



## ***Interactive comment on “The mud volcanoes at Santa Barbara and Aragona (Sicily, Italy): Their potential hazards for a correct risk assessment” by Alessandro Gattuso et al.***

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I think that paper nhess-2020-369 by Gattuso et al.2021 is a very interesting paper and should be soon published after some minor revisions as follows:

- 1) Title should be changed because misleading. Better to write : The mud volcanoes at Santa Barbara and Aragona (Sicily, Italy): A contribution to risk assessment
- 2) Authors mention Hazard Assessment in Ch.5.2 and in Ch.6.1. In spite of valuable geophysical data no calculation or evaluation is given about mentioned Assessment. I think that strong dangerous eruptions could be considered similar to seismic events

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In principle, any natural hazard caused by seismic activity can be described and quantified by the formalism of Probabilistic Seismic Hazard Assessment if a Poisson distribution of data is demonstrated or hypothesized (see also Ch.2.3 in Mellors et al., 2007 in References). Seismic hazard analysis is performed deterministically when a particular earthquake scenario is considered and probabilistically when the likelihood or frequency of specific earthquake size and location are evaluated. (see, for a review, Kijko A., 2011 Seismic Hazard, in Gupta H.K. (Ed.) Encyclopedia of Solid Earth Geophysics). Probabilistic seismic hazard analysis (PSHA) quantifies the rate (or probability) of exceeding various ground motion levels at a site (or a map of sites) from all earthquakes of all possible magnitudes and at all significant distances from the site of interest.

The catalogue of eruptions described in present paper covers the period 1750-2020 approx. The available record is similar to records utilized by Mellors et al., 2007 or by Bonini, 2009 (see References). Within some limitations it's possible to utilize the available catalog in graphs similar to Fig.5 (Kijko, 2011) or to Fig.8 in Youngs RR, Copersmith KJ (1985) Implications of fault slip rates and earthquake recurrence models to probabilistic seismic hazard estimates. Bull Seismol Soc Am 75:939–964. In this way a Probabilistic Eruptive Events Hazard Assessment should be tentatively possible.

Ch.6.3 describes seismic data recorded at Santa Barbara mud volcano. Recorded data evidence that seismic signals are originated by gas bubbles. The proposed method allow to follow during time gas emission processes Authors are encouraged to collect further data and to compare them to eruptive periods. Longer data sets will allow more definitive comments on data oriented to more quantitative evaluations about gas emission dynamics.

- 3) Text should be reviewed by a native English mother language translator