ISTerre
Institut des Sciences de la Terre

Grand Séminaire
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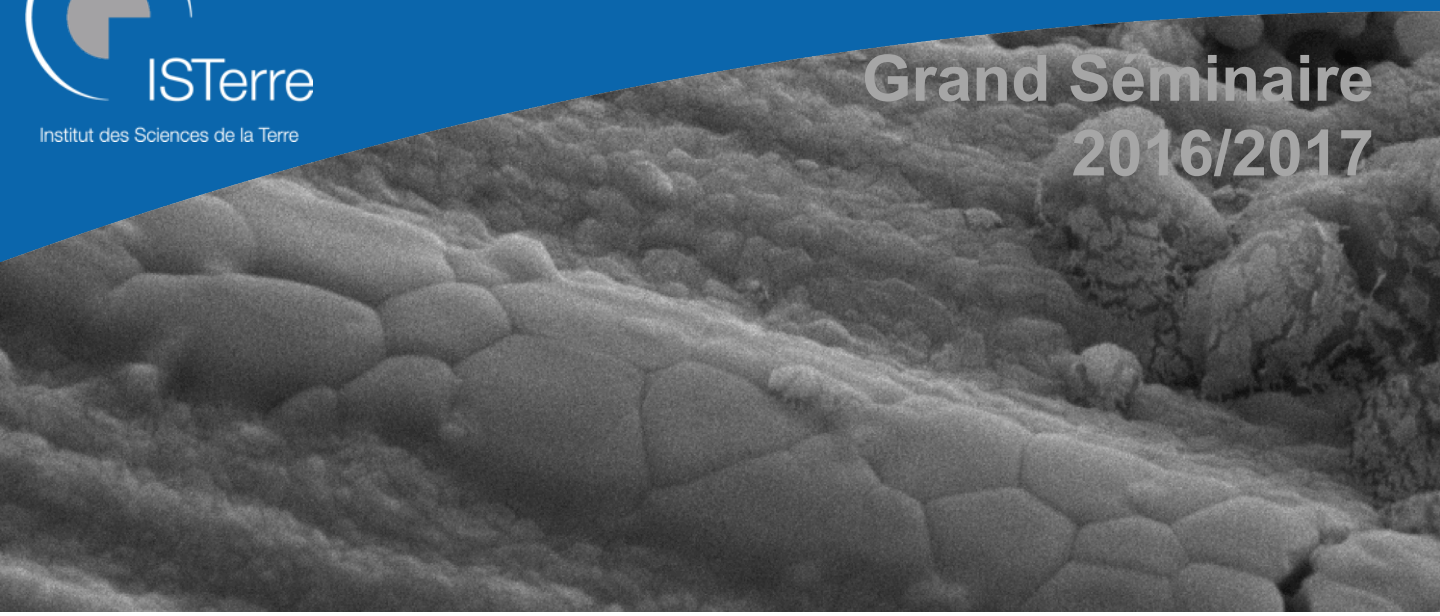

Fault weakening mechanisms in carbonate-bearing rocks during earthquakes

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Moderate to large earthquakes (e.g., Wenchuan Mw 7.8, 2008; L'Aquila Mw 6.1, 2009) often rupture and propagate along faults in carbonate-bearing rocks (dolostones, limestones, marbles, etc.). Because of the large stresses (hundreds of MPa at >10 km depth) and slip rates (about 1 m/s) involved, a large amount of frictional work rate (product of frictional shear stress per slip rate) is dissipated along faults during earthquakes. The frictional work rate can be so large (1 to 100 MW m-2) as to grind and mill the rock (producing particles of nanometric size, or nanopowders) and trigger mechanically- and thermally-activated chemical reactions. Under these extreme deformation conditions, the fault surfaces in carbonates are separated by fluids or other tribochemical products (nano-powders, amorphous and decarbonation products, etc.). It follows that earthquake physics is controlled by the mineral reactions and phase changes triggered by the passage of the seismic rupture and, as a consequence, by the rheology of the reaction products. Here, by exploiting the results of (1) field and microanalytical studies conducted on natural fault products, and (2) experimental studies reproducing the extreme deformation conditions typical of seismic slip, we will discuss the mineral reactions and phase changes concomitant to and responsible of fault weakening in carbonates during earthquakes.

Jeudi 17 novembre 2016 à 11h

Salle de conférences d'ISTerre

OSUG-C, 1381 rue de la piscine, Campus Universitaire
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