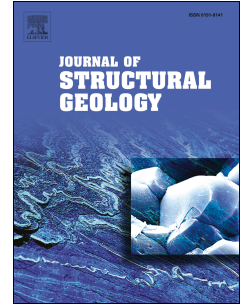


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What controls diffuse fractures in platform carbonates? Insights from Provence (France) and Apulia (Italy)

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# 1 What controls diffuse fractures in platform 2 carbonates? Insights from Provence 3 (France) and Apulia (Italy).

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## 9 **Abstract**

10 Fractures are widespread in rocks and regional opening-mode arrays are commonly ascribed to  
11 major tectonic events. However, fractures occur in otherwise undeformed rocks. Some of these  
12 are early-developed features independent of tectonics and forming a background network at  
13 regional scale.

14 To overcome this lack of understanding, two hydrocarbon reservoir analogues from  
15 platform carbonates have been targeted: the Provence (SE France), and the Apulian platform (SE  
16 Italy). In both areas, an early fracturing stage has been observed, made of high-angle-to-bedding  
17 opening-mode fractures, and bed-parallel stylolites. These features developed synchronously  
18 during the first burial stages and prior to major tectonic events. The fracture sets are not  
19 genetically related to the present-day layering. Contrarily, fractures developed in a brittle media  
20 where facies transitions were not sharp and did not act as mechanical discontinuities.

21 Carbonate facies distribution and early diagenetic imprint constrained the mechanical  
22 stratigraphy when fractures occurred. In addition, we observed that fractures related to late  
23 tectonic inversion were partly inhibited. Indeed, rock mechanical properties change through time.

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