of the Vepor unit and their superposition (orthogneiss hanging wall and paragneiss footwall) is assumed to be a result of Variscan nappe stacking. In order to estimate P-T conditions of Variscan metamorphism, THERMOCALC program (Powell et al. 1998) in combination with exchange thermometry were used. Construction of pseudosection and its application on relict garnet proved to be a powerful tool in such polymetamorphic terrain. Thus for the petrological modelling and PT estimates of Variscan metamorphism we only needed information on bulk composition of the rock, specification of metamorphic mineral assemblage and knowledge of chemical composition of the relict garnet. Because of high Mn content in old garnet, the pseudosection was constructed in the MnNCKFMASH system. By plotting the garnet isopleths into pseudosection we obtained temperature and pressure of 630–670 °C, 0.6–0.7 MPa for the orthogneiss and 640–690 °C, 0.65–0.8 MPa for the paragneiss. The old garnet reveals retrograde zoning which resulted from decrease of calculated temperature from core to rim of about 50 °C. To estimate PT conditions of Alpine metamorphism, chemical composition forming relict mineral assemblage was extracted from the bulk composition of the rock. Calculated P-T conditions for Alpine metamorphism correspond to 440–490 °C, 0.5–0.8 MPa for the orthogneiss and 540–590 °C, 0.8–1.0 MPa for the paragneiss. This P-T range for Alpine metamorphism was also confirmed by using conventional garnet-biotite thermometry (Kleemann and Reinhardt, 1994) and average P-T program (Powell and Holland, 1988). In contrast to Variscan garnet, the Alpine garnet shows progressive zoning and indicates an increase of pressure and temperature from core to rim up to 0.2 MPa and 50 °C.

Microstructural analysis of quartz both in ortho and paragneiss revealed bimodal character of recrystallized grain sizes suggesting two distinct deformation events. Detailed microscale observations documented the presence of relicts of older quartz microstructure that is locally completely transposed into a new one. The earlier quartz microstructure bears signatures of high temperature deformation, which in agreement with well constrained natural cases (Stipp et al., 2002) suggests recrystallization by migration mechanism at temperatures around 650-700 °C. Crystal preferred orientation of the later quartz microstructure in the orthogneiss was measured using Electron back scatter diffraction (EBSD), which confirmed operation of dislocation creep using basal, rhomb and prism slip systems. Activation of these slip systems correspond to recrystallization by subgrain rotation mechanism at temperatures around 400–500 °C (Stipp et al., 2002).

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The Palaeogene Forearc Basin of the Eastern Alps and Western Carpathians: Subduction Erosion and Basin Evolution

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Scarce Palaeogene sediment remnants in the Eastern Alps and Western Carpathians are interpreted as remains of a continuous forearc basin. New apatite fission track geochronological data corroborate mild Paleocen–Eocene exhumation and relief formation in the Eastern Alps. Palinspastic restoration and nine palaeogeographic maps of the Eastern Alps and Western Carpathians ranging from the Paleocene to the Late Oligocene epoch illustrate west to east migration of subsidence in the forearc basin. Subsidence isochrons indicate that oblique subduction of the European plate below the Adriatic plate was responsible for forearc basin migration with a speed of 8 mm/year. The Periadriatic Lineament was formed due to shearing by oblique subduction. The Neogene to recent Sumatra forearc basin is an analogous feature for the evolution of the East AlpineþWest Carpathian forearc basin.