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Monzonitoids as indicator of intrachamber fractionation exemplified by Nui Chua complex (Nothern Vietnam)

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A characteristic feature of various geodynamic settings is the presence genetically related basic, intermediate and acid intrusive rocks. Our investigations have focused on the study of intermediate and basic rocks with increased alkali content. These rocks are known as monzogabbro, monzonite, monzodiorite, mangerite or syenodiorite among the Precambrian anorthositic complexes, of the Caledonian fold structures (Siberia, Norway), among the intrusions associated with subduction zones, as well as in the intrusions associated with Permian and Triassic large igneous provinces (LIP), (Siberian and Emeyshan LIP). We focused on the study of complex Nui Chua (NC), which have the same age with the mafic magmatism associated with Emeyshan LIP. The structure of the N intrusion was traditionally determinate as lherzolite-wehrlite-troctolitic layered rocks, anorthosite-leicogabbronorit pegmatoid, mezogabbronorite, rocks of the marginal series.

The small (up to 10 sq. km) intrusions consist of biotite gabbros, monzogabbro, monzogabbronorite and monzodiorite. These rocks are composed of the western part of the NC intrusion. The material composition of these intrusions has not been adequately studied. NC layered series is accompanied by sulphide PGE-Cu-Ni mineralization in rocks. Marginal rocks are accompanied by ilmenite mineralization (Kay Cham deposit in NE contact of the NC intrusion). Disseminated ilmenite is also observed in the rocks of the western part of the NC intrusion and Co Lam and Son Dau intrusions. To date, one of the questions about of the complex is the relationship between NC layered series rocks with monzodiorite of small intrusions. What is kind of this relationship: petrogenetic or they are two independent magmatic events?

Thus, the petrographic data show the differences between the layered series of the NC intrusion and monzonitoids of satellite intrusions. However, mineralogical, petrochemical and geochemical data show that monzonitoids may be genetically related to the layered series rocks. Geochronological and geological data suggest that the layered series of the NC intrusion formed before the formation of monzonitoids and this process can not be attributed to the Late Triassic. Formation of the monzodiorites may be due to fractionation of the parental melt. In this case, monzodiorites are the product of crystallization of residual melts. The simulation of the differentiation using "COMAGMAT" software found this opportunity. The following parameters was used for modeling: the parental melt composition - basalt of zone Song Hien, pressure – 2 kbar, QFM, the water content in the parental melt - 0.1 wt. %, thickness of the layered series - 1000 m.

Thus, the petrological and geochronological data are shown, that lherzolite-wehrlite-troctolitic stratified, anorthosite-leicogabbronorite pegmatoid, mezogabbronorite marginal sequence of rocks, monzonitoids (monzogabbro, monzonite, monzodiorite, mangerite or syenodiorite) and Fe-Ti ore mineralization related by fractionated processes in intermediated chamber.

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