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# Observations of rapid large-scale slip/deformation of the slab before some large subduction earthquakes

Michel Bouchon\*<sup>1</sup>

<sup>1</sup>Université Grenoble Alpes – uniersité de grenoble alpes – Grenoble, France

## Abstract

The past 20 years have shown that the slip and deformation of the slab, as it begins its descent into the mantle, takes many forms. It may occur in seconds or minutes by brittle rupture, in hours with seismic tremors, in months with SSEs, in years by viscous processes. Because of the inherent limit of resolution of our instruments we tend to think that a particular behavior is restricted to a specific depth range. But is it so ? We learned from SSEs that the slab can slip over a huge area with a very small displacement and that this process can begin (and turn off) rapidly. In tremors we see the unavoidable signature of fluids. We present observations which support that several large subduction earthquakes were preceded by episodes of slow slip extending deep down the slab (~100km) and lasting for weeks or months. Like for SSEs, the amount of slip is small but the volume of slab which slips and deforms is large. Like for tremors the rapidity with which the process begins and spreads points to fluids.

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\*Speaker