Geophysical Research Abstracts
Vol. 18, EGU2016-14037, 2016
EGU General Assembly 2016


# Stylolite shape, roughness growth dynamics and related burial history: a 3D analysis.

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Stylolites are dissolution features that develop under applied pressure and during chemical compaction. Stylolites are common in sedimentary basin, altering the chemistry and physical properties of rocks, as well as the small- to large-scale hydrological system. This contribution follows recent finding about the self-affine roughness growth properties leading to a fractal, stitch-like shape of stylolites. 3D surface scanning and X-ray computed microtomography imaging have been carried out onto numerous stylolites from the southern Permian Zechstein basin (Germany) and from the Umbria Marches fold-and-thrust belts (Italy). In these two environments stylolites have been sorted following a recent advanced classification of stylolite based on the shape and growth dynamics. This classification consists in four classes (rectangular layer type, seismogram pinning type suture/sharp peak type and simple wave-like type) and we aim to characterize the roughness properties for each of these classes. A fractal analysis has been conducted accordingly using Fourier transform and Correlation function signal analysis over roughness surfaces. These fractal analyses have been used to reconstruct the maximum burial depth recorded by each stylolite. The reconstruction of burial depths at the same place but regarding all stylolite classes returns and maximum depth evolution. This dataset is thus used 1- to understand the links between the roughness growth dynamics of stylolites and their final shape and 2- to establish a relationship linking the shape of roughness to the maximum burial depth recorded. We hope results and interpretation reported can push the community to consider stylolite as an efficient tool and reliable way to appraise burial history in sedimentary basins.