Geophysical Research Abstracts
Vol. 21, EGU2019-15571, 2019
EGU General Assembly 2019

How to explain the present-day deformation in France: In the mountain ranges (Alps and Pyrenees) and outside. Constraints from a new analysis of GNSS data.

Christine Masson (1), Philippe Vernant (1), Stéphane Mazzotti (1), and Giorgi Khazaradze (2)

(1) University of Montpellier, GM - Géosciences Montpellier, Montpellier, France (masson@gm.univ-montp2.fr), (2) Grup Risknat, Departament de Geodinamica i Geo[U+FB01]sica, Facultat de Geologia, Universitat de Barcelona, Spain

Global Navigation Satellite System (GNSS) is a powerful tool to decipher the present-day deformation along plate boundaries, but it is usually overlooked in slow deformation regions because of the resolution limit. France is a part of the Western Eurasian plate and is commonly considered stable or having low velocities in terms of horizontal motion at the limit of resolution obtainable with GPS data.
With a global re-analysis of ∼1200 GNSS continuous sites across Western Eurasia and a large set of synthetic data, we are able to quantify the accuracy of the determination of the long-term velocity and the robustness of the signal extracted.
In the Alps and the Pyrenees, the analysis of the actual GNSS data shows groups of sites having significant velocities which are spatially coherent. However, the rigid rotations of Apulia and Iberia relative to Western Eurasia do not explain the strain patterns computed for the Alps and the Pyrenees, raising the question of the origin of the deformation and seismic hazard in these active earthquake regions. Other processes, such as erosion, need to be taken into account to explain the seismicity and the strain patterns observed in the Alps and the Pyrenees.
Furthermore, outside the mountain ranges (Brittany, Aquitaine region, Paris basin...) we observe a significant deformation but low seismicity. In these areas, the origin of the deformation is more difficult to determine and requires considering other origins of deformation such as transient hydrological phenomena.