

Summarised description

Unit name

Moulin de la Foulerie Formation

Code

MFL

Status

Formal Formation

Parent unit

Forrières Group

Child units

Saint-Joseph Member, Eau Noire Member

Characteristic description

Mixed silty and shaly limestone succession including beds of coarse-grained crinoidal limestone, often dissolved in surface, passing to greyish and bluish calcareous shale and bioclastic nodular limestone beds.

Age

Late Emsian to early Eifelian

Thickness

100 to 300 metres

Area of occurrence

Southern limb of the Dinant Synclinorium up to Izier.

Type locality

Section along the Eau Noire River south of Couvin near the Moulin de la Foulerie.

Alternative names

Grauwacke de Bure

Authors

Denayer & Mottequin (2024)

Modified after

Denayer, J. & Mottequin, B., 2024. Lower Devonian lithostratigraphy of Belgium. *Geologica Belgica*, 27/3-4, 115–154.

Date

23/09/2025

Cite as

Denayer, J. & Mottequin, B., 2025. The Moulin de la Foulerie Formation, 23/09/2025. National Commission for Stratigraphy Belgium. <https://ncs.naturalsciences.be/lithostratigraphy/Moulin-de-la-Foulerie-Formation>

Full description

Unit name

Moulin de la Foulerie Formation

Code

MFL

Status

Formal Formation

Parent unit

Forrières Group

Child units

Saint-Joseph Member, Eau Noire Member

Origin of the name

After the Moulin de la Foulerie on the west bank of the Eau Noire River, south of Couvin.

Alternative names

Grauwacke de Bure

Authors

Denayer & Mottequin (2024, p. 138): *Moulin de la Foulerie Formation*

Modified after

Denayer, J. & Mottequin, B., 2024. Lower Devonian lithostratigraphy of Belgium. *Geologica Belgica*, 27/3-4, 115–154.

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Characteristic description

The base of the **Saint-Joseph Member** (Tsien, 1974) is defined by the first laterally-continuous bed of light grey or bluish argillaceous limestone overlying the siltstone and sandstone of the Hierges Formation. It passes upwards to a mixed silty and shaly limestone succession including beds of coarse-grained crinoidal limestone commonly rich in crinoids, brachiopods and other bioclasts, often dissolved in surface (*Grauwacke de Bure* in the old literature). A horizon of haematitised bioclasts and oolites occurs in the Lomme River valley (e.g. Denayer et al., 2011). Calcareous sandstone beds still occur sporadically. The top of the Member is marked by a 2 m thick limestone bed in the type section. The **Eau Noire Member** (Tsien, 1974) consists of greyish and bluish calcareous shale and bioclastic nodular limestone beds. The macrofauna is abundant and diverse (rugose and tabulate corals, brachiopods, trilobites, crinoids). The carbonate content increases upwards, announcing the calcareous Couvin Formation. East of Nismes, the Villers-la-Tour Member of the Eifelian Couvin Formation disappears but a 10–20 m thick basal carbonate unit remains between the Eau Noire Member and the overlying Vieux Moulin Member (see Denayer et al., 2024). This unit of argillaceous

crinoidal limestone can be traced up to the Jemelle area. The term **Sohier Limestone** was proposed by Denayer (2019) for this unit corresponding to the lithological sub-unit i of Bultynck (1970).

Whereas Tsien (1974) introduced the Bure formation, composed of two members (Saint-Joseph and Eau Noire members), Bultynck & Godefroid (1974), Bultynck et al. (1982) and Bultynck (1991b, 1991c) considered both members as distinct formations and consequently abandoned the name Bure Formation. In the type area, near Couvin, these members can be separated but eastwards, their lithological composition changes and they are hardly recognisable as separate units. On recent geological maps, they are mostly mapped as a single unit (unformal Saint-Joseph–Eau Noire grouping). Hence it is proposed here to demote the Saint-Joseph and Eau Noire units to members of the newly introduced Moulin de la Foulerie Formation.

On the geological map Chimay–Couvin (Marion & Barchy, 1999) the composition and boundaries correspond to those of the stratotypes but on the neighbouring map Olloy-sur-Viroin–Treignes, a c. 25 m thick carbonate unit (Sohier Bed, see below) was included in the Saint-Joseph–Eau Noire grouping by Dumoulin & Coen (2008) based on lithological similarities. Eastwards, on the maps Sautour–Surice (Dumoulin & Marion, 1997, 1998) and Agimont–Beauraing (Lemonne & Dumoulin, 1999), the siliciclastic unit identified as the Vieux Moulin Member of the Jemelle Formation (Dumoulin & Blockmans, 2008) was mapped indistinctly with the Eau Noire Formation whereas the lower sandy part of the Saint-Joseph Formation was mapped as the Hierges Formation. On the maps Felenne–Vencimont (Dumoulin & Blockmans, 2013b) and Pondsôme–Wellin (Dumoulin & Blockmans, 2013a), the lower limit of the Saint-Joseph–Eau Noire grouping follows the stratotypic definition and its upper limit still falls at the top of the Sohier Bed. In the Aisne River valley (Villers-Sainte-Gertrude), the sandy facies dominates and the members cannot be distinguished anymore (Bultynck, 1991b).

Area of occurrence

Southern and south-eastern limbs of the Dinant Synclinorium up to the Ourthe River valley. East of the Lomme River valley, the carbonate character of the Eau Noire Member is less expressed. In the Ourthe River valley, shaly facies are dominant in both members (Lessuise et al., 1979) whereas in the Aisne River valley, sandy facies appear in the Eau Noire Member.

Type locality

The historical stratotype of the Bure formation is situated along the disused railway of the Lomme River east of Bure but it is nowadays very overgrown (Godefroid, 1968; Blockmans et al., 2019). The stratotypes of the Saint-Joseph Member in Nismes and Olloy-sur-Viroin have completely disappeared. The best section for the Moulin de la Foulerie Formation and its two members is the section along the west bank of the Eau Noire River, about 100 m north of the foot-bridge south of Couvin near the Moulin de la Foulerie (Bultynck, 1970; Marion & Barchy, 1999).

Age

The Saint-Joseph and Eau Noire members correspond to the lower Couvinian ‘Co1’ in the classic literature (i.e. Maillieux, 1912; Bultynck, 1970). The Emsian–Eifelian boundary based on the first entry of the conodont *Icriodus retrodepressus*, a characteristic species of the *partitus* conodont Zone, falls c. 5 m below the top of the Eau Noire Member in its (holo)stratotype (Bultynck et al., 2000). Consequently, the abundant fauna of the Moulin de la Foulerie Formation (e.g. Maillieux, 1938; Tsien, 1969; Godefroid, 1977; Denayer, 2025) is mostly late Emsian in age (*patulus* conodont Zone; Bultynck & Godefroid, 1974; Weddige et al., 1979).

Thickness

The Moulin de la Foulerie Formation is about 100 m thick between Couvin and Olloy-sur-Viroin (60 m for the Saint-Joseph Member and 40 m for the Eau Noire Member, Marion & Barchy, 1999); further to the east, its thickness increases to a maximum of 320 m in the Wellin–Halma area (Dumoulin & Blockmans, 2013a), and east of this area, it decreases, reaching 100 m at Grupont (Blockmans et al.,

2019), 75 m in Jemelle and Marche-en-Famenne, and only 35 m in the Aisne River valley (Lessuise et al., 1979).

Lower boundary

The first laterally-continuous bed of light grey or bluish argillaceous limestone overlying the siltstone and sandstone of the Hierges Formation.

Upper boundary

Last thick bed of limestone of the Sohler Limestone.

Regional correlations

North of Izier, the marine character disappears progressively, and the Formation is diluted into the red siliciclastics deposits of the Pepinster Formation.

References

- Blockmans, S., Dumoulin, V. & Dejonghe, L., 2019. Carte géologique de Wallonie : Grupont – Saint-Hubert 59/7-8. 1/25 000. Service public de Wallonie, Direction générale de l'Agriculture, des Ressources naturelles et de l'Environnement, Namur, and its explanatory booklet, 84 p.
- Bultynck, P., 1970. Révision stratigraphique et paléontologique de la coupe type du Couvinien. Mémoires de l'Institut géologique de l'Université de Louvain, 26, 1–152.
- Bultynck, P., 1991b. ENR Formation de l'Eau Noire. In Bultynck, P. et al., Les formations du Dévonien moyen de la Belgique. Mémoires pour servir à l'Explication des Cartes géologiques et minières de la Belgique, 30, 19–20.
- Bultynck, P., 1991c. STJ Formation de St-Joseph. In Bultynck, P. et al., Les formations du Dévonien moyen de la Belgique. Mémoires pour servir à l'Explication des Cartes géologiques et minières de la Belgique, 30, 11–17.
- Bultynck, P. & Godefroid, J., 1974. Excursion G. In Bouckaert, J. & Streel, M. (eds), International Symposium on Belgian micropaleontological limits from Emsian to Viséan: Namur, September 1st to 10th, 1974. Guidebook. Geological Survey of Belgium, Brussels, 42 p.
- Bultynck, P., Godefroid, J. & Sartenaer, P., 1982. [Brachiopods and conodonts from beds near the Emsian/Couvinian boundary in the Belgian Ardennes]. In Sokolov, B.S. & Rzhonsnitskaya, M.A. (eds), [Biostratigraphy of Lower and Middle Devonian boundary deposits. Proceedings of Field Symposium of the International Subcommission on the Devonian Stratigraphy, Samarkand 1978]. Akademiya Nauk SSSR, Leningrad, 31–37. [In Russian].
- Bultynck, P., Coen-Aubert, M. & Godefroid, J., 2000. Summary of the state of correlation in the Devonian of the Ardennes (Belgium-NE France) resulting from the decisions of the SDS. In Bultynck, P. (ed.), Subcommission on Devonian Stratigraphy, Recognition of Devonian series and stage boundaries in geological areas. Courier Forschungsinstitut Senckenberg, 225, 91–114.
- Denayer, J., 2019. Revised stratigraphy of the Eifelian (Middle Devonian) of southern Belgium: sequence stratigraphy, global events, reef development and basin structuration. *Geologica Belgica*, 22, 149–173.
- Denayer, J., 2025. Rugose corals across the Early–Middle Devonian boundary in southern Belgium. *Palaeobiodiversity and Palaeoenvironments*, 105/1, 179–216.
- Denayer, J., Pacyna, D. & Boulvain, F., 2011. Le Minerai de fer en Wallonie. Cartographie, histoire et géologie. Service public de Wallonie, Direction générale opérationnelle de l'Agriculture, des Ressources naturelles et de l'Environnement, Namur, 312 p.

Denayer, J., Coen-Aubert, M., Marion, J.-M. & Mottequin, B., 2024. Middle Devonian lithostratigraphy of Belgium. *Geologica Belgica*, 27/3-4, 155–192.

Dumoulin, V. & Blockmans, S., 2008. Le passage latéral entre les formations de Couvin et de Jemelle (Eifelien) au bord sud du Synclinorium de Dinant (Belgique) : Introduction du Membre du Vieux Moulin – Formation de Jemelle. *Geologica Belgica*, 11/1-2, 25–33.

Dumoulin, V. & Blockmans, S., 2013a. Carte géologique de Wallonie : Pondrôme – Wellin 59/5-6. 1/25 000. Service public de Wallonie, Direction générale de l’Agriculture, des Ressources naturelles et de l’Environnement, Namur, and its explanatory booklet, 84 p.

Dumoulin, V. & Blockmans, S., 2013b. Carte géologique de Wallonie : Felenne – Vencimont 58/7-8. 1/25 000. Service Public de Wallonie, Direction générale de l’Agriculture, des Ressources naturelles et de l’Environnement, Namur, and its explanatory booklet, 59 p.

Dumoulin, V. & Coen, M., 2008. Carte géologique de Wallonie : Olloy-sur-Viroin – Treignes 58/5-6. 1/25 000. Ministère de la Région wallonne, Direction générale des Ressources naturelles et de l’Environnement, Namur, and its explanatory booklet, 103 p.

Dumoulin, V. & Marion, J.-M., 1997. Notice explicative de la carte géologique de Wallonie à l’échelle 1/25 000 : Sautour – Surice 58/1-2. Ministère de la Région wallonne, Direction générale des Ressources naturelles et de l’Environnement, Namur, 70 p.

Dumoulin, V. & Marion, J.-M., 1998. Carte géologique de Wallonie : Sautour – Surice 58/1-2. 1/25 000. Ministère de la Région wallonne, Direction générale des Ressources naturelles et de l’Environnement, Namur.

Godefroid, J., 1968. Contribution à l’étude du Couvinien entre Wellin et Jemelle (bord sud du bassin de Dinant). *Académie royale de Belgique, Mémoires de la Classe des Sciences*, in-4°, 2^e série, 17/3, 1–87.

Godefroid, J., 1977. Le genre *Paraspirifer* Wedekind, 1926 (Spiriferida – Brachiopode) dans l’Emsien et le Couvinien de la Belgique. *Annales de la Société géologique du Nord*, 97/1, 27–44.

Lemonne, E. & Dumoulin, V., 1999. Carte géologique de Wallonie : Agimont – Beauraing 58/3-4. 1/25 000. Ministère de la Région wallonne, Direction générale des Ressources naturelles et de l’Environnement, Namur, and its explanatory booklet, 66 p.

Lessuisse, A., Streel, M. & Vanguetstaine, M., 1979. Observations palynologiques dans le Couvinien (Emsien terminal et Eifelien) du bord oriental du Synclinorium de Dinant, Belgique. *Annales de la Société géologique de Belgique*, 102/1, 325–355.

Maillieux, E., 1912. Texte explicatif du levé géologique de la planchette de Couvin n°191 (pl. 8 de la feuille LVII de la carte topographique). Ministère de l’Industrie et du Travail, Administration des Mines, Service Géologique de Belgique, Bruxelles, 70 p.

Maillieux, E., 1938. Le Couvinien de l’Ardenne et ses faunes. *Mémoires du Musée royal d’Histoire naturelle de Belgique*, 83, 1–57.

Marion, J.-M. & Barchy, L., 1999. Carte géologique de Wallonie : Chimay – Couvin 57/7-8. 1/25 000. Ministère de la Région wallonne, Direction générale des Ressources naturelles et de l’Environnement, Namur, and its explanatory booklet, 89 p.

Tsien, H.H., 1969. Contribution à l’étude des Rugosa du Couvinien dans la région de Couvin. *Mémoires de l’Institut géologique de l’Université de Louvain*, 25, 1–174.

Tsien, H.H., 1974. Excursion J. In Bouckaert, J. & Streel, M. (eds), *International Symposium on Belgian micropaleontological limits from Emsian to Viséan: Namur, September 1st to 10th, 1974. Guidebook. Geological Survey of Belgium, Brussels*, 34 p.

Weddige, K., Werner, R. & Ziegler, W., 1979. The Emsian–Eifelian boundary: An attempt at correlation between the Eifel and Ardennes regions. *Newsletters on Stratigraphy*, 8/2, 159–169.