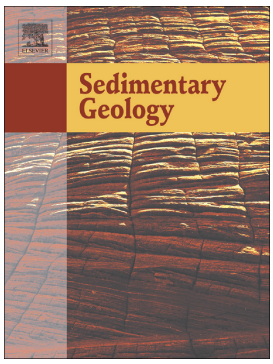

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Zebra textures in carbonate rocks: Fractures produced by the force of crystallization during mineral replacement

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ABSTRACT

Zebra textures are enigmatic banded fabrics that occur in many carbonate-hosted ore deposits, dolomite hydrocarbon reservoirs and carbonate successions globally. They consist of a variety of minerals and are characterised by parallel light and dark bands that occur at a millimetre- to centimetre-scale. Based on petrological evidence, there is general consensus that the dark bands formed by replacement of the carbonate host rock. Historically, more contention surrounds the origin of the light bands, but the dominant view is that these are mineral-filled cavities, which is supported by overwhelming textural evidence. Overall, the feature common to all versions of zebra textures is mineral replacement of the original carbonate host.

We suggest that mineral replacement (and the force of crystallization) in association with open space generation is a viable mechanism for the development of zebra cavity systems. Dissolution and open space generation in either evaporites or carbonates adjacent to the site of replacement reactions is necessary to remove the confining pressure from the rock and to allow the development of fractures. The pressure of the growing replacement crystals within the carbonate pervasively splits the carbonate apart, producing thin strips of carbonate surrounded by open space. The fractures may then be subject to dissolution and are later filled