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3rd September 2026

New GCAT Balkan Quake Model

INSURED 360°, Ljubljana

Paweł Franków, Head of Analytics, CEE & Turkey

Agenda

1. What is a CAT model?
2. Earthquake modelling landscape
3. The GCAT Balkan EQ Model
4. GCAT Risk Rating

What is a CAT model?

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What is a CAT model?

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What is a CAT model?

What

A tool that quantifies risk

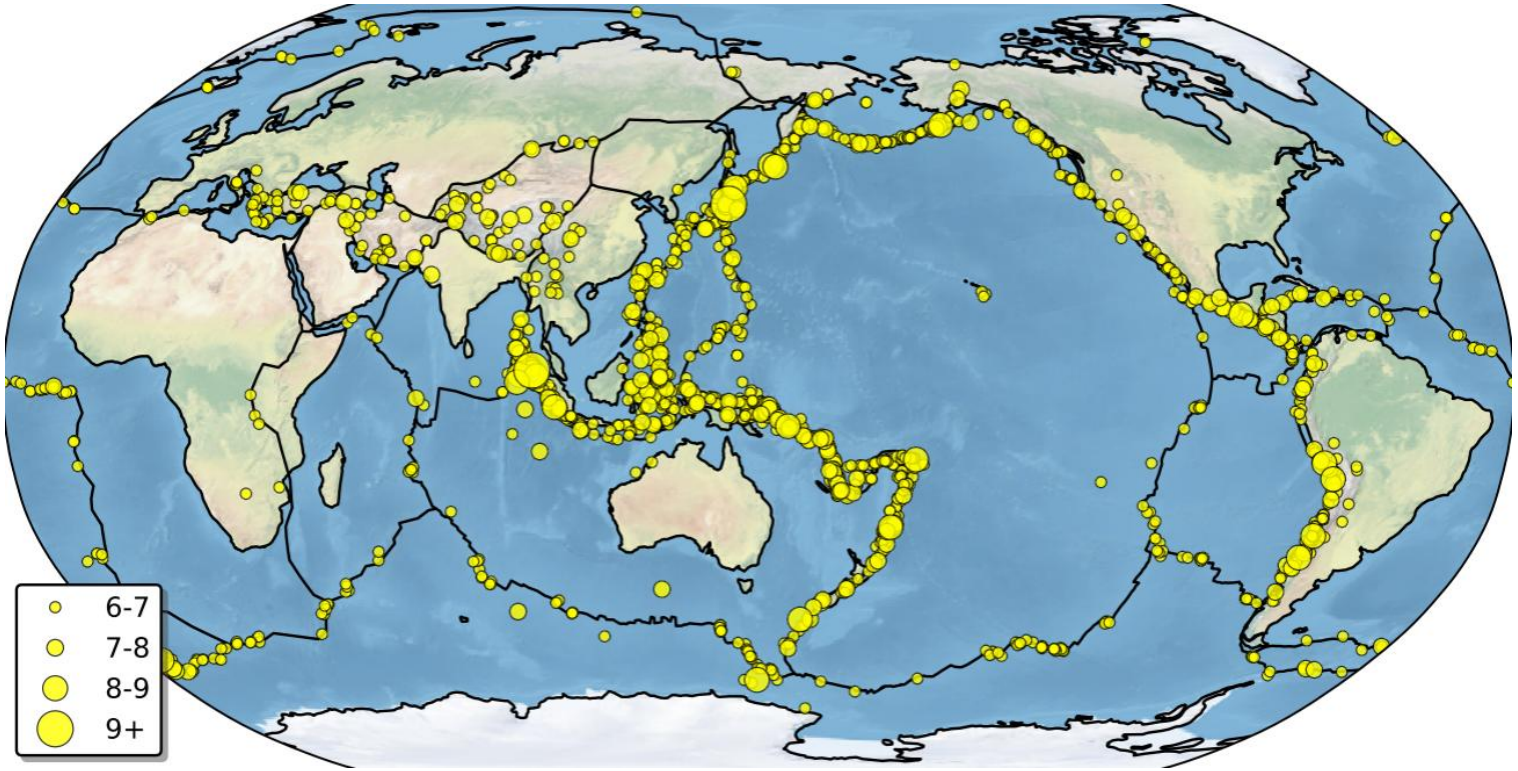
How

Examines insured values that are exposed to catastrophic perils such as hurricanes, earthquakes and terrorism

Why

Aids management decision-making on:

- Pricing and underwriting
- Reinsurance buying
- Rating agencies
- Portfolio management



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Catastrophe Model Vendors

Moody's | RMS

- Founded at Stanford University in 1988
- World's leading provider of products/services for the quantification and management of catastrophe risks
- Grew in the 1990s, expanding services and perils covered
- Main software products are RiskLink™ and HD

Verisk™

- Founded in 1987
- Pioneered the probabilistic catastrophe modeling technology

GCAT®

- GCAT is Marsh Re' suite of tools providing a view on catastrophe risk filling the gaps in major vendor model landscape

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The Three Catastrophe Model Components

Hazard Module
Site Intensity

Generates the pattern of physical disturbance from an event (HU, EQ, tornado/hail, etc.)

Important elements – Geocoding, distance to coast

Stochastic event database

Vulnerability Module
Vulnerability of Property

A set of relationships that defines how structural damage varies with exposure to differing levels of hazard (such as ground motion or wind speed)

Important elements – Value of risk, construction, occupancy, year built, number of stories

Financial Module
Loss Calculation

Evaluates insured loss given structural values as well as the applicable insurance and reinsurance structures

Important elements – Limit, deductible, reinsurance information

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Earthquake modelling landscape

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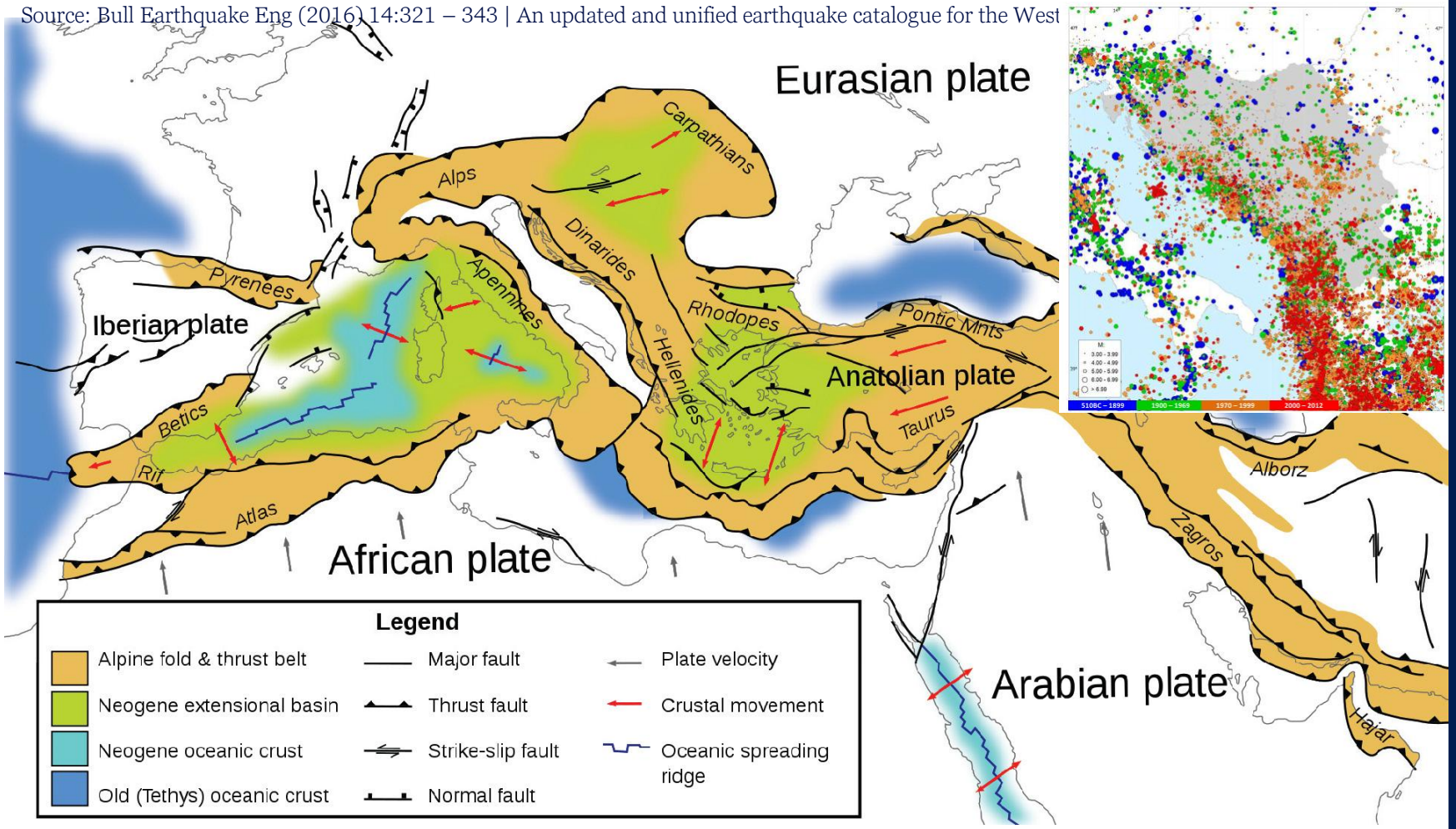
Earthquakes in the Balkans

Source: Bull Earthquake Eng (2016) 14:321 – 343 | An updated and unified earthquake catalogue for the West



Key features of earthquakes in the Balkans region:

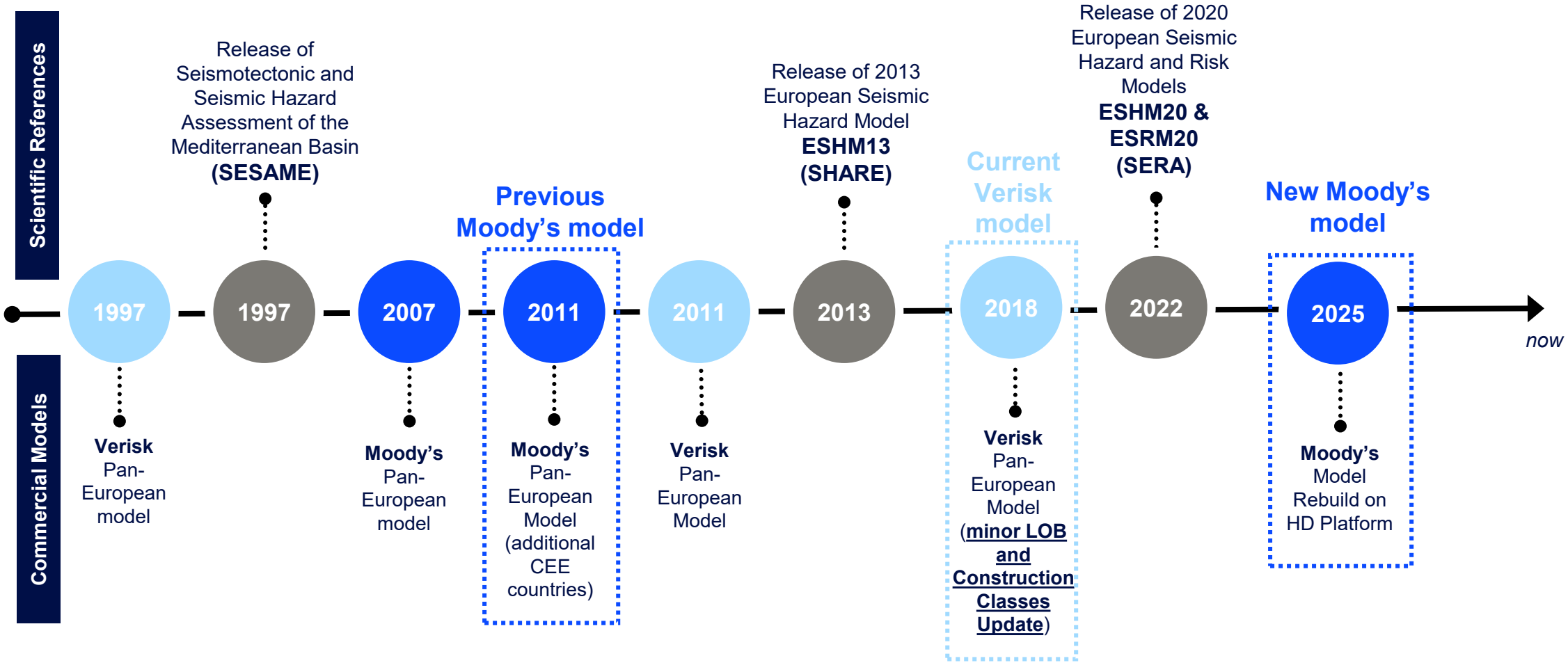
- Seismicity in Europe is concentrated in the Alpine-Mediterranean region where the African Plate pushes northwards into the Eurasian Plate.
- In the Balkans region seismicity is further influenced by movement from the Adriatic, Aegean, Anatolian microplates. The region is prone to moderately strong earthquakes.
- Albania is the most seismically active country in the region, with most earthquakes generated by faults at the boundary between the Adriatic Plate and the Hellenides and Dinareides mountain ranges.

Major recent earthquakes in the Balkans region:

- 1963 M6.1 Skopje, Macedonia
- 1967 M6.7 Shupenze, Albania
- 1979 M6.9 Montenegro and Albania
- 2010 M5.5 Kraljevo, Serbia
- 2019 M6.4 Mamurras, Albania
- 2022 M5.7 Strupici, Bosnia and Herzegovina

Europe Earthquake Model Landscape

How have models evolved with respect to the latest science?



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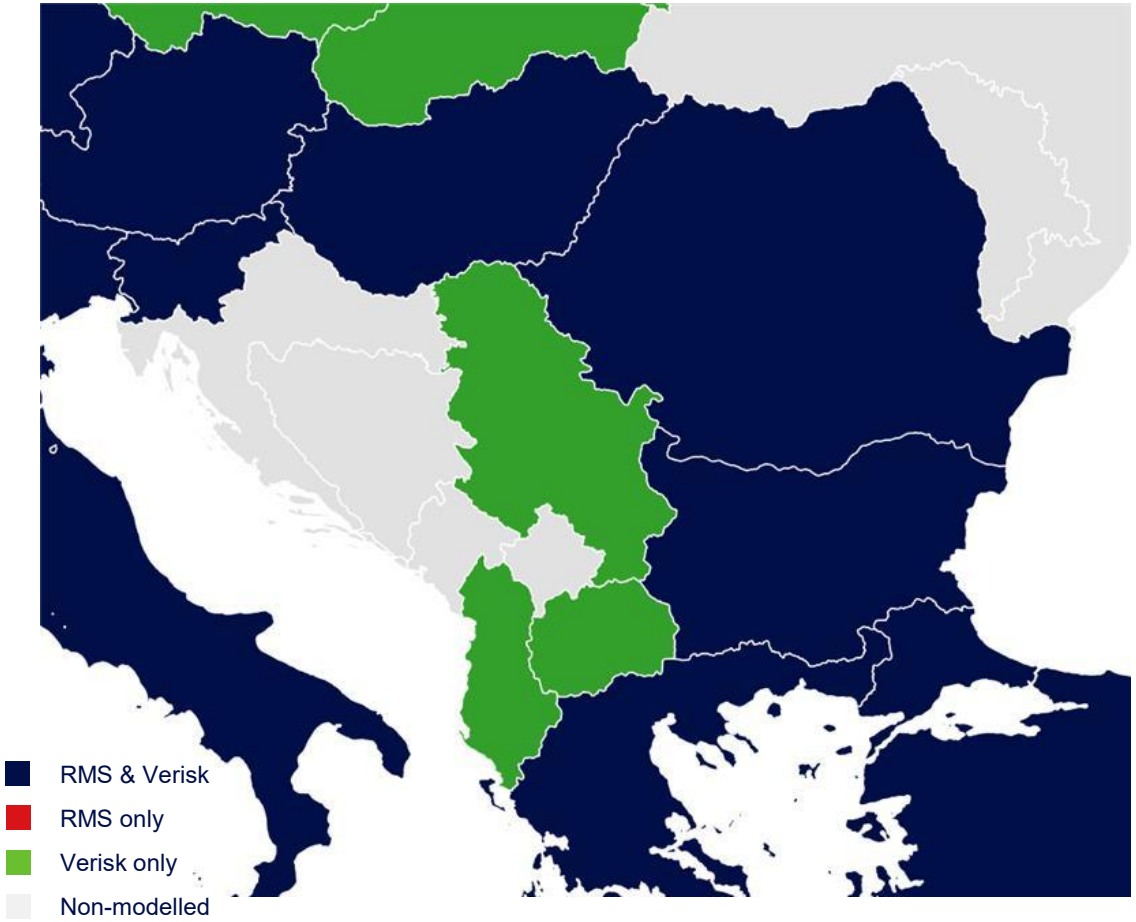
Model Availability in Balkans Region

Traditional vendor model coverage is extremely low

- RMS and Verisk are the dominant models in the European market.
- However traditional vendor models provide limited coverage the Balkan area:
  - RMS: Slovenia only
  - Verisk: Slovenia, Serbia, North Macedonia and Albania
- Historically Marsh Re have addressed this through products from smaller alternative vendors

  e.g. QuakeRisk, Cat Risk Solutions
- **There is a clear need for one reliable, long-term solution to fill the gap**



Source: GC Securities

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The GCAT Balkan EQ Model

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The GCAT Balkan EQ Model

Why?

- Grow our in-house view of risk in the region (existing FL & HL models)
- Slovenia, Croatia, Bosnia & Herzegovina, Serbia, Montenegro, Kosovo, Albania, & North Macedonia in one model

What?

- Transparent, model developed in-house
- Single, consistent framework for the entire region
- Enhanced spatial granularity
- Scientifically robust and modern
  - Adjusted components based on in house research and appraisal of data
  - Historical Event Scenarios
  - Buildings-based Built Environment specifically tailored to the region

What is a GCAT EQ Model?

A fully probabilistic, earthquake CAT model

- Comprised of:
  - Hazard Module
  - Built Environment Module
  - Vulnerability Module
  - Financial Module

A consistent methodology with a single event catalogue across multi-country models

Runs on MODEX, a Verisk platform running the industry-standard OASIS Loss Modelling Framework

Covers Residential, Commercial and Industrial risks across 3 coverages (Building/Contents/ Business Interruption)

Middle East & North Africa, PNG, Central Asia, Balkans (in dev)

10k to 100k-year Stochastic and Historic event sets

Detailed risk types with Guy Carpenter Industrial Park database for disaggregation

How does GCAT compare to other Balkans models

Note: MSA for GCAT model is still in progress

Component	GCEQ	CRS	GCAT	Comments on GCAT score
Seismic Source Characterization	●	●	●	GCAT uses more up to date science from ESHM20
Earthquake Frequency	●	●	▨	Result based on evaluation for Slovenia only
Ground motion Attenuation	●	●	▨	Result based on evaluation for Slovenia only
Exposure Grid	●	●	●	Highly granular built environment
Vulnerability	●	●	○	Not started
Financial	●	●	●	GCAT model is fully Oasis-enabled

● Good ● Average ● Limitations ▨ Shading indicates preliminary score ○ Evaluation of component not started

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GCAT Risk Rating

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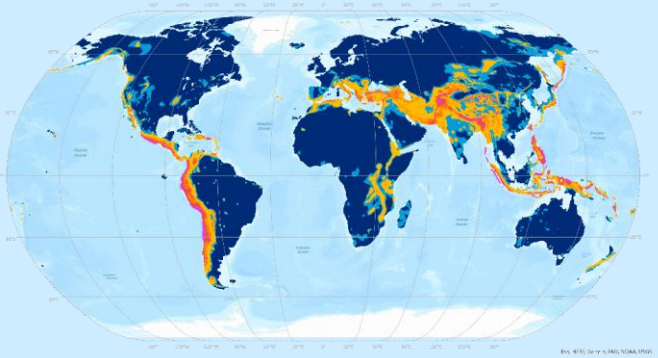
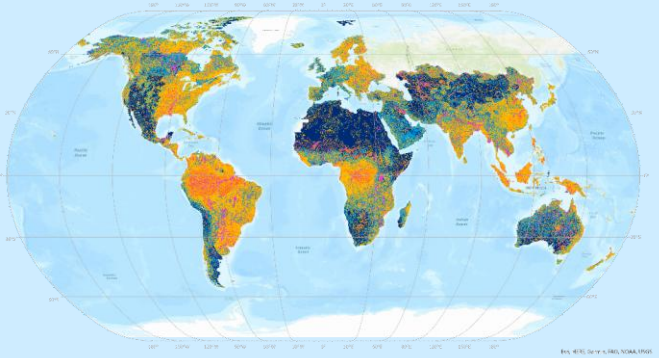
GCAT Risk Rating Offer

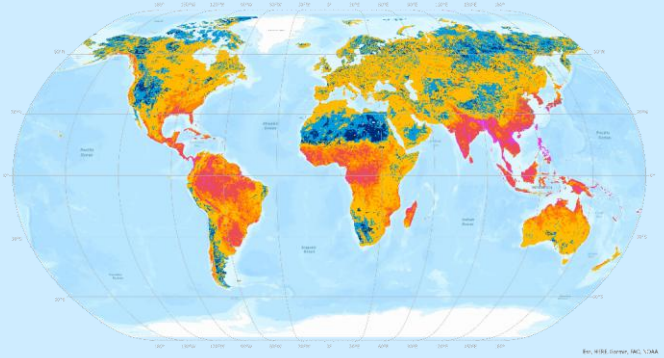
Earthquake



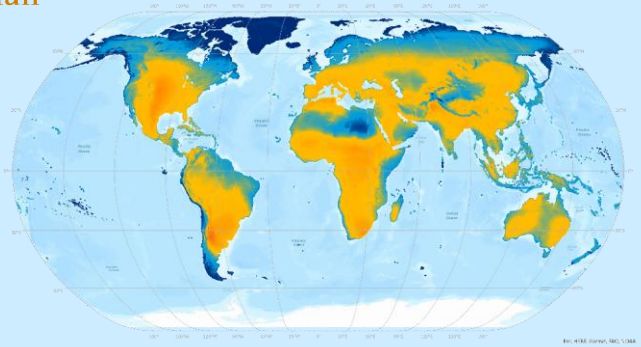
Fluvial Flod



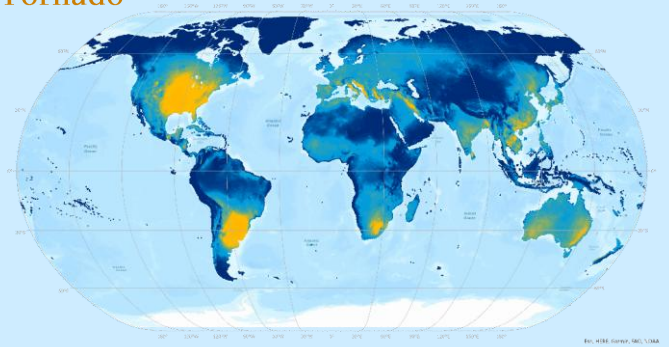
Pluvial Flood



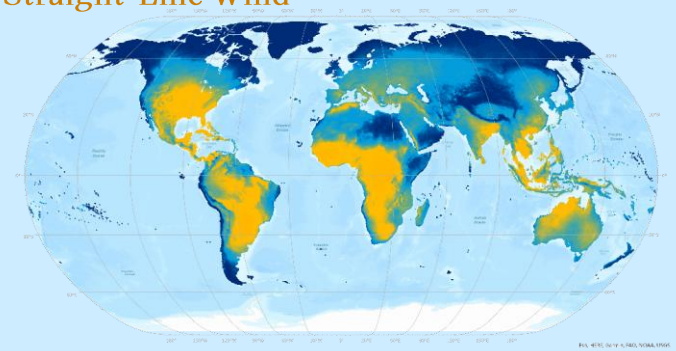
Hail



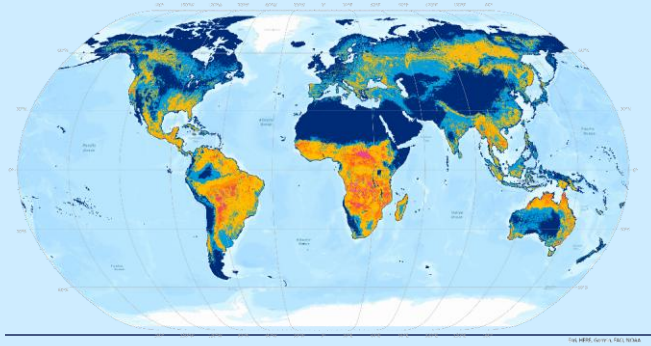
Tornado



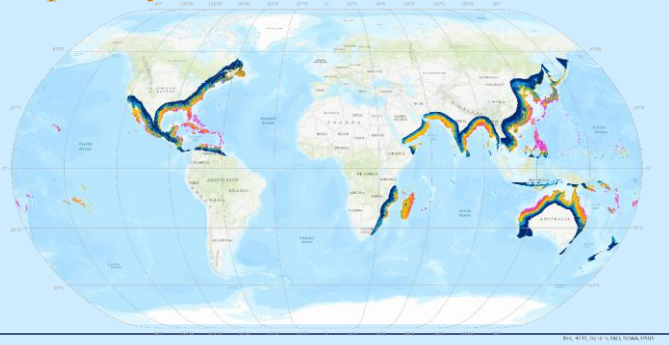
Straight-Line Wind



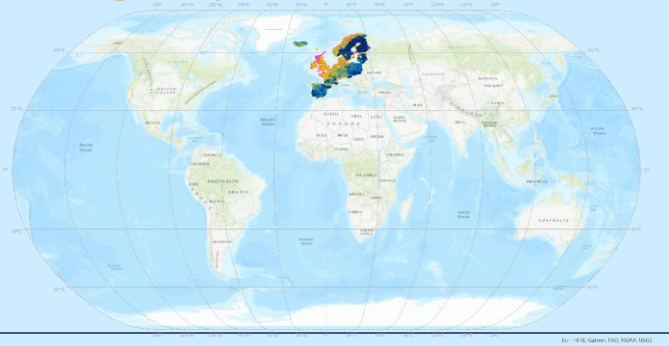
Wildfire



Tropical Cyclone Wind



Extratropical Cyclone Wind



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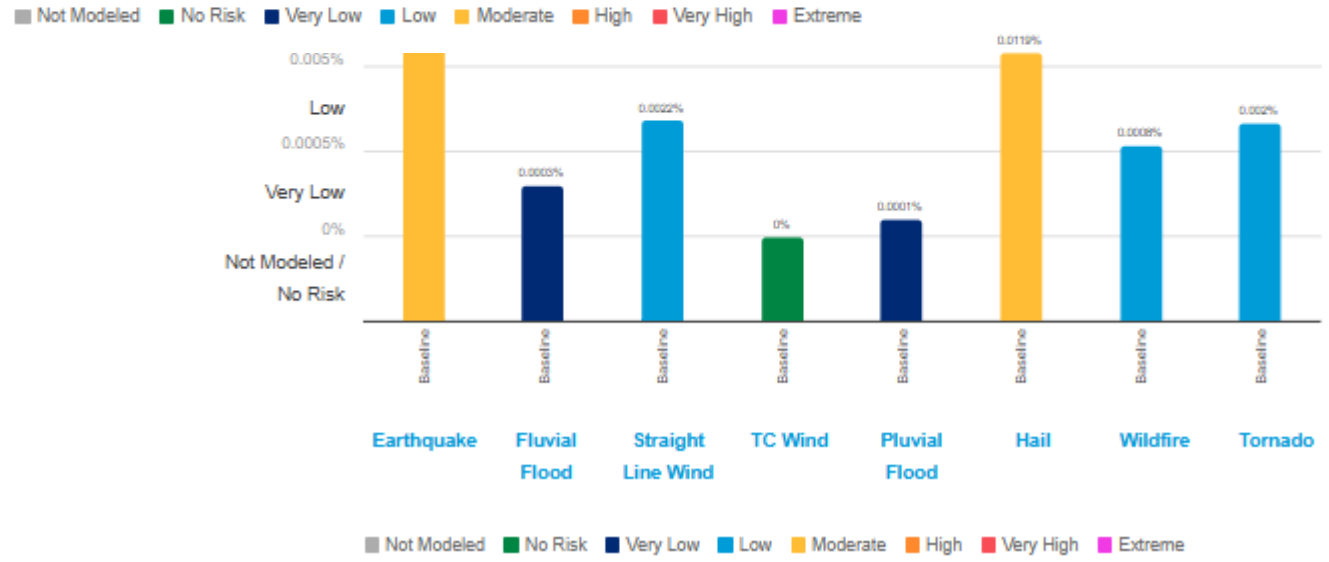
Use Case 1

Informed and quantitative underwriting

Quantitative underwriting with standardized metrics measured in consistent units, enabling effective and accurate comparison of risk across multiple perils. This approach empowers insurers to make data-driven pricing decisions.

Peril	Climate	Risk Level	Dmg Ratio	Risk Premium	Show
Earthquake	Baseline	Moderate	0.0264%	$5,280	☐
Hail	Baseline	Moderate	0.0119%	$2,387	☐
Straight Line Wind	Baseline	Low	0.0022%	$438	☐
Tornado	Baseline	Low	0.002%	$396	☐
Wildfire	Baseline	Low	0.0008%	$162	☐
Fluvial Flood	Baseline	Very Low	0.0003%	$60	☐
Pluvial Flood	Baseline	Very Low	0.0001%	$21	☐
TC Wind	Baseline	No Risk	0%	$0	☐



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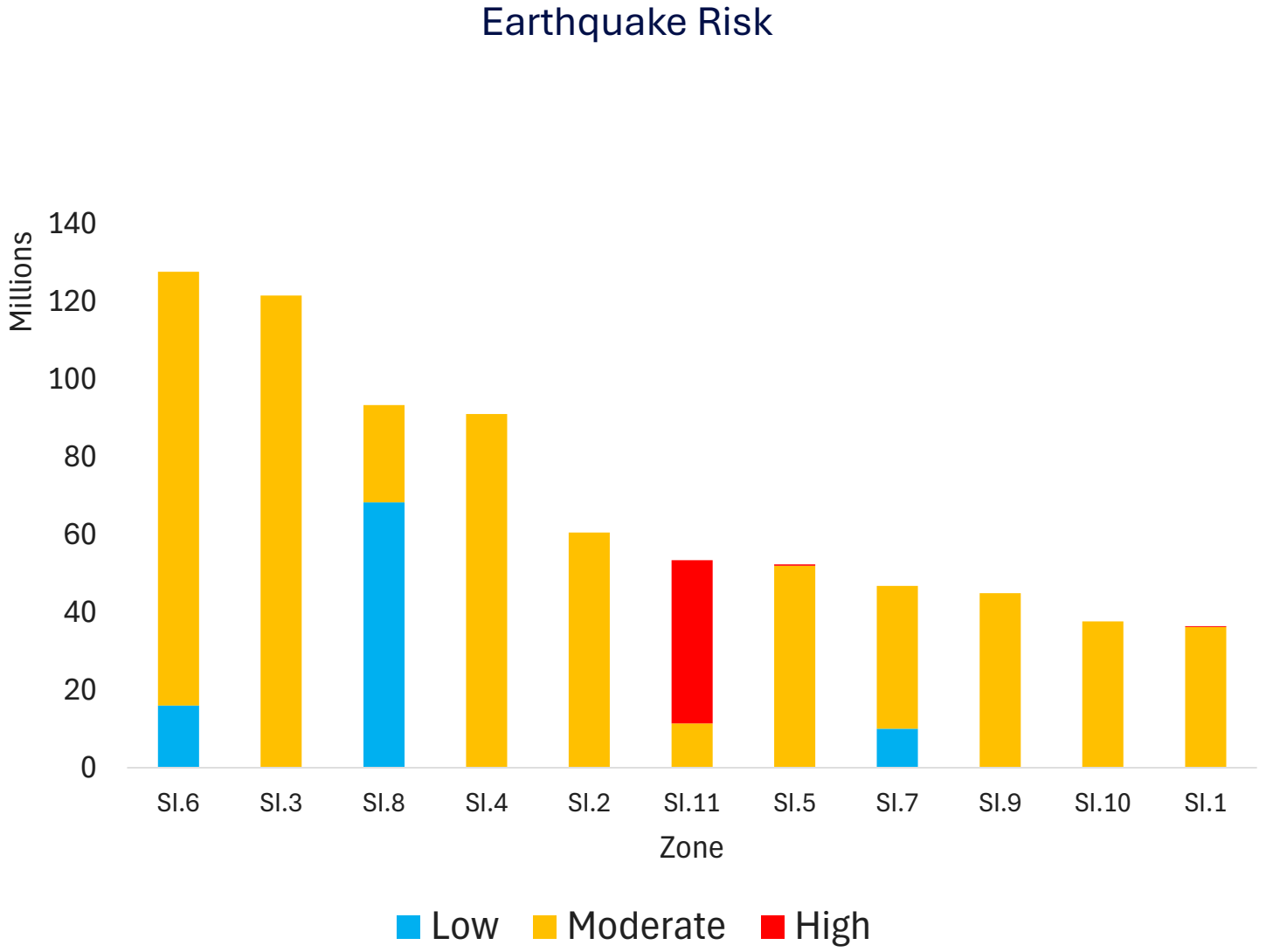
Use Case 2

Portfolio risk analysis

Quickly identifying top exposure concentrations through the aggregation of Total Insured Value (TIV) and Risk Count enables insurers to pinpoint areas of heightened risk efficiently. This insight supports proactive risk management, optimizes capital allocation, and improves portfolio resilience.



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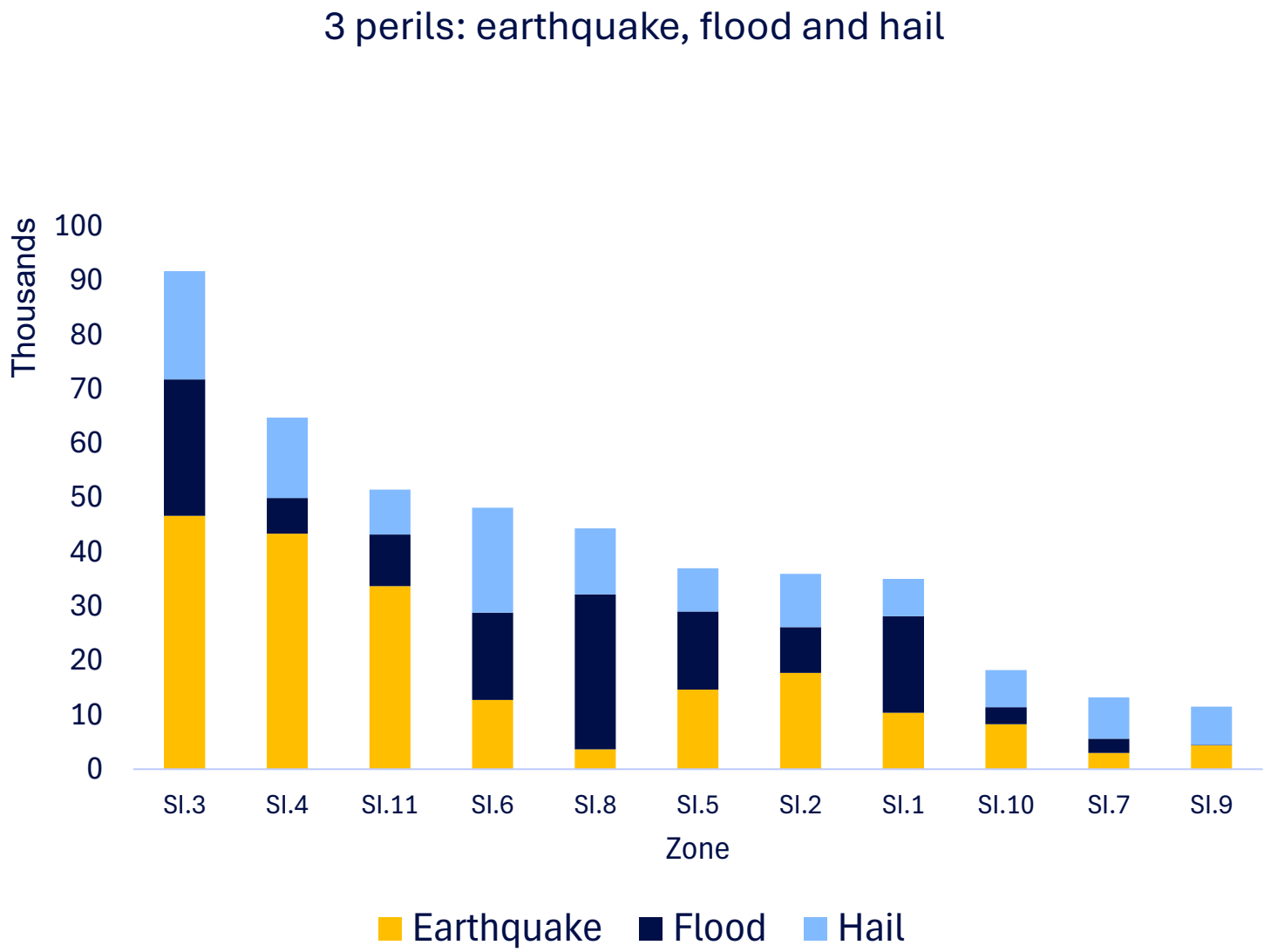
Use Case 3

Compare risk exposure seamlessly across geographies and perils with standardized metrics and unified units for smarter benchmarking

Defining the same metric across perils and using consistent units standardizes risk measurements, allowing risk rating products to accurately compare exposure levels across different hazard types. This uniformity facilitates clear benchmarking of exposure across geographies and perils, supporting more informed risk assessment and decision-making.



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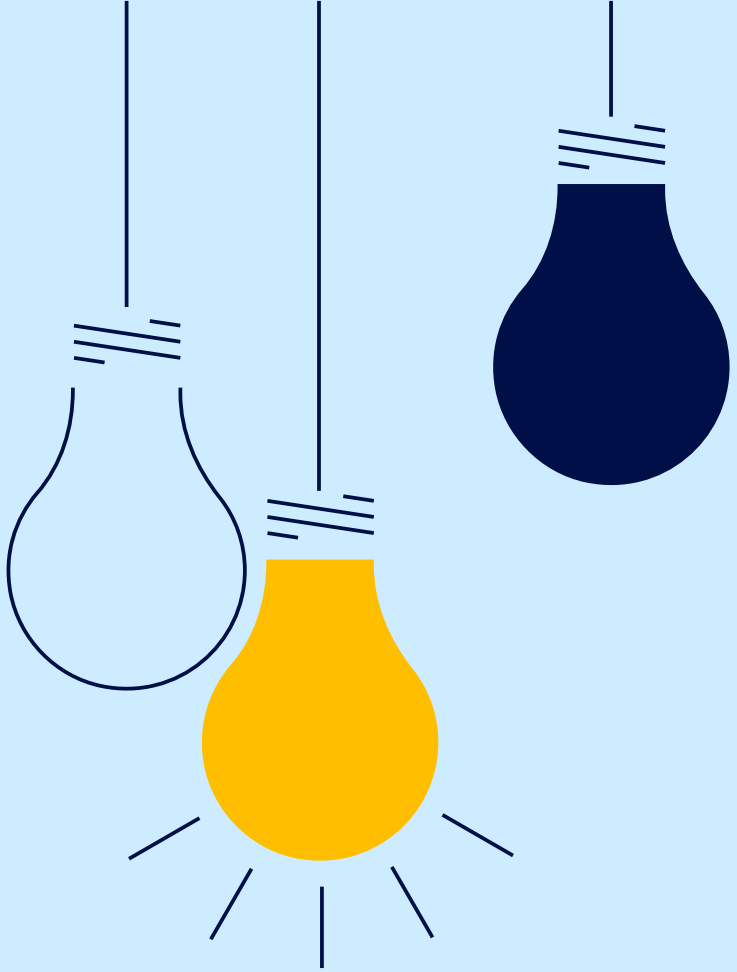
Thank you!



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