January 9th, 2023

Dear Dr. González,

We sincerely thank you and referee #2 for the constructive comments. We have addressed the questions and highlighted the areas where changes are made. Here we present our point-by-point responses and revisions to the comments.

Linlin Li

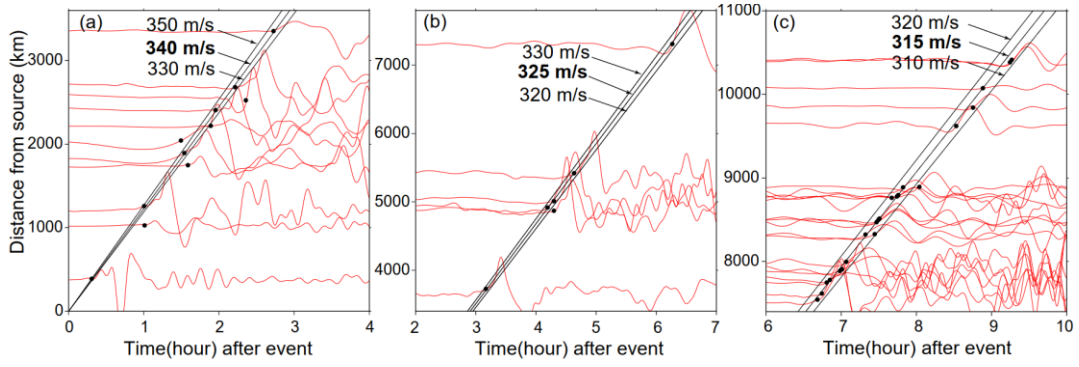
Note: The comments are in "*italics*", and our responses and revisions are in "regular" text (in blue) for clarity.

Response to Reviewer #2

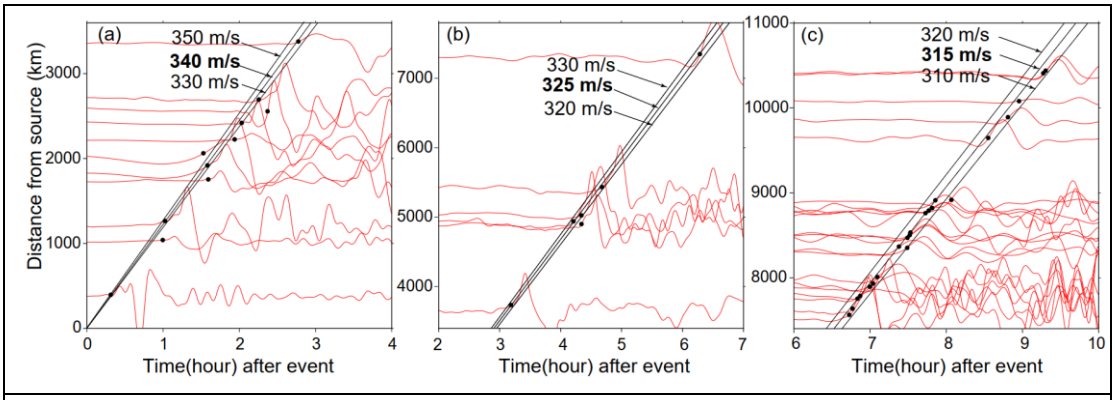
1. Response to comment 7 (original response to comment 11). Specification in this table indicates the measurement sensitivity is 1 mm. Hence, 0.1 mm could be the measurement error of DART. Even in lab experiment, it is hard to achieve an accuracy of 0.1 mm, not to mention the field measurement of DART.

Author's response: Thank you. It's a bit subjective when selecting a criterion value to identify the tsunami arrival time. In addition to the criterion of 0.1 mm. We have tested other criterion values such as 1 mm and made a careful comparison of different results. When we zoom in the figures, we find the larger criterion leads a visible shift of the arrival time at some Dart stations. However, the quantitative arrival difference between the results of 1 mm and 0.1 mm range between only a few seconds and ~4 min. To present the visual shift of the arrival time, we zoom in on the subplot (c) of both Criterions, for example, arrival time in the blue circle shift to the right ~3 min. The different results of the two criterions are shown in the figures below. We therefore conclude that the selection of criterion values (0.1mm or 1mm) does not affect the interpretation of the results.

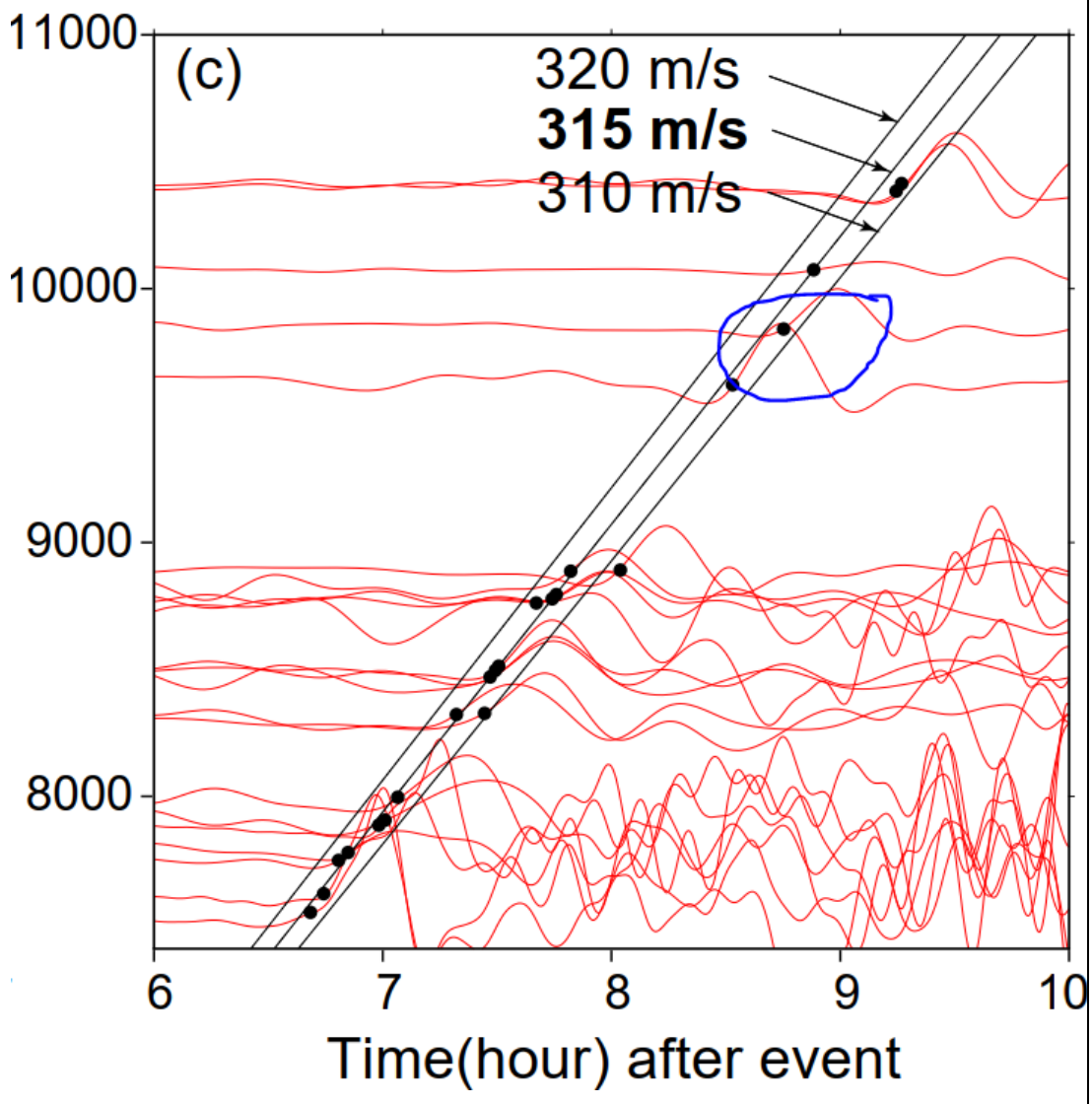
Criterion = 0.1 mm



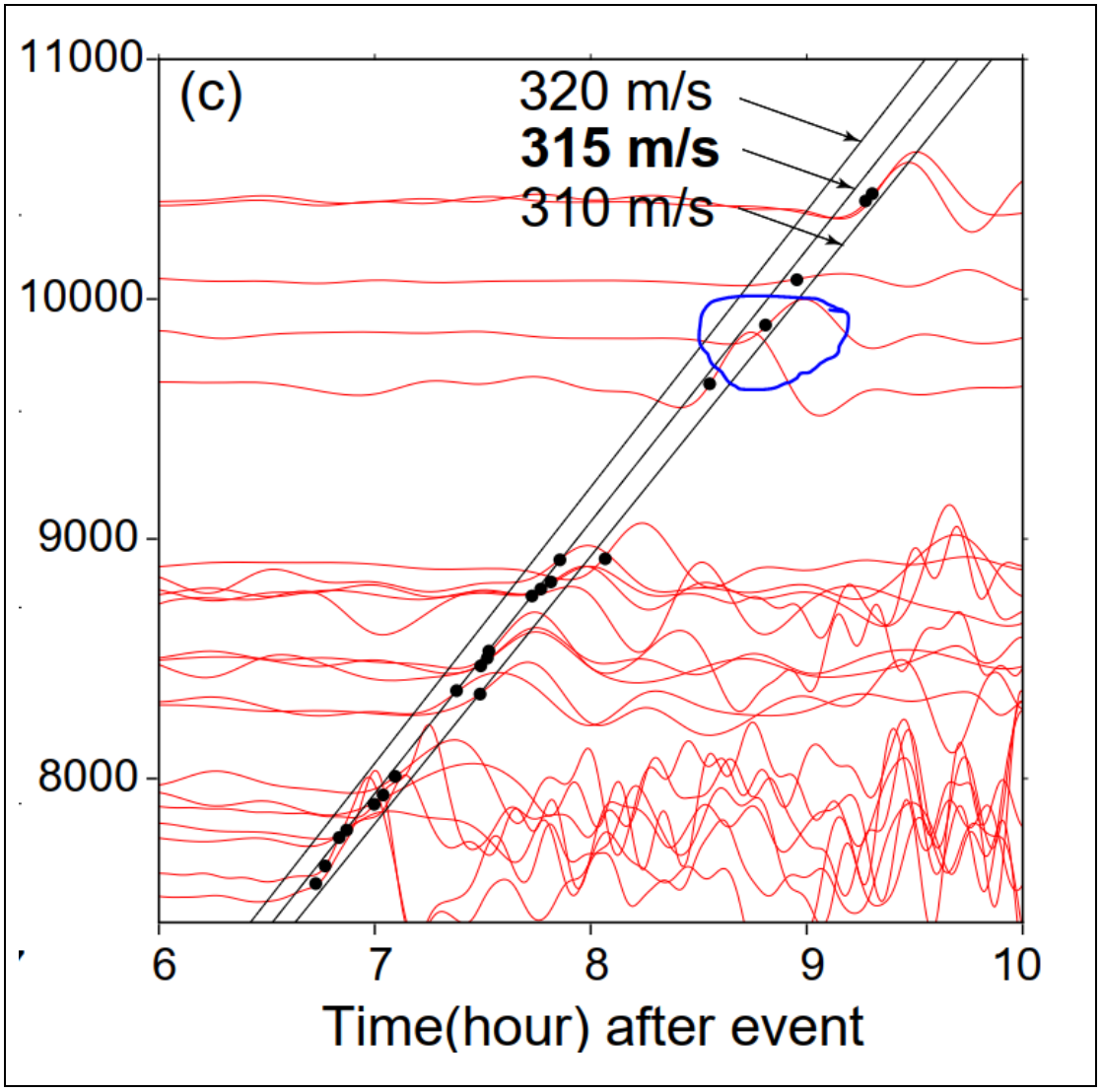
Criterion = 1 mm



Zoom in on the subplot (c) of Criterion = 0.1 mm



Zoom in on the subplot (c) of Criterion = 1 mm



2. Response to comment 9 (original response to comment 14). In last response, authors mentioned that 'We set the velocity to fit the Lamb wave arrival', while in this response, authors mentioned that 'The black lines are only used as a visual reference to help reader understand the velocity, not to fit the arriving time points'. I am lost with these two responses. Since the difference among the three velocities in sub-figures is not that large, i.e., 340, 325, and 315 m/s, plotting these black lines should be very much sensitive. Otherwise, the conclusions may change.

Author's response: We use the black lines which represent different constant velocities, to identify the velocity range of the Lamb wave-induced tsunami waves. The previous word 'fit' might be a bit confusing. We have rephrased this part to clarify our approach in the related content.

Author's change to manuscript: We have modified the related content in the manuscript as "Using different velocity values as constraints, we illustrate …" "Figure 3. Identifying the Lamb wave-induced tsunami velocities using different constant velocities as constraints"

3. Response to comment 15 (original response to comment 27). The blanked-out peripheral area of the spectrum shown in the response is different from what I know. Authors may refer to: Grinsted, A., Moore, J.C. and Jevrejeva, S. (2004) Application of the cross wavelet transform and wavelet coherence to geophysical time series. Nonlinear Process. Geophys., 11, 561–566.

Author's response: Thank you. This study adopts one of the wavelet methods, which is called "cross wavelet analysis and wavelet coherence", to analyze the waveforms of two time series together (Grinsted1 et al., 2004). The blanked-out peripheral area you mentioned is 5% significance level against noise backgrounds and the cone of influence where edge effects might distort the picture. It's one of the features of this method. We believe the blanked-out peripheral area doesn't influence how we interpret the results. Similar approach has been used by many previous studies (e.g. Titov et al., 2005; Wang et al., 2022; Heidarzadeh and Satake, 2013)

Reference

Grinsted1, A., Moore1, J. C., and Jevrejeva, S.: Application of the cross wavelet transform and wavelet coherence to geophysical time series, Nonlinear Process. Geophys., 11, 515–533, https://doi.org/10.5194/npg-11-515-2004, 2004.

Heidarzadeh, M. and Satake, K.: Waveform and Spectral Analyses of the 2011 Japan Tsunami Records on Tide Gauge and DART Stations Across the Pacific Ocean, Pure Appl. Geophys., 170, 1275–1293, https://doi.org/10.1007/s00024-012-0558-5, 2013.

Titov, V., Rabinovich, A. B., Mofjeld, H. O., Thomson, R. E., and Gonza, F. I.: The Global Reach of the 26 December 2004 Sumatra Tsunami, Science (80-.)., 309, 2045–2049, https://doi.org/10.1126/science.1114576, 2005.

Wang, Y., Heidarzadeh, M., Satake, K., and Hu, G.: Characteristics of two tsunamis generated by successive Mw 7.4 and Mw 8.1 earthquakes in Kermadec Islands on March 4,2021, Nat. Hazards Earth Syst. Sci., 22, 1–10, https://doi.org/10.5194/nhess-2021-369, 2022.