upside-down series crop out over much wider areas. The large-scale strata overturning characterizing the Montagne Noire is thought to have been a result of an over-rise of the dome just behind. This over-rise allowed a much larger top-to-south rotation of the thrusts and related folds during the progression and deepening of the foreland basin so that the dip of the faults decreased and was locally inverted. In addition, post-contractional collapse was responsible for later large-scale flattening and local gravitational sliding. This model may explain why, in the Montagne Noire, the northernmore fold and thrust units are transported farther into the foreland basin and why parts of the northern platform are found as very large (n km^2) olistostroms overriding the other tectono-sedimentary units. In the Montagne Noire, the uplift of the dome is attributed to a diapiric rise of anatectic gneisses into a previous antiformal stack. The presence of such a high-amplitude syn-contractional dome at the wedge-foredeep boundary is thought necessary to large-scale strata overturning, even though processes other than diapirism may contribute to its development. A comparison with the type-model of foreland basin systems (DeCelles and Giles, 1996, Basin Research, 8, 105–123, fig. 1C) shows that the dome of the Montagne Noire is equivalent to the frontal "triangle zone" that marks the boundary between the wedge-top and foredeep depozones with the difference that two-order thrust-propagation folds and related large-scale strata overturning occurred in the Montagne Noire instead of backthrusting in the "triangle zone". This process may be thus stated as one of the possible modes of propagation of the wedge within the foreland basin and could be privileged where a high amplitude dome forms in front of the wedge.

Tectonization of the basement in the western part of Moravosilesian region (Bohemian Massif)

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During the Variscan orogeny the Moravosilesian region represented a promontory of Laurussia involved in an oblique collision with Moldanubian group of terranes. Two domains of the basement with contrasting tectonic evolution can be distinguished representing different tectonothermal history in the western and eastern part.

In the western (collisional) domain, which comprises the footwall units of the Thaya and the Svratka Tectonic Windows, the following tectonostratigraphic sequence is developed (from the bottom to the top):

1. Cadomian basement granitoids with metamorphosed host-rocks;
2. Palaeozoic siliciclastics and platform carbonates;
3. Nappes of MT–HT/LP–HP metamorphic rocks with Variscan cooling ages.

The granitoids of the basement unit are strongly penetratively strained and in the Thaya Window their metamorphism reached the garnet zone (Höck 1995). Quartz of the granitoids and siliciclastic sediments was deformed ductily by rotation and migration recrystallization. The growth of muscovite and isotope geothermometry (S. Ulrich, oral. comm.) indicate that the maximum temperature in the siliciclastics was not lower than 300 °C. In the carbonates, low-stress coarse-grained mylonites predominate over the contrasting relic high-stress mylonites and unstrained limestones.

Stretching lineations with asymmetric structures indicate top-to-the-N (Svratka Window) or top-to-the-NE (Thaya Window) sense of shear (Schulmann et al. 1991, Fritz and Neubauer 1995).

In the eastern (foreland) domain with the Brno batholith, different lithotectonic sequence is developed (from the bottom to the top):

1. Cadomian basement granitoids with metamorphosed host-rocks;
2. Palaeozoic siliciclastics, platform carbonates and basinal volcano-sedimentary facies;
3. Viséan flysch sediments.

Deformation of the basement granitoids is non-penetrative, localized in largely spaced narrow LT mylonite zones. Quartz of the granitoids and siliciclastic sediments has suffered only slight brittle deformation. No trace of muscovite growth has been observed and thermometric data (illite crystallinity, vitrinite reflectance, CAI) indicate that the maximum temperatures reached in the sediments did not exceed 250 °C. In the Palaeozoic sedimentary cover, tectonic juxtapositioning of the platform facies and basinal facies has been proved (Bábek 1997).

East-vergent thrusting is characteristic of the whole sequence of crystalline basement, its pre-collisional sedimentary cover and Viséan flysch (Čížek and Tomek 1991). N–S trending stretching lineations are developed only in the westernmost parts of the eastern domain.

Both parts of the described basement are eroded to the same tectonostratigraphic level and thus the pronounced deformational and metamorphic contrast between the western and the eastern domains cannot be the result of their different post-orogenic uplift.

We suggest that the differences observed can be better explained by tectonic juxtaposition during the large-scale post-metamorphic dextral shear between the collisional and the foreland domains.

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Earthquakes and stresses in the lower crust of the Alpine foreland in southwestern Germany

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Deichmann and others showed more than ten years ago that earthquakes below the Molasse basin and the Jura mountains in Switzerland are located throughout the crust to depths of about 30 km, just above the Moho. It is, however, still enigmatic why deep crustal earthquakes can occur under conditions generally believed to involve deformation by ductile flow. In an effort to elucidate the complex relation between these earthquakes and the stresses, temperatures, and rheology of the deep crust, we have relocated events in the region extending from Lake Zurich across the Swiss–German border (Lake Constance area) to the Iller river. We have used seismograms recorded by the state seismic network of Baden-Wuerttemberg in southwestern Germany (1994–2000) and by other German, Swiss, Austrian, and French stations. One goal of this study is to improve the accuracy of focal depth determinations in this region, mainly by including Moho reflections (PmP, SmS) in the location procedure. As a first approximation to the southeastward deepening crustal structure, we use average Moho depths along the ray paths between each source and individual stations. We observe two distinct seismogenic depth intervals, an upper one to 15 km and a lower one from 20–30 km depth, separated by an apparently aseismic zone. Applying the Gephardt & Forsyth stress inversion scheme to fault plane solutions determined by us and others, we find that each of these "layers" displays its own particular stress regime: The upper layer shows predominantly strike-slip faulting, whereas the lower layer is goverened by normal faulting. In an attempt to explain the depth-dependent stress regimes in terms of the current evolution of the foreland, we combine the seismotectonic analysis with thermomechanical modeling. We suggest that the seismogenic stress regime may be related to the recent "unflexure" of the western foreland lithosphere (Andeweg and Cloetingh 1998).

The associated unloading possibly causes differential uplift in the west and basin-parallel tilting toward the east.