

Response to Reviewers

Manuscript ESSD-2026-202 — "Ground-Motion Dataset for Shallow Earthquakes in Colombia"

Reviewer 2

General remarks and recommendations

Reviewer comment: (a) *Magnitude conversion uncertainties ($M < 4.5$) — the authors observe significant scatter in the between-event variability for magnitudes below 4.5. This is attributed to the empirical conversions used to transition from m_b and M_L to M . It would be beneficial if the authors will include a subsection demonstrating how extracting M from FAS corner frequencies compares directly with the SGC & GEM (2018) empirical equations.*

Response: We implemented a moment magnitude (M) estimation based on the S-wave corner frequency (f_c), estimated by fitting a Brune (1970) source model to the effective Fourier amplitude spectrum (EAS) of each recording. The corner frequency is converted to a rupture radius (Brune, 1970), and the seismic moment is obtained via the Eshelby circular-crack relation under an assumed constant stress drop, then converted to M following Hanks and Kanamori (1979). We tested stress-drop values of 1, 3, and 5 MPa against independently reported M (GCMT and other agency M solutions) and selected 5 MPa as the value that best reproduced the reference magnitudes. This corner-frequency-based M is now used preferentially over the original SGC & GEM (2018) m_b/M_L -to- M empirical conversion whenever a reliable agency-reported M is unavailable, since it does not rely on regional empirical conversion relationships. δB_e variability was considerably reduced.

Reviewer comment: (b) *Proxy-based VS30 limitations — only 28 of the 227 sites feature direct, in-situ shear-wave velocity measurements; the remaining site parameters rely heavily on topographic-slope inference maps. The authors may add a brief paragraph discussing the potential amplification of the epistemic uncertainty this introduces to the site-to-site standard deviation.*

Response: We agree and have added a paragraph noting that only 28 of the 227 sites have in-situ, microtremor-based measured, while the remaining sites rely on a topographic-slope-based VS30 proxy (Eraso and Montejó, 2019). We caution that this introduces additional epistemic uncertainty at proxy-based sites, which may inflate the site-to-site standard deviation ($\phi S2S$) estimated in this study.

Reviewer comment: (c) *Tectonic classification ambiguity — the manuscript leaves the exact tectonic classification (e.g., separating shallow crustal faults from intraplate subduction or interface events at shallow depths) down to the end-user's preference. It is advisable to provide even a preliminary tectonic categorization within the flatfile.*

Response: After consideration, we have chosen not to implement a preliminary tectonic categorization within the flatfile at this stage, as robustly separating shallow crustal, intraplate, and shallow interface events in this tectonically complex region would require a dedicated analysis beyond the scope of the present data-description manuscript, and a preliminary/uncertain classification could itself become a source of misuse if adopted uncritically by end users. We instead provide all the event parameters (depth, location, focal mechanism where available) needed for users to apply their own preferred classification scheme, and we note this limitation explicitly in the manuscript.

Targeted remarks

Reviewer comment: Line 56: *Define the acronym for the general readership as ground motion prediction model.*

Response: Done — GMPM is now defined at first use in the Introduction.

Reviewer comment: Line 68: *Define SGC. Not defined yet in the text, just in the affiliation section.*

Response: Done — SGC is now defined at first use in the main text (Compilation of the Data).

Reviewer comment: Line 69: *It must be stated that given these criteria, 694 seismic events are selected.*

Response: We now state explicitly that more than 700 earthquakes met the initial selection criteria, and that after removing volcanic events, records with signal artifacts, and (following this round of revision) a small number of events with unreliable magnitude estimates or coda-contaminated corner-frequency measurements, 667 events and their associated records were retained in the final flatfile.

Reviewer comment: *Line 97: How was the uncertainty (sigma) effect incorporated in the conversion?*

Response: This comment applied to the original empirical mb/ML-to-M conversion, which we have superseded with the corner-frequency-based approach described above. Uncertainty in the new approach is instead addressed through the sensitivity test across stress-drop values (1, 3, and 5 MPa) and validation against independently reported M.

Reviewer comment: *Line 108: The distances must be defined and/or referenced.*

Response: Distance metrics are now explicitly defined and referenced, including the Joyner-Boore distance (RJB) and standard hypocentral/epicentral/rupture distance definitions.

Reviewer comment: *Line 169: The terms of rel. (3) shall be explained.*

Response: The terms of the sigma decomposition equation are now defined immediately after the equation: τ , $\phi S2S$, and $\phi 0$ are the standard deviations of the between-event (δBe), site-to-site ($\delta S2Ss$), and single-station within-event (ϵ) residuals, respectively.

Reviewer comment: *Line 237: The significance of statistical data shall be commented.*

Response: We expanded the discussion of the δBe trends shown in Figure 7, including the divergence in sign between the global and regional GMPM within the M [4.2, 4.7) range and its possible relation to remaining magnitude calibration uncertainty.