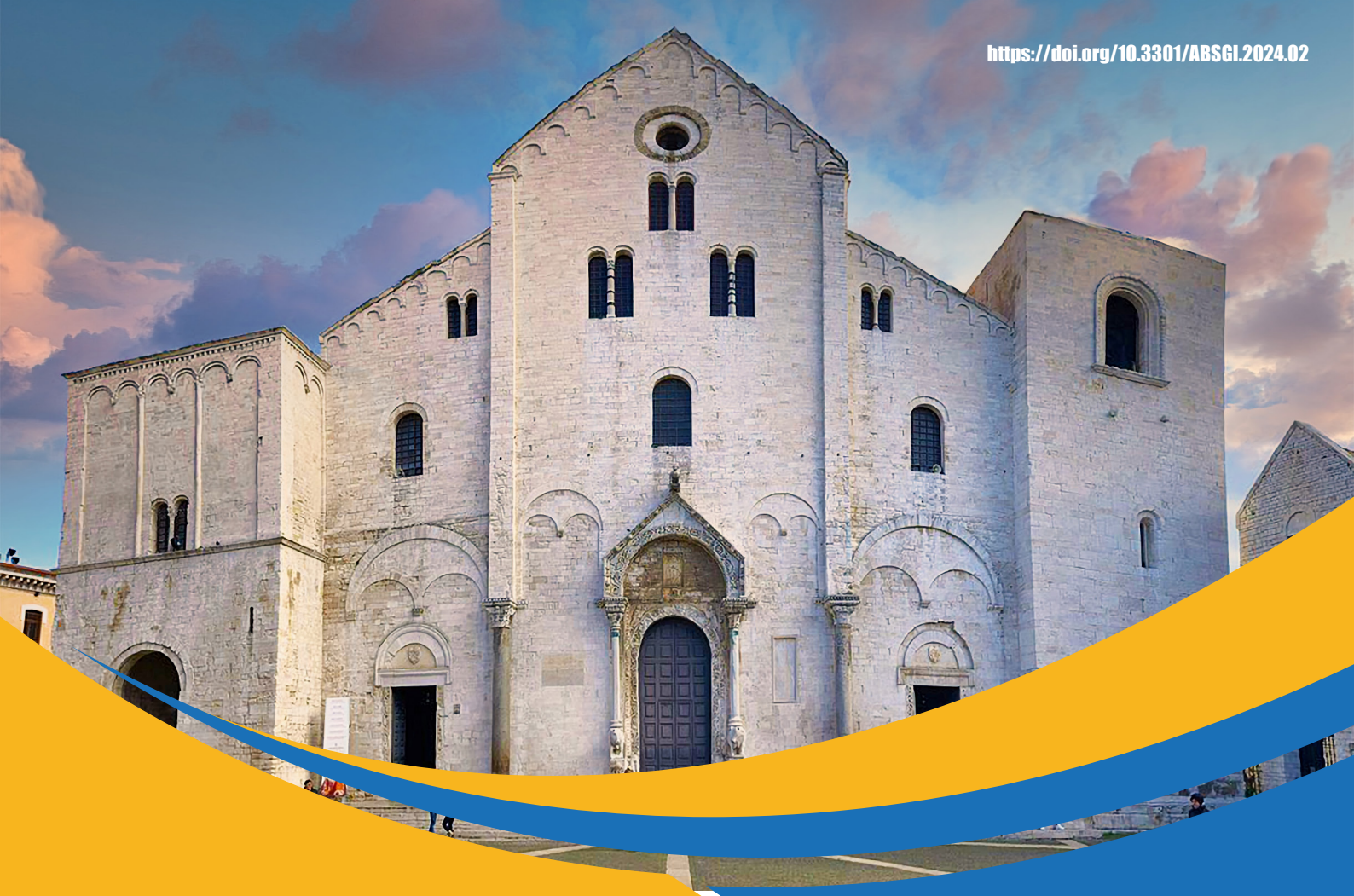
https://doi.org/10.3301/ABSGI.2024.02



Bari, 2-5 September 2024

ABSTRACT BOOK

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The Pontifical Basilica of Saint Nicholas (Bari).

Paleoseismological evidence of multiple, large magnitude earthquake surface ruptures on the active Mt. Morrone normal fault, central Apennines, Italy

Puliti I.[1], Pizzi A.*[1], Gori S.[2], Falcucci E.[2], Galadini F.[2], Moro M.[2] & Saroli M.[2]

[1] Dipartimento di Scienze Psicologiche, della Salute e del Territorio, Università "G. d'Annunzio", Chieti. [2] Istituto Nazionale di Geofisica e Vulcanologia, INGV. [3] Dipartimento di Ingegneria Civile e Meccanica, Università di Cassino e del Lazio meridionale.

Corresponding author email: alberto.pizzi@unich.it

Keywords: paleoseismology, seismic hazard, Central Apennines.

The Mt. Morrone active normal Fault (MMF) and the related Sulmona intermountain hanging wall basin constitute one of the most characteristic examples of the extensional tectonic landscape carving the central Apennines of Italy. Above the SW-dipping MMF, extending for more than 22 km in a mean NW-SE direction, concentrates a population of several tens thousands of inhabitants with a thriving industrial and commercial reality, as well as a historical and cultural heritage of great significance documented by archaeological and architectural elements. According to the current knowledge, the last activation event of the whole MMF occurred approximately 2000 years ago (Ceccaroni et al., 2009) and the maximum expected magnitude from fault activation is approximately M 6.6-7 (Gori et al., 2009). Thus, the MMF today constitutes one of the most problematic structures in the central Apennine seismotectonic setting in terms of large magnitude earthquake probability. However, despite this, information on the activity of the MMF rare presently relatively few, both as for associated historical seismicity and paleoseismological data. To strengthen these knowledge weaknesses, we performed new extensive paleoseismological analyses (by means of four trenches dug across the MMF) in the central sector of the fault, specifically in the Roccacasale village area. Our goal was to supplement the limited existing dataset, primarily comprised of a single paleoseismological study (Galli et al., 2015) on evidence of coseismic faulting (situated close to the northwestern tip of the fault). Additionally, we aimed to incorporate findings from a pair of studies focused on archaeoseismological and speleoseismological secondary evidence (Di Domenica & Pizzi, 2017). Through these analyses, we unveiled three significant surface rupture events of the MMF occurred over the past 6000 years Before the Present (BP). Specifically, as for the youngest displacement event (Eq1) that we identified, it occurred after 3.6-3.5 kyr BP, being thus chronologically consistent with the previous paleoseismological and archaeosesismological information that dated the event at 2nd century CE; a penultimate event (Eq2) occurred after 4.4 kyrs BP; a previous event (Eq3) occurred after 5.4-5.3 kyr BP, presumably between 4.8 kyr and 4.6 kyr BP; and the oldest event (Eq4) took place after 9-8.9 kyr and (presumably) before 5.8-5.7 kyr BP. Considering that the cumulative minimum vertical displacement (minimum because we lacked correlative stratigraphic markers in the fault footwall as to define the actual cumulative offset), estimated encompassing the last three events, is approximately 140 cm, that metre-scale large ground chasms opened during these events, and based on the length of the fault at the surface, we can confirm that earthquakes with M 6.6-7.0 may be expected from the activation of the MMF with an inferred average recurrence interval not longer than 1800 years over the last ca. 5500 years.

Ceccaroni E. et al. (2009) - The 2nd century AD earthquake in central Italy: Archaeoseismological data and seismotectonic implications. Natural Hazards, 50(2), 335-359, https://doi.org/10.1007/s11069-009-9343-x.

Di Domenica A. & Pizzi A. (2017) - Defining a mid-Holocene earthquake through speleoseismological and independent data: Implications for the outer Central Apennines (Italy) seismotectonic framework. Solid Earth, 8(1), 161-176, https://doi.org/10.5194/se-8-161-2017.

Galli P. et al. (2015) - Holocene paleoearthquakes and early-late pleistocene slip rate on the sulmona fault (Central Apeninnes, Italy). Bulletin of the Seismological Society of America, 105(1), 1-13, https://doi.org/10.1785/0120140029.

Gori S. et al. (2009) - Active normal faulting along the Mt. Morrone southwestern slopes (central Apennines, Italy). International Journal of Earth Sciences, 100(1), 157-171, https://doi.org/10.1007/s00531-009-0505-6.

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