Time Evolution of Deep-Seated Gravitational Slope Deformation in the Queyras Massif (South East France) and their relationship with shallow landslides

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Résumé

Deep Seated Gravitational Slope Deformation (DSGSD) is defined as a set of rock mass characterized by a very slow movement (mm.yr-1) affecting large portions of slopes of a valley or a mountain range. These specific processes, which can lead to hazard and disasters should not be neglected and need to be better identified and characterized to anticipate related hazard. Documenting the DSGSDs requires first of all to locate them as for example the recently published inventories initiated for the European Alps and France. These studies initiated approaches aiming at defining the factors controlling their evolution in time and space.
The research developed in this study targets a better understanding the short- ($<$ 100 yrs) and long-term ($>$ 100 yrs) evolution of DSGSDs developed in the sedimentary rocks of the Queyras Massif (South-East French Alps). The main objective is to propose models of DSGSDs evolution with key interpretations of future developments to locate possible new landslide prone areas. The Queyras Massif was chosen because it represents an under-studied area of DSGSDs. The massif is characterized by Cenozoic marine sedimentary rocks accreted and metamorphized by the Alpine orogen. The massif is characterized by a regional schistosity plunging to the West and complex and active fault networks. The highest summits reach an altitude of 2500m a.s.l. and are separated by deep valleys incised by the Riss and Würm glaciers and currently by torrential streams. The method is based on a geomorphological analysis of the landscape and landforms, field observations, image interpretation of remote sensing data and quantitative morphometric analyses. Results allow locating the DSGSD, estimating their degree of activity, and characterizing their structure.

The research is part of the Program "Référentiel Géologique de la France / RGF – Chantier Alpes" which targets to update the geological knowledge of the Alpine basement, surficial formations and associated hazards in three dimensions and in digital format.

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Mots-Clés: DSGSD, Landslides, Gravitational processes, Active tectonics, Geomorphometry, Queyras