

## Geochemistry, Magnetic Susceptibility and Gamma Ray spectrometry records Across the Frasnian-Famennian boundary at Fuhe, China

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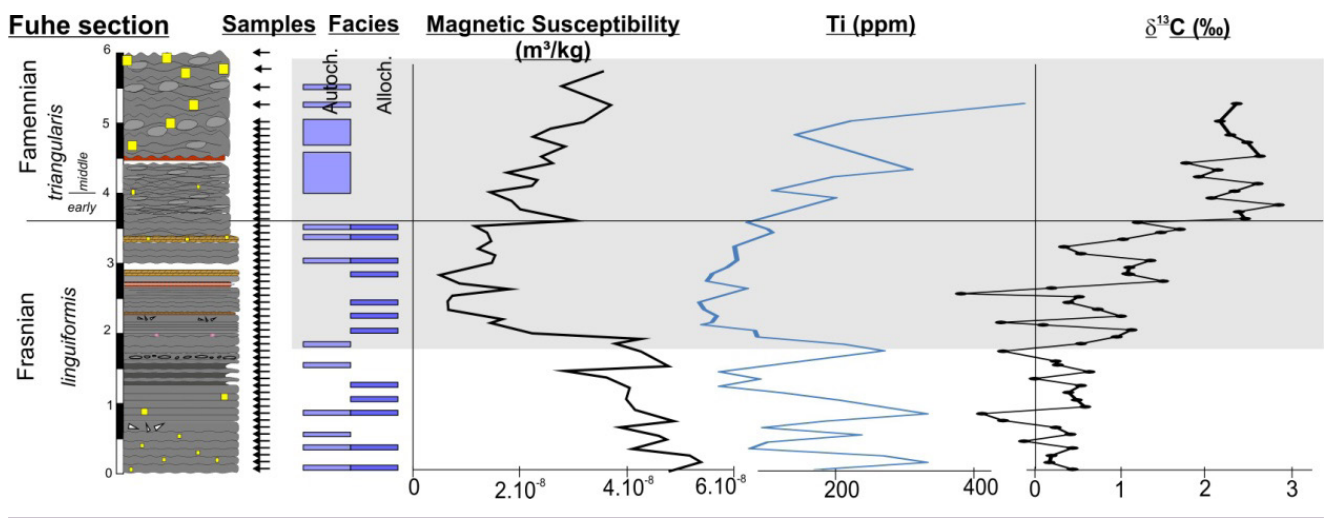
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At the 2010 IGCP-580 meeting in Guilin, China; a field party (guided by Daizhao Chen) was organized to sample key Palaeozoic sections. Our team focused on the Frasnian-Famennian (F-F) boundary, at the Fuhe section (40 km south of Guilin, deep water deposits). The section is 33 m thick and cuts from Early to Late *rhenana*, to *triangularis* conodont zones (including the Upper Kellwasser event, UAE).

- **Sedimentology:** the section is characterized by two main facies: (1) autochthonous pelagic nodular mudstones, with abundant sponge spicule networks, ostracods and some clotted micrite; intercalated with (2) coarser intervals of allochthonous calciturbidites with lithoclastic grainstones, displaying oblique and convolute stratification, grading into bioturbated mud-wackestones (T<sub>c-e</sub> Bouma subdivision).
- **Magnetic susceptibility (MS):** mean MS value for the entire Fuhe section is  $3.23 \cdot 10^{-8}$  m<sup>3</sup>/kg, which is in the range of the MS marine standard of  $5.5 \cdot 10^{-8}$  (Ellwood *et al.*, 2011). The MS values range between  $-1.46 \cdot 10^{-9}$  and  $9.25 \cdot 10^{-8}$  m<sup>3</sup>/kg. The first part of the section (0-9 m) is dominated by turbiditic deposits and the MS values are relatively low ( $\sim 9 \cdot 10^{-9}$  m<sup>3</sup>/kg). Then, between 9 and 27 m, the facies are dominated by autochthonous mudstone with *in situ* sponges and MS is higher ( $6.45 \cdot 10^{-8}$  m<sup>3</sup>/kg), with some sharp variations. The last 6 m, corresponds to the Upper Kellwasser F-F event (Fig. 1). Below the F-F boundary, facies alternate between autochthonous and allochthonous and the MS values decrease from  $5.46 \cdot 10^{-8}$  to  $5.23 \cdot 10^{-9}$  m<sup>3</sup>/kg. Above the F-F, autochthonous facies dominate once again and MS values sharply increase. (Mention Ti data here?). There is a moderate positive correlation between elements which are proxies for lithogenic inputs (e.g. Ti, Al, Zr; see figure) and magnetic susceptibility ( $r = 0.6$ ), showing that the MS signal is probably of primary origin, related to lithogenic inputs (e.g. Riquier *et al.*, 2010).
- **Gamma Ray Spectrometry (GRS):** concentrations of K statistically correlate moderately well with Th concentrations throughout the whole section ( $r=0.75$ ). Correlated Th and K are usually related to the presence of aluminosilicates (clays, potassium feldspars, micas) in carbonates. The mean value for U/Th ratio corresponds to 0.55. Six distinct peaks are present along the section with values above 0.75 indicating probably local suboxic conditions.
- **Geochemistry:** the UAE at Fuhe, as is common around the world, is characterized by a significant positive carbon isotope excursion in both  $\delta^{13}\text{C}_{\text{carb}}$  (3.8 ‰) and  $\delta^{13}\text{C}_{\text{org}}$  (3.3 ‰). Although, unlike other localities around the world, values for TOC and elemental proxies for paleoredox conditions do not display appreciable enrichments at the level of the UAE at Fuhe. Only V displays enrichment with a very narrow peak with a maximum value of 18 ppm associated with the UAE. This implies that there was likely a very short interval of suboxic conditions associated with the UAE (in agreement with the GRS results).



Upper part of the Fuhe section (last 6 m) with the F-F boundary; position of sample (arrows), facies (autochthonous or allochthonous), magnetic susceptibility ( $m^3/kg$ ), Ti (ppm) and  $\delta^{13}C_{carb}$  (‰). The conodont zonation is from CHEN *et al.* (2005) and the grey area corresponds to the Upper Kellwasser interval.

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