Geophysical Research Abstracts
Vol. 19, EGU2017-19485, 2017
EGU General Assembly 2017

From Seismotectonics to Geodesy in the W-Alps: what is (un)correlated ?

Christian Sue
UMR Chrono-environnement, Université de Franche-Comté, Besançon, France (christian.sue@univ-fcomte.fr)

Recent geodetic analyzes in the W-Alps brought new and accurate mapping and quantification of the vertical and horizontal deformations in the belt. Vertical motions appear about 10 times larger than horizontal ones, which support geodynamic models implying isostatic adjustments within the Alpine orogeny (intrinsic buoyancy forces). This kind of interpretations is also strengthened by the regional correlation observed between the fast uplifting core of the W-Alpine arc, and a strong 200 km deep warm anomaly imaged by the latest tomography. Indeed, still debated deep structures should play a major role in the current dynamics. However, surface processes implying GIA and erosional unloading also play a first role as they directly impact the buoyant equilibrium of the Alps. In the modeling of such a geodynamic context, uplift should be associated to extensional tectonics. Actually, the alpine seismicity developed all along the arcuate shape of the W-Alps, is characterized by extensional faulting associated to a minor component of strike-slip. Thus, there is a quite good qualitative correlation in the overall belt between topography, crustal thickness, extension, and uplift. Nevertheless, looking at the new quantification of the vertical motions, it appears that they are partly uncorrelated with extensional seismicity: the maximum of vertical motion (2,5 mm/yr) is located to the North of the W-Alps, whereas the maximum of extensional seismicity is located more than 150 km southward. On the contrary, horizontal deformations observed by GNSS are very well correlated with the seismicity from a regional viewpoint, both in term of deformation mode and quantification. This abstract points out paradoxical uncorrelations in the Alps current tectonism. The resolution expected from the future AlpArray-related data should help to better understand the actual dynamics of the Alps.