

Interactive comment on “Insights into the recurrent energetic eruptions on Awu, one of the deadliest volcano on earth” by Philipson Bani et al.

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This paper provides insights into the Awu volcano; a poorly known but dangerous volcano located in Indonesia. The authors collected and analysed thermal IR, Multi-GAS and petrological data to identify the main hazards associated with this volcano. They also compiled information on past eruptions.

The manuscript is overall well-written and presents interesting data and photos on this interesting system. I'm finding this paper suitable for publication but still have general comments and questions, and identified several technical problems (typo, etc.) and mistakes. Some important statements do not seem supported at this stage by the

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results, but it might just be a matter of rephrasing. In any case, some clarification and further discussion is required (see below). I hope my review will help improve the manuscript and foster discussion.

Specific comments The introduction just documents past eruptions. It would be interesting to briefly introduce your aim and which methods you're going to use in this study in a paragraph or two? It would be great to provide more information regarding this relatively poorly known area of the world in terms of tectonic settings and volcanic activity. I would also perhaps even create a separate section for the volcano history.

Going through the very interesting table 1, I noticed that eruptions are particularly short (a few days). You often refer to Kelud to interpret your results and understand the hazards at Awu which seem totally relevant to me. In our recent paper (Caudron et al., 2015, GRL), we noticed that Kelud had very short but intense eruption and hence reasonable VEI (~4). Do you think this is the case at Awu? Any way to compute the intensity along with the VEI which may better reflect explosivity?

As clearly stated in the paper, another manuscript is being considered for publication in GRL. It would be interesting to explain how they differ as 1 table and several figures are found in both manuscripts (<https://www.essoar.org/doi/pdf/10.1002/essoar.10501997.1>).

L.167-169: I'm a bit lost here. You basically explain that 27 MW of radiant flux would be sufficient to evaporate all the incoming water (without infiltration) in maximum 8 hrs. This is convincing but why is this coherent with the drying out prior to the 1992 eruption? We don't know how fast it did evaporate since there is no date mentioned in Table 1, and the volume was more than 18 times larger than the one you mention on l.155. Similarly how does that support the drying out prior to the 2004 eruption? You may expect more heat to be transferred to the system prior to eruption but I'm a bit lost concerning the take-home message here. The section title Transition of heat to the surface controls the water accumulation is confusing to me at this stage. The fact that

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you did not observe any water in 2015 could simply be explained by the evaporation am I right? So the water accumulation is not simply controlled by heat coming from below.

L.179: I don't understand what supports the statement regarding lava domes emplacement without explosive magma-water interactions?

L.186-187: this is wrong. The 2014 Kelud eruption occurred after 7 years following the dome emplacement. Question: my understanding was the dome quickly grew at Kelud, within a few months or so, then completely stop growing? Is it the case for Awu?

L.196: other mechanisms exist. Just to keep the parallel with Kelud, Cassidy et al. 2019 (G3) suggest internal triggering: <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2018GC008161>. Another may relate to permeability reduction due to alteration at dome-forming volcanoes (Heap et al., 2019). I feel you should discuss these options in detail taking into account their knowledge of the Awu system.

L.215-220: this message is an important one but need to be supported better. You seem to imply that the explosivity of the past vigorous eruptions is related to magma-water interactions. Am I right? The example of Kelud 2007 vs 2014 shows that the water had only a negligible effect on the explosivity. Could you comment/elaborate on this?

Minor questions L.24: what is a little know volcano?

L.28: what are global impacts? L.40: It would be interesting for the reader to explain why/how some injections in the stratosphere lead to a cooling while other produce a warming. Just in 1-2 sentences

L.75: was the Multi-GAS deployed on the dome? The arrow on figure 2. You mention different locations in the text but there is only 1 arrow in the figure

L.101: this low frequency is interesting. What would create a 0.3 Hz pulsation? Are
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there other peaks at other frequencies?

L.159: what is the ambient temperature considered?

L.187-188 : which volcano are you referring to?

Technical Corrections L.26: reference for the extension to the sea bed is missing L.44: casualties L.97: it should be Figure 4 L.129: Cashmana? L.133: order of references? L.136: It is also Section 4.3. L.168: will no longer be sufficient L.176: the Kelud crater lake was not huge (2 million m³). L.176-177: But it is L.193: destabilize L.195: megapascals L.206: suggestion: rephrase this sentence. 'arc. 18 eruptions occurred over the last 3.5 centuries, including...' L. 208: Earth

Table 1: 1892: Why do you capitalize Tsunami and Pyroclastic here? And you don't use bold style for the number of victims. Make sure to be consistent throughout the table Figure 1: Great figure. There is a A, but no B or C. A color scale is missing for the 3D map on the right side. The bold labels on the map are a bit hard to read. Figure 6: can't find the GVP, 2013. I'd would also use consistent label sizes and perhaps change the white color to black for the 28/07/2015 photo. Figure 7: typo: circulations

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