



## **Snowball Earth under the microscope**

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Micromorphology is an under-utilised technique in studies of Cryogenian sedimentary rocks, yet can reveal a number of diagnostic depositional features not visible at macro-scale. Three case studies are presented which illustrate both the breadth and limitations of the technique as applied to ancient glacial successions. Diamictites of the older Cryogenian ('Sturtian') Chuos Formation in northern Namibia exhibit syn-sedimentary deformation structures typical of high strain glaciotectionic shearing, readily distinguished from the regional low-grade metamorphism and cross-cutting fracture cleavage. Diamictites of its younger counterpart, the Ghaub formation ('Marinoan' equivalent), have suffered greater overprint of primary structures by comparison, complicated further by carbonate dissolution. Primary depositional and deformational fabrics can be distinguished nonetheless. The third example, from the purportedly 'Sturtian' Macduff Formation in north-eastern Scotland, demonstrates the value of micro-scale analysis in facies which are often genetically enigmatic at macro-scale, revealing key evidence of a glacial influence not visible at outcrop. Micromorphology can therefore aid in unravelling key questions surrounding the depositional history of Snowball Earth, but its application must contend with the variability in stratified and unstratified sedimentary successions, in the degree of tectonic overprint, and in the diagenetic alteration of carbonates.