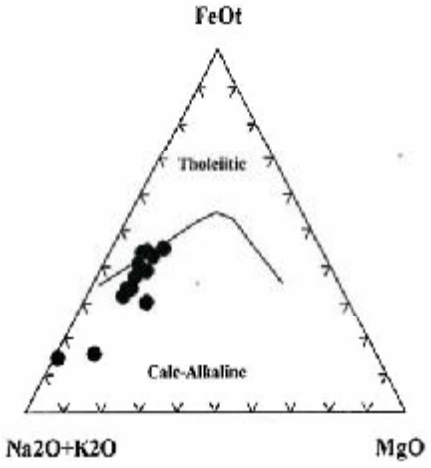


Figure4: AFM diagram, (Irvin&Baragar, 1989)

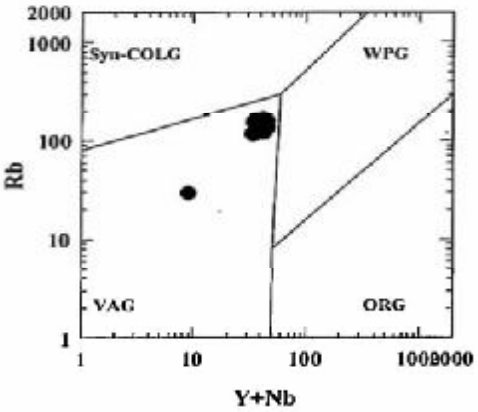


Figure 5: WPG unorogenic granite , VAG volcanic arc district,ORG midocenic granit, continental plate collision(Syn-COLG)

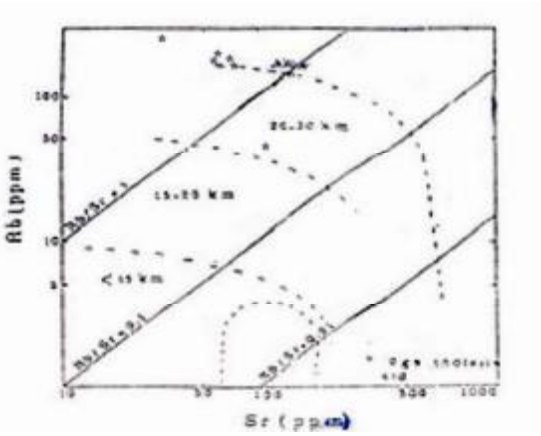


Figure 6: kondie diagram, 1970

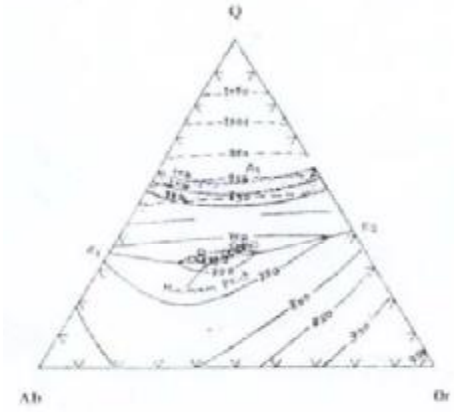


Figure 7: (Q-Ab-Or) system and situation of granitoid simples on it. M-minimum point of tempreture in water saturated(Tuttle and Bowen,1958) A- minimum of tempreture in anhydrous state (Hings, 1985)

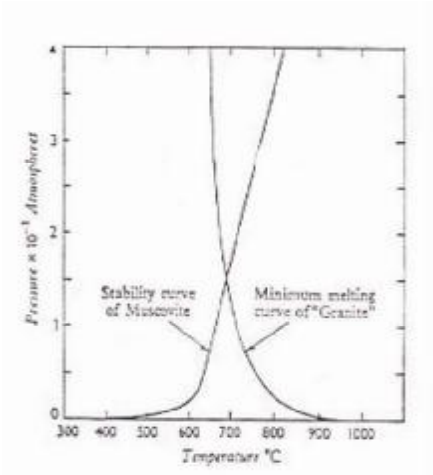


Figure 8: stability curve diagram of muscovite, biotite, hornbland, flogopite and melting curv of granite(viely, 1978)

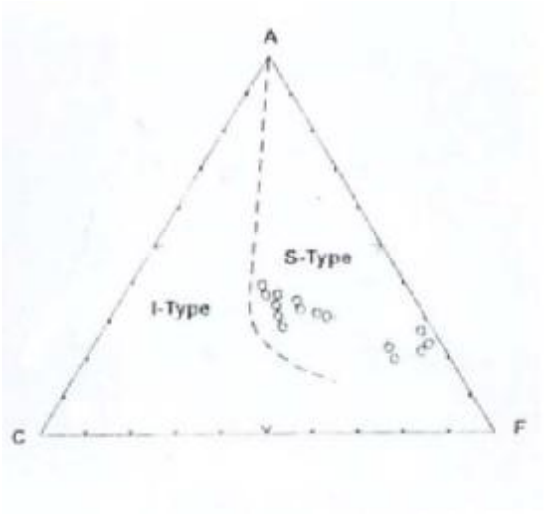


Figure 9: ACF diagram to determine type of granitoids of Aligudarz region. The data are as molly .
F= FeO + MgO A= Al_2O_3 – Na_2O – K_2O C= CaO