Metamorphic Zones of the Vrbno and Rejvíz Series, the Hrubý Jeseník Mountains, Czechoslovakia

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With 10 Figures

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Summary

The Devonian eugeosynclinal volcano-sedimentary complex (the Vrbno and Rejvíz series) building the envelope unit of the Desná Dome in the Hrubý Jeseník Mts. was regionally metamorphosed during the polyphase Variscan metamorphism. In it, five zones have been distinguished: the chlorite, biotite, garnet, staurolite and sillimanite ones. The metamorphism was of progressive character and its intensity (temperature) increased in the Vrbno series from S to N, and in the Rejvíz series from SE to NW. The mineral assemblages of rocks correspond to medium-pressure metamorphism in the greenschist, albite-epidote-amphibolite and the amphibolite facies. The earlier metamorphic phase (I) attained at maximum the staurolite zone. The later metamorphic phase (II) was a medium-pressure, too (5.5 kb at a temperature of 670° to 700°C), but it attained a higher temperature. It is represented by the sillimanite zone in which staurolite is unstable and is replaced by muscovite. Almandine does not change. In this paper, among others, the mutual relationships between sillimanite, biotite, staurolite and muscovite, existing in proximity of the sillimanite isograd, are discussed.

Zusammenfassung

Metamorphe Zonen in der Vrbno- und der Rejvíz-Serie des Hrubý Jeseník-(Altvater-) Gebirges, Tschechoslowakei


Introduction

The Desná Dome forms the eastern part of the Hrubý Jeseník Mountains in northern Moravia. Its core consists mainly of paragneisses and migmatites with interlayers of metabasites, quartzites etc. Most of the Czechoslovak geologists consider them to be Precambrian (Svoboda et al., 1966). The envelope series of this dome which is the object of this paper forms a continuous belt of rocks epizonal to mesozonally metamorphosed, which rim the core of the Desná Dome in the N and the E. This belt has been divided into the Vrbno series (according to Roemer, 1870) and the Rejvíz series (according to Skácel, 1958). These series are separated from each other by the Ondřejovice Fault striking N–S (Fig. 1). The age of both these series has been proved to be Lower Devonian, on the basis of fossils in quartzites (by authors from Roemer, 1865, to Chlupáč, 1975).

The eugeosynclinal volcano-sedimentary complex of the rocks of the envelope series of the Desná Dome was metamorphosed in the course of the Varsican orogeny. The initial rocks were pelites with a small clastic or carbonate admixture, basic magmatites (volcanics) of tholeiitic chemistry, and the above-mentioned psammites (now quartzites). In addition, products of acid volcanism (metakeratophyres) are also widespread here. In contrast to other regions, a characteristic elevated Al content is typical of the metapelites and metabasites of the Vrbno and Rejvíz series. As compared with average phyllites and micaschists (Mehnert, 1968) the metapelites display lower Na contents (comp. Souček, 1976).

Metamorphic Zones

In the studied part of the envelope of the Desná Dome, five metamorphic zones have been distinguished: the chlorite, biotite, garnet, staurolite and sillimanite zones. For their definition the results of the papers by Kříbek (1969), Fišera and Souček (1971), Fišera et al. (1973) were used as well as geological maps and the documentation material by Čabla (1974), Bussinov et al. (1973) and Galgánek et al. (1972). The individual zones are cartographically presented in Fig. 2. From this figure it follows that the metamorphism increases from S to N in the Vrbno series, and from SE to NW in the Rejvíz series.