Recent GPS surveys reveal coupling complexities in the TalTal area, Chile (24○S-26○S) : consequences on seismic hazard in the Atacama region.

Marianne Métois*[1], Emilie Klein[2], Christophe Vigny[2], Gianina Meneses , and Arthur Delorme

[1]Laboratoire de Géologie de Lyon - Terre, Planètes, Environnement [Lyon] (LGL-TPE) – École Normale Supérieure - Lyon, Université Claude Bernard Lyon 1, Institut national des sciences de lÚnivers, Centre National de la Recherche Scientifique : UMR5276, Institut national des sciences de lÚnivers, Institut national des sciences de lÚnivers, Institut national des sciences de lÚnivers, Institut national des sciences de lÚnivers, Institut national des sciences de lÚnivers – 69364 Lyon cedex 07, France

[2]Laboratoire de géologie de l'ENS – INSU, CNRS : UMR8538, École normale supérieure [ENS] - Paris – 24 Rue Lhomond 75231 PARIS CEDEX 05, France

Résumé

GPS surveys have been extensively used over the past 20 years to quantify crustal deformation associated to the Andean subduction zone in Chile. Such measurements revealed the coupling variations associated to the seismic segmentation of the subduction. However, because of data gaps, mostly due to access difficulties, the Atacama-Antofagasta regions of North Chile remain poorly known.

We present here an upgraded interseismic velocity field aggregating new data acquired between 2012 and 2016 in the region of Taltal (24○S - 26○S), over a small scale network of 20 benchmarks. This denser data set reveals a new complexity regarding the modeling methodology commonly used. We first show that a large scale rigid Andean sliver, running from central to North Chile, does not allow to explain the velocities measured in the region of Taltal. This region exhibits an additional coherent block motion of almost 5_˜mm/yr with respect to the inland motion generated by the rotation of the sliver proposed by Métois et al. (2016) which works well everywhere else. Second, once this local block motion is taken into account, the coupling in the Taltal area is refined, which brings new insights about the subduction segmentation there. The Taltal area shows as a relative low in coupling (although coupling values are still high), potentially cutting a long section of the subduction into two independent segments: the Paranal segment - North of Taltal, between 23○S and 25○S - and the Chanaral segment - south of Taltal, between 26○S and 28○S. These segments may rupture individually with magnitude _˜8 earthquakes or simultaneously which would produce a larger earthquake, especially if a third segment (Atacama - more to the south - between 26○S and 28○S) is also involved.

*Intervenant