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Permian lithostratigraphic units, Malmédy Graben (Belgium)

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(1 figure)

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ABSTRACT. The Malmédy Formation, subdivided into three members and consisting essentially of reddish continental conglomerate deposits, is exposed in a 2.5 km to 0.5 km wide and about 22 km long graben structure across the Stavelot Massif, in the eastern part of the Ardennes. It is most likely of Permian age.

KEYWORDS: Permian, Malmédy Formation and members, E Ardennes, Belgium.

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1. Description of formation and members

1.1. Malmédy Formation - MAL

Authors: Dumont, 1832; Renier, 1902.

Description: The formation essentially consists of reddish matrix - to more rarely clast - supported massif to medium bedded conglomerates with subordinate red sandstone to mudstone beds and lenses. Also breccia occur. The Malmédy Fm is subdivided into three members (see below) on the basis of the petrography of the clasts and the stratigraphic superposition of the members (Renier, 1902).

Type area: Warche valley between Bevercé and Malmédy and the Burninville area about 2 km NW of Malmédy.

Area: The about 22 km long and 2.5 to 0.5 km wide NE-SW running graben structure Hoffrai, Malmédy, Stavelot, Basse-Bodeux.

Thickness: See members.

Age: According to the tectonic history of the Ardennes and the age of the fossils from the allochthonous clasts (see Middle Member) a Permian age is most likely, however not proven.

Remarks: The Malmédy Fm is generally considered to represent fluvio-lacustrine deposits and the red colour is ascribed to semi-arid climatic conditions. References: Dumont, 1832; Renier, 1902; Maillieux, 1931; Antun, 1954; Geukens, 1956, 1963, 1986; Ozer & Macar, 1968; Ozer & Pissart, 1983; Smolderen, 1987; Vandenven, 1991; Prick & Ozer, 1995.

1.1.1. Lower Member

Author: Renier, 1902.

Description: At the base a breccia with quartzitic clasts, overlaid by an alternation of micro - conglomeratic sandstone lenses, flags and lenticular conglomerates with well - rounded clasts. Size of clasts: up to 60 cm.

Reference outcrop area: S slope of the Warche valley (about 400 m contour line), about 1 km N of Chôdes.

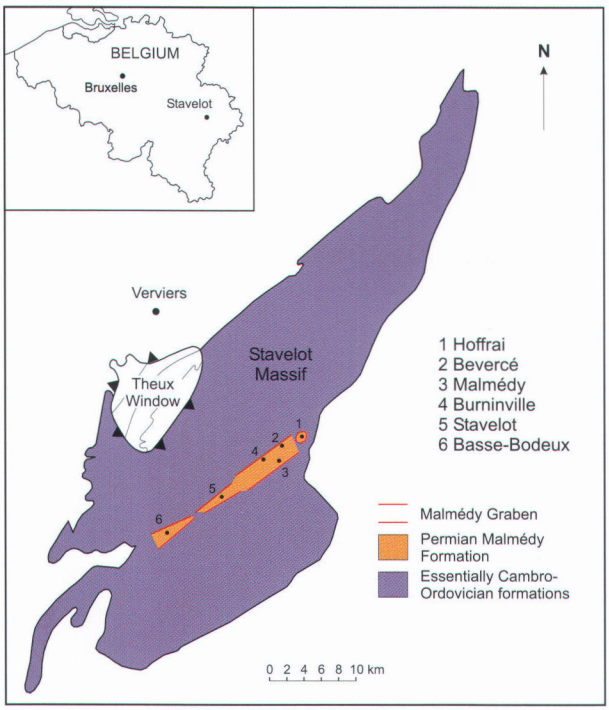

Figure 1: Location of the Malmédy Graben and the Malmédy Formation within the Stavelot Massif (SE Belgium).

Area: Malmédy, Stavelot.

Thickness: About 60 m in the Malmédy area and 15 m in the Stavelot area.

Remarks: In the Malmédy-Bevercé area, the Lower Mbr rests with an angular unconformity upon Cambro-Ordovician rocks (Revin and Salm Groups). Volcanic ash deposits are mentioned from the Lower Mbr by Vandenven (1991).

1.1.2. Middle Member

Author: Renier, 1902.

Description: The Middle Mbr is characterized by predominantly fossiliferous limestone clasts in a red calcareo-argillaceous matrix intercalated with sandstone-siltstone-mudstone lenses and rare sandstone beds.

A few levels show an early stage of calcareous paleosol development (Geukens, 1986; Vandenven, 1991). Size of clasts: generally ranging from 2 to 50 cm.

Reference sections: S slope of Warche valley at Bevercé and slope at the back of the Malmédy cathedral.

Area: Malmédy, Stavelot and Basse-Bodeux.

Thickness: About 150 m in the Malmédy area; 30 to 40 m at Stavelot and about 70 m in the Basse-Bodeux area.

Age: The allochthonous limestone clasts yield conodont faunas of upper Emsian, Eifelian, Givetian, Frasnian, Famennian and Tournaisian age. Tabulate and rugose corals are of Eifelian-Givetian age and stromatoporoids Givetian-Frasnian (Smolderen, 1987). Maillieux (1931) mentioned brachiopods and corals from Emsian, Eifelian, Givetian and probably Frasnian age.

Remarks: Age, litho- and biofacies of the limestone clasts, colour alteration index of the conodonts and direction of debris supply, as determined by size distribution of the clasts, point to a mixture of sediments from different sources. One of these was the Eifel area. In the Basse-Bodeux area the limestone clasts are less frequent and smaller (2 to 7 cm) than in the Malmédy area. According to Geukens (1986) there may be two stratigraphically different units with limestone clasts.

1.1.3. Upper Member

Author: Renier, 1902.

Description: A breccia with flags, phylite and quartz fragments, lying in a red, argillaceous matrix.

Reference section: Outcrops along the N 62 road from Malmédy to Francorchamps, just E of Burninville.

Area: Only known from the Burninville-Bernister area, about 2 km NW of Malmédy.

Thickness: About 30 m.

Remarks: In the reference section area the Upper Mbr is overlying the Middle Mbr.

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