Relation between Slow Slip events and Nonvolcanic Tremor

Nikolai M. Shapiro[1], Vladimir Kostoglodov[2], Allen Husker[2], Juan Payero[2], Michel Campillo[3], Nathalie Cotte[3], Robert Clayton[4]
[1] Laboratoire de Sismologie, Institut de Physique du Globe de Paris, CNRS, France.
[2] Instituto de Geofísica, Universidad Nacional Autónoma de México, México.
[3] Laboratoire de Géophysique Interne et Tectonophysique, Université Joseph Fourier, France.
[4] Seismological Laboratory, California Institute of Technology, Pasadena, USA.

Slow Slip Events (SSE) and Nonvolcanic Tremors (NVT) that have been observed now in different subduction and fault zones may be a very important constituent in the seismic cycle.

At the same time, despite the increasing volume of observations in different regions and tectonic regimes, the physical mechanism behind these phenomena remains still elusive. Large number of observations shows that the SSE is usually associated with an increased NVT activity but it is not clear yet if the NVT and SSE represent the same seismotectonic phenomenon or those are independent expressions of a common origin. A similarity between volcanic and subduction zone tremor has led to suggestions that latter could be related to fluid migration that, in turn, might be "triggered" by slow slip on or near the plate interface. Alternative explanation is that NVT consists of swarms of small low frequency earthquakes resulting from shear failure during slow slip. More data are required to better discriminate between different hypotheses and to get more insights into the physical origin of SSE and NVT.

In particular we will present results of observations during large SSE in Central Mexico occurred in 2006 which provided essential constraints on the problem. GPS and abundant seismic data show that although the NVT energy increased notably during the 2006 SSE, the two phenomena were separated spatially and not consistent in time.