ESC2016-423, 2016
35th General Assembly of the European Seismological Commission

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4–10 September 2016
Trieste

Recent insight into seismic amplification effects and seismically-induced boulder falls at Casentino city site (AQ).

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The 2009 L'Aquila earthquake (5.9 ML) has boosted microseismic zonation studies within the South-East part of the Aterno Valley where seismic Intensity higher than 6 MCS was recognized. During this seismic event several towns and villages were threatened by the combination of multiple co-seismic phenomena. The Italian guidelines for seismic microzonation do not clearly suggest any procedure to combine multiple co-seismic effects from single and multiple seismic hazard scenarios although a few scientists are currently developing studies for drawing maps of multiple co-seismic effects. Thus, the main aim of this study is to combine two-dimensional seismic response analyses carried out by a finite element method commercial code (RSL2D, 2015) to the seismically-induced instability scenario related to 2009 L'Aquila earthquake involving both sliding and fall movements within the case study of Casentino site (Sant'Eusanio Forconese, L'Aquila). The urban area of Casentino is located near the foothill of a limestone steep relief where boulder falls were caused by the main shock on 6 April 2009. The city is settled on the continental sequence where shallow deposits are made up of colluvium and debris covering overlying alluvial soils (10-60m) brought by the Aterno river. Alongside depth there are interbedded layers of silts, clayey silts and sandy silts (10-20m). At the basement of this sequence there are stratified, fractured and cataclased micritic limestones and calcarenites. Casentino urban area suffered seismic amplification effects due to the upper layers of alluvial deposits. Accordingly, the writing authors propose a microzonation map of multiple co-seismic effects for the seismic event scenario of 2009 L'Aquila earthquake.