# Are fracture patterns in bedded rocks controlled by stratonomy and petrophysics? Rapid quantification with FracAbut code applied on Digital Outcrop Models of SE-France.

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**Résumé**

Fractures in 3D account for fluid permeability in reservoirs. The connectivity depends on 3D fracture geometry and its relation to bed interfaces. Modelling Discrete Fracture Networks (DFN) in naturally fractured rocks analogues for underground reservoirs implies to know the fracture spatial distribution and cross-cutting/abutment relationships with stratigraphic interfaces.
We study 3D pattern of burial fractures which is an image of the mechanical stratigraphy at the time failure occurred. Intuitively, in present day rocks, we could potentially predict the fracture network using the stratonomy (stratigraphic geometry, petrophysics and diagenesis) of the sedimentary host rocks. With this objective in mind, we present an integrated approach including characterisation of fracture and mechanical stratigraphy, stratonomy based on geometrical measurements and petrophysical data. The workflow comprises (1) a stratigraphy and fracture pattern survey (field or photogrammetric model); (2) the sampling and thin section analysis and (3) the quantification of bed interface's compliance to let fractures go through, or not. Accounting for abutment and cross-cutting relations, the interface impedance is automatically computed using a newly developed python toolbox called FracAbut. We applied this approach to naturally fractured and stratified carbonates located in SE France.
We present the first results of the study regarding the correlation between mechanical stratigraphy (interface compliance) and (i) petrophysical properties (porosity, permeability, competency); (ii) bed thickness and (iii) rock grain composition but also (iv) DFN models at different scales of their impact on permeability.

**Mots-Clés:** Fracture stratigraphy, mechanical stratigraphy, stratonomy, petrophysical, DFN

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