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GIVETIAN/FRASNIAN BOUNDARY (NISMES AND SOURD D'AVE SECTIONS, SOUTHERN BELGIUM): TRACING THE MAGNETIC MINERALOGY SIGNAL

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The Givetian/Frasnian boundary (GFb) has been investigated at two sites (Sourd d'Ave and Nismes) in the allochtonous Ardennes fold-and-thrust belt (southern Belgium). Both sections were studied biostratigraphically in detail during the eighties for different fossil groups including conodonts (Bultynck, 1987), ostracods (Casier, 1987) and brachiopods (Sartenaer, 1987). The Nismes section was adopted by the Subcommission on Devonian Stratigraphy (SDS) (Prague, 1986) as an auxiliary stratotype for the Givetien/Frasnian boundary in neritic facies (Bultynck et al, 1988). It exposes around 26 meters covering the last meters of the Fromelennes Formation (Late Givetian) and the base of the Nismes Formation (Late Givetian and Early Frasnian). Hundred samples were collected for microfacies, ostracods (Casier and Préat, submitted) and magnetic analyses. The Sourd d'Ave section is an old road cut where around 47 meters are exposed spanning the end of the Fromelennes Formation and the base of the Nismes Formation. Préat (unpublished results) studied the section for microfacies and sedimentological aspects in 1984. For the present study, about 300 samples were taken for multidisciplinary studies including microfacies, magnetic susceptibility (MS) and magnetic mineralogy analyses.

In both studied outcrops, the Nismes Formation (Avignon and Sourd d'Ave Members) corresponds to a greenish shaly unit, with subordinate clayey-carbonate nodules and thin nodular limestone beds, overlying the platy and massive limestones of the Fromelennes Formation (Moulin Boreux and Hulobiet members). This latter contains bivalves, colonial rugose corals and several biostromal beds with stromatopores.

The MS values and thermomagnetic curves were measured with a Kappabridge MFK1-A with a CS-3 furnace at the Geological Survey of Belgium (GSB). Opaque minerals were identified with a Dispersive Raman spectrometer (Bruker Senterra) of the GSB. Hysteresis loops were measured with a J-Coercivity Magnetometer in the Paleomagnetic Laboratory of the Belgian Royal Meteorological Institute. For the Nismes section, MS values range between 0.99 x 10^{-8} m?/kg and 10.4 x 10^{-8} m?/kg. The MS curve shows several decreasing MS trends towards lower MS values in the Givetian limestones. The last trend spanning the GFb corresponds to a positive evolution towards higher MS values at the base of the Frasnian. MS data are compared with microfacies curve and palaeoenvironmental interpretations. For the Sourd d'Ave section, the MS values around the GFb, range between 1.11 x 10^{-8} m?/kg and 38.8 x 10^{-8} m?/kg and the MS values are clearly higher in comparison to the Nismes section. A decreasing MS trend is observed across the GFb.

Based on MS data and microfacies, 16 samples for the Sourd d'Ave section and 10 samples for the Nismes section were selected for thermomagnetic analyses and hysteresis loops across the GFb beds. Magnetic mineralogical measurements would help to determine the origin of the magnetic signal in an attempt to estimate the influence of diagenetic effects on the original signal.