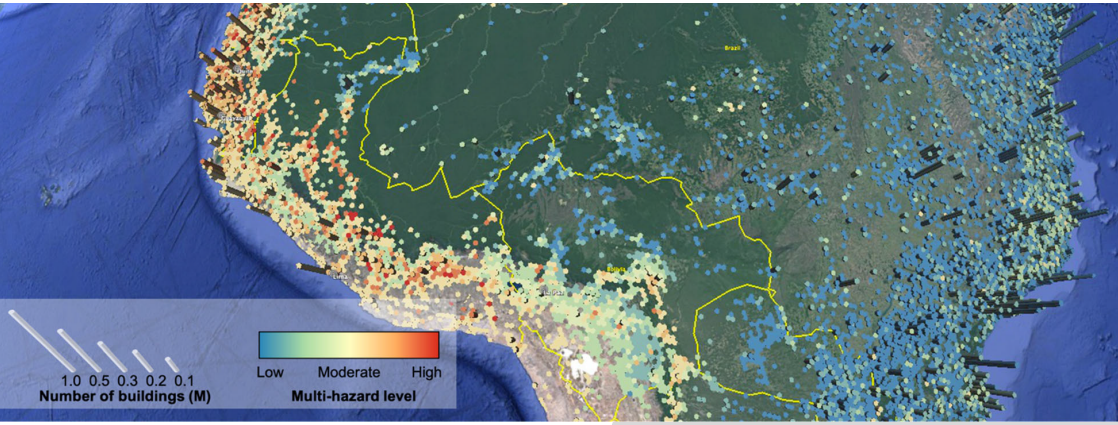
# THE RISK LANDSCAPE

## FROM NOW TO 2030

GEM
GLOBAL EARTHQUAKE MODEL
FOUNDATION




## OUR GOAL

Loss from natural catastrophic events is projected to reach up to $2trn by 2030 (RMS, 2022) due to increasing global population, rapid urbanisation and extreme weather events. GEM's strategic plan roadmap to 2030 aims to deliver integrated risk and resilience solutions in line with the Sendai Framework and Sustainable Development Goals to address this challenge.

## OUR PLAN

- Maintain earthquake expertise and global leadership
- Expand organisational and scientific partnerships
- Advance core capability toward multi-hazard, future-risk models and maps
- Integrate risk and resilience solutions for downstream users

### EARTHQUAKES AND SECONDARY HAZARDS

Advanced earthquake and secondary earthquake hazards modelling and future exposure, vulnerability and risk

### MULTI-HAZARD RISK ASSESSMENT

Multi-hazard risk modelling for earthquake, flood, severe wind, wildfire as well as for critical facilities and public networks

### INTEGRATED RISK AND RESILIENCE SOLUTIONS

Hazard and risk metrics and indicators including future risk models and maps for risk managers and policy makers

For more information scan QR code

**WWW.GLOBALQUAKEMODEL.ORG**

# GEM CATASTROPHE RISK LOSS MODELS

## GEM APPROACH

GEM uses public sources of seismic hazard, exposure and vulnerability information and collaborates with public and private entities in the development, testing and validation of models. All models represent the GEM view of risk, informed by local knowledge and industry expertise and data.

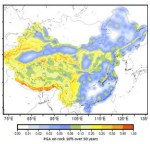
## STANDARD FEATURES

- Hazard component incorporates both fault and area sources.
- GEM's OpenQuake used to generate a stochastic set of hazard footprints for ground shaking hazard.
- Includes GEM's exposure model for estimating total losses to the building stock (commercial, industrial and residential) in addition to portfolio losses.
- Vulnerability models support industry standard construction and occupancy types.
- The vulnerability model was developed taking into account the common building types, replacement costs, seismic regulations and construction practices of each country.

Models fully documented and available via Nasdaq and Touchstone platforms.

### China Model

- Hazard component models faults as a system rather than independent structures, allowing for ruptures that span multiple faults
- Tectonic blocks and geodetic data used to constrain fault slip rates
- Vulnerability model was validated using 11 historical events and considering the ground-up losses obtained for GEM's exposure model for China
- GEM's exposure model was developed at the township level. 2021 construction costs were indexed on the province, occupancy class, building type, and urban/rural division.



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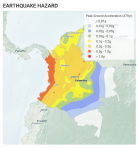
### Colombia Model

- The three main datasets - the active faults database, strong ground motion database, and catalogue of seismicity - were compiled with involvement from local organisations during the SARA project (funded by Swiss Re Foundation).
- The seismic source characterisation utilises a catalogue that has been classified to the major tectonic units using 3D surfaces that define the crustal structure
- GEM's exposure model, which was used to validate the model, was built through continued collaboration with local institutions, such as the Colombian Geological Survey (SGC) and EAFIT University

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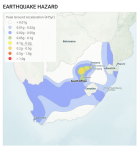
### South Africa Model

- Hazard component uses the model developed by the South Africa Council for Geoscience
- Hazard accounts for epistemic uncertainties in earthquake occurrence and maximum magnitude on a per-source basis
- South Africa Earthquake Catalogue used to constrain occurrence rates includes seismicity induced by mining activities
- Exposure model used to validate the model is based on the 2019 General Household Survey

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