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Title: Critical Evaluation of Strong Ground Motions in Izmir and Implications for Future Earthquake Simulation Results

Dear Editor and Reviewers,

We sincerely thank the Editor and the Reviewer for their careful evaluation of our revised manuscript and for the constructive comments provided in this round of review.

In this revision, we have carefully addressed all additional comments raised by the Reviewer. In particular, explicit acknowledgements have been added for the original observation networks and institutes responsible for acquiring the ground-motion records listed in Table 6, as requested.

Our responses are shown in blue, and all corresponding changes in the revised manuscript are highlighted in yellow for ease of reference. We believe that the revised manuscript satisfactorily addresses all remaining concerns and further strengthens the scientific rigor and transparency of the study.

Sincerely,

Dr. Şahin Çağlar Tuna

I thank the author for carefully considering reviewers' comments and revising the manuscript accordingly. The manuscript has been improved significantly and can be accepted after minor revisions.

- Indeed, the author only used PEER NGA-West2 Ground Motion Database, but those data originated from several different observation networks or institutes. Please include acknowledgements for those networks and institutes that originally obtain the ground motion records in addition to acknowledgement for PEER.

Author Response: Thank you for the comment. We agree with the reviewer. Although the ground-motion records were accessed through the PEER NGA-West2 Ground Motion Database, the original recordings were obtained by several national and international strong-motion observation networks and institutes. Accordingly, Table 6 has been revised to include an explicit note acknowledging the original data-providing networks and institutes, in addition to acknowledging PEER as the data repository. These include the National Research Institute for Earth Science and Disaster Resilience (NIED, Japan; K-NET and KiK-net), the United States Geological Survey (USGS) and the California Geological Survey (CGS), USA, and GeoNet operated by GNS Science in New Zealand.

- Two slightly different city names "Izmir" and "İzmir" are used. Please use consistent name.

Author Response: Thank you for pointing this out. The manuscript has been revised to ensure consistent usage of the city name throughout the text. In accordance with standard English-language publishing conventions, the city name is now uniformly written as "Izmir".

- Discussion on rupture directivity in lines 372-375 seems insufficient. It seems about 60 km between the epicenter of Samos earthquake and Izmir city. Therefore, the rupture directivity would have affected all three stations examined in section 3. Difference of spectral acceleration for components can be caused by the other effects. I am wondering whether the spectral acceleration difference found for only one station can be related to the rupture directivity effect.

Author Response: Thank you for the comment. We agree that, given the approximately 60 km distance between the Samos earthquake source and Izmir, rupture directivity should not be interpreted as a dominant or uniquely controlling mechanism at a single station. The intent of the discussion in Lines 372–375 was not to attribute the observed component-dependent spectral differences solely to rupture directivity, but to place the long-period directional behavior observed during the 2020 Samos Earthquake within a broader physical context.

In the revised manuscript, this section has been rewritten to clarify that the observed N–S to E–W spectral differences—most pronounced at Station 3519 but also present at the other stations with smaller magnitude—are interpreted as the combined effect of source-related directionality, wave propagation, basin geometry, and local site response. Rupture directivity is now discussed as one contributing factor among several, rather than as a controlling mechanism inferred from a single station.

Correspondingly, the construction of the target response spectrum has been reframed to emphasize that long-period spectral characteristics were defined using a physics-informed, regional envelope

that integrates multiple physical considerations, rather than being directly derived from individual station observations.

Notification to the authors:

1. For the next revision, please add full affiliation of the author. The department should be followed by the University/Institute, the city, and the country in English.

Author Response: Thank you for the comment. The author affiliation has been revised to include the full departmental, institutional, city, and country information. The country name is written as “Türkiye,” following its official international designation.

2. Regarding the figure 5: To clarify whether a copyright statement or a credit must be given in the map itself or in the caption, we differentiate between (a) maps entirely created by you, (b) maps created by you but based on layers reused from other originators, or (c) maps simply reused from other originators. An example for (a) is a digital elevation model (DEM) purely based on measurement points collected by you and derived by using a software product. If you use an existing map layer from another originator as a basis for significantly enriching the map with your own content, this would be an example for case (b). Case (c) could be a pure reproduction of Google Maps where your own contribution is rather small (e.g. a city map where you only added a few marks for your study locations). If the map was entirely created by you (case a), there is no need to change the caption or map. Please simply inform us. To the contrary, if your map follows cases (b) or (c), please let us know whether the map is distributed under public domain. If yes, please do not include a copyright statement (copyright is waived) but consider adding a credit to the map or caption. However, if your map follows cases (b) or (c) and is not distributed under public domain, please include at least a credit or even a copyright statement (e.g. © Google Maps), if this is required by the map provider, in the map itself or in the caption.

Author Response: Thank you for the clarification. Figure 5 corresponds to case (b) as defined by the editor. The base map layers were obtained from the AFAD TADAS platform, while the figure itself was produced by the authors by selecting, filtering, and annotating station locations and study-specific elements relevant to the analysis. Accordingly, a proper credit has been added to the figure caption acknowledging AFAD as the source of the base map.