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# Magnetic susceptibility records for global stratigraphic correlations? New constraint in the context of carbonate platform reconstruction (Middle Devonian, Ardennes)

Damien Pas\*<sup>1,2</sup>, Anne-Christine Da Silva<sup>2,3</sup>, Geoffrey Poulain, Simo Spassov<sup>4</sup>, and Frédéric Boulvain<sup>2</sup>

<sup>1</sup>Department of Atmospheric, Oceanic, and Earth Sciences, George Mason University – Fairfax, VA 22030, United States

<sup>2</sup>Pétrologie sédimentaire, B20, Géologie, Université de Liège – Sart Tilman, 4000 Liège, Belgium

<sup>3</sup>Paleomagnetic Laboratory, Fort Hoofddijk, Utrecht University – Budapestlaan, 17,3584 CD, Netherlands

<sup>4</sup>Geophysical Centre, Royal Meteorological Institute of Belgium, 1 rue du Centre – 1 rue du Centre, Belgium

## Abstract

This study undertakes a multi-disciplinary approach (sedimentology, magnetic susceptibility, geochemistry and hysteresis magnetic measurement) to increase our understanding of the Ardennes Givetian platform (Belgium and France) and to address a major question on the reliability of the magnetic susceptibility (*MS*) records for global correlations of marine carbonate records. Sedimentological analyses on two successions lasting millions of years, reveal an extended diversity of shallow- to off-reef palaeoenvironmental settings across the platform and allow to constrain the main sea-level fluctuations and associated environmental changes throughout the Givetian in Ardennes. The comparison of the two *MS* profiles allows to provide correlations, despite the long distance between the sections and their different sedimentological background. However, the comparison of the *MS* profiles from the Ardennes with contemporaneous data from the Rhenische Schiefergebirge (Germany) does not show any evidences of correlation, challenging studies that present the *MS* signal as a global correlation tool. These outcomes are crucial because they have repercussions on future global and regional stratigraphic issues as well as for paleoclimatic reconstructions. Here, we provide new evidences outlining that autogenic processes, which operate at long time scale, modulate the *MS* signal and have a strong influence over the magnetic susceptibility records that can leads to the absence of correlation within long-term *MS* trends.

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\*Speaker