

Up to date geodetic velocity field of the Belledonne region (Western Alps, France)

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The Belledonne region, located on the western edge of the Alps, behaves as a deformation transfer zone between the inner part of the western Alps, whose geodesy and seismicity show extensional deformation, and its shortening surrounding basin (the Rhône Valley). Seismological and geodetic networks are less dense and younger in the latter area, which makes it more difficult to characterize its deformation. These two regions nevertheless have a moderate historical and instrumental seismicity. A large part of these earthquakes is concentrated around the Belledonne range and accommodated by the active NE–SW Belledonne fault, located at the western foot of this chain. The fault characteristics, such as its connection at depth with surrounding fault systems (e.g. Cléry fault), still need better constraints. The dense seismological network present in the Alpine region has made it possible to highlight its dextral strike-slip kinematics. To complete these observations, we present here an update of the geodetic velocity field around this fault from GNSS data recorded over the last two decades.

To do so, we first computed daily positions from about forty European IGS stations and from French RENAG stations on a period of 22 years (from 1997 to 2019) by using a double-difference processing with the GAMIT software (Herring et al. 2015). Then, we constrained a velocity field with the GLOBK software with respect to the fixed European plate. We finally analyzed the updated velocity field around our area of interest related to this fixed referential.

Our results show a consistency with the dextral strike slip mechanism observed by the current seismicity. Methodological prospects concern the expected decrease of uncertainty both on daily positions and on the velocity field thanks to the increase of recordings through time. We aim at confirming and precisng the uplift observed by seismicity and the previous geodetic studies on the Belledonne area.

Mots-Clés : Geodesy – Active tectonic – French Alps

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