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Evidence for Quaternary strong paleo-earthquakes in the epicentral area of the April 6th 2009 l'Aquila earthquake, Italy

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Despite the main active fault system networks of Central Italy are well described and mapped, the April 6th 2009 l'Aquila earthquake demonstrated that strong earthquakes can occur on previously poorly described fault systems, which are characterized by very low morphotectonic evidence, like the Paganica Fault. This implies that, despite the strong seismological potential of the l'Aquila region is documented in the historical heritage of the past two millennia and by available paleo-seismological data, detailed structural data and additional paleo-seismological information bear a fundamental importance for precisely assessing the seismic hazard of the area. In this contribution we present new paleo-seismological evidence for strong paleo-earthquakes collected in temporary outcrops made available by the construction of the post-sisma house complexes in the western sector of the l'Aquila basin. In particular, we describe large liquefaction-induced features associated with a previously unmapped extensional fault zone cutting through Quaternary sediments. We also describe well developed lateral spreading in lignite bearing Quaternary lacustrine sediments, then overprinted by extensional faulting. The relationships between the structural architecture of the western l'Aquila basin, the location of the April 6th 2009 earthquake, and the inferred magnitude of paleo-earthquakes are discussed. Our data support the occurrence of alternating moderate earthquakes along the southern segment of the l'Aquila basin boundary fault system (the Paganica Fault), and strong earthquakes when the entire fault system is activated.