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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Methodological Considerations in Cover-Collapse Sinkhole Analyses: A Case Study of Southeastern China's Guangzhou City" *by* Long Jia et al.

Anonymous Referee #2

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Sinkhole susceptibility in the evaporite environment of the Dead Sea is described in the paper, with implementation of a methodology based upon geophysical methods to ascertain groundwater aggressiveness. The topic is certainly of interest to NHESS, and the work contains some data and considerations worth of interest. However, overall the article needs thorough revision, starting from the English language, that definitely is below the standard for publication. The revised text should be carefully checked by a English native speaker, to ensure its readability. I have listed in the accompanying file a number of small corrections, requests of clarification on some issues that are not clear to me, and highlighted all those parts where I could not get what the Authors meant. But I am sure there are other points in the text where language needs to be

adjusted as well. Another problem, apart from language, is the scientific content. The issues dealt with are sometimes analyzed quite superficially, with general sentences that do not go deep, as expected for a scientific journal. For instance, the historical analysis, through documentation, reports, witnesses, and aerial photograph analyses is a strong and validated approach in the analysis of geological hazards, but this do not appear significantly from the manuscript. It would be interesting to know more about the sources from where the documented sinkholes have been identified, their reliability, etc. Further, when discussing the depth of bedrock in relation with sinkhole occurrence, very few indications are given. I guess you have quite a good amount of data, these should be properly presented and discussed, in order to understand the susceptible areas to sinkholes. As regards morphometry, there is one table showing the data but no discussion follows. Indices exist for sinkholes in order to evaluate their shape, the ratio with depth, etc. Please refer to the recent paper by Zumpano et al. (2019) and have a look at the references therein about sinkhole morfometry.

Throughout the paper the focus is on cover collapse sinkholes, but clear references to the most widespread sinkhole classification (Gutierrez et al., 2008, 2014) are lacking. Further, in the very last paragraphs of the article, for the first time sagging is mentioned. This needs to be clarified, once again referring to Gutierrez et al., 2014, and explain if actually there is cover sagging or not. In case of positive answer, this issue should be dealt with before in the article.

At the beginning of the discussion section, it is not clear whether in China procedures or guidelines to study and investigate sinkholes are mentioned. Please clarify this point, and discuss it.

In general, the reference list is quite poor. I am enclosing to this comment a long list of possible additional references that might be useful to the Authors to improve their paper, and have also indicated in the text locally some possible adding.

When quoting more than one paper in the text, the references must be listed in chrono-

logical order. This guideline is not followed in the manuscript. Please correct it throughout the text.

Comment on Figures Figure 1: scale is missing. In the legend, mantle is typed incorrectly, please correct. Figure 5: it does not add anything to the paper, in my opinion. What is the aim to include it? You should clearly explain it, or delete it.

Suggested references:

Andriani G.F. & Parise M., 2015, On the applicability of geomechanical models for carbonate rock masses interested by karst processes. Environmental Earth Sciences, vol. 74, p. 7813-7821, DOI: 10.1007/s12665-015-4596-z. Andriani G.F. & Parise M., 2017, Applying rock mass classifications to carbonate rocks for engineering purposes with a new approach using the rock engineering system. Journal of Rock Mechanics and Geotechnical Engineering, vol. 9, p. 364-369. Buchignani V., D'Amato Avanzi G., Giannecchini R., Puccinelli A., 2008, Evaporite karst and sinkholes: a synthesis on the case of Camaiore (Italy). Environmental Geology, vol. 53, p. 1037-1044. Closson D, Abou Karaki N (2009) Human-induced geological hazards along the Dead Sea coast. Environ Geol 58:371–380. Closson D, Lamoreaux PE, Abou Karaki N, Al-Fugha H (2007) Karst system developed in salt layers of the Lisan Peninsula, Dead Sea, Jordan. Environ Geol 52:155–172. Dreybrodt, W., 2004. Dissolution: evaporite and carbonate rocks. In: Gunn, J. (Ed.), Encyclopedia of Caves and Karst Science. Fitzroy Dearborn, New York, pp. 295–300. Ezersky, M., Legchenko, A., Eppelbaum, L. and Al-Zoubi A., 2017. Overview of the geophysical studies in the Dead Sea coastal area related to evaporite karst and recent sinkhole development. International Journal of Speleology, 46 (2), 277-302. https://doi.org/10.5038/1827-806X.46.2.2087 Festa V., Fiore A., Parise M. & Siniscalchi A., 2012, Sinkhole evolution in the Apulian karst of southern Italy: a case study, with some considerations on sinkhole hazards. Journal of Cave and Karst Studies 74 (2), 137-147. Ford, D.C., Williams, P., 2007. Karst Hydrogeology and Geomorphology. Wiley, Chichester, (562 pp.). Gutiérrez, F., Guerrero, J., Lucha, P., 2008. A genetic classification of sinkholes illustrated from evap-

orite paleokarst exposures in Spain. Environ. Geol. 53, 993–1006. Gutierrez F., Parise M., De Waele J. & Jourde H., 2014, A review on natural and human-induced geohazards and impacts in karst. Earth Science Reviews, vol. 138, p. 61-88, doi: 10.1016/j.earscirev.2014.08.002. Mancini F., Stecchi F., Zanni M. & Gabbianelli G. (2009) Monitoring ground subsidence induced by salt mining in the city of Tuzla (Bosnia & Herzegovina). Environ. Geol. 58: 381–389. Margiotta S., Negri S., Parise M. & Valloni R., 2012, Mapping the susceptibility to sinkholes in coastal areas, based on stratigraphy, geomorphology and geophysics. Natural Hazards, vol. 62 (2), p. 657-676, DOI 10.1007/s11069-012-0100-1. Margiotta S., Negri S., Parise M. & Quarta T.A.M., 2016, Karst geosites at risk of collapse: the sinkholes at Nociglia (Apulia, SE Italy). Environmental Earth Sciences, vol. 75 (1), p. 1-10, DOI: 10.1007/s12665-015-4848-y. Milanovic PT (2000) Geological engineering in karst. Zebra, Belgrade. Milanovic P. (2002) The environmental impacts of human activities and engineering constructions in karst regions. Episodes, 25:13–21 Palma B., Ruocco A., Lollino P. & Parise M., 2012, Analysis of the behaviour of a carbonate rock mass due to tunneling in a karst setting. In: Han K.C., Park C., Kim J.D., Jeon S. & Song J.J. (Eds.), The present and future of rock engineering. Proceedings 7th Asian Rock Mechanics Symposium, October 15-19, Seoul, p. 772-781. Parise M., 2019, Sinkholes. In: White W.B., Culver D.C. & Pipan T. (Eds.), Encyclopedia of Caves. Academic Press, Elsevier, 3rd edition, ISBN ISBN 978-0-12-814124-3, p. 934-942. Parise M., Closson D., Gutierrez F. & Stevanovic Z., 2015, Anticipating and managing engineering problems in the complex karst environment. Environmental Earth Sciences, vol. 74, p. 7823-7835, DOI :10.1007/s12665-015-4647-5. Parise M., Gabrovsek F., Kaufmann G. & Ravbar N., 2018, Recent advances in karst research: from theory to ïňĄeldwork and applications. In: Parise M., Gabrovsek F., Kaufmann G. & Ravbar N. (Eds.), Advances in Karst Research: Theory, Fieldwork and Applications. Geological Society, London, Special Publications, 466, p. 1-24. Shaquor, F., 1994. Hydrogeologic role in sinkhole development in the desert of Kuwait. Environ. Geol. 23, 201–208. Vigna, B., Fiorucci, A., Banzato, C., Forti, P., De Waele, J., 2010b. Hypogene gypsum karst and sinkhole

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For all the considerations above, I recommend major revision. I believe that, after a good revision of the manuscript, and a control of the English language, it might become acceptable for publication, and encourage the Authors to work on it in order to improve its quality.

Please also note the supplement to this comment:
https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2020-53/nhess-2020-53-RC2-supplement.pdf

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