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Evidences of a Middle Pleistocene rock avalanche in L'Aquila Basin (central Apennines, Italy)

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We present a detailed study of a huge coarse-grained detrital deposit located in L'Aquila Basin which we interpret as the result of a rock avalanche detached during the notable Apenninic regional uplift occurred in Middle Pleistocene [6]. L'Aquila Basin is one of the most tectonically active intermontane basins of central Apennines, as evidenced by strong historical earthquakes, among which the last destructive event that occurred on April 6, 2009 (Mw 6.1) [10]. L'Aquila Basin is placed in the chain axial zone, southward to the Gran Sasso, the highest range of Apennines (about 3000 m asl) and it is filled up by hundreds of meters of clastic deposits, such as pelite, sand, gravel and conglomerate, of fluvial, lacustrine and slope environments. The goal is to define the geometric reconstruction of the detrital deposit, the timing and the transportation processes. The study is based on fine scale geological mapping, facies and sedimentological analysis, reinterpretation of bibliographic data and on numerous deep boreholes carried out after April 6, 2009 earthquake for seismic microzonation mapping of L'Aquila city. Newly collected data allow us to infer that the huge clastic deposit on which the city of L'Aquila was built up is the distal body of a rock avalanche detached from the southern slope of Gran Sasso Range, and to recognize the different parts in which the rock avalanche is composed (Carapace, Body and Basal facies) [7; 8; 9]. This clastic deposit (the so-called "L'Aquila Breccias") extends for 13 km to the NE from L'Aquila city to the Gran Sasso Range, having a volume of about $460 \times 10^6 \text{ m}^3$ and is characterized by typical morphological features such as hummocky topography, compressional ridges and run-up on the opposite slope. The landslide body facies is chaotic with massive detritus and angular to sub-angular clasts composed of limestones and rare cherts, and belonging to the Meso-Cenozoic slope-to-basin carbonate facies of Gran Sasso Range. This support the hypothesis that the source area is placed northward. Such a study is framed within a wider research activity focused on a better understanding of the role of gravity-induced and denudational processes in the Quaternary morpho-evolution of the Apennines chain and to determine the potential "residual risk" conditions interesting slopes already involved in deep seated gravitational slope deformation and massive rock slope failure processes [7; 8; 9].

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