Supporting Information for: "Clay minerals and continental-scale remagnetisation: a case study of South American Neoproterozoic carbonates"

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1. Figures S1 to S4

Introduction

The methodology and discussions related to these figures are maintained in the main manuscript, while the associated data is published in a public repository. Four items are displayed here: **S1**: data or ARM acquisition; **S2**: Heating experiments to confirm the presence and the mineralogy of clay minerals; **S3**: SEM-EDS imaging of iron sulphide phases; and **S4**: synchrotron-based XRF imaging of remagnetised carbonates.

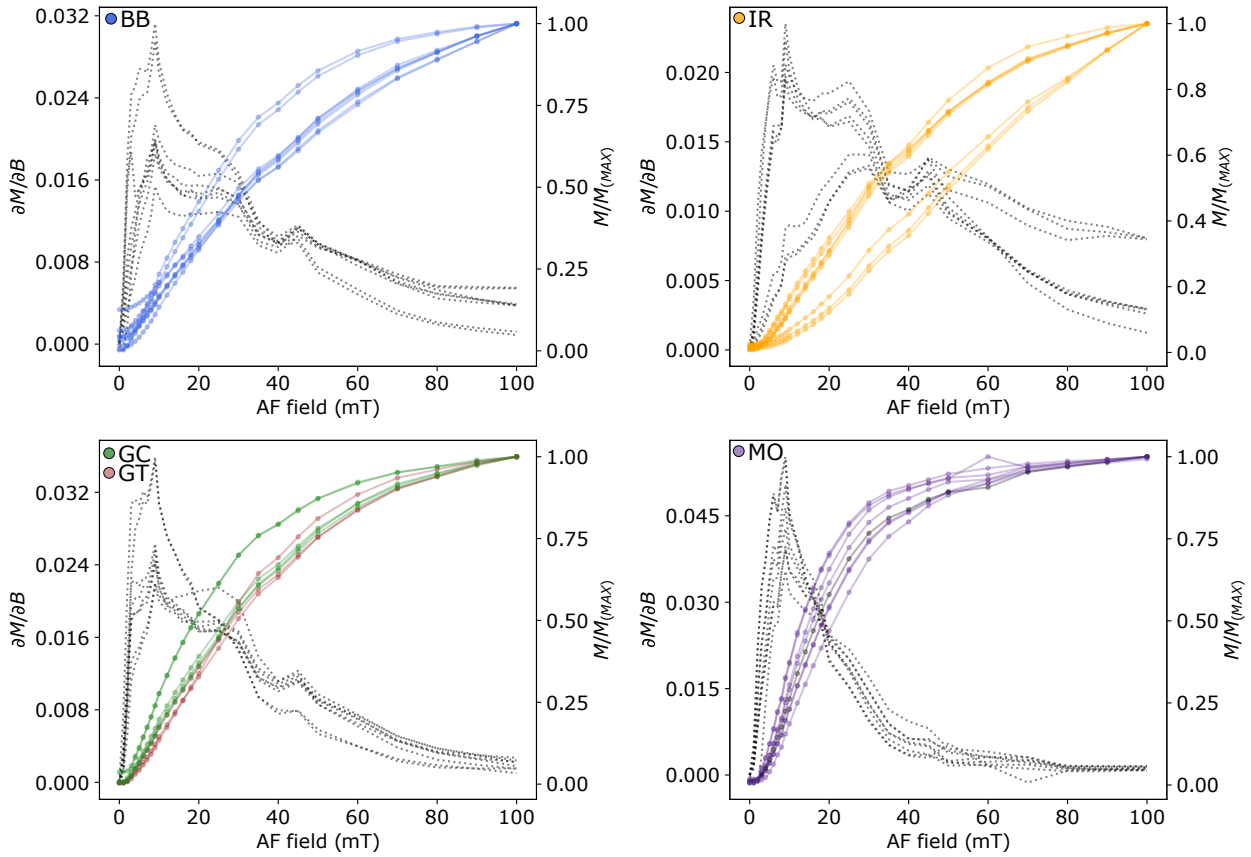

Figure S1. Anhysteretic remanence acquisition curves (ARM). Direct current field (1G), with alternating current fields from 0 to 100 mT. Measurements were performed through a superconductive rock magnetometer (Long Core, 2G Enterprises). Remagnetised units (BB, IR, GC, and GT) show similar patterns, where the gradient quickly increases at low fields and progressively decreases to higher fields, with discrete increments (peaks) near 40 mT. Although tending to reach saturation (acquisition gradient is very low), they are still acquiring magnetisation at 100 mT. Non-remagnetized samples (MO), however, concentrate their coercivity populations near 10 mT, reaching saturation before 100 mT.

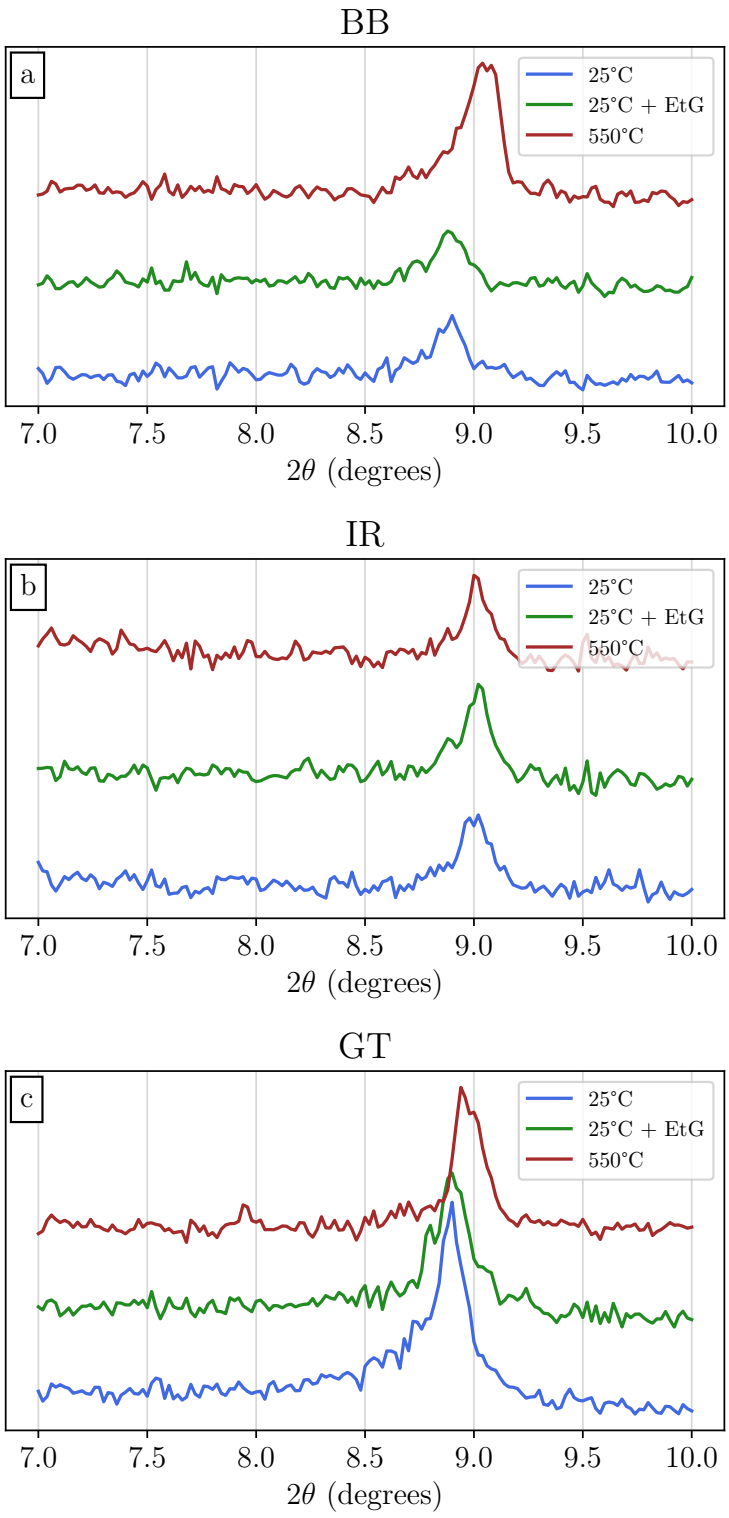

Figure S2. XRD data after ethylene glycol saturation and further calcination at 550°C for samples of the Sete Lagoas (a), Salitre (b) and Guia formations (c).

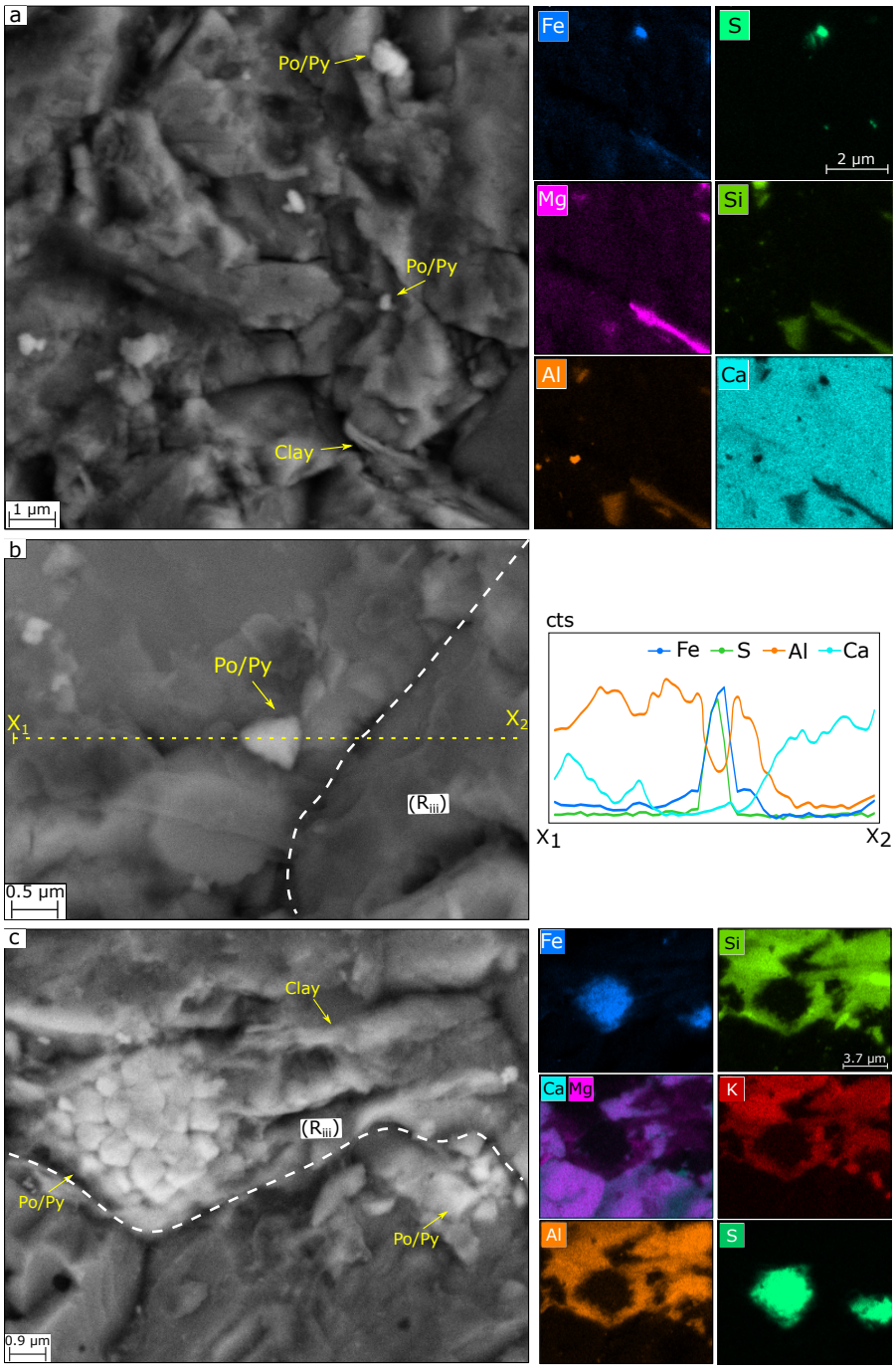

Figure S3. SEM (SE-mode) images showing the occurrences of iron sulphides (pyrite or pyrrhotite, Py or Po) in the remagnetised samples. The right-column images are EDS chemical maps with the same target in the left column. For more details about R_{ii} and R_{iii} regions visit the main manuscript.

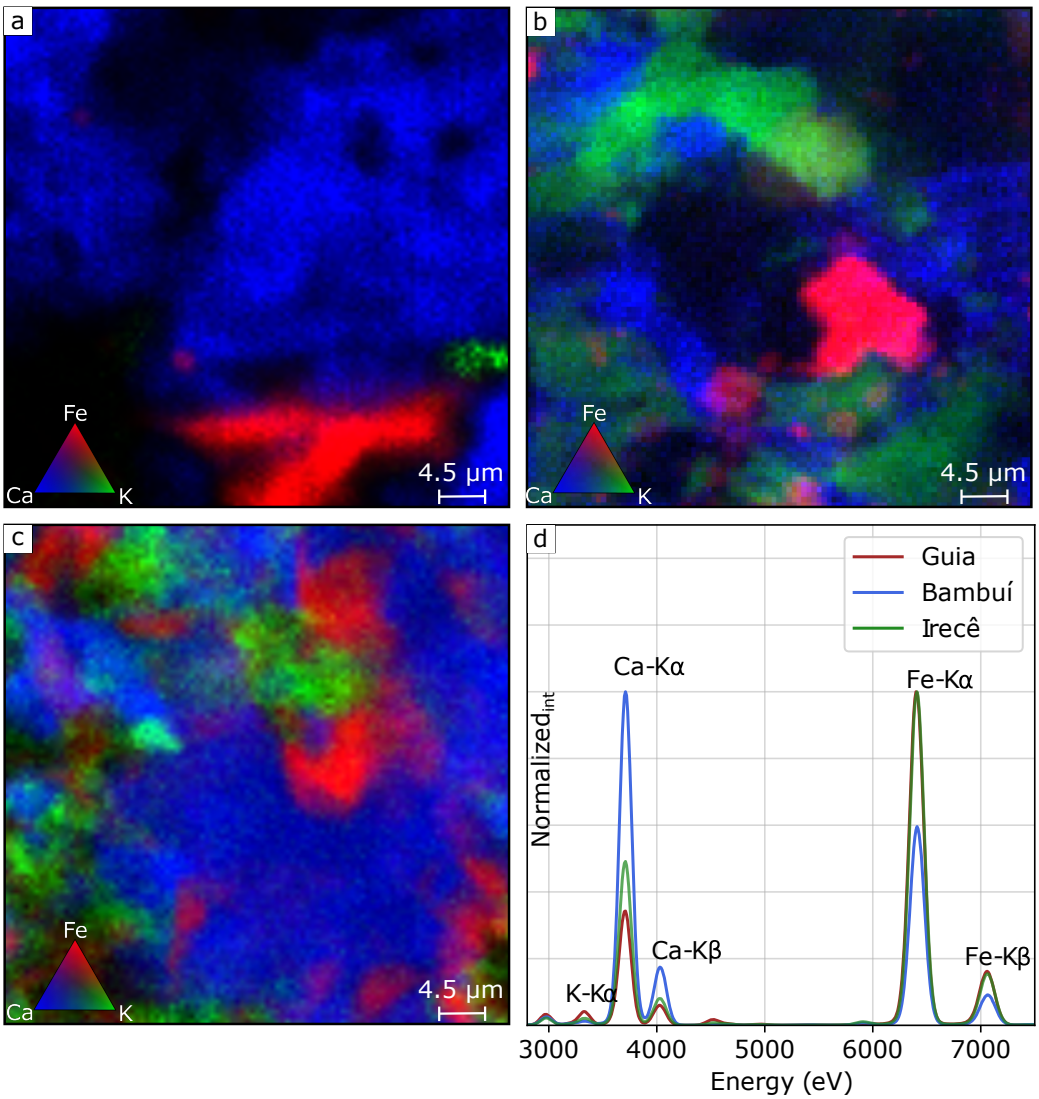

Figure S4. Synchrotron X-ray fluorescence (XRF) maps of the Bambuí (a), Guia (b), and Irecê (c) samples. Regional spectrum (d) indicates the major contribution of Fe, Ca, and K. The spatial proximity of Fe and K could indicate a genetic correlation between remanence-bearing minerals and iron-bearing silicates (clay minerals/K-feldspar).