

Point-by-Point Response Letter

We thank Charlotte Rowe for the valuable feedback on the manuscript. The comments are reproduced below in blue Arial fonts, with our responses and indications of how we have revised the manuscript indicated in black.

First, I'd like to say what a pleasure it is to read a manuscript that is so well-written. So often this is not the case, and it makes it so easy to follow the technical aspects. I have only a few comments / requests regarding revision.

1) Line 33: As a seismologist, I feel compelled to mention one of my major concerns regarding the SMART sensors, that the seismic sensors should be seismometers (velocimeters), not accelerometers - or include both. Here in the introduction only acceleration is mentioned, although I see that much later in the manuscript where instruments are discussed, the authors do state that Alcatel is including both (phew!). Please be consistent. Perhaps you could say "seismic ground motions".

We have revised the manuscript to use the term "seismic ground motions" in the Introduction and revise Section 4.2 to mention "seismic accelerometers and broadband seismometers" in the sensor modules.

2) Line 55: a comma after "earthquakes" would improve clarity.

We have inserted the comma.

3) Figure 1: Great figure and combining the seismicity, bathymetry and nested computational grids is an efficient way to go - but it's confusing to the reader to see mention of these grids and their levels without having been mentioned and defined in the text. Normally a figure does not appear before its contents have been referenced in the body of the manuscript. Is it possible to mention and define these grid levels before the figure appears, or, alternatively make an additional figure later in the manuscript that explicitly addresses them once they have actually been introduced to the reader? Also, grid lines are hard to see.

This is a good point. We have removed the computational grid information from the figure caption and referred to the two figure panels when defining the computational grids in Section 2.2. There is no need for a separate figure.

The faint Lat/Long gridlines in the figure are a result of down-sampling when the pdf was generated by Copernicus. The gridlines are more legible in the original image, which will be submitted separately after the paper is accepted.

4) Line 81: I don't expect this to be addressed here, but I'm just curious if anyone has investigated Coulomb stress changes for the event pairs, and if the probabilities are consistent with the occurrences of secondary events.

We did not perform static or dynamic triggering analysis in Robert et al. (2025) and are not aware of investigations on Coulomb stress changes for the event pairs. The event proximity favors

interaction although there is uncertainty in precise mechanism. The events have spatial and temporal offsets so establishing triggering mechanisms with high confidence is difficult.

We have pointed to the temporal and spatial proximity of the southern event pair and leave it at that.

5) Line 96: Another "just curious" - would the SMART cable deployment include sufficient slack to accommodate maximum anticipated displacements in the immediate vicinity (akin to the accommodation engineered into the Trans-Alaska Pipeline where it crosses major faults)?

A submarine cable crossing a continental margin is very different from pipelines running perpendicular to outcrop of vertical strike-slip faults. Most motion of the upper plate in a subduction zone will be seaward, and unless there is activation of an upper plate splay fault, the cable and shore facilities will translate with the upper plate. At the margins of a large thrust, there will be gradual displacement gradient on the lateral edge of the slip zone, but this will be spread out as elastic deformation, which is likely not strong enough to break the cable running perpendicular to the displacement field.

There is general guidance to include sufficient slack for submarine cables deployed across a continental margin. Typical practice for cable slack on the deep sedimented seafloor is 0.5-1%. This is increased to 1–2% on continental shelves and slopes to accommodate rougher bathymetry and lay tolerance. At a major, active subduction fault, 2–5% local slack plus geometric accommodations in the form of gentle S-curves represents conservative practice. Site-specific design parameters, such as the expected co-seismic slip and recurrence, allow determination of a combination of slack, geometry, and protection with a sufficient safety margin. The Tamtam system supplier takes these factors into account when designing the cable route.

This is an important point that we have incorporated in Section 4.2 of the revised manuscript.

6) Line 96: "SMART Cable would be located"

Maybe "is to be" is clearest.

7) Lines 106-108: It seems like more references are needed here when calling out the different types of finite fault slip models, or is Yamazaki et al. intended to cover them all? I'd like to see some original works cited here.

The reference, Yamazaki et al. (2023), is pertaining to the implementation of finite fault slip models for non-hydrostatic modeling of tsunami generation – an approach used in the present study and described in the sentence in which the reference is meant for. To avoid confusion, we have moved the sentence and reference to the end of the introductory paragraph and cited the original works of Kikuchi and Kanamori (1982 BSSA), Hartzell and Heaton (1983 BSSA), and Satake (1987 JPE) immediately after the sentence, where "finite fault-slip models" is first mentioned.

8) Line 137: "long-periods" In the usage you have, it probably shouldn't be hyphenated (whereas short-periods is correct to be hyphenated since it serves as a single adjective). The bigger

question is that are you referring to spatial wavelength or temporal oscillations? In either case it would be nice to have a rough frequency defined, i.e., "with long periods (~20 s) consistent..."

Suggested phrasing is OK.

9) Figure 2 caption: Slip distribution - total or vertical?

Slip distribution is on the fault.

10) Line 150: modeling is made to capture the maximum scenario. For hazard planning this is prudent. Is there a most likely scenario?

The modeling is made for a range of events from the recent M_W 7.7-8.0 earthquakes to the M_W 8.8 maximum scenario proposed by a UNESCO expert panel. The M_W 8.8 scenario, which comprises five M_W 8.33 subevents, involves rupture of the entire Southern Vanuatu segment of 500 km long. The largest observed plate boundary event, a thrust-faulting earthquake in 1875, is estimated to have been M_W 8.1-8.2. This allows the five M_W 8.33 subevents to individually serve as preferred maximum scenarios along the Southern Vanuatu subduction zone, which is why we present results for each subevent as well as the low probability M_W 8.8 scenario.

We have included this important point in Section 4.1.

Again, I really like this paper and my questions/comments amount to extremely minor changes.

Thank you for the helpful comments.