Towards a dynamic vision of the slip along faults

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Abstract

Faults experience different slip behaviours through time: rapidly during an earthquake, slowly and constantly at the tectonic plate velocity or as transitional pulses called slow slip events. These different behaviours were observed with GNSS temporal series of position, which record the temporal variations of the surface displacements. The seismic cycle was described on the basis of these observations *i.e.* interseismic, coseismic and postseismic phases. As of today, each period is assumed to experience different slip modes. Therefore, assuming that each slip mode has its spatial and temporal distributions, each period is modelled separately from the others. However, thanks to improvements in spatial geodesy accuracy, transitional pulses are suspected to occur on a different time scale. Indeed, it seems that slow slip events might occur very frequently over a wide range of periods during the interseismic and postseismic phases.

This work offers a new modeling strategy: freeing oneself from slip temporal and spatial distributions, we model the full time evolution of slip along fault. This method allows to free oneself from assumptions of slip modes temporal distributions, thus enabling oneself to observe transitional slip on a different time scale. If so, the results of this new method might allow us to revise the common conception of the interseismic phase and therefore better understand large earthquakes' process. On this basis, we may better anticipate eventual rupture zones and their precursory signals.