

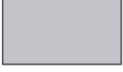



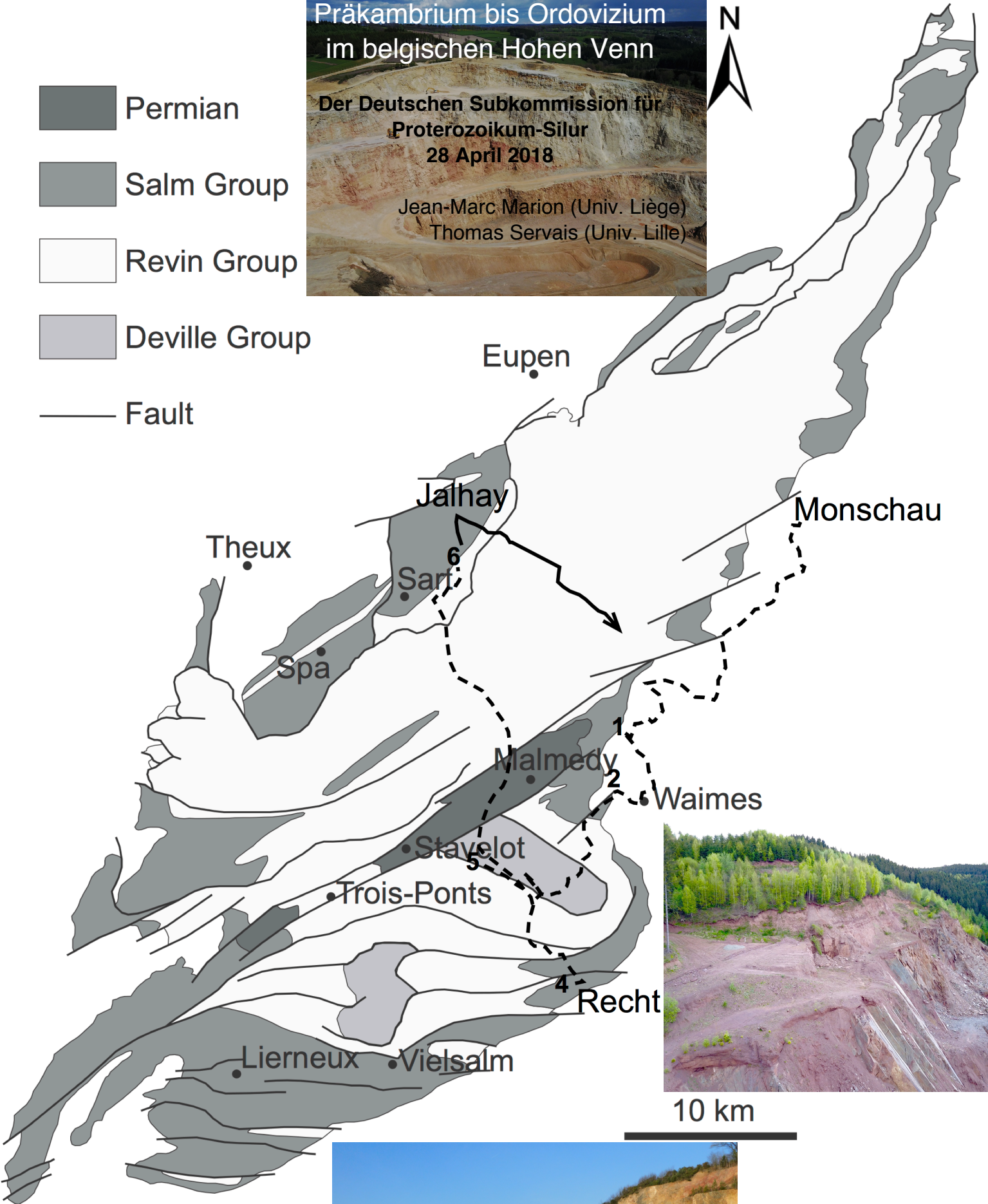
Präkambrium bis Ordovizium im belgischen Hohen Venn

Der Deutschen Subkommission für
Proterozoikum-Silur
28 April 2018

Jean-Marc Marion (Univ. Liège)
Thomas Servais (Univ. Lille)






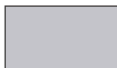

-  Permian
-  Salm Group
-  Revin Group
-  Deville Group
-  Fault

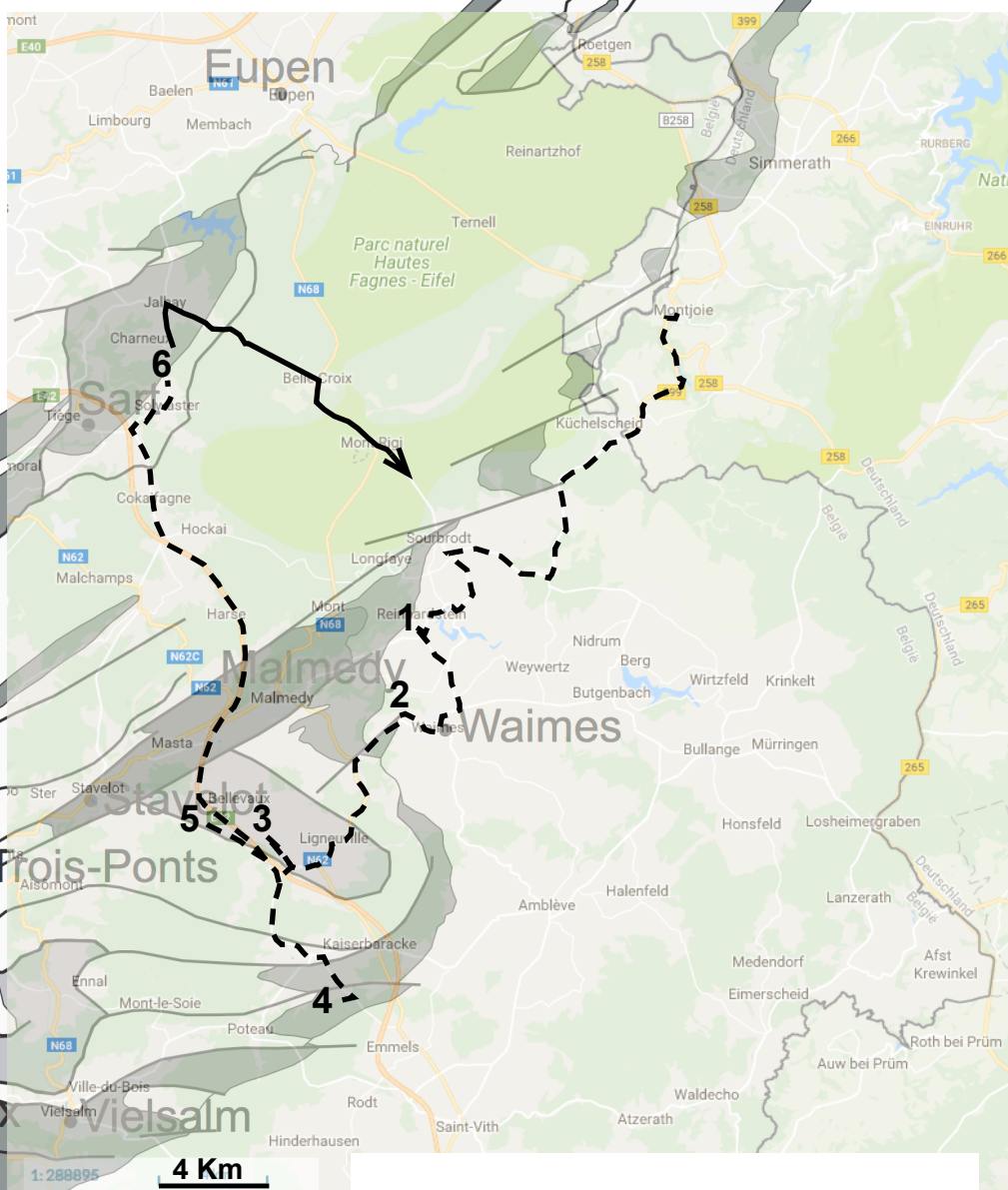


10 km





-  Permian
-  Salm Group
-  Revin Group
-  Deville Group
-  Fault



Theux

Spa

Eupen

Waimés

Trois-Ponts

Lierneux

Vielsalm

4 Km

1:288895

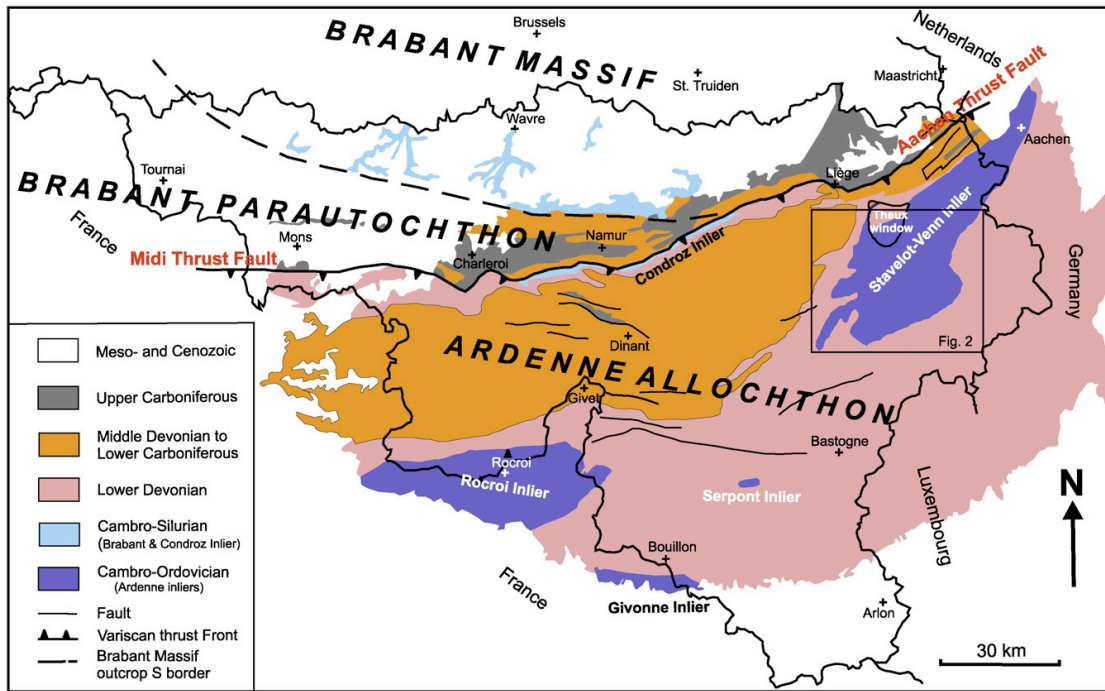


Fig. 1. Simplified geological map of the southern part of Belgium and adjacent countries showing the major structural units of the Palaeozoic and the four Caledonian inliers in the Ardenne Allochthon (Stavelot-Venn, Rocroi, Givonne and Serpont). The black rectangle corresponds to Fig. 2.

(from Herbosch *et al.*, 2016)

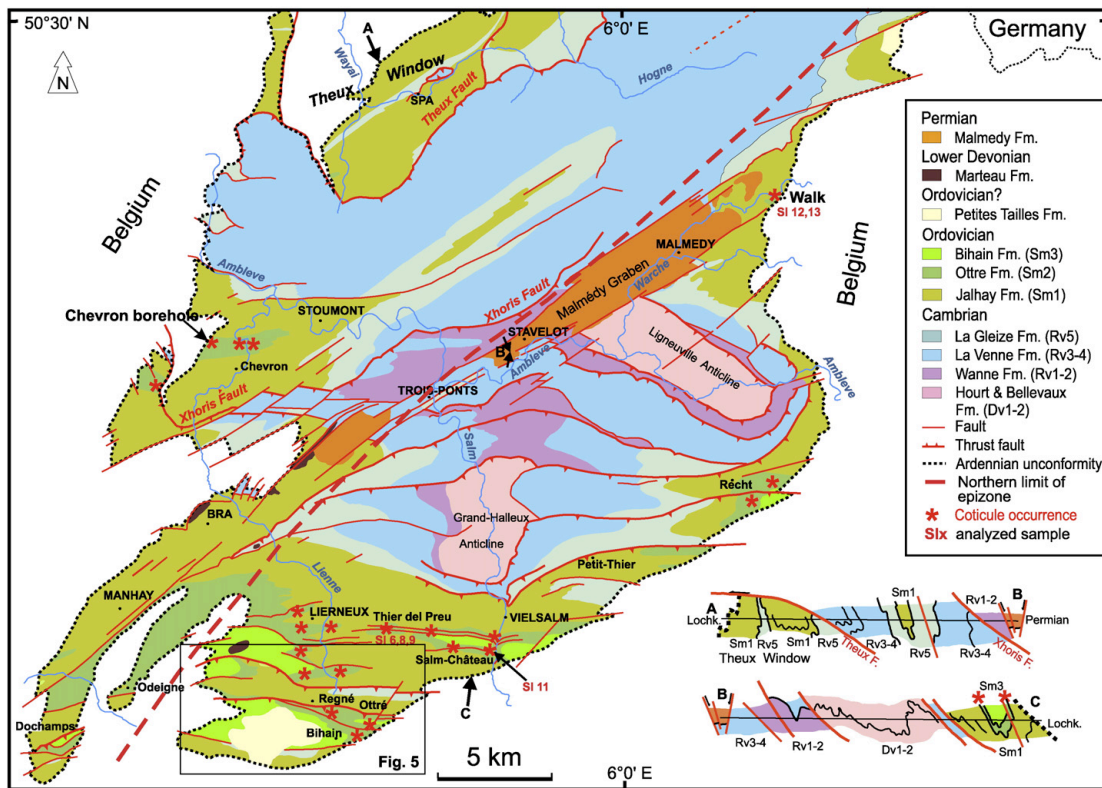


Fig. 2. Geological map and north-south cross-sections (AB and BC) of the southern part of the Stavelot-Venn Inlier after *Geukens (1986, 1999)*. Coticule occurrences are marked by red stars and the newly analyzed samples are shown by red numbers (Six). The Malmédian Permian graben is not affected by the metamorphism. Abbreviation: Lochkov. for Lochkovian. Location in Fig. 1. The black thin rectangle corresponds to Fig. 5 (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article).

(from Herbosch *et al.*, 2016)

Pridolian–Lochkovian macrofaunas from southern Belgium and northern France: de Koninck (1876) revisited

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In southern Belgium and northern France, the essentially siliciclastic rocks unconformably lying on the Caledonian basement were formerly included in the Gedinnian (from Gedinne, a small village of the Namur Province, Belgium). As rightly stressed by Steemans (in Dejonghe *et al.*, 2006), the Gedinnian, in its historical type area, mainly corresponds to a lithostratigraphical unit delimited at its base by a major discordance and its boundaries are strongly diachronous as demonstrated by the miospores (Steemans, 1989). Thus, its use as a regional stage has to be avoided, but it is briefly used here for convenience as a local expression of the Lochkovian *pro parte*. The lower part of the Gedinnian is known for a long time for its diverse invertebrate faunas (*e.g.*, Hébert, 1855; de Koninck, 1876).

Based on Dewalque and Malaise's collections, de Koninck (1876) was the first to illustrate and describe the macrofaunas occurring within the basal "Gedinnian" at Gdoumont on the south-east flank of the Stavelot Massif (Belgium) and at Mondrepuis (northern France) on the southern border of the Dinant Synclinorium. Although these macrofaunas have been revised notably by Leriche (1912), Asselberghs (1930), Boucot (1960), Godefroid (1995) and Godefroid & Cravatte (1999), de Koninck's (1876) material has never been re-illustrated so far. As it has recently been retraced in the historical collections of the Liège University (Dewalque's collection), it is now possible to provide the first photographic illustrations of some type specimens of the species erected by de Koninck (1876), who strongly idealised and embellished the line drawings of his specimens. This discovery is therefore of some interest as is also the case of the recent recovery of almost all the invertebrates (*e.g.*, brachiopods, pelecypods) described by Kayser (1895) from the Pépinster Formation (Eifelian–Givetian). However, the specimens that were part of Malaise's collections have not been found yet in spite of our efforts, but may be housed at the Royal Belgian Institute of Natural Sciences.

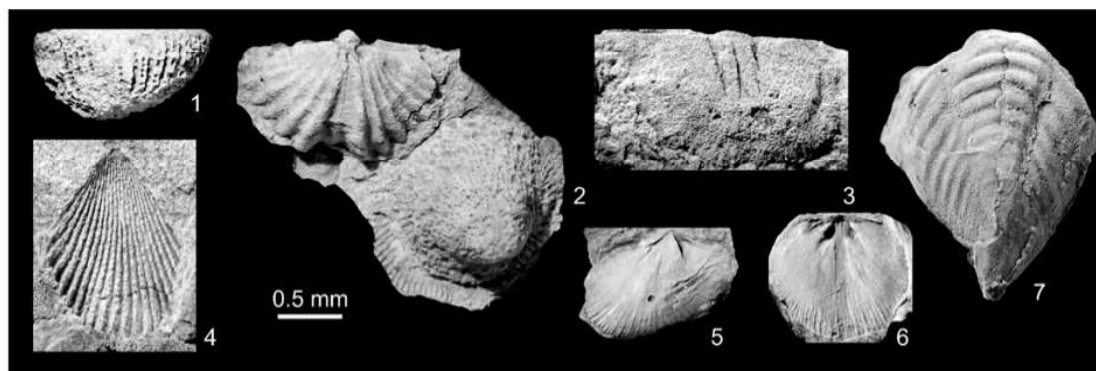


Fig. 1: Some specimens of the Dewalque collection housed at the University of Liège and identified by de Koninck (1876). The specimens no. 1–4 and 5–7 are from the Waimes (Gdoumont) and the Mondrepuis (Mondrepuis) formations, respectively. (1) "*Cyathophyllum binum* Lonsdale" (= de Koninck, 1876: pl. 1, fig. 2). (2) *Quadrifarius dumontianus* (= de Koninck, 1876: pl. 1, fig. 9a-9b) and *Cystiphyllum profundum* (= de Koninck, 1876: pl. 1, fig. 1-1a). (3) *Shaleria rigida* (= de Koninck, 1876: pl. 1, fig. 5?). (4) "*Camarotoechia*" *aequicostata* (= de Koninck, 1876: pl. 1, fig. 7?). (5-6) *Platyorthis verneuili* (de Koninck, 1876). (7) *Digonus roemeri* (= de Koninck, 1876, pl. 1, fig. 15b-15c?).

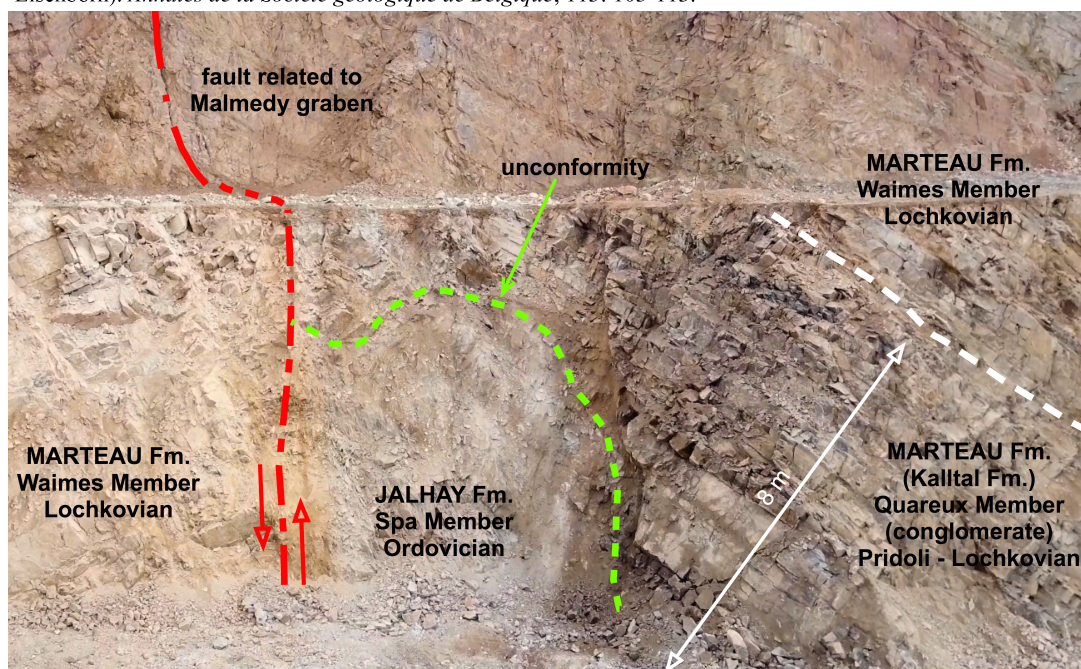
The material from Gdoumont, which mainly consists of brachiopods, solitary rugose and colonial tabulate corals, has been recovered from the lowermost part of the Waimes (Weismes in German) Formation defined by Vandenven (1991), the age of which is considered as Pridolian at least for the fossiliferous levels (see discussion in Godefroid & Cravatte, 1999). The material only consists of poorly preserved internal moulds

and this feature may explain the embellishment of de Koninck's line drawings (e.g., compare the idealized representation of "*Cyatophyllum binum*" with the original specimen (Fig. 1.1)). It includes the following species erected by de Koninck (1876) (their original generic assignment has been modified wherever possible): "*Cystiphyllum*" *profundum*, "*Chonetes*" *omaliana*, *Shaleria rigida*, "*Camarotoechia*" *aequicostata*, *Quadrifarius dumontianus*.

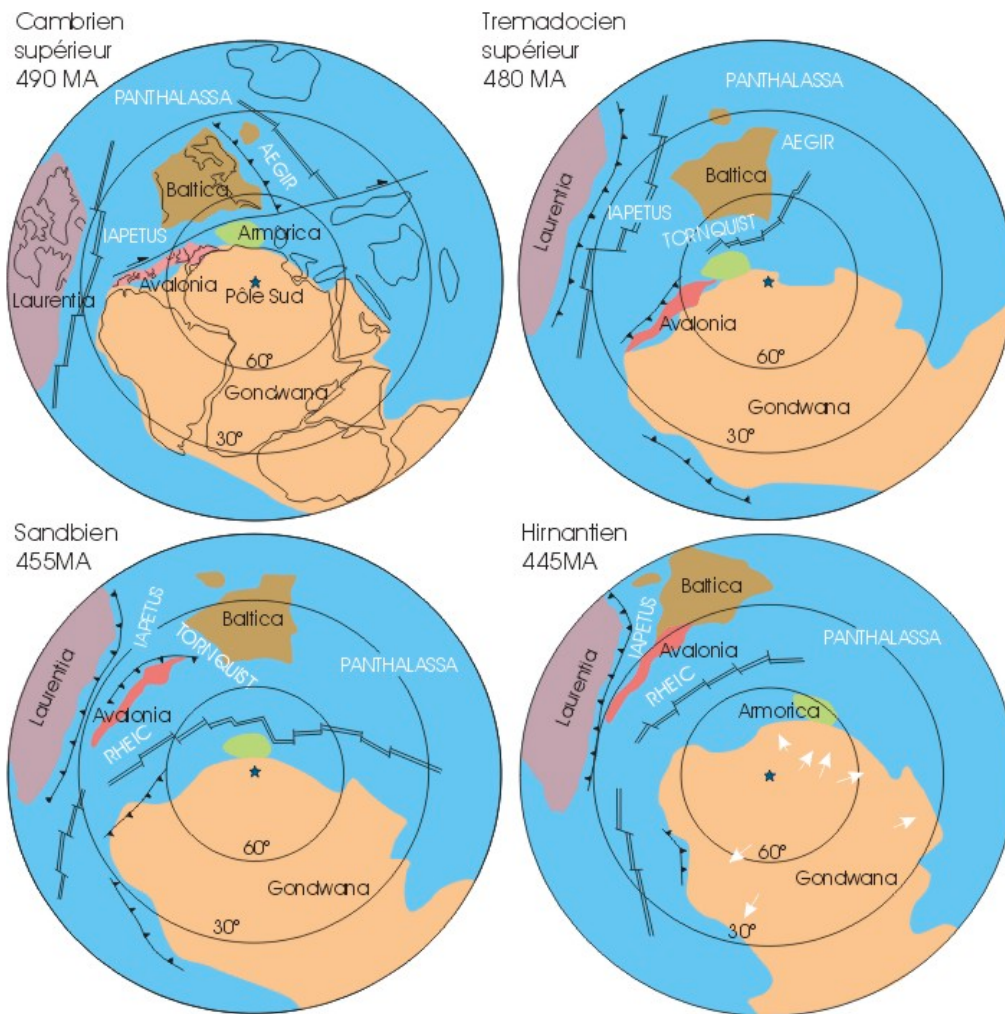
Most of the species described and/or reported by de Koninck are from the Mondrepuis Formation, in the eponym locality. In this area, the base of the formation is early Lochkovian in age (Stemans, 1989). The Mondrepuis Formation yields a diverse fauna including notably brachiopods, ostracods, pelecypods, tentaculites and trilobites. The species erected by de Koninck (1876) are the following (see remarks above): *Primitia jonesii*, *Beyrichia richteri*, *Digonus roemeri*, *Platyorthis verneuli*, *Grammysia deornata*, *Avicula subcrenata*, *Pterinea ovalis*, *Tentaculites irregularis*. The specimen illustrated by de Koninck (1876: pl. 1, fig. 1) was selected (but not figured) as the lectotype of *Digonus roemeri* (de Koninck, 1876) by Richter & Richter (1932) (see also Richter & Richter, 1954). Only one specimen identified as such has been traced in the Dewalque collection. Its general outline is in accordance with de Koninck's illustrations but, as it is smaller, it cannot be definitely considered as the specimen figured by de Koninck.

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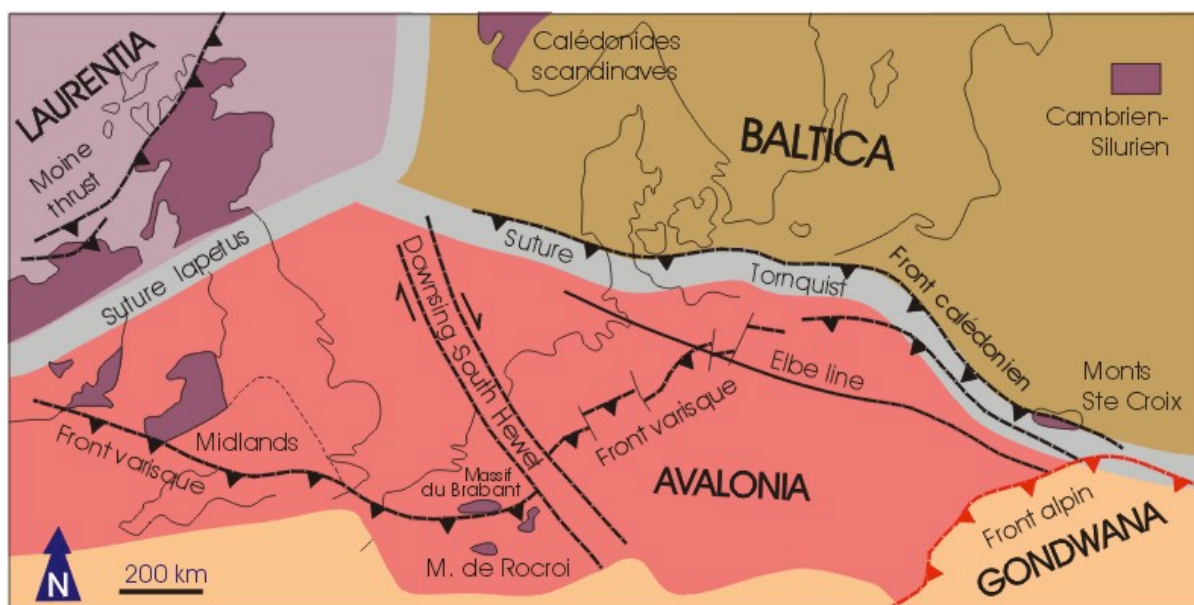
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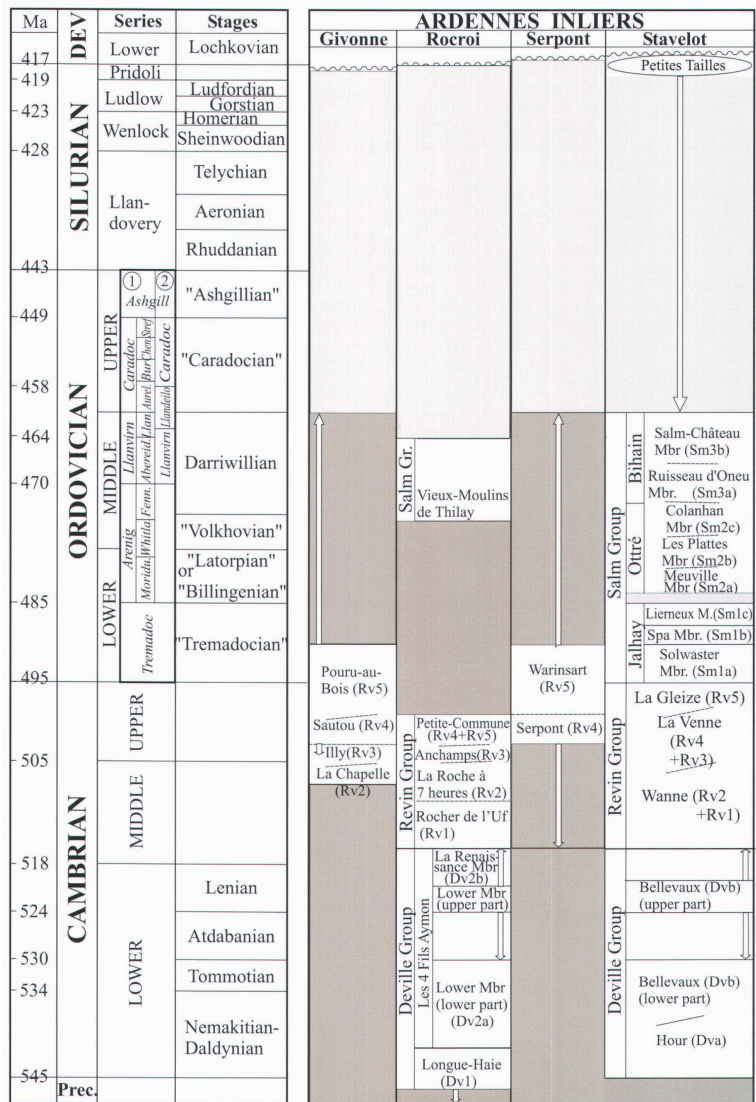
Warchenne quarry (Waimes). Marteau Fm. (Lower Devonian, Lochkovian & Pridoli for the Quareux Mber). Contact (unconformity) with caledonian basement: Jalhay Fm. (Lower Ordovician, Trémadocian).



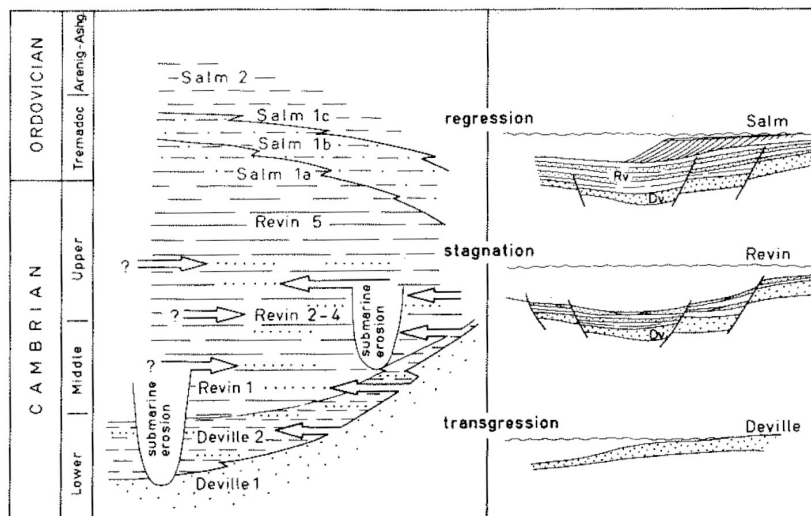
Lower Palaeozoic paleogeography. Arrows indicate the direction of the glaciers (from Boulvain & Pingot, 2017: modified after Cocks & Torsvik 2002).



Current situation of the continental plates involved in the Caledonian orogeny (from Boulvain & Pingot, 2017, modified after Soper et al., 1992).

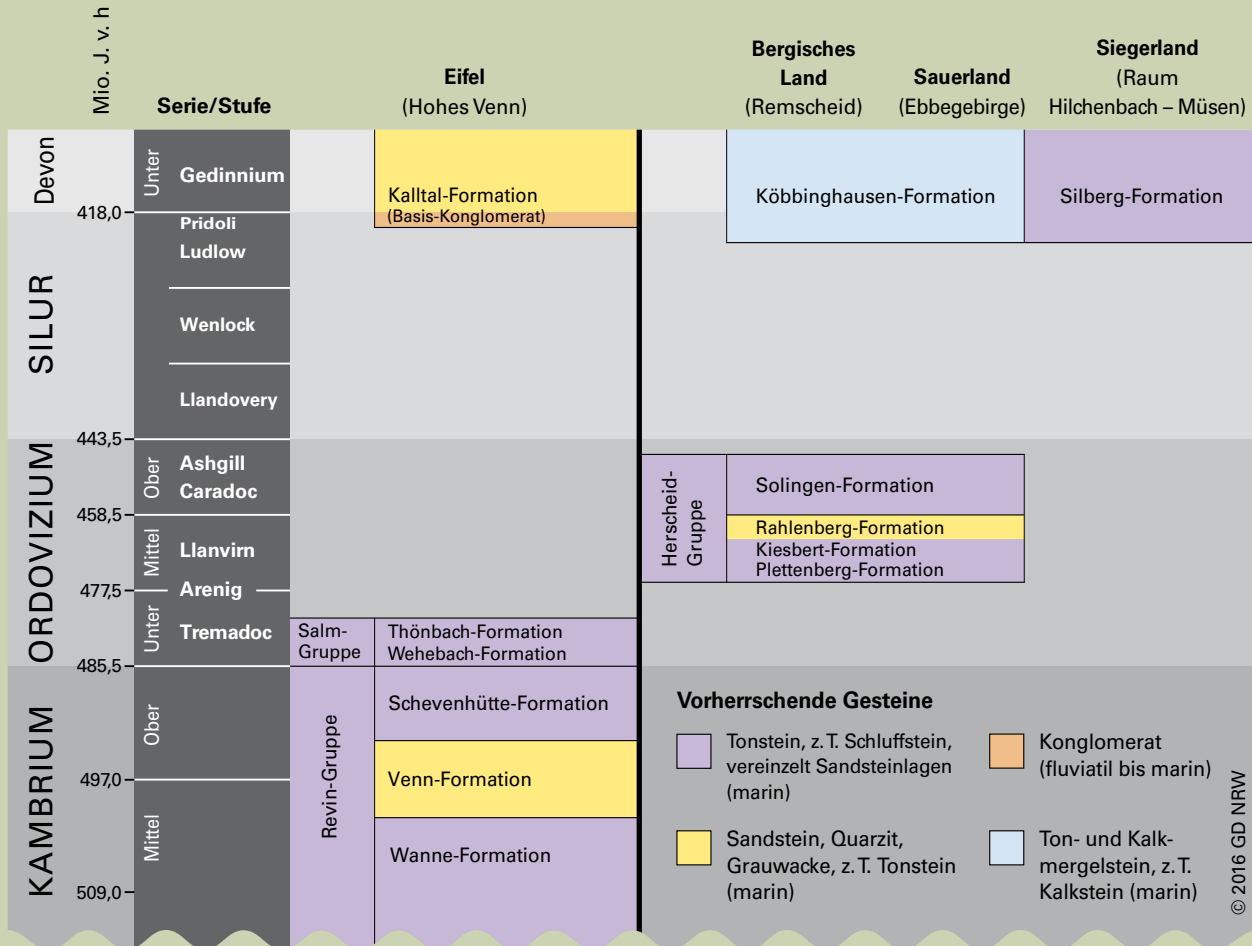


Chronostratigraphical position of the Lower Paleozoic lithostratigraphic units in the Ardennes inliers (from Verniers et al, 2001)



Facies evolution of the Lower Paleozoic units of the Stavelot-Venn Massif. Deville 1, Hour Fm. ; Deville 2, Bellevaux Fm. ; Revin 1-2, Wanne Fm. ; Revin 3-4, La Venne Fm. ; Revin 5, La Gleize Fm. (Schevenhütte); Salm 1, Jalhay Fm. (Wehebach) (a, b & c : Solwaster, Spa & Lierneux Mbs.); Salm 2, Otré Fm. (Thönbach) (in : Ribbert et al. 2001, after Von Hoegen et al., 1985).

Stratigraphische Gliederung des Altpaläozoikums (Kambrium, Ordovizium, Silur)



4. STAVELOT MASSIF

4.1. Deville Group - old Dv

Description: Greenish, purplish and grey coloured slate and quartzite group, subdivided into the Bellevaux and the Hour Fms.

4.1.1. Hour Formation - HUR (old: Dva)

Author: After Geukens, 1999.

Description: Thick beds of light coloured to light greenish quartzite and green slate. The white sandstone is locally altered into a reddened sandstone.

Stratotype: Outcrop in the Rocher de Hourt along the road N28 between Trois-Ponts and Vielsalm.

Area: In two anticlinal structures (Grand-Halleux and Ligneuville) in the southern part of the Stavelot Massif.

Thickness: > 150 m.

Age: Due to the absence of macrofossils and acritarchs in the formation, a possible Neoproterozoic to Early Cambrian age is tentatively proposed (Mortelmans, 1977; Vanguetstaine, 1992).

4.1.2. Bellevaux Formation - BEL (old: Dvb)

Author: After Geukens, 1999.

Description: Alternation of greenish and purple slate and shale; greenish shale and white quartzite.

Stratotype: Amblève valley east of the city of Stavelot and in the Salm valley north of Rochelival.

Area: In two anticlinal structures (Grand-Halleux and Ligneuville) in the southern part of the Stavelot Massif.

Thickness: 150 m.

Age: The only fossils present are the trace fossils *Oldhamia antiqua* and *O. radiata*. Because the genus *Oldhamia* is present in the Lower and Middle Cambrian only and not below the new GSSP of the Cambrian-Precambrian boundary (Crimes, 1992), an Early Cambrian age was proposed by Verniers and De Vos (1995). According to new observations by A. Seilacher (pers. comm., 1998) *Oldhamia* is more restricted in time and only present in the Tommotian or Nemakitian-Daldynian (early Early Cambrian), which would be the age of the formation. Acritarchs are recorded in the uppermost part of the formation, above the *Oldhamia* occurrences. They are assigned to the Zone 0 (Vanguetstaine, 1974) indicating a mid or late Early Cambrian to early Mid Cambrian age (Vanguetstaine, 1974, 1992).

4.2. Revin Group - old Rv

Description: Dark to light grey coloured slate and quartzite group, subdivided into the Wanne, La Venne and La Gleize Fms.

4.2.1. Wanne Formation Rv1-2 or WAN

Author: Geukens, 1999.

Description: Dark green-blue fine slate and green-greyish quartzite, alternating with dark slaty quartzite; some rare 10-15 cm thick conglomerate beds with slaty, quartzitic and sometimes phosphatic pebbles. The lower part comprises black silty slate (called "quartzophyllade" in the older literature), sometimes slate and black finely stratified quartzite. Some interstratified volcanic lavas or tuffs are present.

Stratotype: Not yet defined; type area in the outcrops of the Salm valley south of the village Trois Ponts.

Area: Stavelot Massif.

Thickness: 550-650 m.

Age: The presence of the inarticulate brachiopod *Acrothele cf. bergeroni* indicates a Mid Cambrian age (Vanguetstaine & Rushton, 1979); the acritarchs belong to the biozones 1, 2 and 3, dated as Early (?) to Mid Cambrian (Vanguetstaine, 1974, 1992; Vanguetstaine & Van Looy, 1983).

4.2.2. La Venne Formation - Rv3-4 or VEN

Author: Geukens, 1999.

Description: Heterogeneous unit characterised by the alternation of black slate and dark quartzite. The quartzite is sometimes very clayey and micaceous. In the middle part very thick beds occur of grey-bluish quartzite which can contain thin gravel layers. The lower part is characterised by a rhythmic sedimentation with units consisting of, from base to top, coarse sandstone, fine sandstone, siltstone and slate, and also by well-stratified blue quartzite and by micaceous sandstone beds. Volcanic intrusions are present, mostly acid in composition.

(from Verniers et al., 2001)

Stratotype: Not yet defined; type area in the Amblève valley, along the railway sections between La Gleize and Coö.

Area: Stavelot Massif.

Thickness: 500 m.

Age: Mid to Late Cambrian based on acritarchs (Vanguetstaine & Van Looy, 1983; Ribecai & Vanguetstaine, 1993).

4.2.3. La Gleize Formation - Rv5 or GLE

Author: Geukens, 1999.

Description: In the north: black slate and silty slate (called “quartzophyllade” in the older literature); the upper part contains sometimes dolomite nodules with cone-in-cone structures; the lower part bluish-black slate with thick laminations. Some acid intrusions and lava flows can occur. In the south: graphitic slate occurs at Hebronval.

Stratotype: Not yet defined; type area in the Amblève valley, along the railway section east of the abandoned station of La Gleize.

Area: Stavelot Massif.

Thickness: In the north: 300 m; in the south: unknown.

Age: Late Cambrian based on acritarchs (Vanguetstaine, 1974).

4.3. Salm Group - old Sm

Description: The group consists of three formations: from base to top: the Jalhay, Otrré and Bihain Fms.

4.3.1. Jalhay Formation – JAL (old: Sm1)

Author: Geukens, 1999.

Description: Blue-green slate, sandstone and silty slate (called “quartzophyllade” in the older literature) subdivided into three members.

The Solwaster Mbr – (SLW, old: Sm1a): dark green-blue “quartzophyllade”, black or green-blue slate, with at the base sandstone beds containing black shale fragments; occurrence of flattened nodules encircled by cone-in-cone structures, and of dendroid graptolite levels. Locally at the transition with the underlying Revin-Deville Group homogeneous graphitic black slate can occur.

The Spa Mbr – (SPA, old: Sm1b): dark bluish grey and greenish grey sandy “quartzophyllade”. Many sandstone beds have characteristic sedimentary structures (slumping, convoluted bedding and oblique stratification).

The Lierneux Mbr – (LIE, old: Sm1c): North of the Xhoris fault, olive green clayey “quartzophyllade”; south of the fault: greyish “quartzophyllade”, green sandy slate with reddish patches, magnetite-bearing slate. White sandstone levels in the Lierneux-Vielsalm-Bihain area; light green “quartzophylladic” slate; traces of bioturbation.

Stratotype: Not yet defined; type area of the formation around the village of Jalhay, more precisely around the Gileppe dam; type area of the Solwaster Mbr: around Solwaster, in the section along the forestry track south of the Gospinal Farm; type area of the Spa Mbr: outcrops in the Wayai valley around the city of Spa, more precisely the section along the road to the mineral water factory; type area of the Lierneux Mbr: section along the road from Lierneux to Sart, just south of Lierneux.

Area: See description above.

Thickness: Jalhay Fm: > 400 m (Laloux *et al.*, 1996); Lierneux Mbr: 80 m; Spa Mbr: not estimated; Solwaster Mbr: 60-150 m.

Age: The early Tremadoc age is proven by the presence of the dendroid graptolite *Rhabdinopora flabelliformis* in the lower two members of the formation; the subspecies *flabelliformis* is dominating in the lower part of the Solwaster Mbr, while the subspecies *anglica* and *norvegica* are occurring in the upper part of the Solwaster Mbr and in the Spa Mbr (Malaise, 1874a; Geukens, 1950, 1954; Bulman & Geukens, 1970). Vanguetstaine (1974, 1992) confirmed this age on the base of acritarchs. He could also on the base of acritarchs, assign the uppermost part of the formation, without graptolites, to the late Tremadoc.

4.3.2. Otrré Formation - Sm2 or OTT

Author: Geukens, 1999.

Description: Purplish slate and silty slate (called “quartzophyllade” in the older literature) subdivided into 3 members.

The Meuville Mbr – (MEU, old: Sm2a), in the north: red or purple slate and “quartzophyllade”, purple slate with calcareous nodules, garnet bearing slate. In the north a gradual transition exists between the green “quartzophyllade” of the Lierneux Mbr and the purple “quartzophyllade” of the Meuville Mbr.

The Les Plattes Mbr – (PLA, old: Sm2b), in the north: purplish slate and sandy “quartzophyllade”, calcareous levels with iron and manganese nodules. In the south: “quartzophyllade”, purple or with purple patches containing levels with interstratified coticule, andalusite, garnet and volcanic rocks. The base is formed by a slaty sandstone, light green, with coarse otrellite crystals.

The Colanhan Mbr – (COL, old: Sm2c), in the north: purple coloured slate with a few levels of green slate; in the south: purple and green compact layered slates, containing otrellite.

Stratotype: Not yet defined; type area in the syncline south of Otrré; type area of the Meuville Mbr: outcrops in the Lienne valley north of Chevron; type area of the Les Plattes Mbr: abandoned or active quarries for the “coticule” between Hébronval and Bihain; type area of the Colanhan Mbr: the hill south of Lierneux between the villages of Verleumont and Hébronval and the northern flank of the crest south-west of Vielsalm.

Area: See description.

(from Verniers *et al.*, 2001)

Thickness: Colanhan Mbr: 50 m; Les Plattes Mbr: 30 m; Meuville Mbr: 70 m; total thickness: 150 m.

Age: Neither micro- nor macrofossils observed; by geometry supposedly between Late Tremadoc (Early Ordovician) and Mid Ordovician.

4.3.3. Bihain Formation - Sm3 or BIH

Author: Geukens, 1999.

Description: Black silty slate (called “quartzophyllade” in the older literature) and greenish sandstone. The Salm-Château Mbr – (SCH, old: Sm3b): cleaved “quartzophyllade”, with thick bands of slates, often rich in pyrite, with many bioturbations. The Ruisseau d’Oneu Mbr – (ONE, old: Sm3a): greenish sandy slates with thin beds (5 cm) of sandstone with current bedding (convolute bedding and slumping).

Stratotype: Not yet defined; type area in the Bihain syncline; type area of the Salm-Château Mbr in the “cluse” of the Salm valley between Vielsalm and Salm-Château; type area of the Ruisseau d’Oneu Mbr in the tributaries of the ruisseau de Groumont, south-east of Lierneux.

Area: In the southern part of the Stavelot Massif; in the metamorphic zone the slate contains small crystals of a particular chloritoid (ottrelite).

Thickness: Salm-Château Mbr: > 150 m; Ruisseau d’Oneu Mbr: 30 m; total thickness: > 180 m.

Age: Mid and/or Late Ordovician based on acritarchs and chitinozoans (Vanguetaine, 1974, 1986) in the Salm-Château Mbr.

4.3.4. Petites Tailles Formation - PET

Author: Geukens, 1965, 1986, 1999.

Description: Whitish quartzitic sandstone, often breccia, compact bedded chloritic slate and conglomeratic sandstone with greenish shale pebbles.

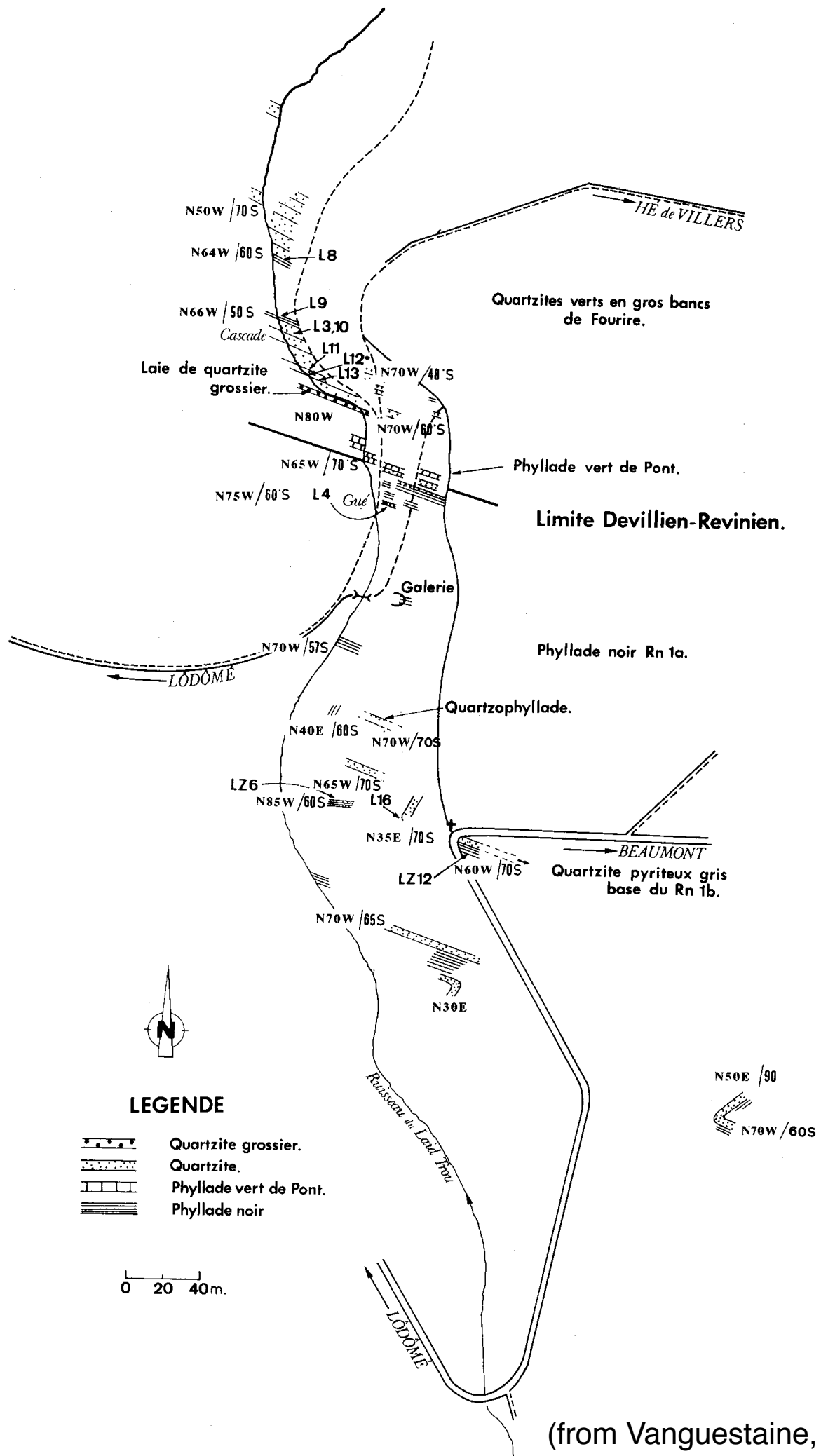
Stratotype: Not yet defined; type area in the vicinity of Baraque de Fraiture and the hamlet Petites Tailles.

Area: Southern part of the Stavelot Massif.

Thickness: (>75 m).

Age: Without macrofossils and only long-ranging acritarchs present (Vanguetaine, unpublished); by its stratigraphical position supposedly between Mid or Late Ordovician (age of the underlying Bihain Fm) and the late Lochkovian (age of covering Fooz Fm, Hance *et al.*, 1992). Geukens (1999) accepts for at least part of the formation an equivalence with the Colanhan Mbr of the Otré Fm.

(from Verniers *et al.*, 2001)



(from Vanguetaine, 1992)

Fig. 3.- Cartographie de la coupe du Laid Trou à l'Est de Lôdômé, Massif de Stavelot, et localisation des échantillons fossilifères L3 à L13 du groupe de Deville; L4 du Rn1a, L16, LZ6 et LZ12 du Rn1b, parties inférieures du groupe de Revin. La composition palynologique de ces échantillons, à l'exception de LZ6, est donnée dans Vanguetaine (1978b, p. 250, 251 et fig. 3).

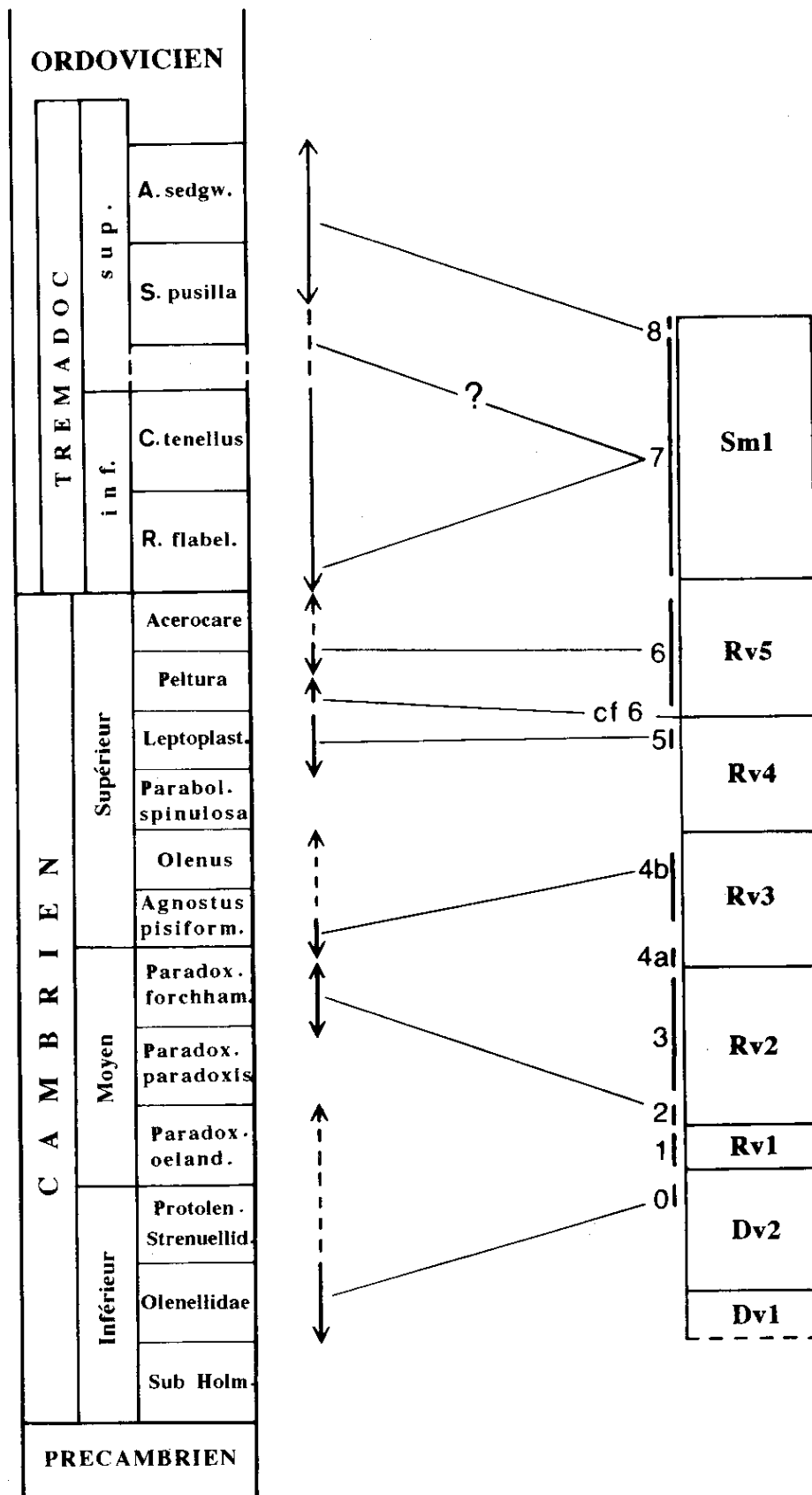


Fig. 6.- Datation des groupes de Deville, de Revin et de la Salm d'après Vanguetaine, ce travail (zone 0), Martin & Dean, 1988, Ribecai & Vanguetaine, 1992 (zone 2, 4b, 5 et 6), Rasul, 1979, Molyneux & Rushton, 1988 (zones 7 et 8). La zone dénommée cf6, correspond à un niveau de Hockay, Vanguetaine *in* Bless & Felder, 1989, que nous corrélons avec la zone de même nom dans le Massif de Rocroi (Meilliez & Vanguetaine, 1983; Vanguetaine, 1986).

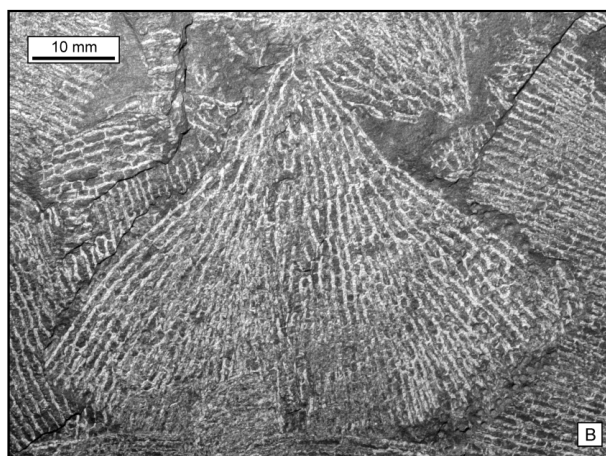
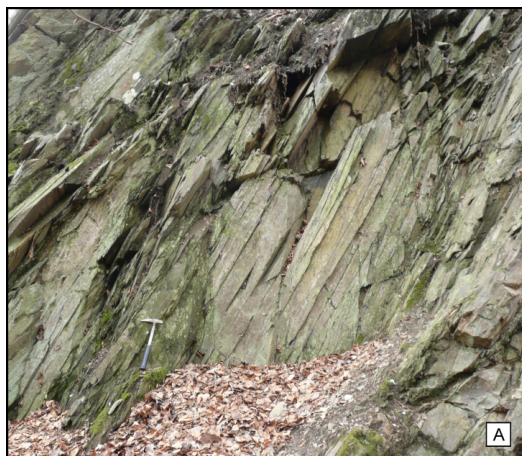
(from Vanguetaine, 1992)

A re-investigation of the *Rhabdinopora flabelliformis* fauna from the early Tremadocian ‘*Dictyonema* Shale’ in Belgium. (Wang & Servais, 2015)

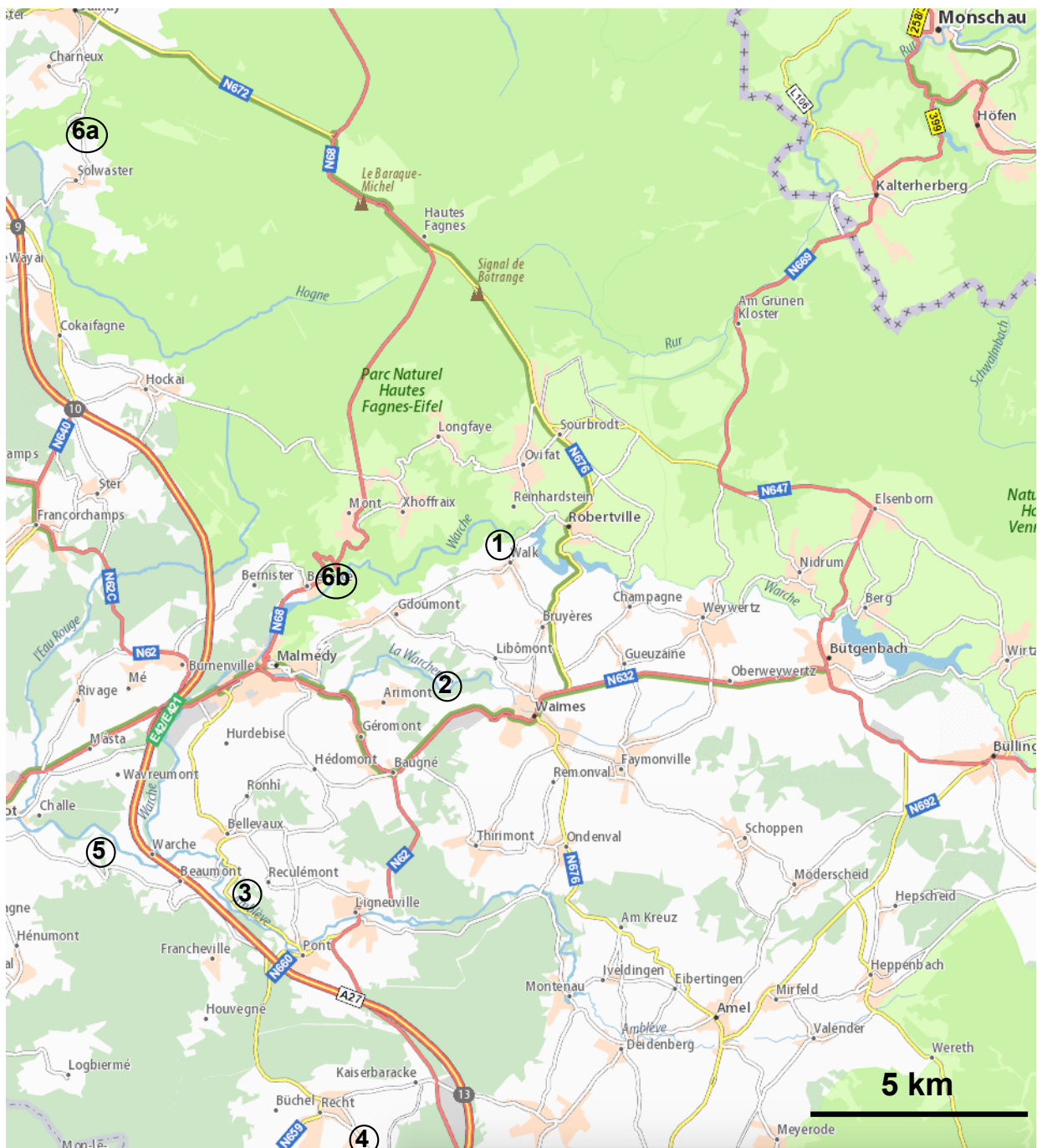
Abstract. During a period of almost 150 years, the diverse *Rhabdinopora flabelliformis* fauna from the Tremadocian (Early Ordovician) of Belgium has been collected from both the Brabant Massif and the Stavelot and Rocroi Inliers (‘Ardenne Massifs’), and in a single borehole from the Condroz Inlier. In the present study, the large collections of the Royal Belgian Institute of Natural Sciences (Brussels) are revised and re-described in the light of present-day graptolite taxonomy. The taxa *Rhabdinopora praeparabola*, *Rhabdinopora flabelliformis flabelliformis*, *R. f. anglica*, *R. f. socialis*, *R. f. norvegica* and *R. f. parabola* have been identified. Based on our taxonomical revision, the early Tremadocian *Rhabdinopora praeparabola*, *R. f. parabola* and *R. f. anglica* graptolite biozones are recognized in the Brabant Massif, allowing correlation with other graptolitic successions worldwide. At the level of regional biostratigraphy, the boundary between the Mousty Formation and the Chevlipont Formation in the Brabant Massif can now be precisely located in the *R. praeparabola* graptolite Biozone, while the boundary between the Solwaster Member (Sm1a) and the Spa Member (Sm1b) of the Jalhay Formation in the Stavelot Inlier (Ardenne) is located within the *R. f. anglica* Biozone. All the *Rhabdinopora flabelliformis* fauna levels can be attributed to Time-Slice 1a of the lower Tremadocian.

System	Stage	TS	Belgium This paper		Scandinavia, Australasia	China	Newfoundland, Canada	England and Wales, UK	Eastern Cordillera, Argentina			
			Brabant Massif	Stavelot Massif	Norway	South E,O	North O,P	F-G	H-J	K-N		
Ordovician (part)	Upper Tremadocian (part)	1b (part)	4	3	<i>Bryograptus ramosus</i>		<i>Psigraptus</i>	<i>Ad. tenellus</i>	<i>Adelograptus spp.</i>	<i>Adelograptus "tenellus"</i>	<i>Bryograptus</i>	
					<i>Adelograptus tenellus</i>				?		<i>Adelograptus ?</i>	
	Lower Tremadocian	1a			<i>Rhabdinopora f. anglica</i>		<i>R. f. anglica</i>		<i>Rhabdinopora f. anglica</i>	<i>Rhabdinopora f. anglica</i>	<i>Rhabdinopora f. anglica</i>	
							<i>Anisograptus matanensis</i>		<i>Anisograptus matanensis</i>		<i>Anisograptus matanensis</i>	<i>Anisograptus matanensis</i>
							<i>Rhabdinopora f. parabola</i>		<i>R. ? parabola</i>		<i>Rhabdinopora f. parabola</i>	<i>Rhabdinopora f. parabola</i>
				<i>Rhabdinopora praeparabola</i>		<i>R. ? taojiangensis</i>		<i>Rhabdinopora praeparabola</i>		<i>? Rhabdinopora praeparabola</i>		

Occurrences of the *Rhabdinopora flabelliformis* fauna in selected key sections. A. Egenhoff et al., 2004; B. Lindholm, 1991; C. Maletz et al., 2010; D. Maletz & Egenhoff, 2001; E. Wang & Wang, 2001; F. Williams & Stevens, 1991; G. Cooper et al., 1998; H. Bulman & Rushton, 1973; I. Cooper et al., 1995; J. Loydell, 2012; K. Zeballo et al., 2008; L. Ortega & Albanesi, 2005; M. Gutiérrez-Marco & Esteban, 2005; N. Monteros & Moya, 2011. O. Zhang et al., 2005; P. Wang & Erdtmann, 1987; Q. Egenhoff et al., 2004; 1, (orange) the Mousty Formation; 2, (dark green) the Solwaster Member (Sm1a); 3, (light green) the Spa Member (Sm1b); 4, (yellow) the Chevlipont Formation. TS: Time-Slices following Webby et al. (2004). From Wang & Servais, 2015.



A. Quartzites an « quartzophyllades » from Solwaster Mber (Jalhay Fm.), Spa. B. *Rhabdinopora flabelliformis* (Eichwald, 1840), specimen ULiège 2012-02-01, Solwaster Mber, Spa (from Mottequin & Marion, 2012).



1: Walk: $50^{\circ}27'00.21''\text{N}-06^{\circ}05'38.61''\text{E}$. 2. Waimes (quarry) : $50^{\circ}25'07.67''-06^{\circ}04'53.43''$. 3. Lasnenville (quarry): $50^{\circ}22'41.01''-06^{\circ}00'53.59''$. 4. Recht (Schieferstollen): $50^{\circ}19'20.16''-06^{\circ}03'26.07''$. 5. Lodomez section: $50^{\circ}23'09.14''-05^{\circ}58'09.89''$. 6a. Solwaster section: $50^{\circ}31'58.67''-05^{\circ}58'02.39''$ or 6b. Mont-Xhoffraix (quarry): $50^{\circ}26'48.51''-06^{\circ}03'10.64''$

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