

Interactive comment on “The Volcanoes of Naples: how effectively mitigating the highest volcanic risk in the World?” by Giuseppe De Natale et al.

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Answers to Short Comment 2 (Christopher R.J. Kilburn)

We thank the colleague for the very helpful comments and suggestions. We try to synthesize our answers to the comments/suggestions received, since it is not a formal review.

‘Previous discussions of the emergency plans, especially for Vesuvius, have focussed on preparations before an eruption (e.g., Rolandi (2010) *J Volcanol Geotherm Res*, 189, 347-362; Papale (2017) *J App Volcanol* 6, 13). This paper raises the importance of considering also how to mitigate the economic and social consequences of long-term evacuation, which it has identified as a key goal for interdisciplinary social and

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volcanological studies. The results will have implications beyond the Neapolitan area. Nearly 70 cities with populations exceeding 100,000 live with the threat from volcanic eruptions (Heiken, 2013, *Dangerous neighbors: volcanoes and cities*. Cambridge) and so effective measures for permanently reducing the numbers at risk will have value worldwide.’

Answer: Thank you, we added all he suggested references in the revised version.

The paper also notes the advantages of evacuation by sea (Lines 335-340). Have the authors assessed the numbers that could realistically be transported, especially during the 72 hours of the emergency evacuation? Local ferries have a notional capacity of 1,000 passengers and so c. 100 journeys would be required to transport numbers on the order of 100,000. For ferries to make a significant contribution, might it be necessary to increase the official evacuation time to more than 72 hours?

Answer: As we specified, in one case at least, namely Ischia island, the evacuation by sea is the only possibility; in this case, the people to evacuate would be reasonably less than the whole island population (there is not an emergency plan or red zone yet), i.e. about 60,000 people. However, although local ferries capacities are more limited, large cruise ships can host more than 3000, 4000 or else 5000 people. So, little more than 100 trips to the closest safe places could be enough to evacuate even the largest red zones. Obviously, the departure ports should be able to host the large cruise ships. This also calls for a serious improvement of the port basins and of their facilities, which fall into the more general infrastructural improvement needed in the areas of maximum volcanic hazard.

Fig. 4. shows an age of about 18 ka BP for the Pomici di Base at Somma-Vesuvius, whereas the text (Line 131) quotes 22 ka BP. Could the preferred age be confirmed? Rolandi (1998) has also recognised an earlier plinian eruption - the Codola eruption - at 25,000 BP (Rolandi, G., 1998. *The eruptive history of Somma–Vesuvius*. In: Cortini, M., De Vivo, B. (Eds.), *Volcanism and archaeology in Mediterranean area*. Research

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Signpost, 3, 77–88. He may additionally have described this eruption in a more widely distributed journal).

Answer: Thank you for having pointed out the mistake, and for suggesting to include Codola eruption. The most accredited age in literature, for the Pomici di Base eruption, is 18 ky BP, just as shown in the figure. So, we corrected the age at lin 131. Furthermore, we did not mention the Codola 25 ky BP eruption, which is however now recognized by most of the recent literature. We then also added it in the figure, which was redrawn from the website of INGV-Osservatorio Vesuviano, and did not report the Codola eruption.

Fig. 7. The graph (and associated analysis) of ground movements at Pozzuoli, in Campi Flegrei, since Roman times is due to Bellucci et al. (2006, Geol Soc London, Spec Pub, 269, 141–158) and not to Troise et al. (2018) nor to Morhange et al. (2006 - Line 186).

Answer: Thank you, we sincerely apologise to have missed this reference, which is undoubtedly the first one in which such a secular deformation behaviour was proposed (it was noted also by the reviewer 2). We added the original reference to the revised manuscript.

Examples of additional studies that could be cited to broaden the review include: (1) At Vesuvius, probabilistic analysis of hazard and risk have also been presented by Scandone et al. (1993, J Volcanol Geotherm Res 58, 263-271), Neri et al. (2008, J Volcanol Geotherm Res 178, 397-415), and Lirer et al. (2010, Bull Volcanol (2010) 72, 411-429). (2) At Campi Flegrei, alternative reconstructions of ground movements since Roman times have been proposed by Parascandola (1947, I Fenomeni Bradisismici del Serapeo di Pozzuoli. Genovese, Naples); Dvorak. & Mastrolorenzo (1991, USGS Spec Paper, 263, 1-47); Morhange et al. (2006, Geology, 34, 93-96); and Di Vito et al. (2016, Sci. Rep. 6, 32245).

Answer: Thank you. We knew such papers, and not quoted all of them just to avoid to

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make references too much cumbersome. However, we actually included some of them.

Please also note the supplement to this comment:

<https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2020-51/nhess-2020-51-AC2-supplement.pdf>

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2020-51>, 2020.

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