# New Palaeomagnetic Constraints for Reconstruction of the Palaeozoic Orogenies in Central Europe

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The KTB drilling project is located within the Hercynian Mountain Belt at the border of the Saxothuringian and the Moldanubian subunits. This deep seated mobile shear zone was active during the Caledonian and the Hercynian Orogenies, as the result of a series of plate collisions during the Palaeozoic.

Earlier reconstructions (e.g. Smith et al., 1981; Fig. 1) generally regarded Europe as a coherent tectonic unit, situated at equatorial palaeolatitudes throughout the Palaeozoic. Palaeontological studies recognised the presence of distinct faunal provinces, but reliable palaeomagnetic data were scarce, due mainly to a widespread Late Paleozoic remagnetization. However, new palaeomagnetic data now confirm that Europe comprises an amalgamation of various crustal blocks - Baltica, Avalonia and Armorica - each of which had separate palaeodrift histories in the Lower Palaeozoic (Bachtadse et al., 1994, Tait et al., 1994a, 1994b, Torsvik et al., 1992). Accurate palaeogeographic reconstructions, shown in Figure 2, are now possible for critical time slices in the Lower Palaeozoic and the palaeomagnetic data suggest the following scenario:

* In the Cambrian, Baltica was situated at high peri-polar latitudes and was inverted with regards to its present day position. During the Ordovician it drifted northwards, whilst rotating anticlockwise, and by the Silurian it was situated at the equator. It was separated from Laurentia by the Iapetus Ocean, and from Avalonia and Armorica to the south by the Tornquist Sea
* Avalonia originated from the northern margin of Gondwana. Rifting occurred in Lower Ordovician times, and it began drifting northwards. It was separated from Baltica by the Tornquist Sea which was gradually consumed during the Ordovician, and collision between Avalonia and Baltica occurred in Late Ordovician/Early Silurian times. The Iapetus Ocean between Baltica/Avalonia and Laurentia had narrowed considerably, and final closure and suturing occurred in the mid Silurian.
* Armorica is also a Gondwana derived terrane. It started drifting northwards in mid Ordovician times opening the Rheic Ocean in its wake, and by the Upper Silurian had collided with the southern margin of Baltica.
* The Rheic Ocean (Paleotethys) was then closed during the subsequent northward movement of Gondwana. Subduction of the oceanic plate below the northern block and the later continent-continent collision with Gondwana resulted in the Hercynian orogeny. Its subunits (Rheno-Hercynian, Saxothuringian, Moldanubian) can be regarded as an accretion of back arc basin volcanites and sediments, remnants of island arcs, acid extrusions and intrusions and upthrusted lower crust of the former margin of Gondwana.

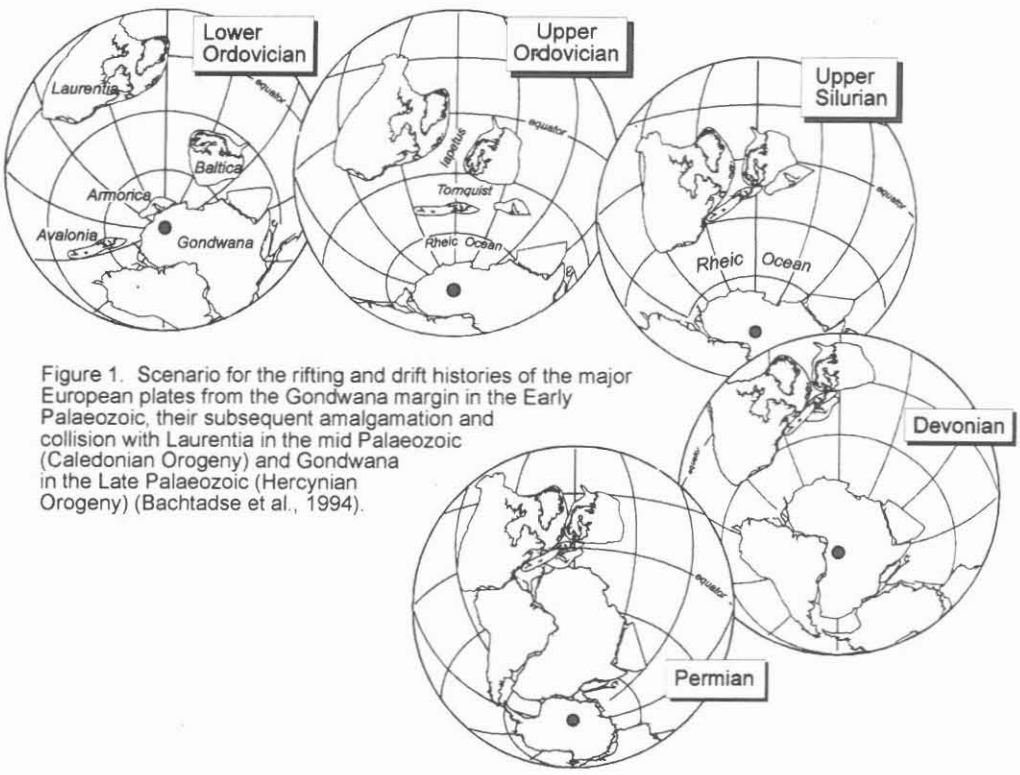


Figure 1. Scenario for the rifting and drift histories of the major European plates from the Gondwana margin in the Early Palaeozoic, their subsequent amalgamation and collision with Laurentia in the mid Palaeozoic (Caledonian Orogeny) and Gondwana in the Late Palaeozoic (Hercynian Orogeny) (Bachtadse et al., 1994).

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