

## Late Devonian subduction and ocean closure: Evidence from zircon ages from the northern Böllsteiner Odenwald

Thomas Reischmann<sup>1</sup>, Axel Gerdes<sup>2</sup>, Hans-Gerhard Fritsche<sup>1</sup>, Heinz-Dieter Nesbor<sup>1</sup>

(1) Hessisches Landesamt für Naturschutz, Umwelt und Geologie (HLNUG), Wiesbaden, Germany

(2) Goethe-Universität Frankfurt, Institut für Geowissenschaften, Frankfurt am Main, Germany

thomas.reischmann@hlnug.hessen.de

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The Odenwald is part of the Mid-German Crystalline Rise (MGCR) at the northern margin of the Saxothuringian Zone of the Variscan orogen. The exposed crystalline basement is divided into the Bergsträsser Odenwald in the West and the Böllsteiner Odenwald in the East, separated by the Otzberg fault zone. The Böllsteiner part is composed of various gneisses in the core of the anticline and mainly schists in the outer regions.

We used samples from drilling sites for geochronological and geochemical studies in the northern part of Böllstein, the deepest of which reached 775 m near Heubach. For comparison we analyzed gneisses from the region of Neustadt as well. The zircon ages were dated by U/Pb analyses with LA-ICPMS. The ages of the orthogneisses of the Heubach drilling site as well as those from Neustadt cluster between 361 and 368 Ma. The zircons of this age indicate an igneous origin. Sphene and some metamorphic rims from zircons are between 330 and 339 Ma old, giving evidence for a metamorphic overprint during the peak of the Variscan orogeny. Paragneisses and a quartzite additionally contain 400-600 Ma old inherited zircon grains. The major igneous event is younger than that of the 410 Ma old gneisses of the southern Böllsteiner Odenwald and the ca. 420 Ma old core gneisses of the neighboring crystalline Spessart. Furthermore, it is significantly older than the majority of Variscan plutonic rocks of the Bergsträsser Odenwald. The only similar ages are known from the Frankenstein Massiv with 361 Ma and from the Albersweiler gneiss with 365 Ma. Analog to those rocks, the geochemistry of the investigated samples indicates a subduction-related origin.

Therefore, the zircon ages obtained in this study provide evidence for at least one late Devonian subduction zone in the realm of the MGCR. Subduction of the Rhenohercynian ocean from the North or the Rheic ocean from the South are a plausible settings for such a scenario.