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Managing Catastrophe Risk

A2II 29/11/2023

Portfolio Risk Management, Lloyd's

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Oversight of Catastrophe Risk Management

Principles for doing business

Managing agents should ensure syndicates maintain appropriate control of catastrophe risk (from natural and non-natural perils) in line with their wider business strategy.

Sub-Principles - Managing agents should…	10 components to consider
Manage catastrophe exposure in line with their agreed risk appetites.	•Risk Appetite
Employ data standards, risk quantification tools, controls, expertise, and reporting frameworks which are appropriate to their risk profile.	•Data and Tools •Exposure Monitoring and Reporting •Resourcing
Adequately justify and validate methodology and assumptions, including expert judgements.	•Model methodology •Model validation
Have a complete representation of catastrophe risk in the internal model, reflecting all possible sources of loss and allowing effective use by wider business functions	•Model completeness •Model change •Model use and capital modelling
Have robust governance and oversight of risk aggregations.	•Governance and Oversight

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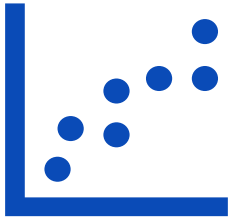
Managing Catastrophe Risk

Deterministic

Modelled losses from a suite of prescribed Realistic Disaster Scenarios (RDS) are submitted by syndicates and collated to form a market level view. These include scenarios for the five most material region-perils.

Probabilistic



Aggregate/Annual Exceedance Probability (AEP) modelled losses are collected for Lloyd's five most material region perils. All other worldwide modelled losses are collected in a combined 'Rest of World' AEP curve for each syndicate.

Additional Data

Lloyd's collects country aggregates and exceedance probability curve return period modelled losses for a prescribed set of region / perils which represent a 'second tier' of materiality at market level for nat cat perils

Materiality

High → Low

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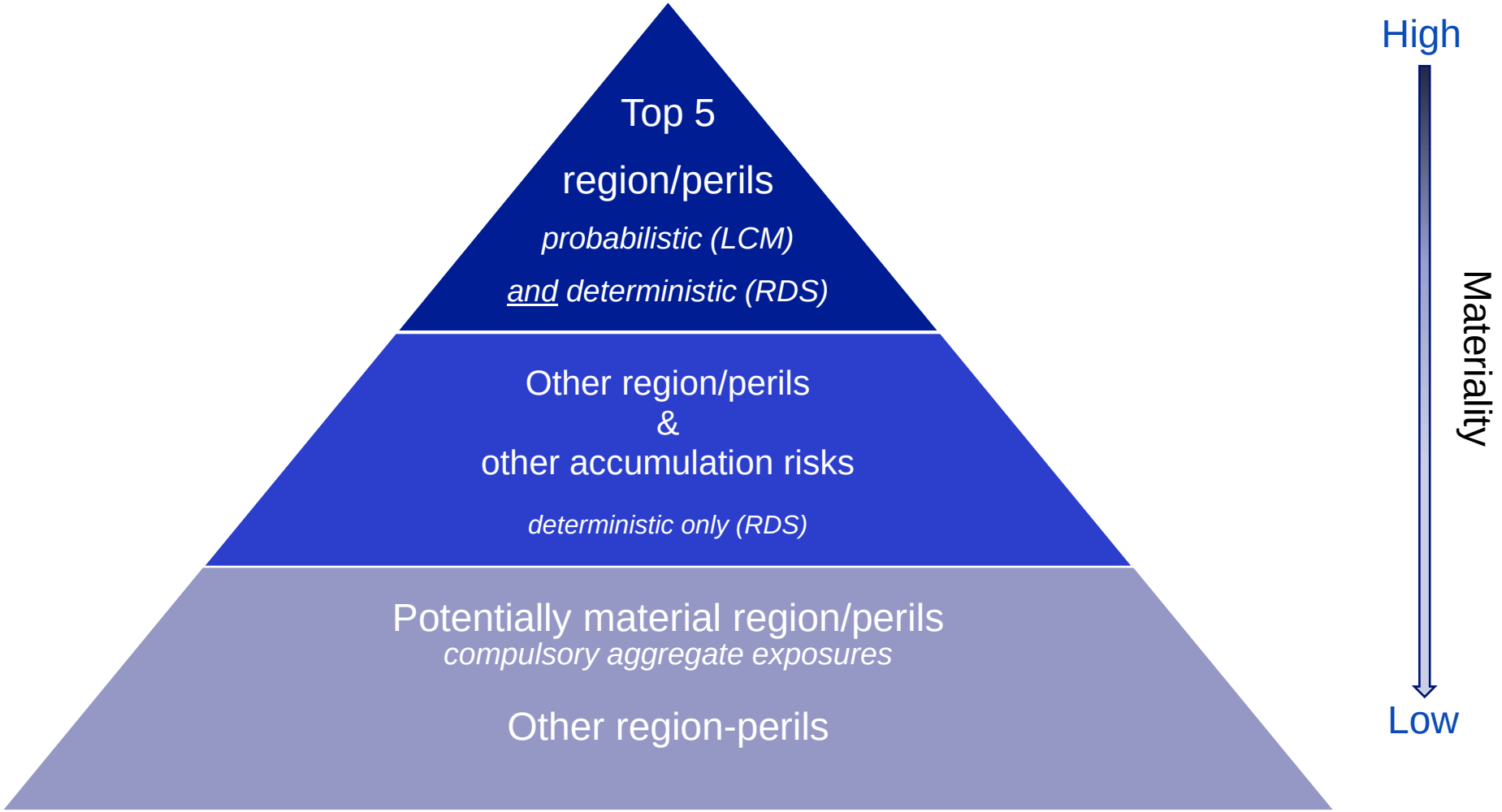
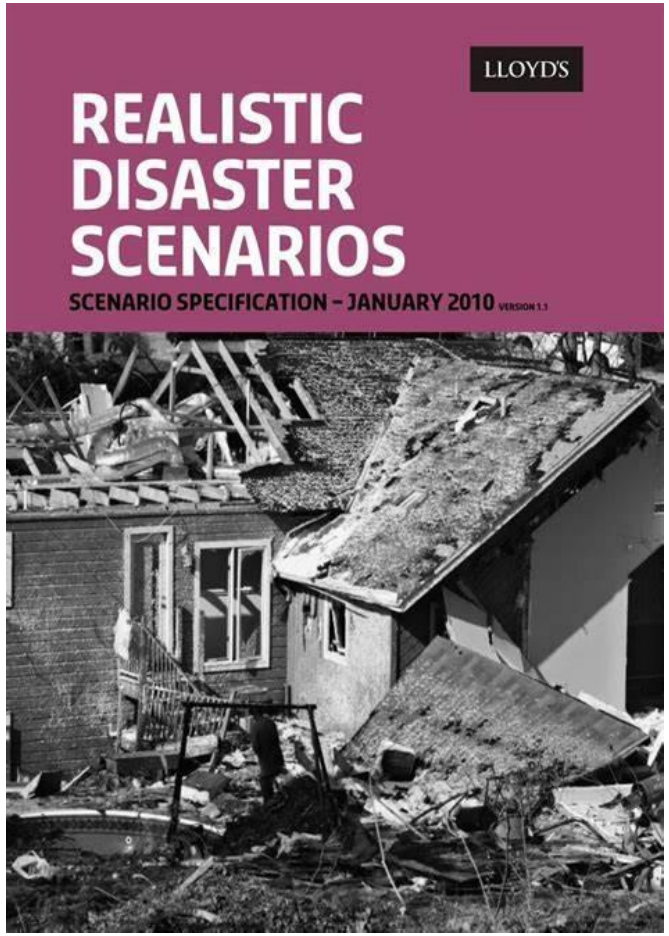
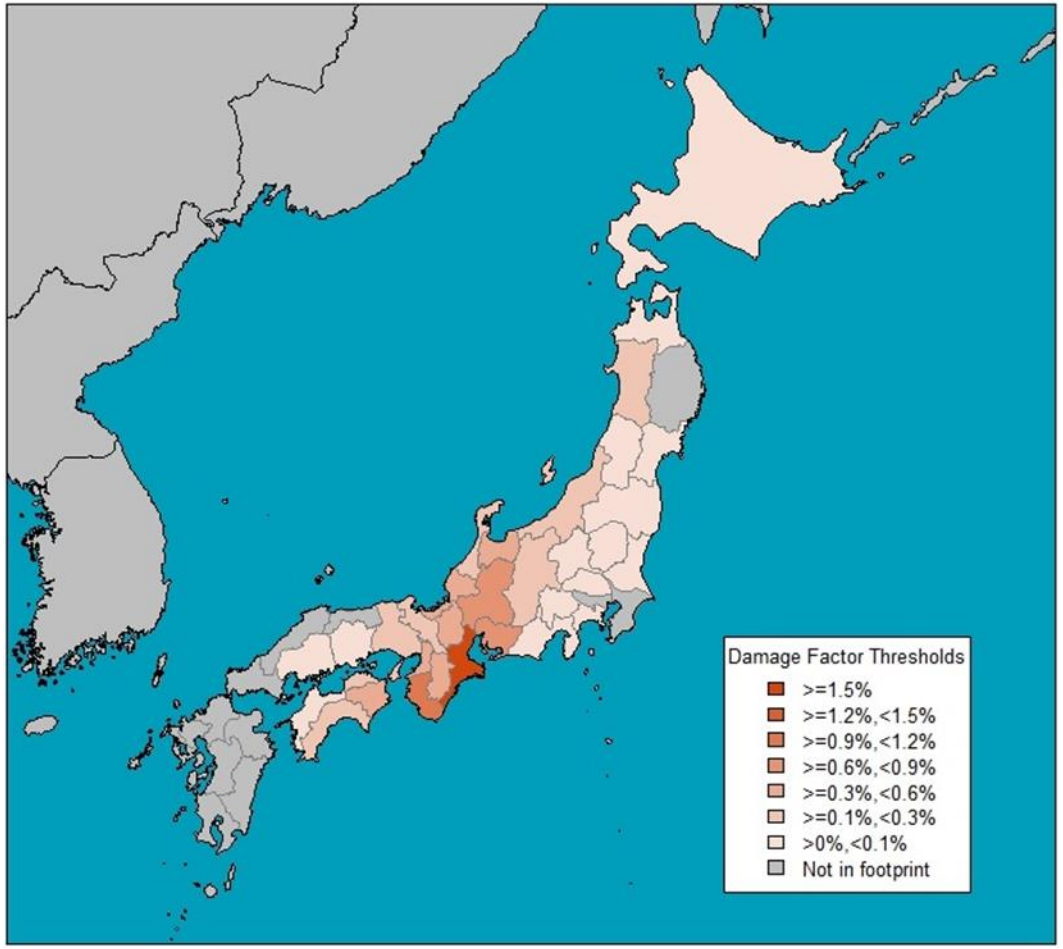
Managing catastrophe risk



Deterministic: Realistic Disaster Scenarios





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Lloyd's maintains a suite of Realistic Disaster Scenarios

Natural Catastrophe scenarios

US windstorm
- 2 events
- Pinellas
- Miami Dade
- Gulf of Mexico

Other windstorm
- Japan
- Europe

Earthquake
- Los Angeles
- San Francisco
- New Madrid
- Japan

Other natural
- Europe flood

Non-Natural Catastrophe scenarios

Terrorism
- Rockefeller centre
- One-world trade centre

Cyber
- Cloud cascade
- Ransomware
- Business blackout
- Data breach

Other non-natural
- Marine
- Major complex
- Aviation
- Satellite risks
- Political risks

Liability
- Financial products & markets
- Pharmaceutical
- Construction
- Chemicals in food
- Off/on-shore energy

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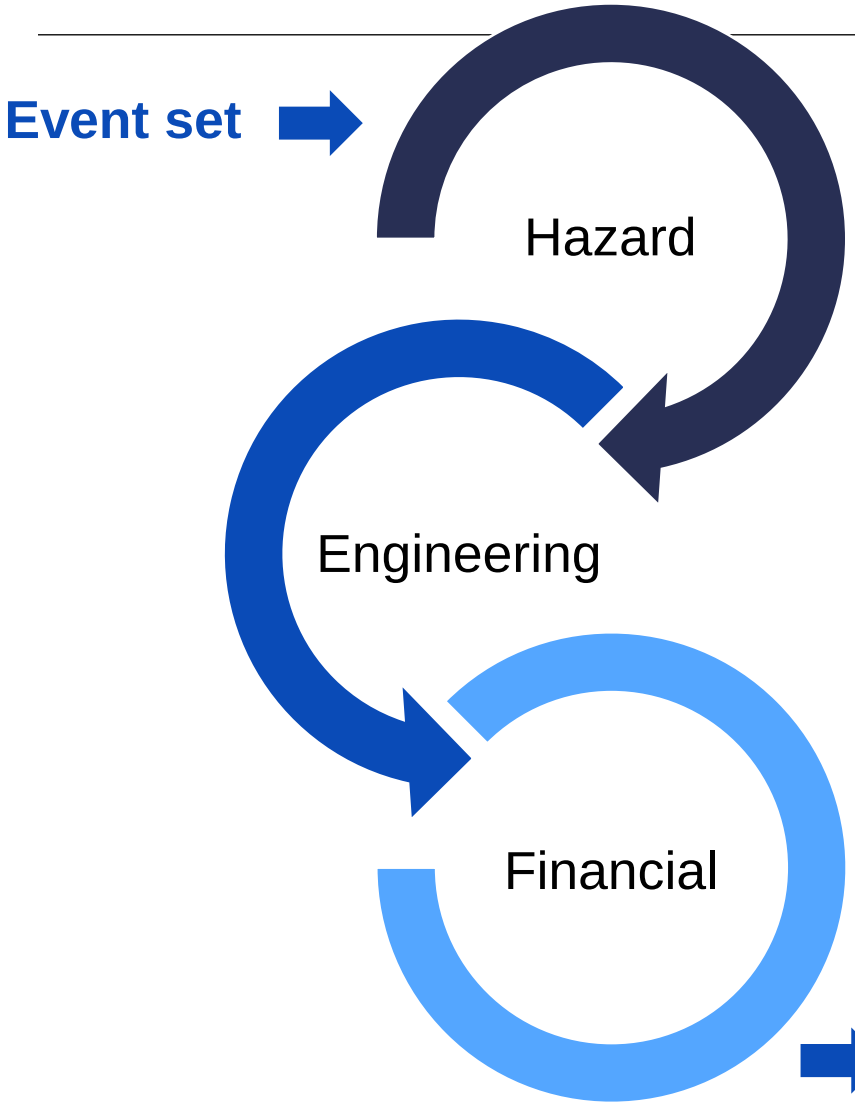
How Catastrophe Models Work



The hazard module generates the event set – locations, magnitudes, frequencies - and assesses the physical hazard of each event e.g. wind speeds or storm surge.

The engineering module calculates the damage from each event to every exposure using damage functions. Exposure data is overlayed in this calculation e.g. location, building height & construction type.

The financial module translates physical damage into monetary loss, which is in turn translated into insured loss with policy terms applied.

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Lloyd's Catastrophe Model

Aggregates the outputs provided by syndicates to form a market-level view

Syndicate Year Loss Tables (YLT)

At least 10,000 years

Aggregation by rank matching methodology

Combine the separate region perils

Lloyd's catastrophe model view of risk

View is validated by Lloyd's and syndicate outputs reviewed by individual syndicates

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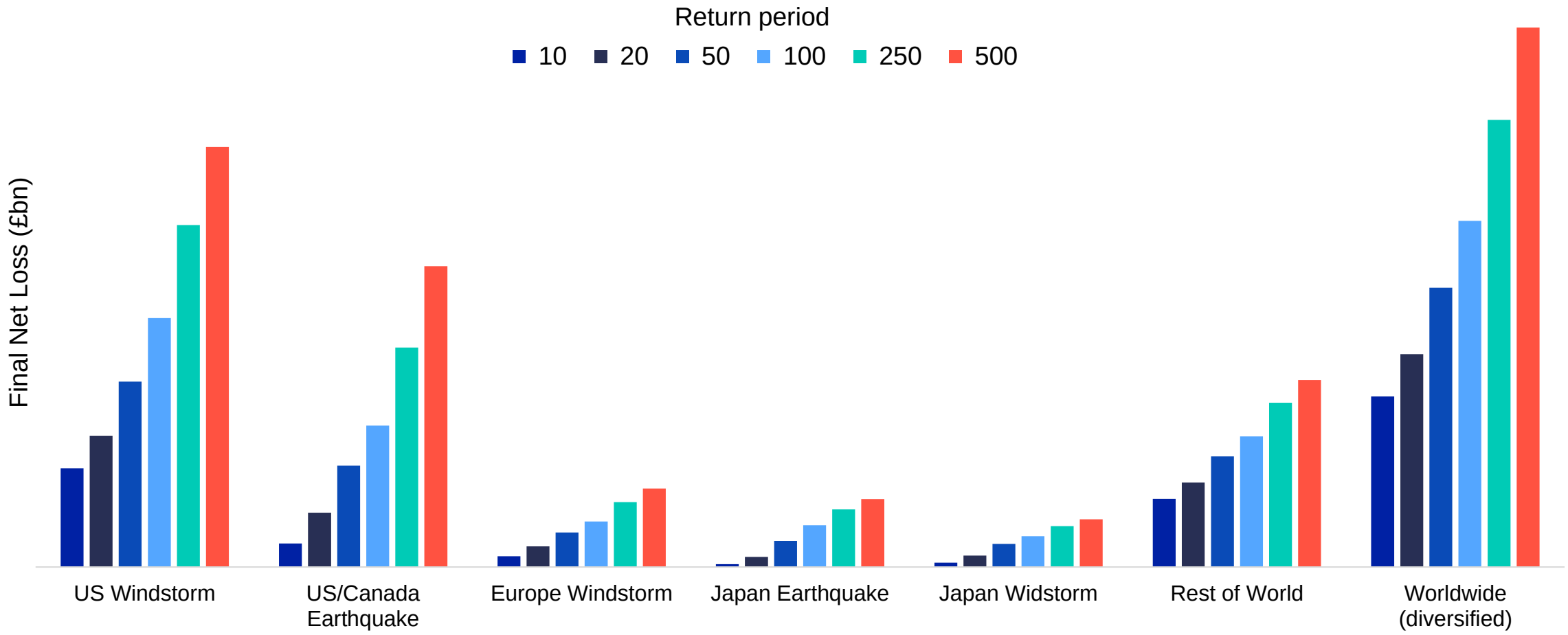
Lloyd's Catastrophe Model Output



2023 plan figures

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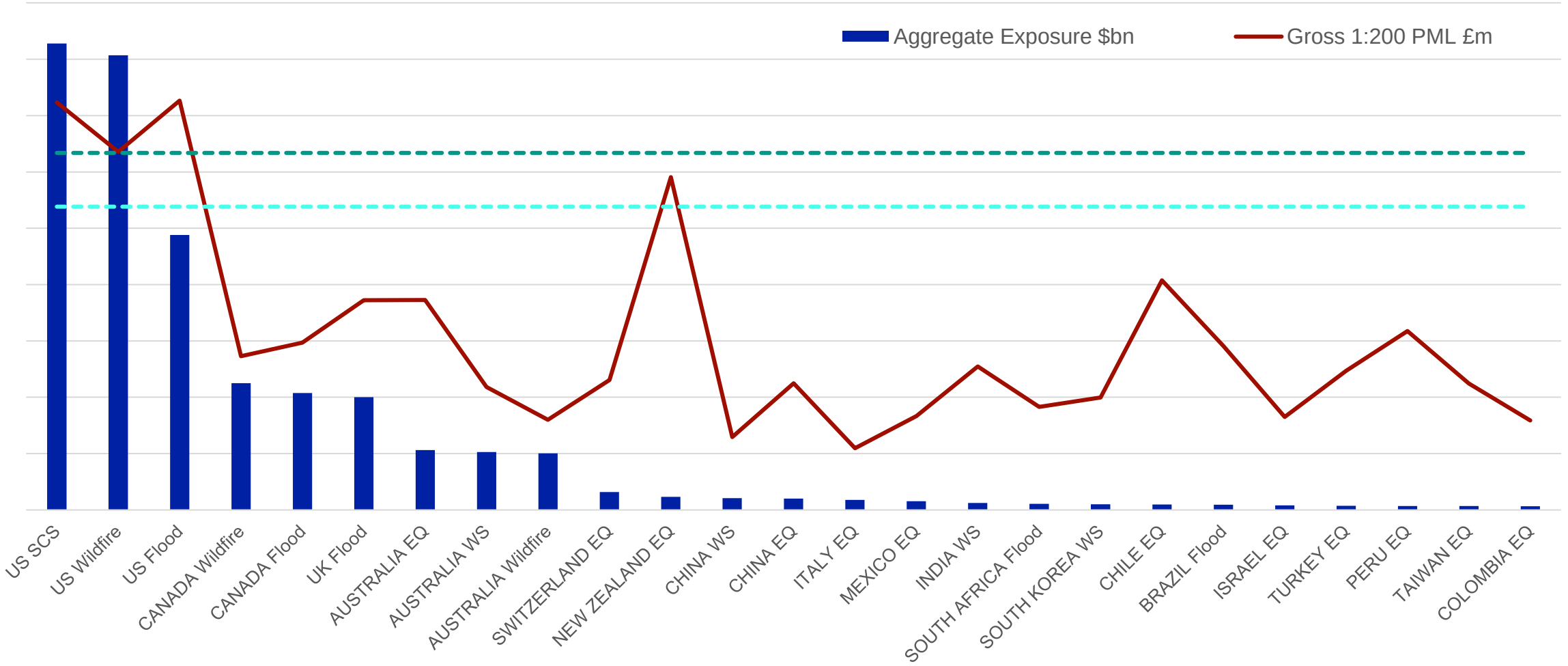
Additional Data: monitoring “non-peak” cat



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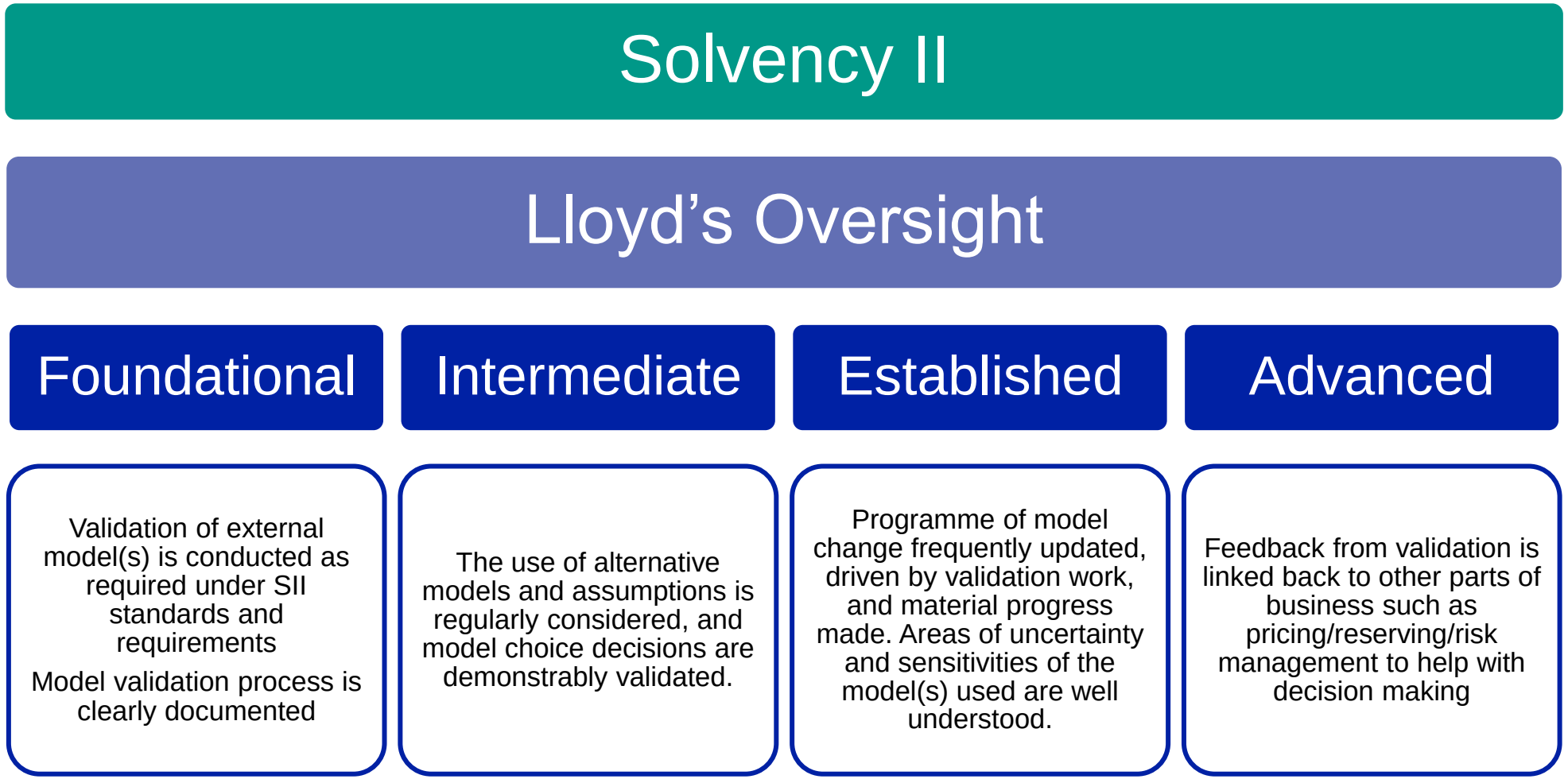
Catastrophe Model Validation

How we ensure models are fit for purpose



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