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The small rock avalanche of January 9, 2016 from the calcareous NW pillar of the iconic Mont Granier (1933 m a.s.l., French Alps)

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On January 9, 2016 at 4:57, inhabitants of the municipality of Entremont-le-Vieux were awakened by the sound of a large rock collapse detached from the Mont Granier (1933 m, Savoie, France), iconic mountain of the Chartreuse massif located between Chambery and Grenoble. Its north face, a 900-m-high natural geological cross section in Urgonian limestone, Hauterivian marls, Valanginian limestone and Berriasian marls, was affected in 1248 by a huge collapse (500 million m3) that caused hundreds of fatalities.
The SW pillar, shaped in the upper Urgonian limestone, climbed for the first time in 1964 and several times during the warm and dry autumn 2015, collapsed throughout its height (180 m) over a width of up to about 85 m with a volume certainly much higher than 100,000 m3. Blocks rolled down the western slope on about 700 m before stopping in the forest. It is now notched over a hundred meter wide. No infrastructure was affected.
The Granier has many predispositions to large instabilities. This is the western remaining part, largely fractured, of a much eroded perched syncline whose inclination is oriented to the east. Fracturing and orientation of the strata contributes to pre-cut limestone and marl. The Granier is also a major karstic area: the Granier plateau with its multilevel karst network (90 km of galleries explored) is a good model of polyphased karst network. The region is also frequently affected by small earthquakes but seismicity does not appear to be a triggering factor. Conversely, the collapse has produced an M 2.2 earthquake. Besides rock fatigue related to what has just been mentioned and a vertical or overhanging topography, it is likely that heavy rains of days before the event and after a long period of drought have unleashed the destabilization.
The collapse is not comparable to the historical event of 1248, which had reshaped the entire northern side. However, its dimensions make the January 2016 event one of the major events of recent decades in the limestone western Alps. Events of this size are very rare in the currently available rockfall data series.
There is now a significant residual risk of falling boulders while a large overhang just formed suggests probable collapses in the short or medium term, with volumes exceeding 10,000 m3.