

## **Variscan backthrusting on the northern border of the Rocroi Inlier (Belgium): the ‘pop-up structure’ stage of the Dinant Synclinorium**

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The studied region encompasses the northern part of the Cambrian Rocroi Inlier and the Devonian cover of the southern border of the Dinant Synclinorium. The base of this work consists of a detailed geological mapping of the Belgian part of the region performed in the framework of the new geological map of the Walloon Region at the scale of 1:25 000 (Geological Survey of Wallonia, SPW, Jambes, Belgium).

The whole belongs to the Ardenne Allochthon and is therefore carried northwards through the Midi Fault or its equivalent at depth. The Cambrian rocks are recognized over about 1400 meters thick. They mainly show quartzites and dark slates belonging to the Revin Group, and quartzites and green or purple slates of the Deville Group in the eastern part of the study area. The Lower Devonian series is about 2000 meters thick. It is made up of a stack of alternately sandstone and slaty shales formations. These series overlie the Cambrian Formations with an angular unconformity that is complicated by the existence of back-thrust faults: the Fépin and Lahonry faults.

These faults present a northwards dip, and therefore a southwards vergence. The Fépin Fault causes the base of the Devonian (Fépin Formation) to slide over the less competent Cambrian formations. The Lahonry Fault splits the Cambrian-Devonian contact as well as the Devonian basal layers. The Macquenoise Fault, for its part, is located at the base of the Oignies Formation. It carries the same Formation and the overlying rocks, to the south, on the incompetent siltstones and shales of the Mondrepuis Formation.

In a larger extent, this back-thrusting contributes to the upwards expulsion of the essentially Upper Paleozoic terrains, between, on the one hand, the Variscan Front (Midi Fault) accompanied by a certain number of other overlapping faults with northwards vergence (e.g. the Yvoir Fault) and, on the other hand, the Rocroi Massif. This large ‘pop-up structure’ probably occurred early in the evolution of the Variscan compression. A north-verging deformation was superimposed during the later shortening of the structure.

The back-thrusting is facilitated by varying competences between the different formations, but above all by the fact that the isotherm of 300-(350) °C must have been situated (at the beginning of Variscan contraction) in the vicinity of the top Lower Paleozoic (Ardennian) unconformity.

This simplifies the interpretation of a certain number of facts that have been known for a long time. For example, the existence of a stepped structure, constituted by north-verging tight chevron-folds with horizontal hinge lines and moderately inclined axial surfaces, located on the southern edge of the Dinant Synclinorium, which would paradoxically correspond to retro-folds initiated on the hanging-wall of the Fépin and Lahonry backthrusts.