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Processes of progressive failure of a rock slope over a 10 kyears period: results from the "La Clapière" slope (French south Alps, France).

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The "La Clapière" landslide (Tinée valley; Alpes Maritimes; 06; France) was regarded as an example of unstable rock slope affected by large tension cracks and scarps spread all over the slope and by a 60 10^6 m^3 currently active rockslide at its foot. The displacement rates and orientations of this slope were estimated for the period [10 kyears – actual] by coupling ^{10}Be cosmogenic datations of slope gravitational features with a morphostructural analysis. Indeed, tensile cracks are first triggered with a strike perpendicular to the slope main orientation and from the gravitational reactivation of slope pre-existing tectonic faults. Then, a progressive shearing of the cracks is observed until failure of a large rock mass volume occurs at the foot of the slope. Cracks apertures variations and changes in directions were used as geomorphic indices to quantify slope displacements. For the last 10kyears, three phases were evidenced:

- First, a slow slope deformation, spreading from the foot to the top characterized by displacement rates of 4mm per year,
- Second, displacement rate increase ot 13 to 30mm per year from the foot to the middle of the slope,
- Third, a historic phase is characterized by the development of a large failure surface at the foot of the slope bounding the currently active La Clapiere rockslide with strong displacement rates of 80 mm per year.

Main conclusion of this study is that such a fractured slope destabilization appears progressive with very slow displacements rates for thousands years (8 to 10 kyears) and a final acceleration of a short period (50 years). The method that was calibrated allows the estimation in time and in space of the occurrence of such a final acceleration period for a given mountainous fractured rock slope under temperate climate and moderate seismicity.