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.