

ARC-TYPE CRUSTAL ZONING IN THE BRUNO–VISTULICUM, EASTERN CZECH REPUBLIC: A TRACE OF THE LATE-PROTEROZOIC EURO-GONDWANA MARGIN

F. FINGER¹, CH. PIN²

¹*Institut für Mineralogie der Universität, Hellbrunnerstraße 34, A-5020 Salzburg, Austria*

²*Laboratoire Geochimie, CNRS, 5 Rue Kessler, F-63038 Clermont Ferrand, France*

Considerable amounts of well-preserved Precambrian lithosphere are present at the eastern termination of the Central European Variscides (Bruno–Vistulicum *sensu* Dudek, 1980). These rocks yield important information concerning the nature and the origin of the European segment of the late Proterozoic Gondwana continent.

Based on geochemical and Rb–Sr, Sm–Nd isotopic data, three NW–SE striking zones can be distinguished in the Bruno–Vistulicum, that appear to constitute a cross-section through a destructive plate margin. These correspond to an island arc, a back-arc basin and a continental terrane, which we refer to as the Slavkov terrane, the Brno–Břeclav terrane and the Thaya terrane, respectively.

The island arc crust of the **Slavkov terrane**, east of Brno, consists mainly of a chemically and isotopically primitive plutonic suite (quartz diorites, tonalites and granodiorites), which intruded a metamorphosed, partly migmatized immature volcano-sedimentary formation. The composition and structure of the Slavkov terrane is mainly known from drill holes and geophysical data (Dudek, 1980, Jelínek & Dudek, 1993), since most of the area is covered by younger sediments. A small piece of the Slavkov terrane outcrops in the eastern Brno Massif. Here, one of the granodiorites (Blansko type) was dated at ca. 590 Ma (Fritz et al., 1996). Chemical Th–Pb monazite model ages suggest that migmatization in the pre-plutonic series occurred at about the same time.

The **Brno–Břeclav terrane**, to the southwest of the Slavkov terrane, appears to be a late Proterozoic back-arc basin. It contains abundant metabasite bodies with MORB (often E-MORB) chemistries (the so-called “basic zone” of the Czech authors — e.g., Hanžl, 1995). The ϵ_{Nd}^i values for the MORB suite range between +5 to +8 ($T = 600$), chemical Th–Pb model ages of monazites from cognate rhyolites suggest a Cadomian protolith age.

West of this zone, the Bruno–Vistulicum contains significantly older crustal components (**Thaya terrane**). Predominant are high-K I-type granites and granodiorites with intrusion ages of ca. 580 Ma (Finger et al., 1994; Friedl, 1997), Sr initial ratios of 0.705–0.710 and ϵ_{Nd}^i values of -1 to -6, respectively.

Judging from its lithological and isotopic record, it is likely that the Bruno–Vistulicum represents a fringe of the late Proterozoic plate margin of the Gondwana continent. The observed polarity of crustal zoning is indicative of a SW-dipping palaeo-subduction zone, a major ocean (Tornquist ocean?) in the northeast and a continental (cratonic) hinterland in the southwest.

The most likely interpretation is that the different terranes of the Bruno–Vistulicum were welded together during a Cadomian arc–continent collision, which led to high-grade metamorphism and extensive plutonism.