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REPORT OF THE PROJECT GROUP ON CARBONIFEROUS MAGNETOSTRATIGRAPHY

There has been considerable progress in refining and integrating the magnetostratigraphy previously obtained from the Maritime Provinces in Canada, and the Mauch Chunk Fm in the Appalachian Basin, by integrating with palynostratigraphy, through the work of Opdyke, Giles & Utting (2014). An integrated graphical summary of their work, compiled with existing magnetostratigraphic data from lavas in the Asbian -Brigantian interval is shown in Fig. 1. This demonstrates a clear and validated pattern of polarity changes through the Brigantian, Pendleian and lower Arnsbergian, from several overlapping sections. These data are predominantly from red-bed alluvial facies, with the sub-stage divisions related to the spore zones of eastern Canada (Utting et al. 2010). The Asbian-Brigantian boundary is not well defined, but occurs in the lower part of the Mauch Chunk sections measured. The position of this boundary, proposed by Opdyke et al (2014) appears to approximately concur with the polarity pattern across this boundary seen in the British lava successions (data reviewed in Hounslow et al. 2004).

Opdyke et al (2014) also clearly identify the base of the Kiaman reverse superchron in the *Raistrickia saetosa* biozone (approximately near the base of the Langsettian), which they place at ~318 Ma using the 2012 timescale. This date agrees closely with the base of the Kiaman Superchron identified in Australia where the normal polarity Wanganui Andesite Member (U-Pb date of 319.2 ± 2.8 Ma), is succeeded by the reversed polarity (within the base of the Kiaman superchron) Peri–Eastons Arm Rhyolite (U-Pb date of 317.8 ± 2.8 Ma; Opdyke et al. 2000).

There seems to be amble scope in potentially linking the boundaries of the polarity chron MI12, in the late Brigantian to the Serpukhovian task forces debate about the definition of the GSSP. It is clear that the geomagnetic polarity stratigraphy as published in the 2012 timescale volumes bears little resemblance to this detailed work, which brings into question the reliability of the old Russian data (reviewed by Hounslow et al. 2004), on which the 2012 polarity timescale was constructed.

New palaeomagnetic and magnetostratigraphic data from Billefjorden on Spitsbergen across the Serpukhovian-Bashkirian boundary (Iosifi & Khramov, 2013), bears some similarity to the polarity pattern shown in Fig. 1, with normal polarity dominating the lower Bashkirian. Unfortunately insufficient section stratigraphic details, limits any more direct comparisons. The Serpukhovian- Bashkirian interval has also recently been studied in the Tengiz reservoir (Kazakhstan), where a geomagnetic polarity stratigraphy has contributed to a detailed chronostratigraphic sub-division of the reservoir units (Ratcliffe et al. 2013). Hopefully this work will eventually be published, and develop the magnetostratigraphic pattern through the Mississippian - Pennsylvanian boundary.

The project groups main efforts now need to extend this pattern established in Canada and the USA, to fill the data gap occupied by the Mississippian-Pennsylvanian disconformable boundary in North American sections, and to extend the polarity pattern down into the Viséan and Tournasian. Planning for a UK-based project (Andy Biggin-

[Liverpool], Hounslow [Lancaster] et al) to undertake some of this task, as part of a bigger geodynamo modelling project, is being prepared, for start in early 2016. Kate Ziegler [ZGC, New Mexico] is planning on some re-evaluation of the Pennsylvanian – Permian boundary strata in central New Mexico, searching for an original haematite magnetization.

Hounslow M.W, Davydov, V.I., Klootwijk, C.T., & Turner, P. 2004. Magnetostratigraphy of the Carboniferous: a review and future prospects. Newsletter On Carboniferous Stratigraphy, 22, 35-40.

Iosifidi A. G. & Khramov, A. N. 2013. Paleomagnetism of Devonian and Carboniferous Sedimentary Rocks of Spitsbergen: to the Paleozoic History of the Barents–Kara Basin. Izvestiya, Physics of the Solid Earth, 49, 725–742.

Opdyke, N.D., Roberts, J., Claoue-Long, J., Irving, E., and Jones, P.J., 2000, Base of the Kiaman: Its definition and global significance. Geological Society of America Bulletin, 112, 1315-1341.

Opdyke, N.D. Giles, P.S. & Utting, J. 2014. Magnetic polarity stratigraphy and palynostratigraphy of the Mississippian-Pennsylvanian boundary interval in eastern North America and the age of the beginning of the Kiaman. Geological Society of America Bulletin, 126, 1068-1083.

Utting, J., Giles, P.S., & Dolby, G., 2010, Palynostratigraphy of Mississippian and Pennsylvanian rocks, Joggins area, Nova Scotia and New Brunswick, Canada: Palynology, 34, 43–89.

Ratcliffe, K., Urbat, M., Emma, D. Playton, T., Katz, D. 2013. Using chemo and magnetostratigraphy to define a chronostratigraphic framework in an isolated carbonate platform: the Tengiz Field, Republic of Kazakhstan. AAPG abstract, May 19-22. http://www.searchanddiscovery.com/abstracts/html/2013/90163ace/abstracts/rat.htm

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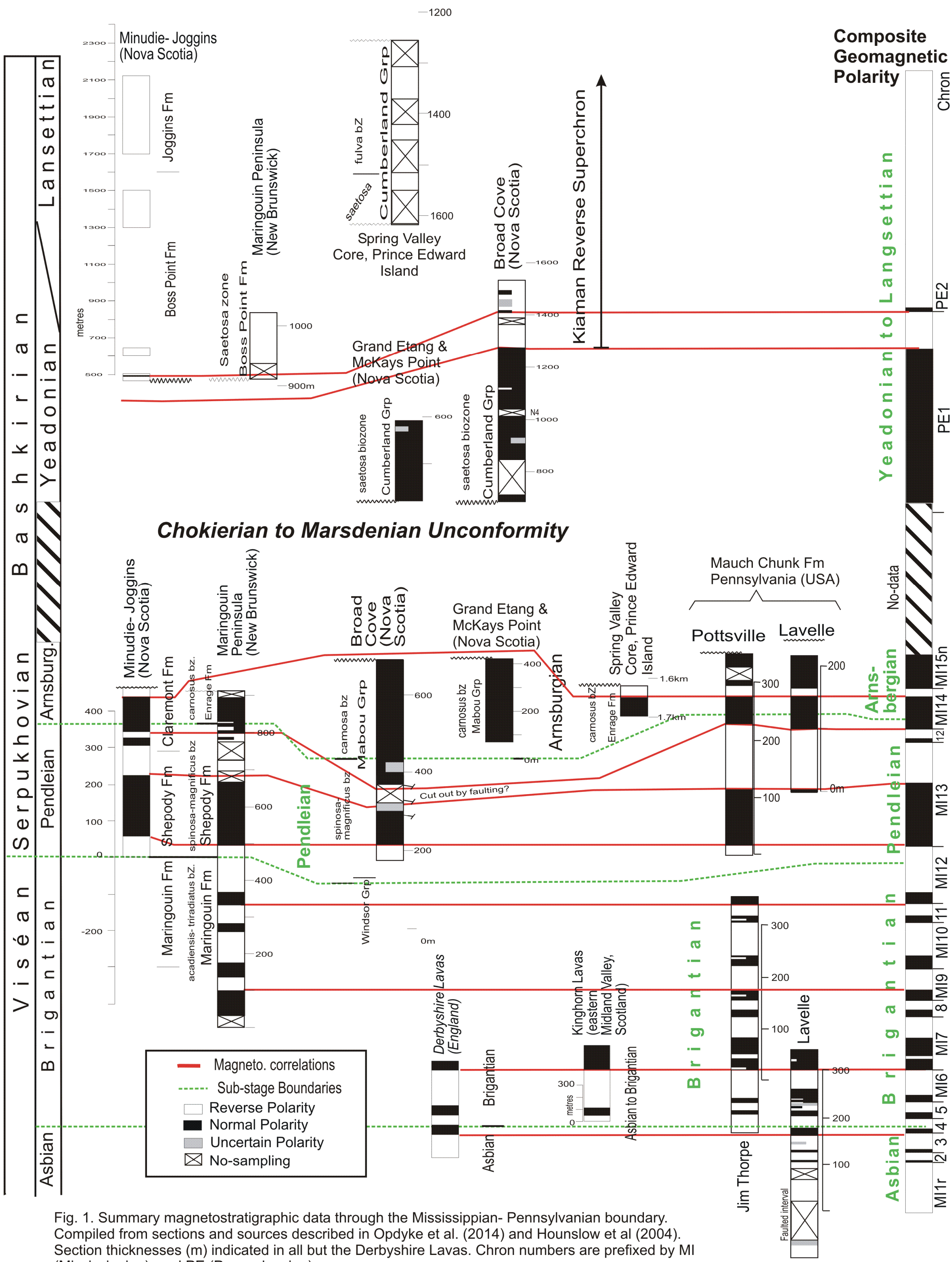

Fig. 1. Summary magnetostratigraphic data through the Mississippian- Pennsylvanian boundary. Compiled from sections and sources described in Opdyke et al. (2014) and Hounslow et al (2004). Section thicknesses (m) indicated in all but the Derbyshire Lavas. Chron numbers are prefixed by MI (Mississippian), and PE (Pennsylvanian).