Preliminary report Mw 7.4, San José del Palmar, Colombia 10-Aug-2026

Preliminary visual report

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1. General description

On August 10, 2026, at 7:34 a.m. local time (UTC-5), an earthquake of magnitude M_w 7.4 occurred in western Colombia. The epicenter was approximately 5 km south of San José del Palmar, department of Chocó, and the event depth was estimated at 103 km. These characteristics are consistent with an intermediate-depth intraplate subduction earthquake, associated with a rupture within the Nazca plate beneath the South American plate.

The ground motion was felt across Colombian territory and produced effects in several cities in the western and central regions of the country. At the time of this preliminary report's preparation, structural damage had been documented in Pereira, Armenia, Cali, Manizales, and Quibdó, in addition to impacts on other populations within the region. Due to the preliminary nature of this report, data concerning structural damage, casualties, and affected infrastructure remains under consolidation and validation. Figure 1.1 illustrates the epicenter's location, the distribution of recording stations, peak ground acceleration (PGA), reference cities, and the approximate layout of the Colombian volcanic arc.

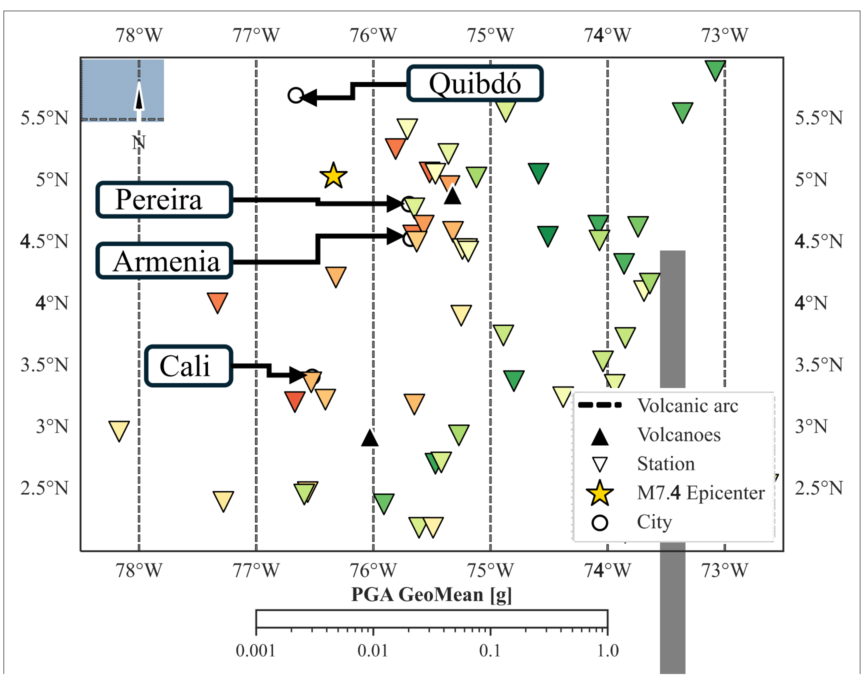

Figure 1.1. Location of the epicenter of the Mw 7.4 earthquake of August 10, 2026, and spatial distribution of peak ground acceleration (PGA) recorded at stations of the National Accelerograph Network. Major cities in the area and the approximate location of the Colombian volcanic arc are also indicated. Data adapted from Servicio Geológico Colombiano (SGC, 2026).

2. Seismicity
2.1. Tectonic Setting

Colombia's seismicity is driven by the interaction among the Nazca, South American, and Caribbean tectonic plates, coupled with diverse crustal fault systems traversing the national territory. In the western region, a primary source of seismic activity is the subduction of the Nazca plate beneath the South American continent. Earthquakes from this tectonic setting are primarily differentiated into megathrust interface events and intraplate events occurring within the subducted Nazca plate. Four predominant seismotectonic environments are identified in Colombia:

1. Crustal seismicity associated with faulting at depths shallower than approximately 60 km.
2. Subduction interface earthquakes, predominantly located toward the Pacific coast.
3. Intermediate-depth intraplate earthquakes west of the Andes, with hypocentral depths generally exceeding 60 km.
4. Deep seismicity associated with the Bucaramanga seismic nest. (Arcila et al., 2020; Arteta et al., 2021).

The August 10, 2026 earthquake occurred within the Cauca seismic cluster, a region characterized by a high rate of intermediate-depth seismicity. Furthermore, the geometry of the subducted Nazca plate exhibits a significant structural variation near 5° N. Based on seismic relocations and three-dimensional tomography, Chiarabba et al. (2016) identified an abrupt offset in the Wadati-Benioff zone at this latitude, which is interpreted as an approximately east-west plate tear. South of this transition, the subducting plate displays a steeper dip angle, whereas to the north, it adopts a considerably flatter configuration. This transition zone roughly coincides with the northern end of the active volcanic arc. The event occurred almost exactly at the latitude of this geometric transition. Its spatial coordinates and depth (approximately 103 km) are fully consistent with intermediate-depth seismicity originating from the subducting Nazca plate. The specific characteristics of the event and its focal mechanism are presented in Section 2.2.

2.2. Seismological Characteristics
According to the moment tensor solution reported by the Colombian Geological Survey (SGC, 2026), the event's centroid was located at 4.99° N and 76.29° W, at a depth of 103 km. The estimated seismic moment was $M_0 = 1.69 \times 10^{20}$ N · m, yielding a moment magnitude of 7.42. The focal mechanism solution indicates two possible nodal planes:

- NP1: strike 125°, dip 44.5°, and rake 162.4°.
- NP2: strike 227.7°, dip 77.8°, and rake 46.9°.

The resulting focal mechanism (**Figure 2.1**) corresponds to an oblique rupture exhibiting both strike-slip and compressive motion components, consistent with the internal deformation of the subducted Nazca plate. Based on currently available data, determining which of the two nodal planes represents the physical rupture plane is not possible.

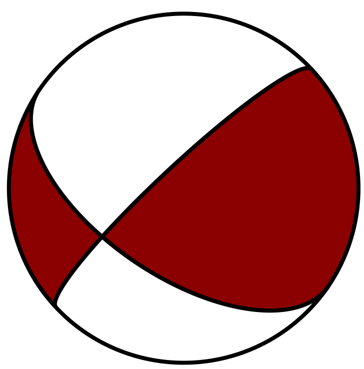

Figure 2.1. Moment tensor solution of the M_w7.4 earthquake of August 10, 2026. The centroid was located at 4.99° N and 76.29° W, at a depth of 103 km, with a seismic moment $M_0 = 1.69 \times 10^{20}$N·m. Colombian Geological Survey (SGC, 2026).

2.3 Prior earthquakes
This earthquake struck a region with an established historical record of intermediate-depth seismicity linked to the Nazca plate. Notable historical events include:

- February 4, 1938: Magnitude Ms 7.0, located at 4.68° N and 75.69° W, depth 150 km.
- December 20, 1961: Magnitude Ms 6.8, located at 4.49° N and 75.51° W, depth 163 km.
- July 30, 1962: Magnitude M_w 6.5, located at 5.17° N and 76.35° W, depth 64 km.
- November 23, 1979: Magnitude M_w 7.2, located at 4.73° N and 76.16° W, depth 110 km.

All four historical events are classified as intraslab earthquakes and reached maximum macroseismic intensities of VIII on the EMS-98 scale. The 1962 and 1979 events are spatially the closest predecessors to the 2026 earthquake (Figure 2.2), with epicentral separation distances of approximately 21 km and 32 km, respectively. The 1979 event is particularly relevant given its similarity in both magnitude and depth to the August 10, 2026 event

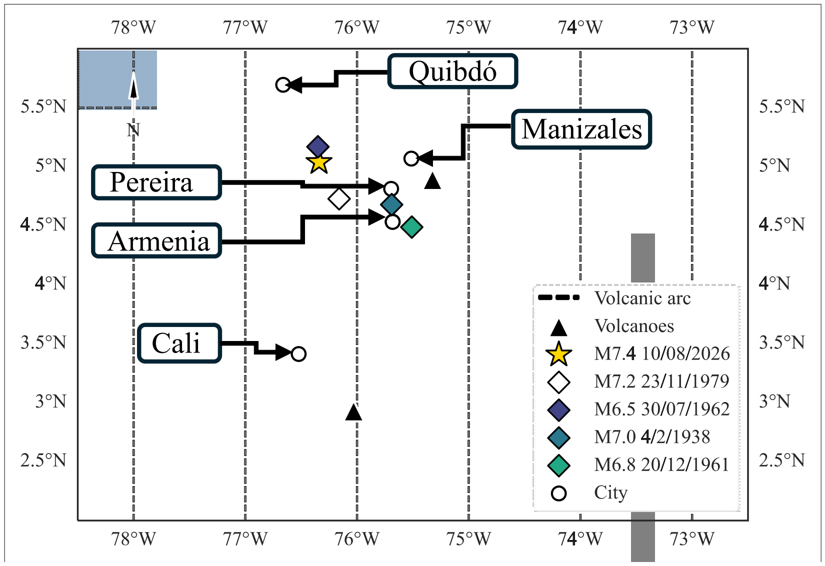

Figure 2.2. Location of the 1962, 1979, and 2026 intraplate earthquakes in western Colombia, along with reference cities and the approximate volcanic arc.

2.4 PGA and response spectra

Table 2.1 summarizes the Peak Ground Accelerations (PGA) recorded at selected stations of the National Accelerograph Network, alongside their respective hypocentral distances. The east-west (EW) and north-south (NS) horizontal components are presented, as well as the vertical component (Z). The selected stations cover hypocentral distances between approximately 120 and 400 km, allowing for the observation of the regional distribution of amplitudes recorded during the event. (See **Figure 1.1**).

Table 2.1. Peak Ground Accelerations (PGA) recorded at selected accelerometric stations during the August 10, 2026 seismic event. Hypocentral distances are presented alongside the orthogonal horizontal (EW, NS) and vertical (Z) acceleration components. Source: Colombian Geological Survey (SGC, 2026).

Station Name	Hyp. Dist. (km)	PGA EW (cm/s^2)	PGA NS (cm/s^2)	PGA Z (cm/s^2)
Anserma, Caldas	120	223.2	201.0	37.2
*Pereira, Risaralda	128	17.3	17.9	9.1
Armenia, Quindío	134	198.7	221.8	80.8
Manizales, Caldas	134	283.0	203.8	70.5
Salento, Quindío	137	156.9	142.9	81.0
Villamaría, Caldas	147	146.9	139.1	47.1
Bahia Malaga, Valle del Cauca	190	187.9	212.1	84.7
*Jamundi, Valle del Cauca	227	418.7	205.6	151.4
Punta Ardita, Chocó	311	217.1	198.8	81.4
La Cruz, Nariño	402	277.1	295.6	4.5

* Records and PGA values corresponding to the Jamundí and Pereira stations require additional technical review prior to definitive interpretation.

Figure 2.3 presents the response spectra corresponding to the stations at Anserma, Manizales, Armenia, and Cali, expressed as the geometric mean of the two horizontal components. As a reference, median estimates from the regional model for subduction earthquakes by Arteta et al. (2021) are included, along with the interval defined by one standard deviation around the median.

Overall, the recorded spectra exhibit amplitudes higher than the model's median prediction across a significant period range. In Manizales, a marked concentration of the response is observed around 0.5 to 0.8 s, where the recorded spectrum exceeds the median and locally exceeds the one-standard-deviation interval. A similar behavior is observed in Cali, where recorded amplitudes exceed the model median primarily at intermediate periods. The comparison shows that while the recorded amplitudes are generally compatible with the expected variability for intraplate earthquakes in the region, there are local spectral amplifications that are not reproduced by the median spectral shape of the model. These differences may be associated with specific source, path, and site effects and should be evaluated in greater detail in subsequent analyses.

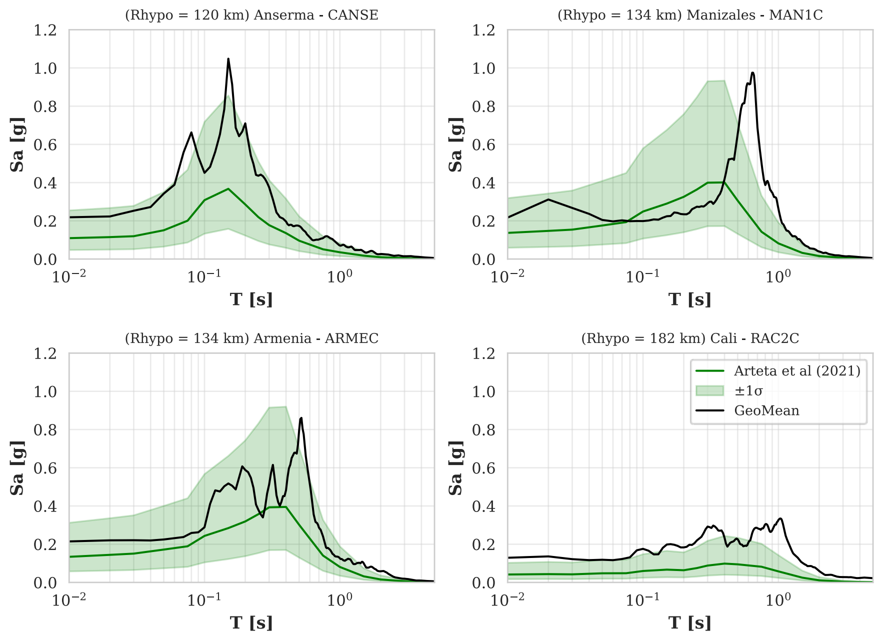

Figure 2.3. 5% geomean response spectra at the stations of Anserma, Manizales, Armenia, and Cali. Green lines represent the median estimates of the strong-motion model for intraslab earthquakes by Arteta et al. (2021), and the shaded areas correspond to the interval of μ ± 1σ.

2.5 Attenuation

Figure 2.4 shows PGA attenuation with hypocentral distance (Rhypo), across 71 stations classified by site category (s2 to s5, based on the predominant period T_n of each station; see Table 1 in Arteta et al., 2021). The medians and the interval μ±1σ of the regional attenuation model for intraplate earthquakes by Arteta et al. (2021) are overlaid, calculated for Mw 7.4 and differentiated between forearc and backarc paths relative to the volcanic arc. The forearc/backarc classification of each station was determined geometrically using the coordinates of active volcanoes monitored by the SGC. The gray-shaded area indicates distances outside the calibration range of the intraplate model (70–450 km).

Overall, the observations are distributed in a manner reasonably consistent with the median and expected variability of the model across the four site categories, without an evident systematic bias toward overestimation or underestimation. However, two stations are identified whose observed PGA exceeds the model median by more than 2 standard deviations within the calibrated distance range: Punta Ardita (Chocó, +2.75σ) and La Cruz (Nariño +4.0σ). The Jamundí station (Valle del Cauca) also exhibits notable amplification (+2.75σ); however, as indicated in Table 2.1, its record requires additional review prior to a definitive interpretation. These amplifications are consistent with the differences between the recorded spectra and the median spectral shape of the model discussed in Section 2.4 for Manizales and Cali, and could be associated with local site effects or rupture particularities not captured by a regional ergodic model; their origin must be evaluated in greater detail in subsequent analyses.

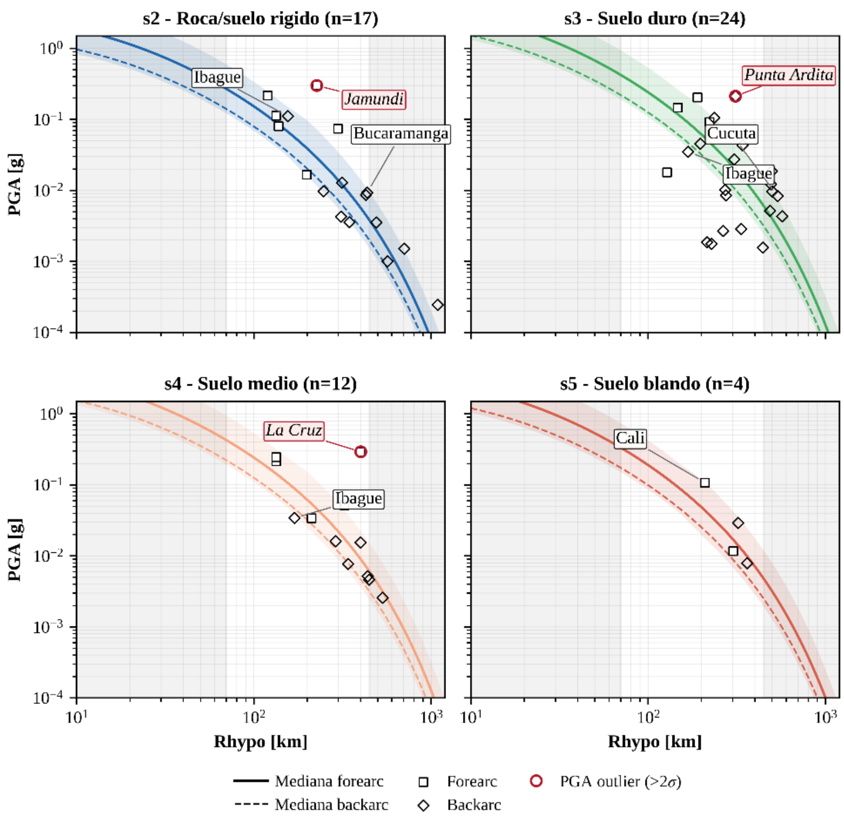

Figure 2.4. PGA attenuation with hypocentral distance (R_{hypo}), by site category (s2–s5). Solid and dashed lines: median of the Arteta et al. (2021) model for forearc and backarc paths, respectively (Mw 7.4, intraslab); shaded: interval μ±1σ.

3. Consequences

3.1. Damages

The observations presented in this section are of a preliminary nature and correspond to a rapid assessment conducted less than 24 hours after the event. The available information comes primarily from press reports, social media, and publicly shared audiovisual material, and therefore should not be considered representative of the totality of the damage. Additionally, Professor Albert Ortiz, one of the authors of this report and a resident of Cali, conducted a reconnaissance tour of the city immediately following the event, preliminarily documenting some of the observed damage. This section also includes some photographs taken during this tour.

Impacts have been reported in different cities across the country, including Quibdó, Cali, Armenia, Pereira, and Manizales, with varying levels and types of damage. The first available records show impacts on different types of buildings, structural systems, and general infrastructure.

Regarding buildings, the Presidency of the Republic reported via Noticias Caracol at 1:20 pm (Noticias Caracol, 2026): 61 collapsed buildings, and 18, 52, and 17 health centers, educational centers, and community centers with damage, respectively. Regarding road systems, 18 roads with damage were reported, along with 6 airports with damage and not operating for commercial flights, and one airport with damage and not operational.

In Cali, the collapsed structures reported so far are (Alcaldía de Santiago de Cali, 2026): La Luna sector, Calle 42 and 38, Calle 44, Calle 3 D and 67, Calle 10 and Cra 71, Cra 28 D and 72 - Notary 20, Calle 9 and 24, Cra 41 and 7th, Motel Molino Rojo, Calle 9 and 24, Carrera 44 and 9, Edificio Marisol, Carrera 9 and 53, Calle 5 and 44, and Calle 5 and 57.

Among the reported cases are damages to unreinforced masonry buildings, including some heritage structures. Notable among these cases is the Basilica of Manizales, which suffered severe damage (See **Figure 3.1**).

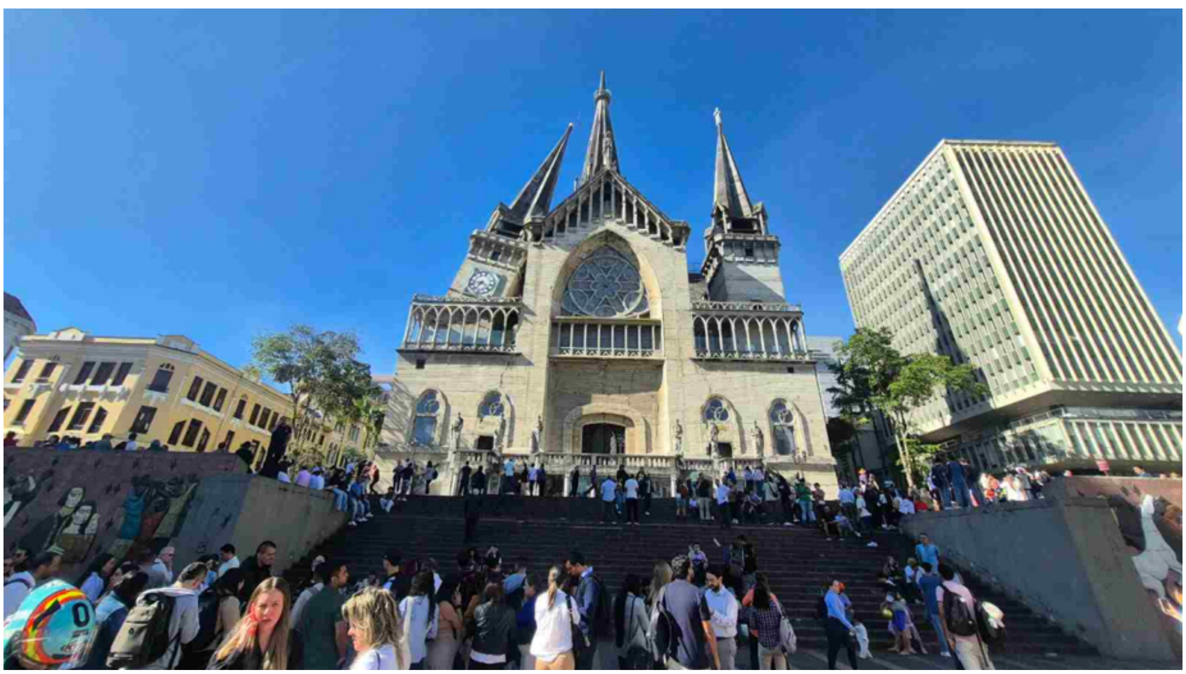

Figure 3.1. Basílica de Manizales (La Patria, 2026).

A large portion of the building inventory in Colombia consists of reinforced concrete frames. The vulnerability of this structural system depends significantly on the building code used (Arteta et al., 2026). For buildings constructed under Colombia's most recent code, seismic performance is expected to be comparable to that of the ACI 318-08 code (Arroyo et al., 2018). Due to local construction practices, a considerable number of these buildings correspond to a system known as reinforced concrete frames with masonry infills. As masonry is a more brittle material, damage to infill walls is expected, and preliminary reports show a significant number of buildings with this type of damage.

Figure 3.2 shows a five-story building in Manizales that suffered a collapse concentrated on the first floor. The observed pattern could be consistent with the presence of a soft story, although this hypothesis must be verified through a detailed field inspection. **Figure 3.3** presents an eight-story building with severe damage to the first-story columns. The images show longitudinal reinforcement splices located approximately at mid-height of the columns, a condition that could have contributed to the degradation of the concrete core and the observed damage.

Figure 3.2. First-floor collapse in a building in Manizales: (a) Pre-earthquake photo (Google Maps, 2026a); (b) & (c) Post-earthquake photos showing the partial collapse of the structure (Source: Photographs provided by Juan Ocampo via WhatsApp).

Figure 3.3. Observed damage to a reinforced concrete frame structure in Cali: (a) Pre-earthquake photo (Google Maps, 2026b); (b) & (c) Post-earthquake photos showing damage to the reinforced concrete elements (photos by Albert Ortiz).

Finally, **Figure 3.4** shows damage to buildings at the Universidad Tecnológica del Chocó, approximately three to four stories high. In this case, damage is observed primarily in masonry partitions and non-structural components, including damage to the roofs.

(a) (b)

Figure 3.4. Damage at Universidad Tecnológica del Chocó, in Quibdó. Source: Photographs provided by Professor Gentil Ayala via WhatsApp.

In addition to the previous cases, **Figure 3.5** shows the location of buildings and institutions based on the preliminary report from the Universidad del Valle team, led by Professor Albert Ortiz. Collapsed structures are shown in red, while those with some type of damage are shown in yellow. We thank Marcela Perlaza for preparing the map and students Eduardo Arzayuz and Maia Insuasty for their support.

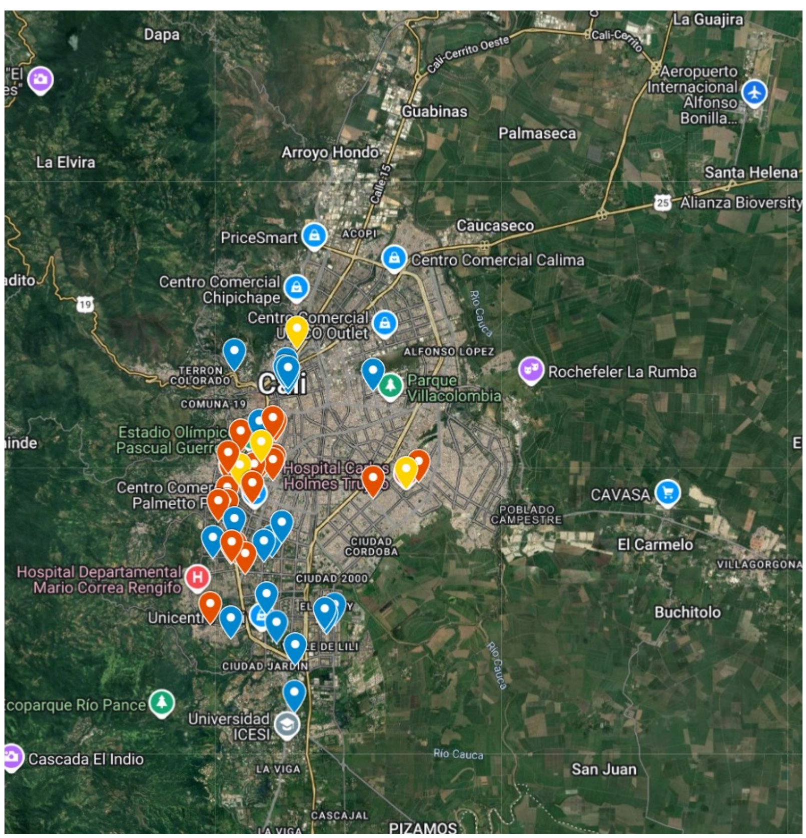

Figura 3.5. Building location of surveyed buildings by Universidad del Valle (Ortiz, 2026).

3.2. Injuries, Fatalities and Hospital infrastructure

An initial report at 10:30 am did not indicate the total number of injured. At that time, 18 fatalities were reported in Pereira, 3 in Manizales, 1 in Buenaventura, and 5 in Valle del Cauca, bringing the total to at least 25 people. In Pereira, collapsed buildings with people trapped inside were reported.

A second report at 12:00 pm indicated 40 fatalities in Pereira, with 65 buildings severely damaged or collapsed. Regarding the hospital network, damage was reported at the Clínica Noé due to infrastructure impairment. In this city, the hospital network's capacity is compromised.

The numbers reported by the Presidency of the Republic via Noticias Caracol at 1:20 pm on the day of the earthquake are (Noticias Caracol, 2026): 111 fatalities and 87 injured, along with 1,575 homes affected and 61 collapsed buildings. That figure was announced by the President of the Republic at approximately 1:56 p.m.

In Cali, the affected hospital infrastructure requiring evacuation are (Alcaldía de Santiago de Cali, 2026):

- Clínica Alba
- Clínica Rey David
- Clínica Nuestra Señora del Rosario
- Clínica Sanitas Tequendama
- Clínica Cali
- Carlos Holmes Trujillo
- Urgencias Pasoancho
- Clínica Colombioclinica Versalles
- HUV (Hospital Universitario del Valle)

3.3. Airports

Operations remain suspended at seven terminals as of 12:00 p.m, August 10:

1. Alfonso Bonilla Aragón — Cali/Palmira.
2. Matecaña — Pereira.
3. La Nubia — Manizales.
4. El Caraño — Quibdó.
5. El Edén — Armenia.
6. Santa Ana — Cartago.
7. Gerardo Tobar López — Buenaventura.

4. Final remarks

The present report is of a preliminary nature, generated utilizing data available up to five hours post-event. It will be iteratively expanded as structural reconnaissance operations and data verification processes advance. Imagery of building structures corresponds to photographs crowdsourced via social media platforms, or screen captures in which the authors have explicitly identified the city of the recording.

5. References

Alcaldía de Santiago de Cali. (2026). *Este es el reporte preliminar luego del terremoto que sacudió a Cali. 10 Agosto de 2026*. Retrieved from

Arcila, M., García, J., Montejo, J., Eraso, J., Valcárcel, J., Mora, M., . . . Díaz, F. (2020). *Modelo nacional de amenaza sísmica para Colombia*. Retrieved from Bogota:

Arroyo, O., Barros, J., & Ramos, L. (2018). Comparison of the Reinforced-Concrete Seismic Provisions of the Design Codes of the United States, Colombia, and Ecuador for Low-Rise Frames. *Earthquake Spectra, 34*(2), 441-458. doi:https://doi.org/10.1193/102116EQS178EP

Arteta, C. A., Abuchar, V. J., & Hurtado, T. (2026). Collapse Safety of Reinforced Concrete Frames Under Building-Code Evolution. *Earthquake Spectra, 42*(2), e70067. doi:https://doi.org/10.1002/esp4.70067
Arteta, C. A., Pajaro, C. A., Mercado, V., Montejo, J., Arcila, M., & Abrahamson, N. A. (2021). Ground-motion model for subduction earthquakes in northern South America. *Earthquake Spectra, 0*(0), 1-34. doi:10.1177/87552930211027585
Chiarabba, C., De Gori, P., Faccenna, C., Speranza, F., Seccia, D., Dionicio, V., & Prieto, G. A. (2016). Subduction system and flat slab beneath the Eastern Cordillera of Colombia. *Geochemistry, Geophysics, Geosystems, 17*(1), 16-27. doi:https://doi.org/10.1002/2015GC006048
Google Maps. (2026a). Edificio Albania, Manizales, Colombia. Retrieved from https://maps.app.goo.gl/xjmKMsZz2vxL1XbP8
Google Maps. (2026b). Mercadillo de Sammy, Cali, Colombia. Retrieved from https://maps.app.goo.gl/3a8rUVDourM8zzvN9
La Patria. (2026). Sismo causó graves daños en la Catedral de Manizales: una torre cayó hacia el interior. . Retrieved from https://www.lapatria.com/manizales/sismo-causo-graves-danos-en-la-catedral-de-manizales-una-torre-cayo-hacia-el-interio
Noticias Caracol. (2026). Edición mediodía. 10 Agosto de 2026 [Press release]
Ortiz, A. R. (2026). Colapsos y daños verificados. Retrieved from https://www.google.com/maps/d/u/0/viewer?mid=15ywiXsoHiONpGOp2G3X7-L3-FkbO_60&ll=3.4182548914095903%2C-76.51604204042967&z=14
SGC. (2026). Resumen - San José del Palmar - Chocó, Colombia. Retrieved from https://www.sgc.gov.co/detallesismo/SGC2026pqqmro/resumen