

RC1

Line 1: I suggest "investigations"

Line 2: (Italy)

The title is now: New paleoseismological and morphotectonic investigations along the 2018 surface ruptures of the Fiandaca Fault, eastern flank of Etna volcano (Italy)

Line 20: here in the abstract you mention 3 events only, so it is not clear how you can affirm this. Please rephrase

Thanks for the suggestion, this section of the abstract has been modified

Line 25: This sentence is more appropriate in the conclusions than in the abstract

Thanks for noticing that, the sentence have been removed from the abstract and integrated with the conclusions

Line 30: Done; as suggested, 'vital' has been changed with 'important'

Line 31: why late Quaternary? I should say in general volcanic areas

Yes, Late Quaternary volcanoes has been changed with "active volcanoes"

Line 43: 'morphotectonic' changed in 'morphotectonics'

Line 59: 'historical' has been added as suggested

Line 100: macroseismic intensity is usually expressed by roman numbers, i.e. IX-X

Now is expressed in roman numbers

Line 104: I recommend to cite another important paper by Branca & Ferrara (2013), <https://doi.org/10.1016/j.tecto.2012.11.011>

Done

Line 123: no, dashed faults are buried

We thank the reviewer; we meant uncertain faults, since they are uncertain they have been removed from the figure

Line 143-144: Guidoboni et al. did not associate the 1329 seismic swarm to the FIA activity. It is not correct to cite them to anticipate the results of your trench. Please, modify the sentence

Yes, maybe the sentence was not clear and it has been modified as follow: The first known strong earthquake in the study area (Mw 4.03; Rovida et al., 2020) occurred during the seismic swarm that preceded and accompanied the 1329 lateral eruption (Guidoboni et al., 2019). This event occurred on the Mt. Etna E flank; however, there is no available information about the seismogenic structure responsible for 1329 earthquake.

Line 176: uniform with E-most at row 178

Done

Line 206: it should be cited as "personal communication"

Done

Line 234: chapter 5?

Thanks for noticing, the chapter are now numbered correctly

Line 316: Done, 'in the same area' has been added to the text as suggested

Line 372: this hypothesis is based on not-comparable evidence: detailed historical accounts vs faulting events detected in that trench. I consider this misleading

We modified the text adding the following:

We are aware that this hypothesis is based on evidence that in principle might seems not comparable: detailed historical accounts vs faulting events detected in a trench. However, paleoseismic data allow to extend the seismic catalogue back in time (Michetti et al., 2005; and reference therein). Even with dating uncertainties, paleoseismology is the only possible methodological approach that permit to complement the macroseismic and instrumental seismicity data in order to obtain a long-term record of strong earthquakes, which is the only reliable basis for seismic hazard analysis. This is the case for Mt. Etna, where historical macroseismic information is essentially limited to the XVIII century to present time window. Moreover, the extensive literature that uses a similar approach worldwide testify in fact the robustness of this approach (e.g., Rockwell et al., 2000).

Line 383: Done, 'buried beneath lava-flows' has been added as suggested

Line 389: Done, 'hidden' has been changed with 'buried' has suggested

Line 404-407

The letters indicating the figures have been corrected

Line 435 and 436: Done, 'mean' has been added

Line 460: Done, 'evidence' has been changed with 'investigation'

Line 463: Done, the 'recent' has been changed with 'the last eight'

Line 484: Done, 'reveals' has been changed with 'could be compatible with'

Line 486: Done, 'corroborate' has been changed with 'are consistent with'

Line 486: Done, 'findings' has been changed with 'evidence'

RC1 to the Supplementary

Table S1: the following are not epicentral locations but just areas in which the earthquakes were felt. Please modify

Done

Table S1: the above table and the following description mimics the paper by Azzaro (1999), based on the same historical sources. The authors should explain the difference with this previous work, and what they added as a new contribution/information

We thank the reviewer for the comment. The table caption has now the references of the data which is modified after Azzaro (1999), Azzaro et al. (2022) and Tringali et al. (2023). Specifically, the earthquakes of 1329 (from Guidoboni et al. 2019), 1766, 1809, 1819, 1829, and 1831 (from Azzaro and Castelli, 2015) have been added. The table and text describing earthquakes and historical surface faulting is only a summary of information that has already been published for the most part. The only substantial addition concerns the 1997 earthquake, for which information has been added. However, the 1997 earthquake was a very small event, so we decided not to include all this information in the main text. For this reason, the table and the detailed descriptions are included in the supplementary material.

We have added this sentence before the description of each earthquake: “Below is a description of the earthquakes with further information regarding surface faulting, which is a summary of the data already published. The only substantial addition concerns the 1997 earthquake surface faulting information”

Comment for the sentence “*The surface faulting length and the macroseismic data confirms that the 1894 and 2018 earthquakes are very similar each other.*”: this outcome has been already discussed in Azzaro et al. (2022). Please cite it

Done; the citation has been added along with Tringali et al. (2023) where was also observed the similarity between the 1894 and 2018 event.

Figures S3, S4 and S5: the surface reference (dashed black line) taken in the footwall appears in some cases (prof. 1,24,8) highly arbitrary; the same for the hangingwall (prof. 3,4,5,10,11). This affects the results. Please discuss in detail method and choices made. In addition, what's the role of geology?

We thank the editor for noticing this. All the profiles have been carefully reviewed and modified as follows:

- Profile 1: replaced
- Profile 2: removed
- Profile 3: fixed
- Profile 4: replaced
- Profile 5: replaced
- Profile 8: removed
- Profile 10: fixed
- Profile 11: fixed

There are now 10 profiles in total, rather than 12.

The reference surface has been evaluated along several sections based on the very detailed DTM available for the study area. The DTM used to realize the topographic profiles, and to estimate the lava flows thickness, has generally an accuracy of ± 0.3 m varying at ± 0.6 m in areas covered for the 70% by tree vegetation. Therefore, the calculated throws have an accuracy of ± 0.3 m. The reference surface has been considered as the top of the lava flows. The surfaces have been traced by hand on both the sides of the fault. The profiles are located where these surfaces are most recognisable. In particular, the profiles are located in areas with a low degree of urbanization along the fault zone. We therefore chose profile traces that are less affected by erosion or anthropization with excavations and/or refilling. However, we are aware that, as this is a densely inhabited area, there may be changes to the original surface. For this reason, we have realised several profiles in order to minimise possible errors in the measurements. The similar values obtained in almost all the profiles confirm the reliability of the obtained results.

The role of geology, in terms of the different lava flows cover, is extensively discussed in the main text in the section 6.3 alongside the kinematic model. In fact, the proposed model suggests that the lava flows totally covered the original fault scarp and the observed surface offset is tectonically cumulated with a trishear mechanism. The model is supported by the observed 2018 surface faulting features.