



**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

Graptolites from a thin anoxic within the siltstone/oxic grey mudstone transition between the Moffat Shales proper (Birkhill Shales) and Gala Group greywackes at Selcoth Burn, Moffatdale

Evolution of the Southern Uplands Terrane

Internal Report IR/02/119

Graptolites from a thin anoxic within the siltstone/oxic grey mudstone transition between the Moffat Shales proper (Birkhill Shales) and Gala Group greywackes at Selcoth Burn, Moffatdale

Mark Williams

The National Grid and other Ordnance Survey data are used with the permission of the Controller of Her Majesty's Stationery Office.
Ordnance Survey licence number GD 272191/1999

Key words

key words: graptolites, Llandovery, Telychian, *guerichi* Biozone, *gemmatus* subzone, Moffatdale, Scotland Sheet 16W Moffat

Bibliographical reference

WILLIAMS, M. 2002. Graptolites from a thin anoxic within the siltstone/oxic grey mudstone transition between the Moffat Shales proper (Birkhill Shales) and Gala Group greywackes at Selcoth Burn, Moffatdale. *British Geological Survey Internal Report*, IR/02/119. 1p.

BRITISH GEOLOGICAL SURVEY

The full range of Survey publications is available from the BGS Sales Desks at Nottingham and Edinburgh; see contact details below or shop online at www.thebgs.co.uk

The London Information Office maintains a reference collection of BGS publications including maps for consultation.

The Survey publishes an annual catalogue of its maps and other publications; this catalogue is available from any of the BGS Sales Desks.

The British Geological Survey carries out the geological survey of Great Britain and Northern Ireland (the latter as an agency service for the government of Northern Ireland), and of the surrounding continental shelf, as well as its basic research projects. It also undertakes programmes of British technical aid in geology in developing countries as arranged by the Department for International Development and other agencies.

The British Geological Survey is a component body of the Natural Environment Research Council.

Keyworth, Nottingham NG12 5GG

☎ 0115-936 3241 Fax 0115-936 3488
e-mail: sales@bgs.ac.uk
www.bgs.ac.uk
Shop online at: www.thebgs.co.uk

Murchison House, West Mains Road, Edinburgh EH9 3LA

☎ 0131-667 1000 Fax 0131-668 2683
e-mail: scotsales@bgs.ac.uk

London Information Office at the Natural History Museum (Earth Galleries), Exhibition Road, South Kensington, London SW7 2DE

☎ 020-7589 4090 Fax 020-7584 8270
☎ 020-7942 5344/45 email: bgs london@bgs.ac.uk

Forde House, Park Five Business Centre, Harrier Way, Sowton, Exeter, Devon EX2 7HU

☎ 01392-445271 Fax 01392-445371

Geological Survey of Northern Ireland, 20 College Gardens, Belfast BT9 6BS

☎ 028-9066 6595 Fax 028-9066 2835

Maclean Building, Crowmarsh Gifford, Wallingford, Oxfordshire OX10 8BB

☎ 01491-838800 Fax 01491-692345

Parent Body

Natural Environment Research Council, Polaris House, North Star Avenue, Swindon, Wiltshire SN2 1EU

☎ 01793-411500 Fax 01793-411501
www.nerc.ac.uk

Acknowledgements. The fauna described here was discovered by Dr. R.P. Barnes at Selcoth Burn during May 2002. It was subsequently collected by Drs Barnes and Williams.

Contents

Acknowledgements	i
Contents	i
Summary	i
Biostratigraphy	1
References.....	1

Summary

Graptolites occur within a thin anoxic mudstone horizon, midway through several metres of oxic grey mudstones and siltstones that separate the Moffat Shale Group proper (i.e. the black anoxic mudstones with bentonites of the Birkhill Shales) from sandstones of the overlying Gala Group, at Selcoth Burn in Moffatdale (at National Grid Reference NT 1575 0619). The lithostratigraphical setting and the graptolite fauna is very similar to that known from Pot Burn in the Ettrick Valley, the graptolites indicating the *gemmatus* subzone of the *guerichi* Biozone (lower Telychian, upper Llandovery). The find indicates the importance of searching for graptolites in uncompromising, predominantly oxic siltstone/mudstone sequences where these occur between the Moffat Shales and overlying sandstones.

Biostratigraphy

Graptolites have previously been reported from Selcoth Burn in Moffatdale, from the uppermost exposed Moffat Shale at National Grid Reference NT 1575 0619. These provide a *sedgwickii* Biozone s.l. age assignment (see Williams, 2001). During recent surveying in Moffatdale, Dr R.P. Barnes discovered graptolites at the same locality, but within a thin anoxic mudstone in the several metres of oxic mudstone and silty mudstones that form a transition from the Moffat Shales into the overlying greywackes of the Gala Group. The anoxic mudstone interval, a few centimetres thick, yields the following fauna (registered as specimens BGS 18E1-18E34).

'Monograptus' gemmatus (Barrande, 1850)

Streptograptus pseudoruncinatus (Bjerreskov, 1975)

Glyptograptus fastigatus Haberfelner, 1931

Monograptus bjerreskovae Loydell, 1993

Stimulograptus halli (Barrande, 1850)

Rastrites cf. *fugax* Barrande, 1850

Rastrites cf. *maximus* Carruthers, 1867

Rastrites cf. *spengillensis* Rickards, 1970

Streptograptus sp.

This fauna is **indicative of the *gemmatus* subzone of the *guerichi* Biozone** (lower Telychian, upper Llandovery). The setting and age assignment of the fauna are very similar to that described from Pot Burn in the Ettrick Valley (see Williams et al., in press). As the oxic grey siltstones/mudstones are known to succeed other sequences of Moffat Shales from which *sedgwickii* Biozone graptolite faunas have been recovered, for example at Muchra Burn (see Williams, 2001), or at Duffkinnel Water in Dumfriesshire (see Williams, 2000), it begs the question of whether this *gemmatus* subzone fauna might be recoverable elsewhere, with significant implications for the stratigraphy.

Selected references

Most of the references listed below are held in the Library of the British Geological Survey at Keyworth, Nottingham. Copies of the references may be purchased from the Library subject to the current copyright legislation.

References for individual graptolite species noted above are not given, but these can be found in Loydell (1993).

LOYDELL, D.K. 1993. Upper Aeronian and Lower Telychian (Llandovery) graptolites from western Mid-Wales. Part 2. *Monograph of the Palaeontographical Society* London, 56-180, pls 2-5 (publ. no. 592, part of vol. 147 for 1993).

WILLIAMS, M. 2000. New collections of Caradoc and Llandovery graptolites from Duffkinnel Water, NE of Gillenmoor Wood, Scotland Sheet 10. *British Geological Survey Technical Report*, IR/00/073.

WILLIAMS, M. 2001. Graptolite collections from Sheet 16 (Moffat, Southern Uplands) made during the summer of 1998. *British Geological Survey Technical Report*, IR/01/096.

WILLIAMS, M., ZALASIEWICZ, J.A., RUSHTON, A.W.A., LOYDELL, D. & BARNES, R.P. in press. A new, stratigraphically significant *Torquigraptus* species (graptolite) from the central Belt of the Southern Uplands. *Scottish Journal of Geology*.