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Coupling deep seated gravitational slope deformation (DSGSD) and geodynamical context: preliminary results from a regional study in the Argentera massif (Southern French Alps)

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The western part of the Argentera-Mercantour massif (French Alps) hosts very large currently active landslides (like the La Clapière landslide) responsible of many desorders and risks to the highly touristic valleys of its foreland. Such instable rock volumes of 50 to 70 10^6 m^3 were mapped at a regional scale and the results were compared to multiparametric mapping of the geology, hydrogeology, seismicity performed at the same scale. In detail, two types of large slope destabilisations were identified: deep seated landslides (DSL) that correspond to rock volumes bounded by a failure surface and deep seated gravitational slope deformations (DSGSD) that correspond to large sagging zones including trenches and scarps or counterscarps.

This morphological analysis highlights that:

- DSL are mostly included within DSGSD and situated near the slope foot. Looking at different DSL evolution stages, most of them followed a similar rupture evolution process.
- DSGSD are present on many slopes, presenting sagging typical characteristics in the middle to upper part of the slope. An interesting result is that some features are parallel to the crest line direction and that some others are secant to this classical orientations (even being perpendicular in some cases). Those anomalously oriented features appear also much longer that the slope, crossing valleys where local reorientations of rivers network are observed.

Compared to the massif geology, anomalous deformation directions are mainly colinear to major N140 tectonic faults of the massif. Major slope movements are present when the mountain crest is collinear with the N140 direction and less developed movements are present when the crest line is secant to that direction. This could prove that a tectonic movement along those faults could be responsible of DSGSD observed at the slope surface. Then the stress state close to the surface and mainly concentrated at the foot of the slope could allow those features to evoluate into large DSL.