Abstract

Lifespan of sedimentary basins may be terminated by processes leading to 'contingent fate', independent from the basin type. It is typically represented by basin inversion which is a process when a formerly extensional basin undergoes shortening accommodated by fault reactivation in typically compressional regime. Compressive forces transmitted from the orogenic front towards distant foreland regions are capable of reactivating basement faults and controlling basin development. This mechanism for basin inversion has been widely discussed for the foreland area of Alpine Orogen in Europe, with the Elbe and Tornquist zones given as typical examples of repeatedly (from Late Paleozoic onwards) reactivated crustal-scale faults. The Bohemian Massif forms an extensive, proximal part of the Alpine foreland. It is a widely regarded notion that it experienced complex intra-plate tectonosedimentary evolution since until the termination of Variscan Orogeny practically until the present-day. This thesis examines the post-Variscan, Late Paleozoic to Late Cretaceous tectonosedimentary evolution of the northern Bohemian Massif as a case example of complex intra-plate movements in the Alpine foreland of central Europe. Sedimentological, stratigraphic and provenance data from the Permian, Jurassic and Upper Cretaceous sedimentary successions are integrated to interpret controls on deposition of stratigraphic successions (by analysis of accommodation/supply ratio, transgressive–regressive cycles, etc.), direction of sediment dispersal and source areas and to provide time constraints on their possible shifts. The main issue this thesis addresses is whether the basins formed diachronously in the northern Bohemian Massif between the Permian and the Late Cretaceous, but were later completely destructed by subsequent tectonic processes, their fill recycled into younger basins. This could have happened over a relatively short time span – as in the case of basin formation and deformation resulting from multiple reactivations of NW–SE faults (e.g., Lusatian Fault, Elbe Zone) during the Late Paleozoic. The evolution of fluvio-lacustrine system of Vrchlabí Fm. of the Krkonoše Piedmont Basin records extensional phase of an extensive basin complex, succeeded by formation of transtensional basins tectonically discordant to the previous generation. Alternatively, inversion processes are exemplified by mid-Cretaceous inversion of the hypothetic Lusatian Basin and redeposition of its fill into the successor Bohemian Cretaceous Basin. The latter contains large amount of Paleo-/Mesoprozerozoic, Baltica-derived zircons that ended up on the Bohemain Massif presumably after multi-phase recycling of deposits extending between Scandinavian and N Bohemia. At last, they were recycled from sedimentary cover of unroofing Lusatian Block, particulary during late Turonian–Coniacian period of tectonic acceleration. As a result, a time-slice reconstruction of paleogeographic and tectonosedimentary evolution of the northern Bohemian Massif is used to demonstrate that periods of basin development and deposition (early Permian, late early Permian to Early Triassic, Middle Jurassic–Early Cretaceous, Late Cretaceous) were interrupted by major depositional gaps (Middle Triassic–Early Jurassic, mid-Cretaceous). The Mesozoic depositional episodes occured when major NW–SE fault zones were reactivated due to stress transfer from the North Atlantic Rift during Jurassic to Early Cretaceous, overridden by the far-field effect of convergence of Iberia, Africa, and Europe during Late Cretaceous. This phenomenon is well-known from a number of basins ('marginal troughs') of central Europe, recently interpreted as 'intraplate foreland basins'.