



The Ordovician of the Sauerland (western Germany) revisited

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Ordovician sediments in Germany are mostly located in the central and eastern parts of Germany (Thuringia, Saxony, northern Bavaria) or in the subsurface of northern Germany (Rügen Island). However, Ordovician outcrops in western Germany are rare (Servais et al. 2008). Among the French-Belgian inliers (Rocroi, Givonne, Serpont, Condroz Inliers, etc.) that include Lower Palaeozoic rocks, only the Stavelot Inlier extends into western Germany, with a few Lower Ordovician outcrops near the Belgian-German border (Ribbert et al. 2002). The very small Remscheid-Altena and Ebbe inliers (also known as 'Remscheid Anticline' and 'Ebbe Anticline'), being part of the Rhenish Massif, are the most important western German outcrop areas. The most complete stratigraphical succession is present in the Sauerland (south-eastern part of North Rhine-Westphalia) in the Ebbe Inlier. The Ordovician age of these sediments was first documented by the discovery of Ordovician trilobites by Rudolf and Emma Richter in 1937. The present paper reviews the extensive stratigraphical, palaeontological and palaeobiogeographical studies since the 1990s.

The Ordovician sediments all belong to the Herscheider Schichten (Herscheid Beds) and are attributed to four lithological units. The four formations are now attributed to the Middle to Upper Ordovician, including the Plettenberg-Bänderschiefer (Plettenberg Banded Slate) Formation and the Kiesbert-Tonschiefer (Kiesbert Slate) Formation (Darriwilian), the Rahlenberg-Grauwackenschiefer (Rahlenberg Greywacke Slate) Formation (earliest Sandbian) and the Solingen-Tonschiefer (Solingens Slate) Formation (Katian) (e.g. Maletz 2000).

The fossils from the Ebbe Anticline not only include trilobites (reviews available in : Koch 2010 ; Koch et al. 2011), but also graptolites and acritarchs (e.g. Maletz & Servais, 1993), chitinozoans (e.g. Samuelsson et al. 2002), ostracods (e.g. Schallreuter & Koch 2011), foraminiferans (e.g. Riegraf & Niemeyer 1996) and trace fossils (e.g., Eiserhardt et al. 2001). The Remscheid and Ebbe inliers are today considered as the German extension of the French-Belgian inliers, and they present a stratigraphical succession of Ordovician age with fossils that are typical of the eastern part of the microcontinent Avalonia.

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References

- Eiserhardt, K.-H., Koch, L. & Eiserhardt, W. L., 2001: Revision des Ichnotaxon *Tomaculum* Groom, 1902. *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* 221(3), 328-358.
- Koch, L., 2010: The trilobite fauna from the Ordovician of the Ebbe Anticline (Rhenish Massiv). In Geotop 2010. Geosites for the Public. Paleontology and Conservation of Geosites. *Schriftenreihe der Deutschen Geologischen Gesellschaft* 66, 64-65.
- Koch, L., Lemke, U. & Schöllmann, L., 2011: Neue Trilobiten-Funde aus dem Ordovizium des Ebbe-Sattels (Rheinisches Schiefergebirge, Deutschland). *Geologie und Paläontologie in Westfalen* 80, 5-30.
- Maletz, J., 2000: Review of the Ordovician biostratigraphy of the Herscheid Schichten (Rheinisches Schiefergebirge, Germany). *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* 218 (1/2), 45-60.
- Maletz, J. & Servais, T., 1993: Acritarchs and graptolites from the Early Llanvirn (Ordovician) of the Herscheider Schichten (Rheinisches Schiefergebirge, Germany). *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* 190, 125-142.
- Ribbert, K.H., Servais, T. & Vanguetaine, M., 2002: 4.28. Stavelot-Venn-Antiklinale (28). *Courier Forschungsinstitut Senckenberg* 235 : 68-89
- Riegraf, W. & Niemeyer, J., 1996: Agglutinierte Foraminiferen aus Graptolithen-Schwarzschiefern des Llanvirnium (Ordovizium) von Plettenberg im Sauerland (Nordrhein-Westfalen, NW-Deutschland). *Paläontologische Zeitschrift* 70 (1/2): 19-36
- Samuelsson, J., Gerdes, A., Koch, L., Servais, T. & Verniers, J., 2002: Chitinozoa and Nd isotope stratigraphy of the Ordovician rocks in the Ebbe Anticline, NW Germany. In Winchester, J. A., Pharaoh, T. C. & Verniers, J. (eds): *Palaeozoic Amalgamation of Central Europe*. Geological Society, London, Special Publication, 201: 115-131.
- Schallreuter, R. & Koch, L., 2011: Ostrakoden aus dem Ordovizium des Ebbe-Sattels (Rheinisches Schiefergebirge, Westfalen, Deutschland). *Geologie und Paläontologie in Westfalen* 80: 31-41.
- Servais, T., Dzik, J., Fatka, O., Heuse, T., Vecoli, M. & Verniers, J., 2008 : Ordovician. In McCann, T. (ed.). *Geology of Central Europe. Volume 1: Precambrian and Palaeozoic*. 203-248. The Geological Society, London,