Estimation of strain rate in the subduction interface in the conditions of the deep transient slips from local observations and analysis (Gratera and Pigno slices, Corsica)

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Résumé

The understanding of the subduction interface dynamics is questioned by the discovery of deep transient slips occurring along these interfaces. They raise important issues regarding the temporal evolution and rheological behavior of the subduction interface. One of the major parameters playing a role in the dynamics of the subduction interface is the strain rate.Often used in numerical models aimed at improving our understanding of deformation under deep transient slip conditions within these interfaces.The strain rate is often approximated at first order from the convergence rate along the subducting plate and the interface thickness. However, this strain rate estimate does not consider the deformation heterogeneity in the subduction interface and the dependence on the considered time slot within the seismic cycle of the deformation. In this study, we estimate strain rates in two subducted and then exhumed slices (one heterogeneous slice made of oceanic crust and the other one being homogeneous and composed of continental crust) from the piezometer method on quartz grain and sub-grain size. Based on the results obtained and Magott et al (2016 And 2017) and Marroni and Pandolfi (2007) studies carried out in these slices, we propose a distribution of the deformation rates in each tectonic slice and estimate the total strain rate. We also discuss our results by comparing them to estimates of average strain rates in other subduction complexes.

Mots-Clés: pseudotachylyte, quartz, piezometer, strain rate, subduction interface, oceanic slice, deep transient slips

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