

Abstract

The southwestern part of the Moldanubian Zone including southern flank of the Western Moldanubian Unit, Bavarian Unit and "Transitional Zone" located in between reveal a complex tectonic history as the result of late-orogenic exhumation and several post-Variscan tectonic episodes in Permian to Neogene era. New multi-mineral K-Ar dating reflects the cooling up to ca. 150° C and later stages of crustal exhumation in the southern flank of the Western Moldanubian Unit at ~339 to 334 Ma. In contrast, the "Transitional Zone" and the Bavarian Unit underwent the exhumation and similar cooling history in range ~330 to 315 Ma and ~300 to 280 Ma, respectively. These events were driven by fading ~N(NNW)–S(SSE) oriented compression (up to 325 Ma) and subsequent increasing role of ~ENE–WSW oriented extension. In this context, a prominent right-lateral to oblique normal slip along ~WNW(NW)–ESE(SE) shear or fault zones and simultaneous left-lateral to oblique normal slip along ~NNE(NE)–SSW(SW) were active. Following "post-orogenic" (post-Permian) episodes were mainly associated with (a) additional thermal input (re-heating) between Jurassic (~170 Ma) to early Cretaceous (~140 Ma), accompanied by ~NE–SW oriented extension (transtension) and (b) upper Cretaceous (~105–82 Ma) crustal uplift and cooling under prevailing ~NE(NNE)–SW(SSW) oriented compression (transpression). The final exhumation to the present-day surface position occurred between ~60 Ma and 25 Ma and is attributed to tectonic events in northern Alpine foreland.