



## **How stylolite tips cause cracks (and vice versa?)**

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Stylolites are localized dissolution surfaces, ubiquitous in sedimentary rocks. They can be described mathematically as “Localized Volume Reduction”(LVR) features, with an associated stress field of an Edge Dislocation (or identically of an Eshelby inclusion). The calculations predict that an LVR tip induces large compression in certain quadrants, yet large extension and shear in other quadrants surrounding the tip. The stress field close to the tip may be much larger than the far-field compressive stress, and may cause seemingly surprising brittle features—specifically veins, pull-aparts and shear fractures. We present the stress field, and demonstrate how it may form a set of coeval fractures observed in a network of sedimentary stylolites from the Calcare Massiccio Formation of the Umbria–Marche, Central Italy.