



# Alpine reworking of Ordovician protoliths in the Western Carpathians: Geochronological and geochemical data on the Muráň Gneiss Complex, Slovakia

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Received 29 September 2003; accepted 2 June 2005

Available online 19 September 2005

## Abstract

Magmatic protoliths of Ordovician age have been identified in the metamorphic rocks of the Muráň Gneiss Complex, Veporic Unit (Central Western Carpathians). Vapor digestion single zircon U–Pb dating yields an intrusion age of  $464 \pm 35$  Ma (upper intercept) for the granite protolith. A lower intercept age of  $88 \pm 40$  Ma records amphibolite-facies metamorphic overprint in the Cretaceous, during the Alpine orogeny. Geochemical and isotopic data suggest crustal origin of the orthogneiss.  $\epsilon\text{Nd}_{\text{initial}}$  are between  $-2.6$  and  $-5.0$  and  $T_{\text{DM}}^{\text{Nd}}$  between 1.3 and 1.5 Ga (two-step approach).  $^{87}\text{Sr}/^{86}\text{Sr}_{\text{initial}}$  ratios vary between 0.7247 and 0.7120, and a steep REE pattern further constrains the crustal affinity of these rocks. Associated amphibolite bodies have  $\epsilon\text{Nd}_{\text{initial}}$  values of 6.5,  $^{87}\text{Sr}/^{86}\text{Sr}_{\text{initial}}$  ratio of 0.7017, and a flat REE pattern. They are interpreted as MORB derived metabasites. Whole-rock Pb isotope analyses define a linear array in a  $^{206}\text{Pb}/^{204}\text{Pb}$  vs.  $^{207}\text{Pb}/^{204}\text{Pb}$  diagram with an age of ca. 134 Ma, consistent with intense Alpine metamorphism and deformation.

These basement rocks of the Central Western Carpathians are interpreted as Ordovician magmatic rocks intruded at an active margin of Gondwana. They represent the eastern prolongation of Cambro–Ordovician units of the European Variscides, which were part of the peri-Gondwana superterrane and accreted to Laurussia during the Variscan orogeny. Variscan metamorphic overprint is not recorded by the isotopic data of the Muráň Gneiss Complex. Alpine metamorphism is the most dominant overprint.

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**Keywords:** Western Carpathians; Gondwana; Ordovician; Basement; Alpine orogeny

## 1. Introduction

Ordovician magmatic complexes are recognized in many areas of the Central European Variscides, like in the Bohemian Massif (e.g. Hegner and Kröner,

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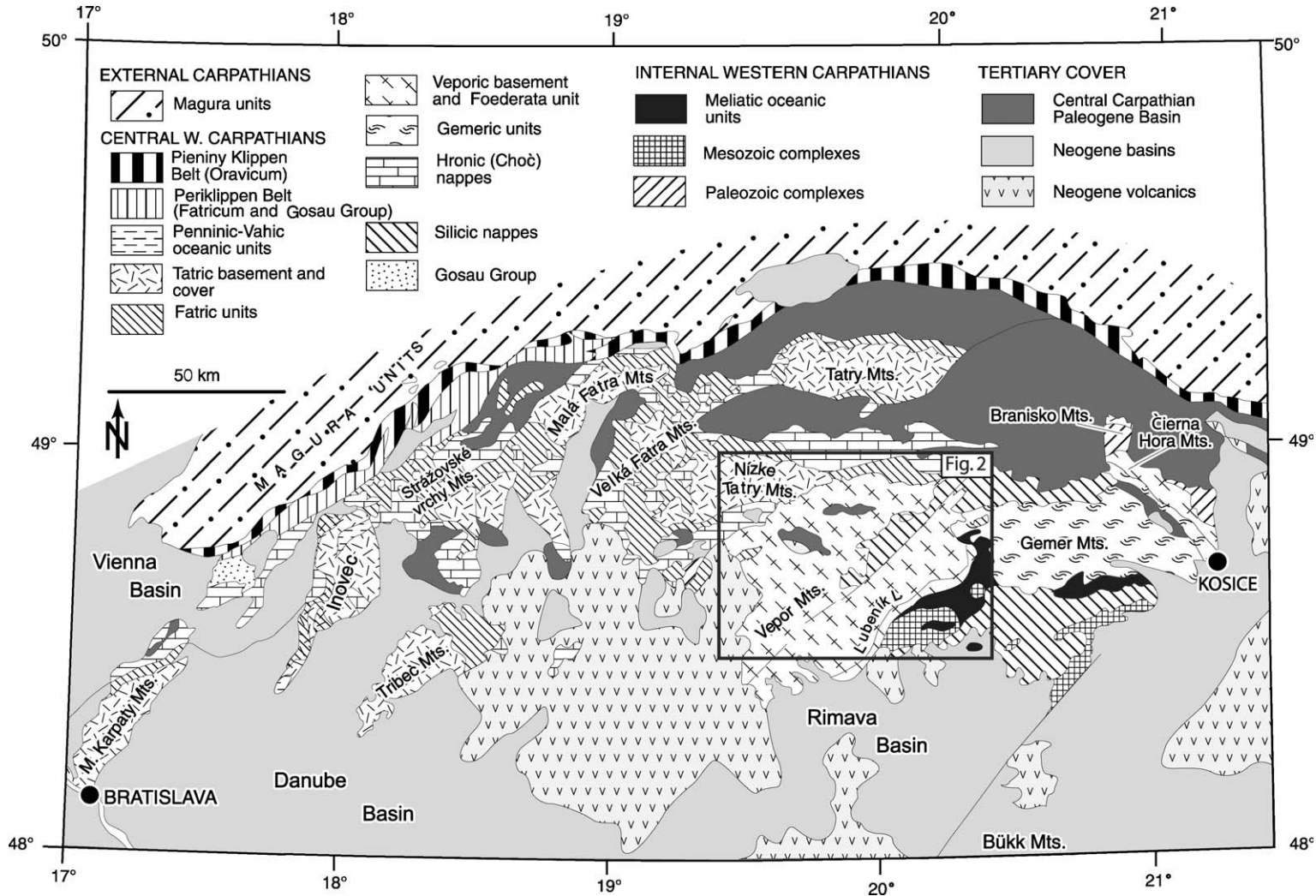


Fig. 1. Geologic Map of Slovakia modified after Plašienka (1997). Location of Fig. 2 indicated.

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