



## **The Asquempont Detachment System: a large-scale, Early Palaeozoic extensional detachment within the Brabant Massif, Belgium**

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The Brabant Massif is a Lower-Palaeozoic, single-phase deformed slate belt in the subsurface of N-Belgium. It represents the SE-part of the Anglo-Brabant Deformation Belt, one of the deformation belts of eastern Avalonia. Within the largest outcrop area of the Brabant Massif (Senne-Sennette area), an enigmatic contact exists between the lowermost Ordovician Chevlipont Formation and the Lower to lower Middle Cambrian Oisquercq Formation. Although this contact was attributed to an important reverse fault (Legrand, 1967; cf. Mortelmans, 1955), a re-examination indicates that this contact corresponds to a low-angle, pre-cleavage and pre-folding extensional detachment, currently called the Asquempont Detachment System (ADS; Debacker, 2001; Debacker et al., 2003, 2004, 2005; Piessens et al., 2005; Herbosch et al., in press).

At present, the ADS has been observed in three outcrops in the Senne-Sennette outcrop area in the southern part of the massif and in several boreholes in the unexposed SW-part of the massif (Debacker, 2001; Debacker et al., 2003, 2004; Piessens et al., 2005). In addition, the ADS can be traced in between adjacent outcrops in two more outcrop areas in the eastern part of the Brabant Massif (Dyle-Thyle and Gette outcrop area; Debacker et al., 2005; Herbosch et al., in press). Considering its well-constrained trace, and the well-constrained Lower Palaeozoic stratigraphy of the Brabant Massif, the ADS can be regarded as an outstanding example of a large-scale, Early Palaeozoic

extensional detachment.

The ADS can be traced for at least 110 km in a WNW-ESE-direction, and extends for at least 75 km in a NNE-SSW-direction. It is responsible for the removal of a sedimentary pile estimated at between 3.5 and 6 km thick. In outcrop, the ADS, strongly overprinted by cleavage, is up to 10 metres wide. Because of the low-angle to bedding, the relatively large width, and the strong overprinting by cleavage, its orientation cannot be determined in outcrop or boreholes. On the basis of hanging wall and footwall stratigraphy and cartographic inferences, a consistent, extremely low dip emerges. The activity of the ADS can be constrained between the Caradoc and the time of cleavage development.

Although the geometry and age of the ADS are now rather well constrained, the cause and formation mechanism are not understood. Taking into account the lithology, the overall architecture and the basin evolutionary history of the Brabant Massif, several ideas can be put forward for the regional cause of the ADS, which eventually may serve as working hypotheses for the possible formation mechanism of the ADS.

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