New paleoseismic data from the Irpinia Fault. A different seismogenic perspective for southern Apennines (Italy)

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SUMMARY

The Irpinia Fault (i.e., Mount Marzano Fault System: MMFS) was responsible for the devastating 1980 earthquake (Mw 6.9) that caused the longest surface faulting ever observed in Italy (>30 km). Early paleoseismological studies have revealed a ~2 kyr recurrence time for 1980-like characteristic earthquakes on this fault system during the Holocene. However, this appears to clash with both the catastrophic historical seismicity and the high GPS-derived strain rate of the area. To explain this apparent discrepancy, we investigated the MMFS through a multidisciplinary approach. First, on the basis of recent archives and archaeological research, we reassessed the historical seismicity of the area, analyzing the highest intensity distribution of the major earthquakes of the upper Ofanto Valley, with respect to the MMFS hanging wall. Then, we carried out a step-by-step survey along the entire 43-km-long fault system, through both high precision topographic levelling along the compound fault scarp and geostructural analyses. Finally, we excavated trenches and pits across different fault segments, to explore the recent paleoseismological history of the structure. Based on the combined results that we have obtained, we propose