



# ***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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Review #1 Line 20: we added “Digital Surface Model (DSM)” as suggested by Review Line 73: we added sentences as suggested by reviewer due to the multidisciplinary monitoring approaches. “ Multidisciplinary monitoring approaches have been used in different MVs in the world; more recently at Lusi Mud Volcano during and after the 2006 eruption. The last few years of activity have been characterized by periodic short-lived eruptive bursts. In May and October 2011, it was documented the activity with high-resolution time-lapse photography, open-path FTIR, and thermal infrared imagery (Vanderkluysen et al., 2014). Different geochemical surveys have been carried in 2006

by Sciarra et al., 2016, monitoring the soil gas concentration (222Rn, CO<sub>2</sub>, CH<sub>4</sub>) in the Sidoarjo district (Eastern Java Island, Indonesia). Linea 85: we have replaced “provoking” with “causing” as suggested by Review. Linea 88: we have replaced “repose” with “dormancy” as suggested by Review. Line 94: space “of drone”. Line 102 to 107: we rewrote the sentences as suggested “Santa Barbara and Aragona MVs areas are located in the central and south-west sector of the Sicily Region respectively, inside the Caltanissetta Basin (locations in Fig. 1). These two areas, consisting of Late Miocene to Pleistocene accretionary prism, have been formed simultaneously with the Tyrrhenian Sea opening, during the convergence between the African and Eurasian plates in the Neogene-Quaternary (Catalano et al., 2000b), reaching a deposit thickness of the order of some km”. Line 119, Figure 2: we added A and B and standardized the font size. Lines 163-165: we combined the 2 sentences “A general uplift of the area around the mud volcano, together with the presence of variable fractures with horizontal and vertical rejections were observed (DRPC report, 2008). During the period just before the paroxysmal event, from December 2007 to August 2008, Cigna et al., (2012) recorded up to 3–5 cm of progressive movements accumulating in the direction towards the satellite with the Satellite-based synthetic aperture radar interferometry method”. Line 178: we added references and rewrote the sentence as follow “The paroxysmal event lasted several minutes and was anticipated by a telluric event (Madonia et al., 2011) occurred a few hours before in the whole Terrapelata area and, contemporaneously, in the neighbouring area of St. Anna. According to Madonia et al., 2011, in august 2008, 5 earthquakes occurred with magnitudes ranging from 1.7 to 2.4 in the radius of 10-55 km from the sites” Line 189: we changed the sentence as suggested, “The activity of the Maccalube of Aragona, according to Greek, Roman and Arab historical evidences, have occurred at least for 2,500 years”. Line 245: we added the sentence “It could be lethal to human life if breathed in high concentrations, It is a toxic, corrosive, irritant and colorless gas with the characteristic unpleasant smell of rotten eggs. It can cause chronic diseases of the respiratory organs through prolonged exposure even at very low concentrations; at concentrations of 200-250 ppm it can

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cause pulmonary edema and risk of death, while at 1,000 ppm it is immediately lethal (NIOSH, 1981)" Line 278, Figure 4: we added A and B. Line 288: we have replaced "at first" with "starting" as suggested by Review. Line 289: we have replaced "With the aim" with "By using" as suggested by Review. Line 293, Figure 5: we added A and B. Lines 297-298: we rewrote the sentence "Secondly, through the elaboration in ArcGis 10.5, we created from each emission points checked in 2017, different omni-directional buffer circumferences, considering an increase in distance of + 30% respect to the greatest historical distance reached, due to the creation of the safety limits in both areas. For the hazard assessment, we elaborated 117 and 165 buffer circumferences with a radius of 180 m and 195 m at Santa Barbara and at Aragona respectively (Fig.6a and b). Line 304 Figure 6: we added A and B. Line 342 Figure 7: we added A and B. Line 412: we moved the sentence at line 245 as suggested.

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