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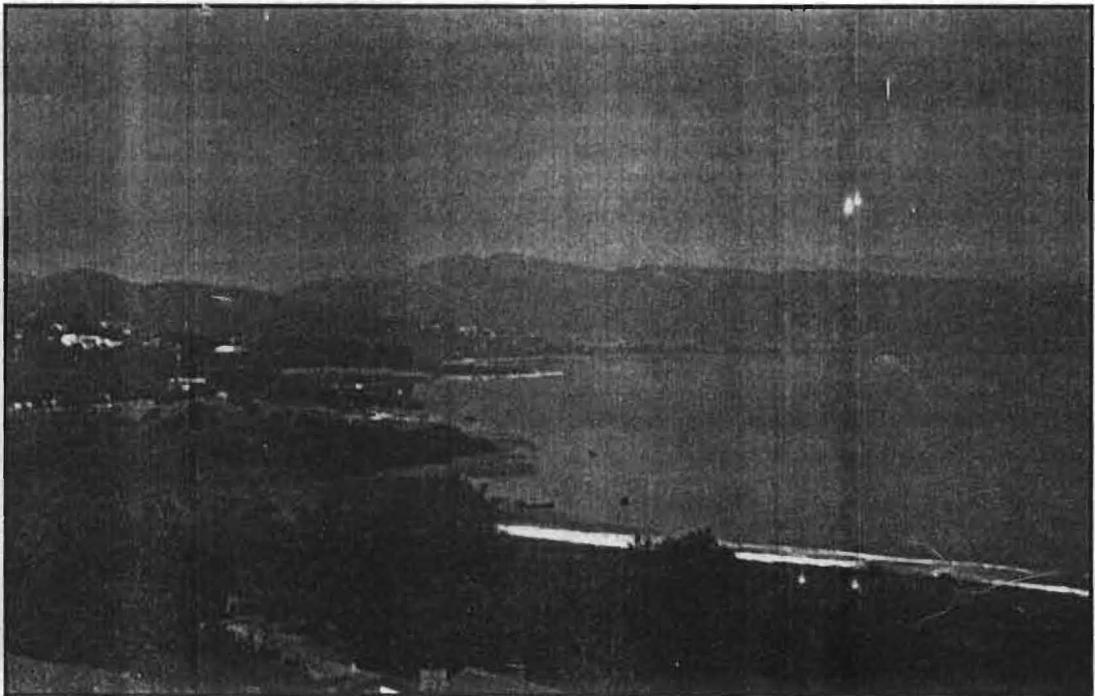


SYMPOSIUM - ANNUAL MEETING



PROCEEDING

*MAGMATISM, METAMORPHISM AND METALLOGENY OF THE
VARDAR ZONE AND SERBO-MACEDONIAN MASSIF*



*PLATE TECTONIC ASPECTS OF ALPINE METALLOGENY
IN THE CARPATHO-BALKAN REGION*

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Metamorphism of the Impure Calcite Marbles from the Kriva Lakavica

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Abstract

The paper about the metamorphism of the metamorphosed carbonate rocks from the Kriva Lakavica, deals with the issue of the degree of metamorphism, determined based on the consolidated mineral paragenesis in the rocks. All rocks metamorphosed in the low-pressure Abakuma -type conditions. The rocks studied formed in high temperature conditions. T (620° - 650°) P 3.5 - 3.75 kbar.

Key Words: impure marbles, prograde reaction, scapolite, vesuvianite, garnet, titanite.

Introduction

The impure calcite marbles of the Kriva Lakavica site were first discovered when compiling the geological map the scale 1 :10 000 in 1965. The rocks occur along the Stip - Radovis road, 20 km far from Stip. The extent in a 4-5 km long and 700m to 2km wide area.

Microscopic appearance of the rocks varies. They are light to dark grey with granoblastic structure. The matrix is composed of well crystallized calcites of irregular rounded grains of clinopyroxene, garnet, hornblende, vesuvianite, clinozoisite, plagioclase, K-feldspar and titanite.

Arsovski. M. (1967) for the genesis of these rocks at this site says: I assume that they are metamorphosed Paleozoic marly clayey and limestone sediments.

Penderkovski (1967) assumes that they are skarns formed under the influence of dacite - andesitic rocks.

Stojanov. R. (1985) about the genesis of this complex says: In the valley the Madenska Reka, west and south-west of Pilav Tepe metamorphic rocks can be found represented by skarns.

Ivanov. T. determines these rocks as carbonatites.

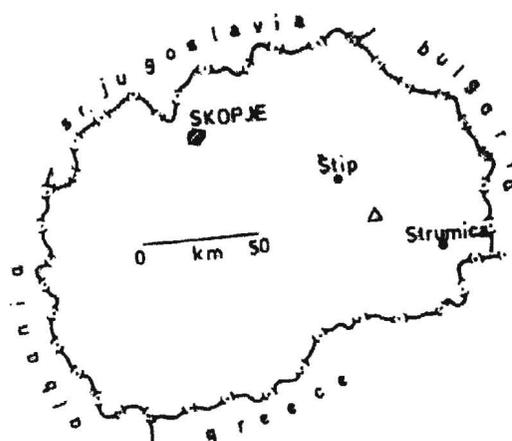


Fig. 1. Δ Localite of the impure marble rocks studied

Almost monomineralic calcite and impure calcite marbles are among the main lithological components of the Kriva Lakavica complex in Macedonia, all rocks of which metamorphosed in the low-pressure Abakuma -type conditions. The studied rocks are high-temperature. As judged from associations of the accompanying cordierite-mica gneisses, their metamorphic degree corresponds to the sillimanite - muscovite K-feldspar subfacies T (620° - 650°C, P3.5 - 3.75 kbar). These silicate carbonate rocks cannot be classified with contact-reaction skarns, because they are not related to the narrow contact zones around any granite massifs, metasomatic zonation typical of skarns is completely absent in them, and all types of silicate - bearing marbles are widely distributed in sites without granite bodies or veins. The impure marbles have a common granoblastic texture: the separate grains of clinopyroxene, grossular - andradite garnet, hornblende, vesuvianite, wollastonite,

clinozoisite, plagioclase, scapolite, K-feldspar and titanite disseminated in calcite matrix.

In the Kriva Lakavica locality impure marbles contain all of the minerals listed above, except a wollastonite.

The clinopyroxene are relatively magnesian diopside - hedenbergites with X_{Fe} 0.08 - 0.42. Some of Cpx grains are zoned with X_{Fe} increasing outward. Small inclusions of actinolite and albite were found in clinopyroxenes, but they are absent in the matrix. These inclusions can be interpreted as the armoured relics of an early metamorphic stage, progressively disappeared in course of the

prograde reaction $Act + Cal + Ab \rightarrow Cpx + Scp$ ($Pl_{Ca\ rich}$) + H_2O . The hornblendes belong to pargasite series and have an unusual high K content (up to 2.4 - 2.6 wt.%). The garnets are the grossular andradite series with nearly equal Grs and Adr content. The vesuvianites are represented by a ferric variety. Fe_2O_3 content in clinozoisites are 4-6wt.%. The impure marbles in this locality are high in scapolite and K-feldspar and minor plagioclase. The scapolite are close to meionite (77-86%Me), and are Cl - and SO_4 -poor. The K-feldspar contain 0-10% albite component. Anorthite content in Pl is 36-70%.

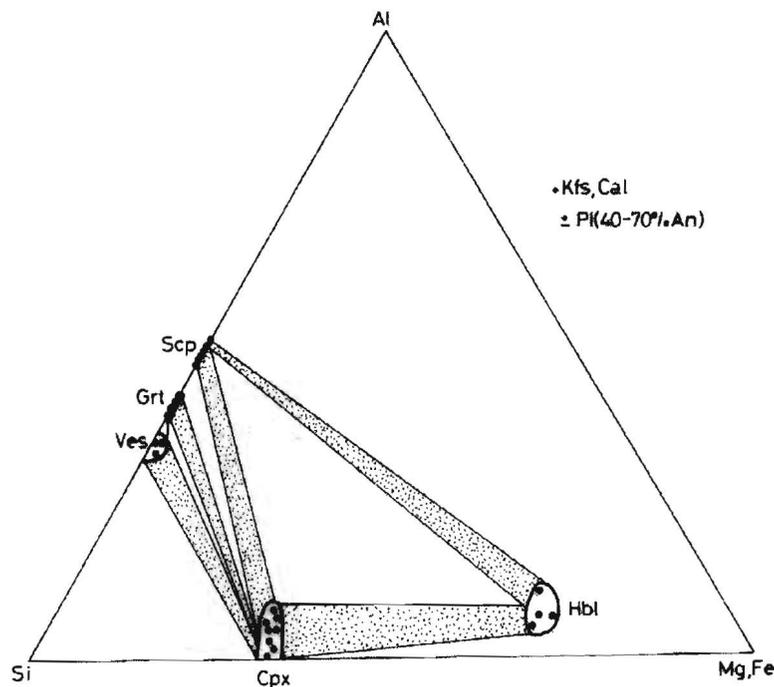


Fig. 2. Prograde associations of the Pl-Kfs bearing impure marbles from the Kriva Lakavica area in a Si-Al-Mg, Fe plot.

The mineral associations of the calcite-bearing impure marbles are plotted in a Si-Al-Mg, Fe diagram (fig.2) with Cal, Kfs and Pl in excess (a projection from Cal, Kfs and Pl points). In course of plotting of the real mineral compositions of in the diagram, Adr-molecula were subtracted from Scp, Hbl and Cpx compositions, and Fe^{3+} was subtracted from Vs, Cpx and Hbl compositions. This diagram illustrates the dependence of the mineral composition of the marbles on the Si content. In the relatively Si-poor marbles associations Cpx+Hbl+Scp is stable, as Si content increase associations Cpx+Grt and Cpx+Ves appear.

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