Dear Dr. de Ruiter and Reviewer,

We would like to first express our deepest gratitude to Dr. de Ruiter for the rapid handling of our manuscript and for her continuous support and patience throughout the entire review process. We also extend our most sincere thanks to the reviewer for the exceptionally valuable suggestion regarding the recent work by Mori et al. (2026). **As the reviewer rightly pointed out, this suggestion was incredibly useful for us; it has guided us step-by-step in refining our manuscript, allowing us to accurately position our research within the very latest state of machine-learning ground-motion modeling in Italy.**

Yours sincerely,

The Authors
Key Laboratory of Earthquake Engineering and Engineering Vibration, Institute of Engineering Mechanics, China Earthquake Administration, Harbin 150080, China
Key Laboratory Earthquake Disaster Mitigation, Ministry of Emergency Management, Harbin 150080, China

Email of Corresponding Author: zifa@iem.ac.cn

Author Comment (AC)
Response to Referee

Manuscript: "A ground motion prediction model for the Italian region based on a mixture of experts framework"

In response to this insightful comment, we have made the following specific modifications to the revised manuscript:

1. Addition of a Comprehensive Methodological and Quantitative Comparison:

We fully agree that comparing our framework against Mori et al. (2026) significantly strengthens the manuscript. To properly address this, we have added a completely new Discussion section, which includes a new comparison table (Table 4), to systematically discuss the differences in dataset selection, validation strategies, and total residual variability (σ).

2. Clarification of Quantitative Performance (Track A vs. Track B):

As detailed in the newly added Discussion section, when evaluated under our strict single-event baseline (referred to as Track A in our development), our MoE-XGB model demonstrates highly competitive accuracy. For instance, at PGA, our model achieves a total standard deviation (σ) of 0.273, which is even slightly lower than the impressive 0.294 reported by Mori et al. (2026).

Furthermore, we explicitly contextualized the results of our foundational regional engine (Track B). While the σ is numerically higher in Track B (0.377 at PGA), we clarified that this explicitly reflects the massive scale and extreme heterogeneity of our dataset. Mori et al. filtered their dataset to 90 well-documented events, whereas our Track B incorporates 1,987 highly heterogeneous events, evaluated via a severe chronological splitting strategy (predicting 159 completely unseen "future" events). Constraining σ at 0.377 under such harsh, forward-looking conditions highlights the distinct robustness of the Mixture-of-Experts architecture.

3. Distinct Operational Advantages (Rapid Emergency Response):

To further differentiate our work, we explicitly discussed the distinct application contexts of the two models. Mori et al. (2026) achieved high precision by utilizing finite-fault distance metrics (e.g., R_{rup}, R_x) and complex DEM-based proxies. However, obtaining detailed finite-fault rupture models immediately after an earthquake is notoriously difficult and time-consuming. In contrast, our MoE-XGB model is deliberately designed to rely exclusively on highly accessible point-source parameters and scalar V_{s30}. As added to the manuscript, this predictor subset provides our model with a distinct operational advantage for rapid post-earthquake emergency response and automated ShakeMap generation.

4. Future Perspectives:

Finally, we highly value the advancements demonstrated by Mori et al. We have explicitly stated in the manuscript's outlook that integrating their proposed high-resolution geomorphometric predictors into our MoE routing mechanism represents a highly promising avenue to further elevate predictive precision in future research.

We believe that these additions provide a balanced, transparent, and rigorous view of our model's position in the current literature. We are deeply grateful for this suggestion.