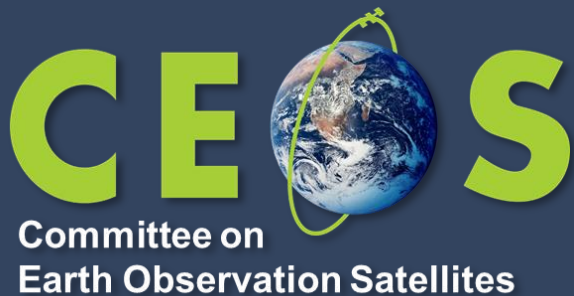


The Seismic Risks Initiative (SRI)

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CEOS WGD-24

September 30, 2025

Bariloche, Argentina

Seismic Risk Initiative Summary



- **The Seismic Risks Initiative** is continuing to pursue successful activities of the precursor Pilot and Demonstrator activities related to seismic hazard, while also introducing a new activity related to seismic risk. We are engaging with new user communities from the civil engineering industry, concerning seismic exposure in urban land.
 - **Continuation:** Advanced science products for rapid earthquake response, Active fault mapping with InSAR and VHRO data, and using established data sharing agreements with The International Charter.
 - **New Activity:** Engaging geoscience centers and users from the civil engineering to support seismic exposure mapping by providing data and processing capabilities.
- For the first 2 years, the initiative focuses the activity on the **Latin America & Caribbean (LAC) region**.
 - A geographic focus aids in the management of commitments concerning access to data and resources.

Partners of the Initiative - Returning



❖ INGV

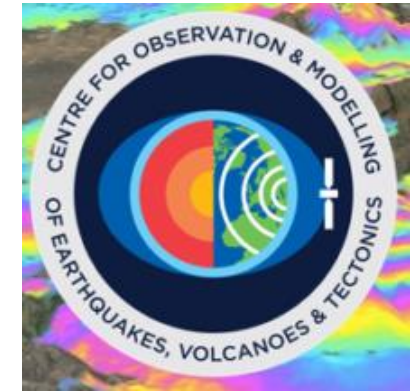
- **INGV** supports the Seismic Risks Initiative and coordinates with the existing national and international operational support schemes and frameworks.
- Coordination of EO data access, generation of scientific products, engagement of other communities, sharing of automatically generated global seismic source models.



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❖ COMET

- Partners from the **Universities of Oxford and Leeds** have agreed to continue supporting the CEOS seismic activity through the active fault mapping objective.
- COMET has identified several local partners with ongoing projects in LAC, and we have begun to process their data requests.



❖ AUTH

- **Aristotle University of Thessaloniki** supports the EO for Seismic Risks Initiative with scientific animation, expert advice on EO techniques for terrain motion mapping and advanced processing using the SNAPPING service chain on the GEP.



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❖ GEM and EUCENTRE

- Representing the seismic engineering community, they work on a global scale within several projects in close contact with local stakeholders.
- They will use the VHR radar and optical data for seismic exposure mapping, as well as for damage assessment in the case of a large earthquake in the LAC region.

❖ LIST

- The ***Luxembourg Institute of Science and Technology*** will contribute by creating maps of building damage caused by earthquakes, using scientifically validated methods that utilize SAR and optical data from high and very high-resolution sensors.
- The algorithms utilize deep learning methodologies, operate automatically, and have the capability to integrate multimodal data, enabling them to deliver information rapidly.

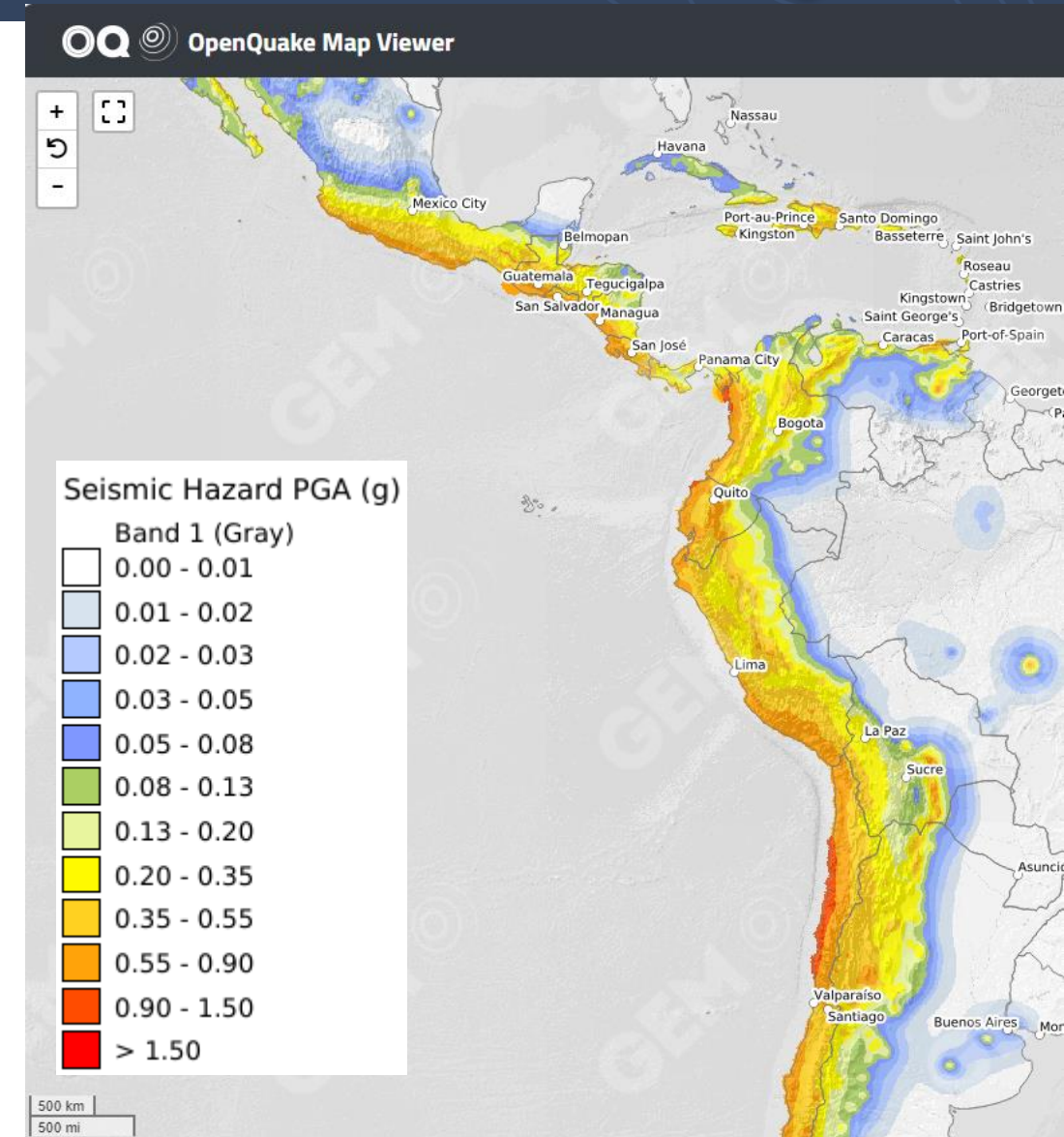


GEM Global Seismic Hazards Map



Urban areas to be covered by CSK (11):

- Bogota, Colombia
- Guatemala City, Guatemala
- Managua, Nicaragua
- San Jose, Costa Rica
- Panama City, Panama
- Lima, Peru
- Santiago, Chile
- San Salvador, El Salvador
- Quito, Ecuador
- La Paz, Bolivia
- Mexico City, Mexico

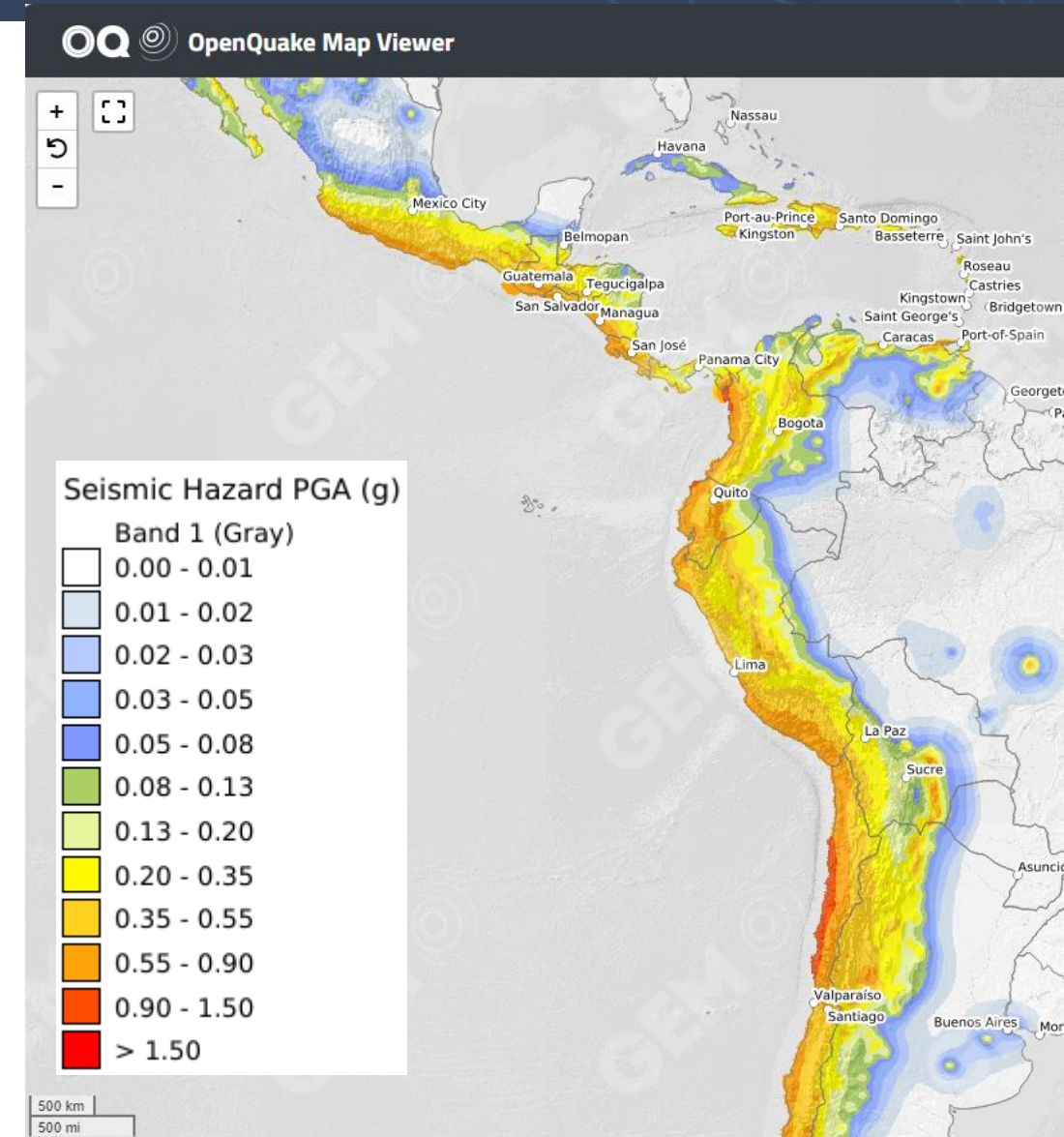


GEM Global Seismic Hazards Map



Rural areas to be covered by CSK:

- West coast of Mexico and Central American countries
 - West coast of South American countries
- Data over these areas will be requested only in the event of an earthquake (post-seismic deformation)



Active Fault Mapping – Sites

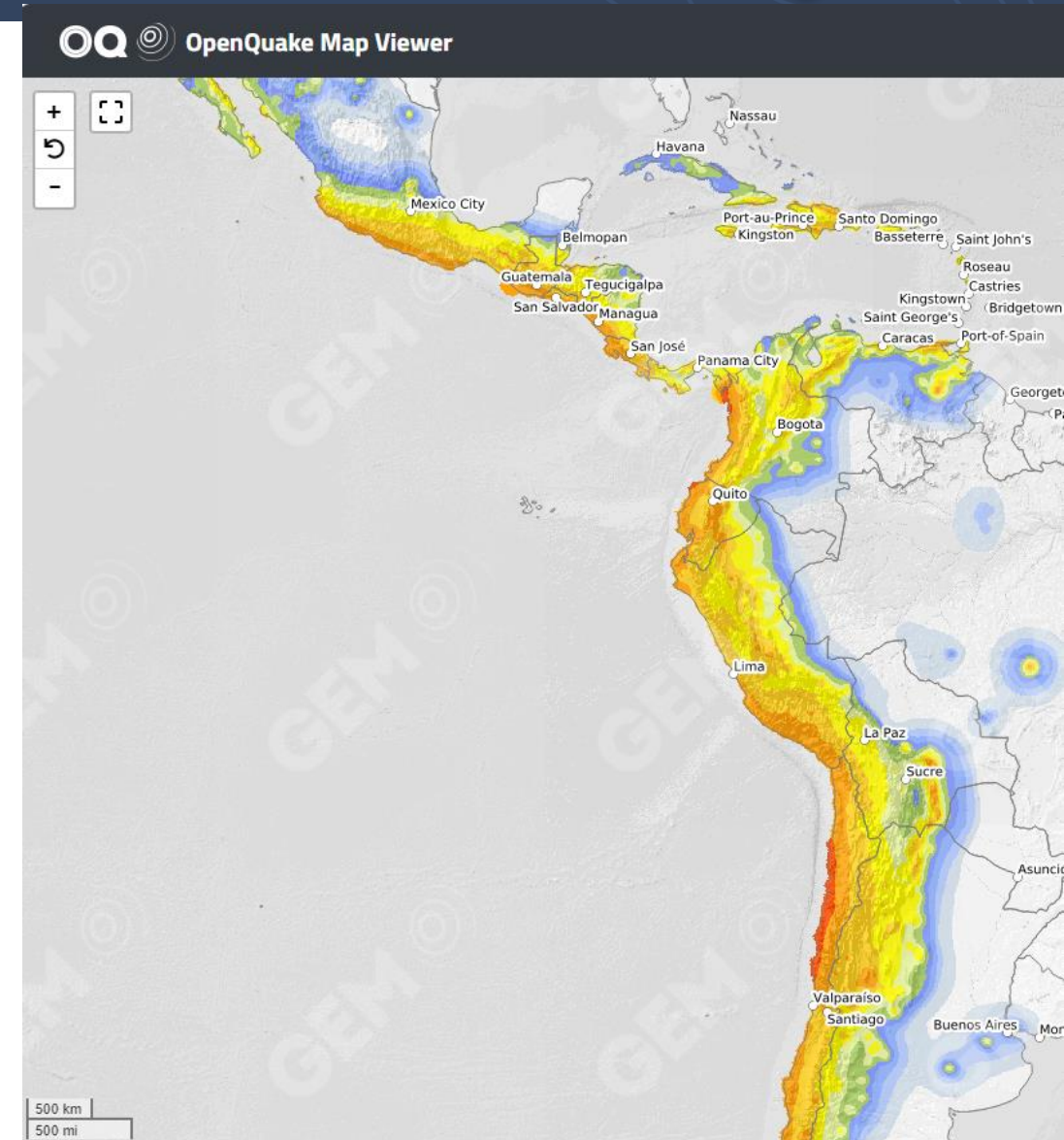


Request for Pleiades data sent:

- ❖ **Guatemala** - Both Guatemala city (there are active faults in the urban area) and sections of the Guatemala plate boundary fault (close to cities)
- ❖ **Argentina** - Active fault adjacent to Mendoza and San Juan

Request for Pleiades data being prepared:

- ❖ **Mexico** - Coastal region including Huatulco
- ❖ **Peru** - Coastal region near Arequipa (evidence of subduction-related uplift, and onshore faults).



COMET has linked the initiative with several teams working on the active fault systems in Latin America, who are requesting Pleiades Stereo data to improve their research.

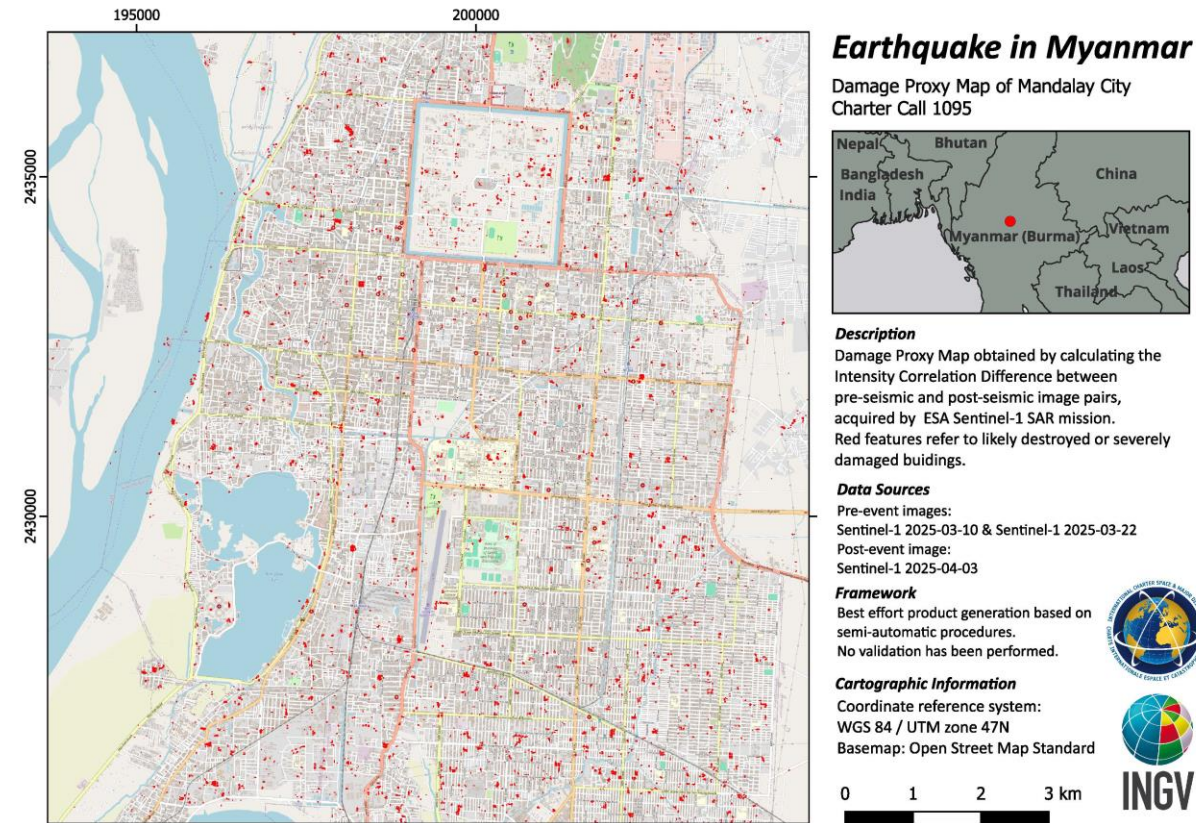
- ❖ Motagua and Polochic Faults in Guatemala
 - University of Missouri (USA) and Friedrich-Schiller-University Jena (DE)
 - Pleiades DEMs to refine slip rate estimates and earthquake recurrence models.
- ❖ Eastern and Southern Precordillia range front in Argentina
 - Universidad Nacional de San Luis and Universidad de Buenos Aires (AR)
 - Manuscripts on the regional neotectonics notably quaternary deformation

Earthquake in Mandalay, Myanmar



The SRI was engaged for the large earthquake in Myanmar in March 2025

- ❖ The collaboration agreement between CEOS WGD and the International Charter was activated to grant SRI partners access to Charter data
- ❖ LIST and INGV acted as value-adders in the Charter activation to generate damage maps



Damage Proxy Map generated by INGV

- CSK and TSX data have been requested for exposure mapping purposes.
- Pleiades data has been ordered for active fault mapping, with more requests planned.
- COMET has identified several scientific teams in Latin America who would like to use Pleiades stereo data for active fault mapping. We have been liaising with these teams and are currently optimizing data requests.
- At the last CEOS WGD meeting in Sicily, we saw the presentation from Uni Pavia regarding detecting earthquake damage using radar data. We are liaising with Uni Pavia to order TSX data through the SRI. Licensing forms have been filled, and the request is being prepared.

❖ Using VHR Radar Data (SAR):

- Detection of surface deformations and shifts in structures. Used to create digital elevation models (DEMs) and to monitor changes in building structures.
- Tracking building integrity and infrastructure stability, vital in estimating where the most at-risk populations are located after seismic events.
- SAR data can provide detailed information about ground stability and detect any pre-seismic deformations that may indicate vulnerability of critical infrastructure.
- Currently, CSK and has been requested over sites in Latin America for exposure mapping purposes.

Conclusion



- The initiative is in the process of finalizing data requests. Acquisition modes and satellite availability over certain sites are being verified.
- We are in the process of engaging individual organizations and scientific teams who are based in or working on projects in Latin America to promote the initiative.
- The **EU LAC Digital alliance** and the **CopernicusLAC initiative** provide interesting contexts with the development of two regional EO based Data Centres, one in Panama and one in Chile, that are planned to be supported with substantial capacity development activities.

