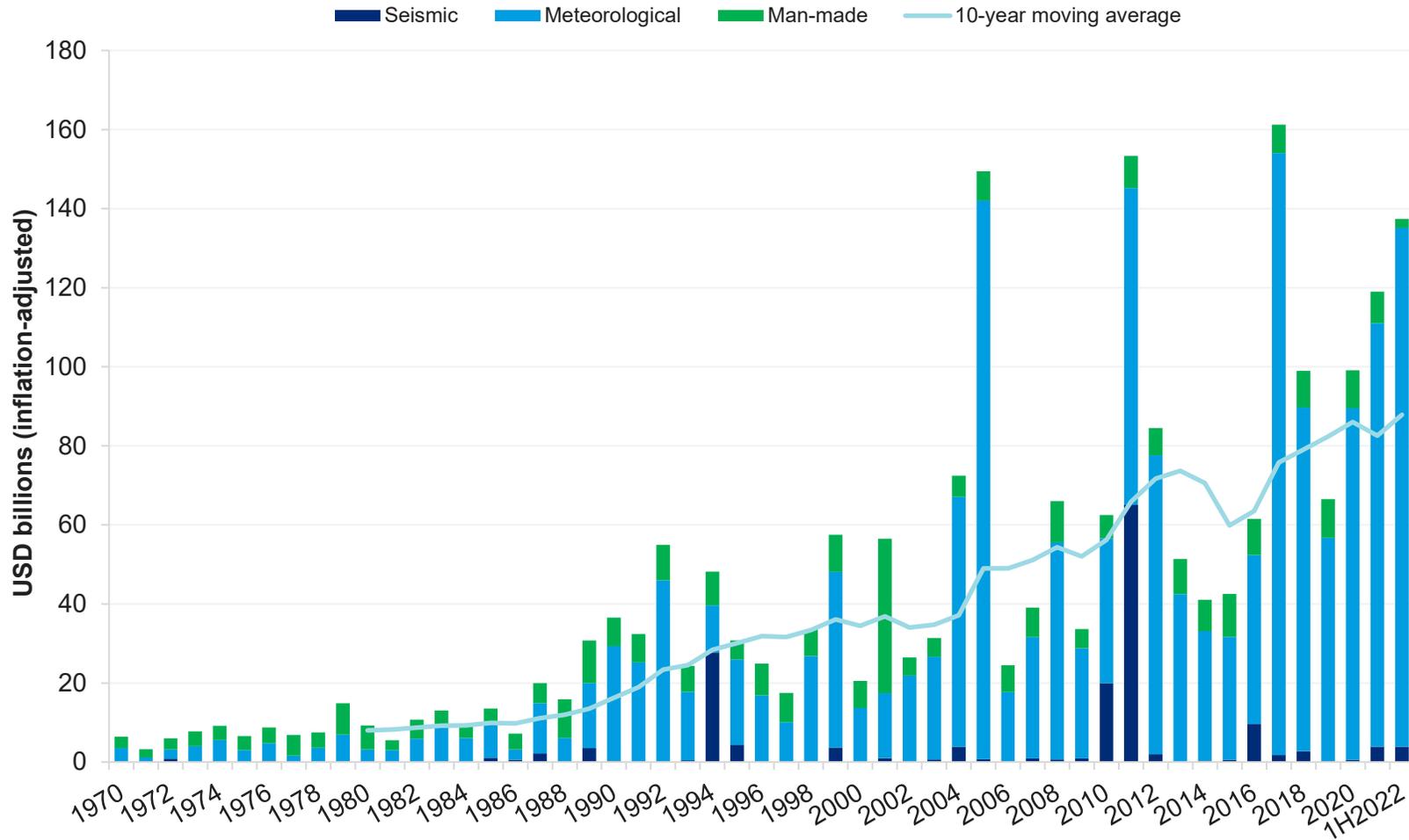


UNIMUTUAL CONFERENCE 2023

Managing Catastrophe Risk

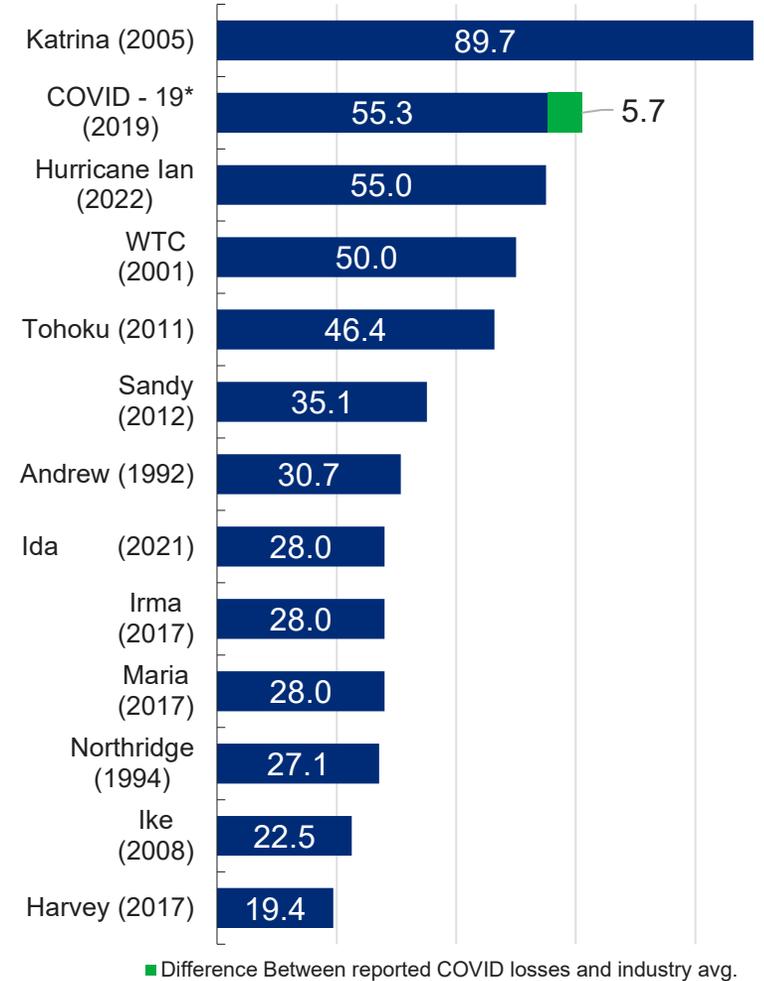
Global – Catastrophe Losses

Insured Catastrophe Losses 1970-1H 2022



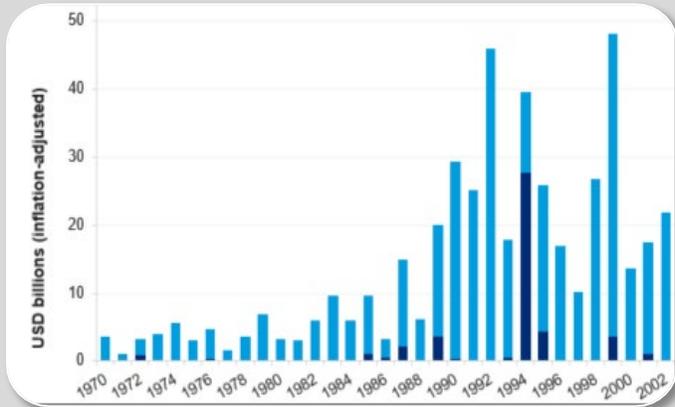
Major Loss Events

USD billions (inflation-adjusted)



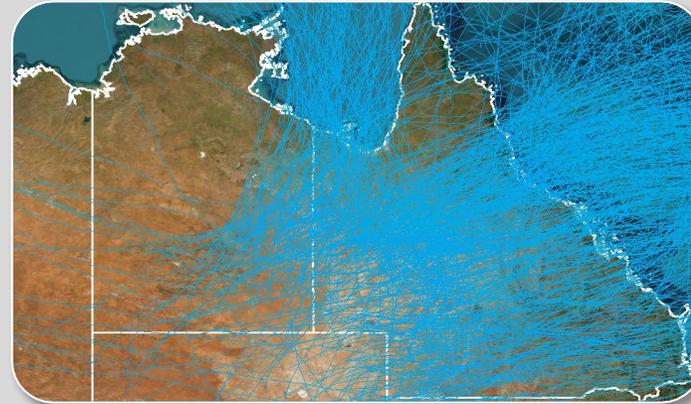
Traditional Approaches VS the Cat Modelling Approach

Traditional Approaches



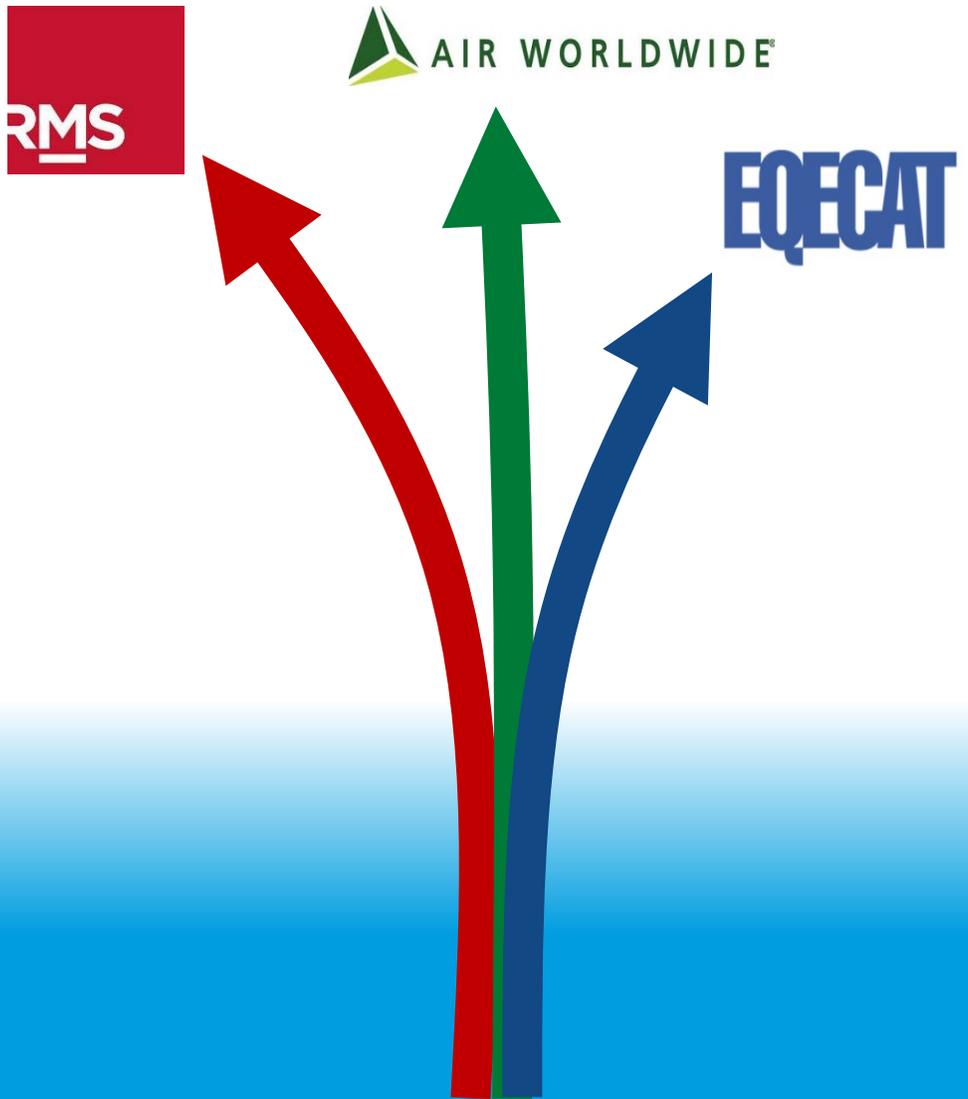
- Historical loss analysis
- PML % estimates
- Based on limited loss data

CAT Modelling Approach

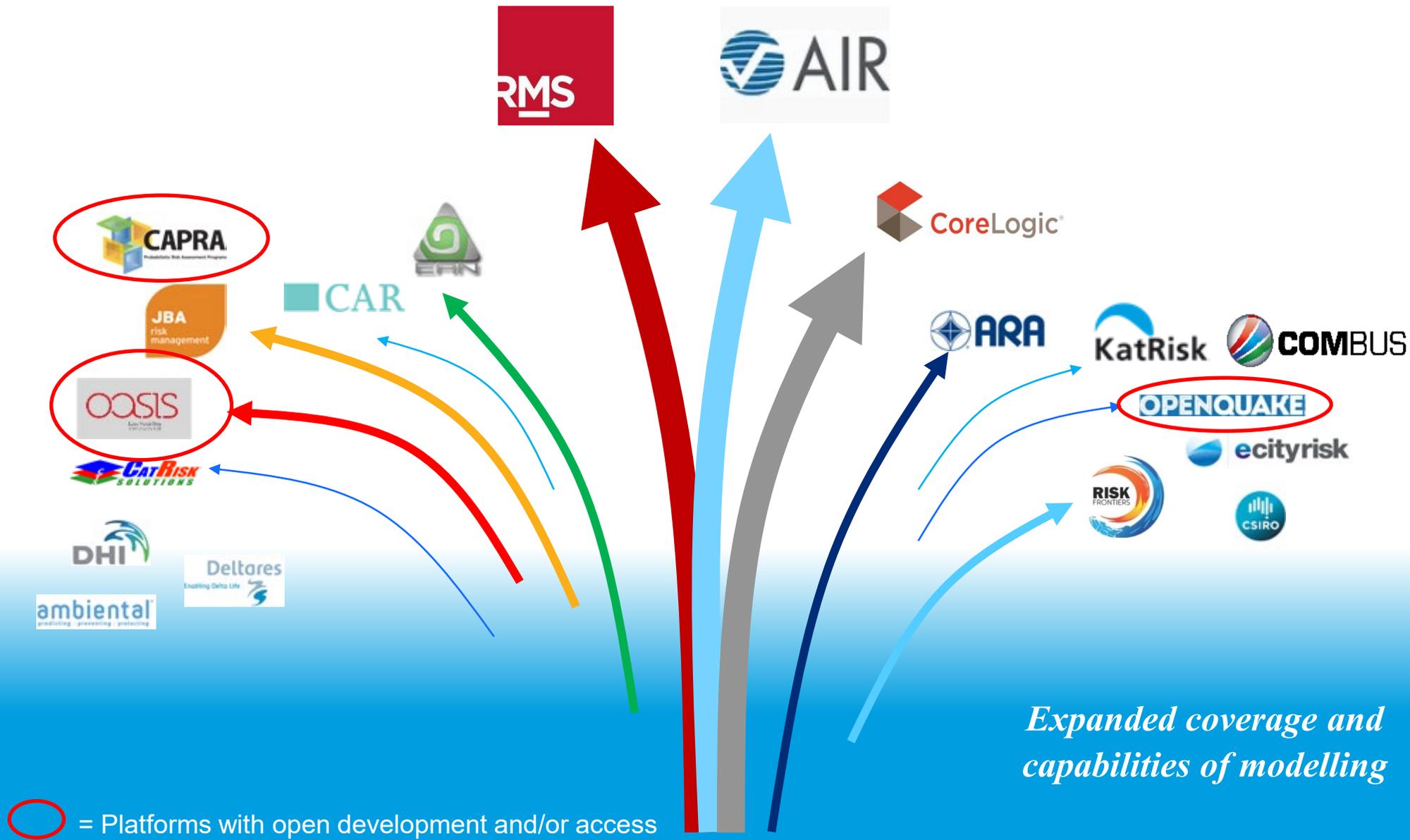


- Based on a longer record of data
- Better reflects changes in exposure and property types
- Generates losses that are larger than what has occurred historically

Early Days of Cat Modelling.....



Expansion of CAT modelling capabilities



Expanded coverage and capabilities of modelling

 = Platforms with open development and/or access

Managing catastrophe risk for Unimutual

A range of approaches to measure catastrophe risk for Unimutual and its members



**Accumulations
Analysis**



**Catastrophe
Modelling**



**Realistic Disaster
Scenarios**



Loss Experience

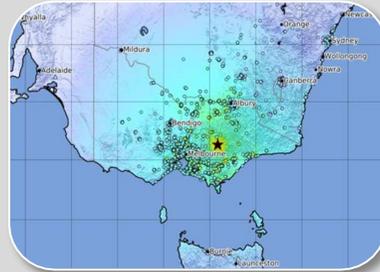
The main components of a CAT model

Exposure Module



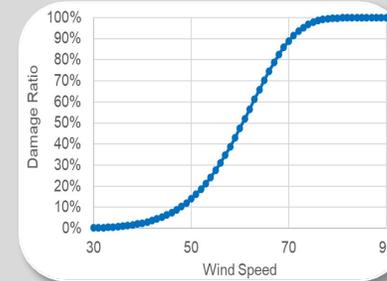
- Where is the exposure?
- What is its value?
- What types of buildings?

Hazard Module



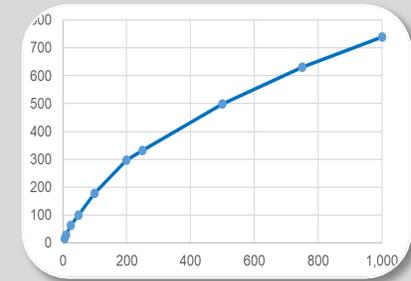
- Where?
- How big?
- How often?

Vulnerability Module



- What is the expected amount of damage?

Financial Module



- What is the financial implication to the company?

Exposure - Key inputs to the model

Geocoding

Replacement Value

Occupancy Type

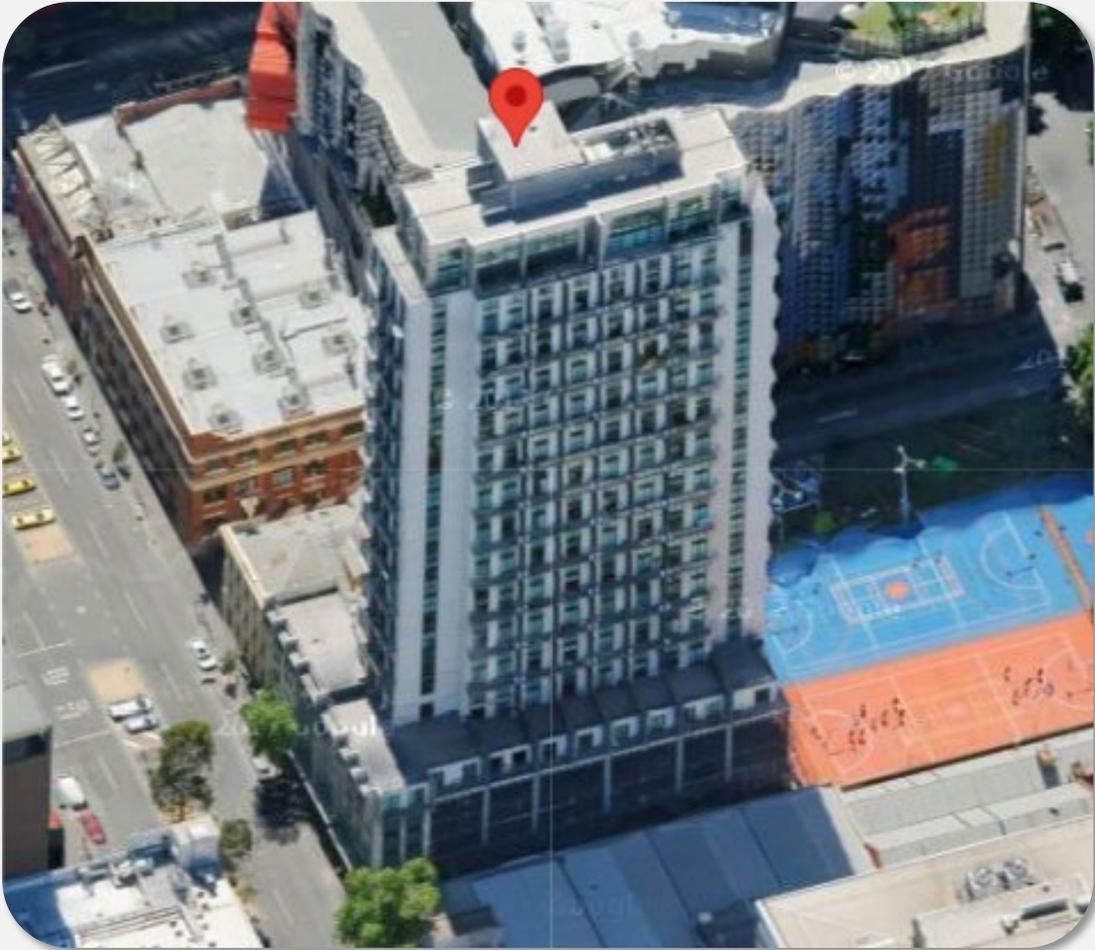
Structure Type

Year Built

Number of Buildings

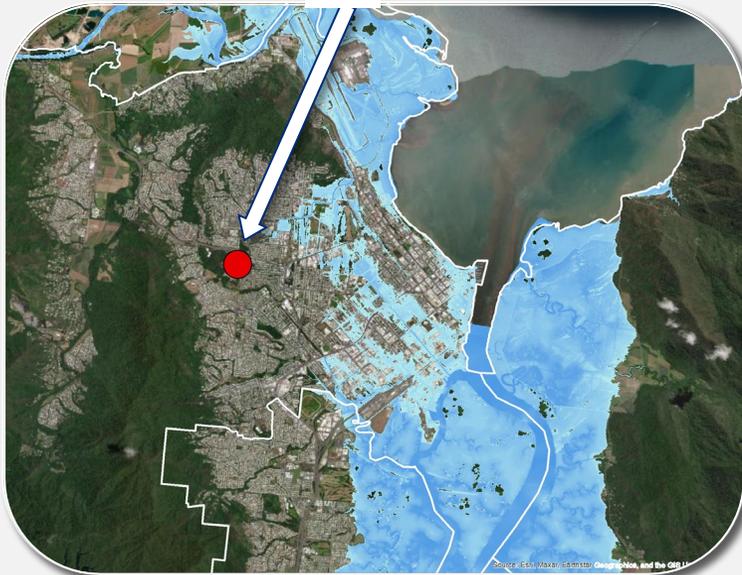
Number of stories

Floor Height

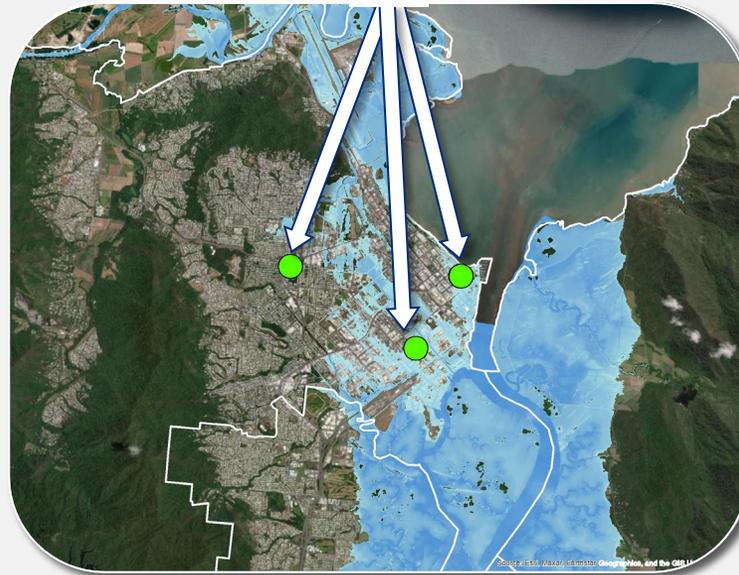


Geocoding – accuracy vs precision

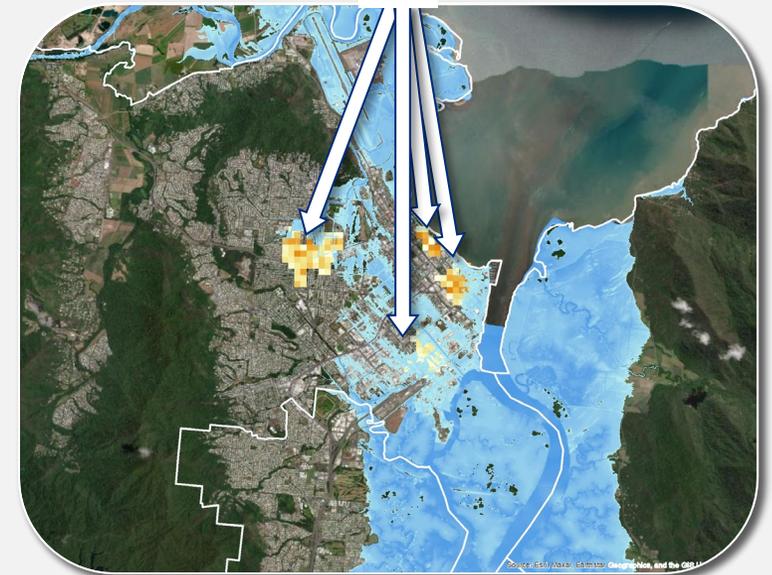
Postcode co-ordinate



Building Co-ordinate



Postcode Disaggregated

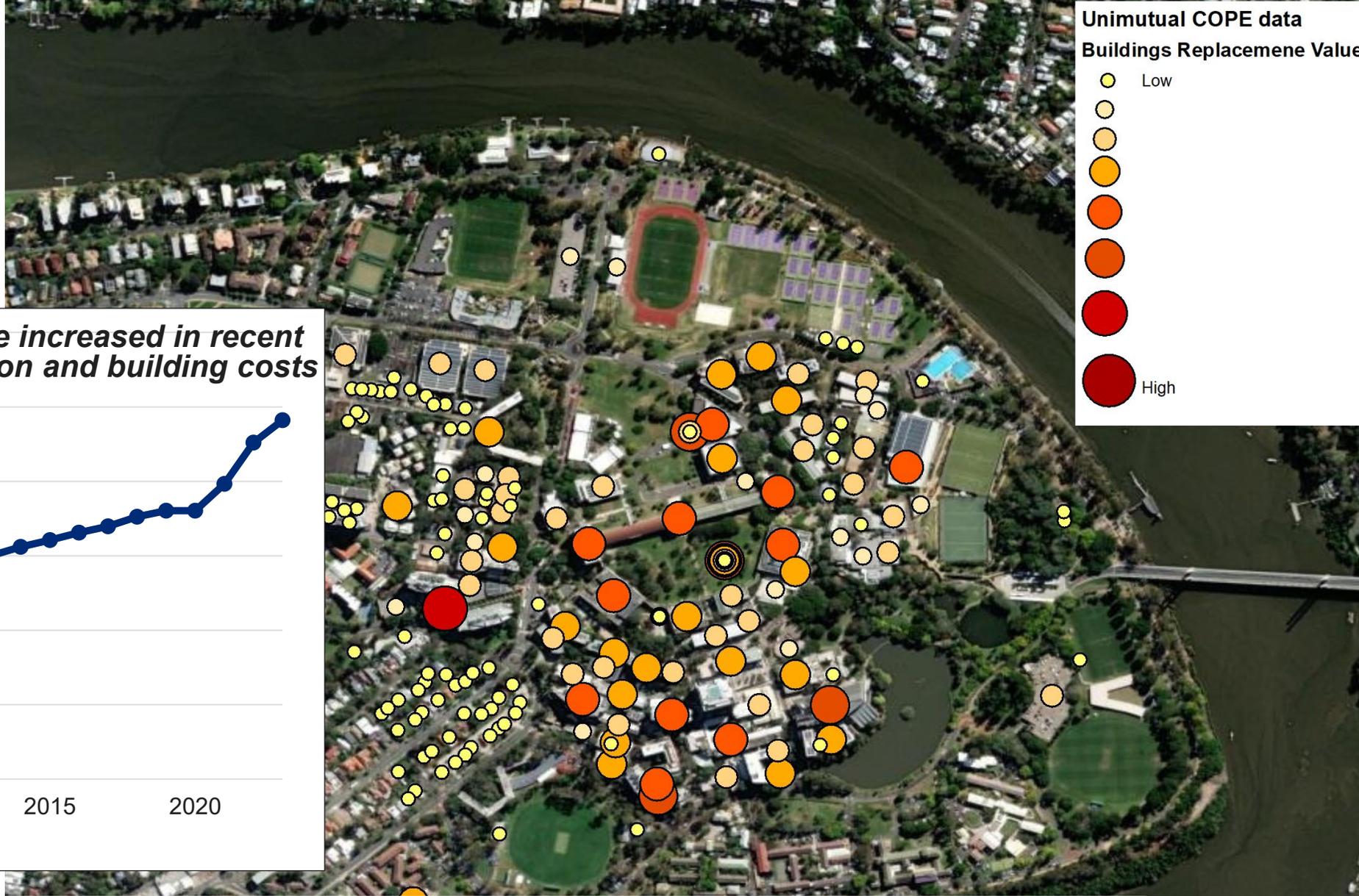


Geocoding – identifying individual sites



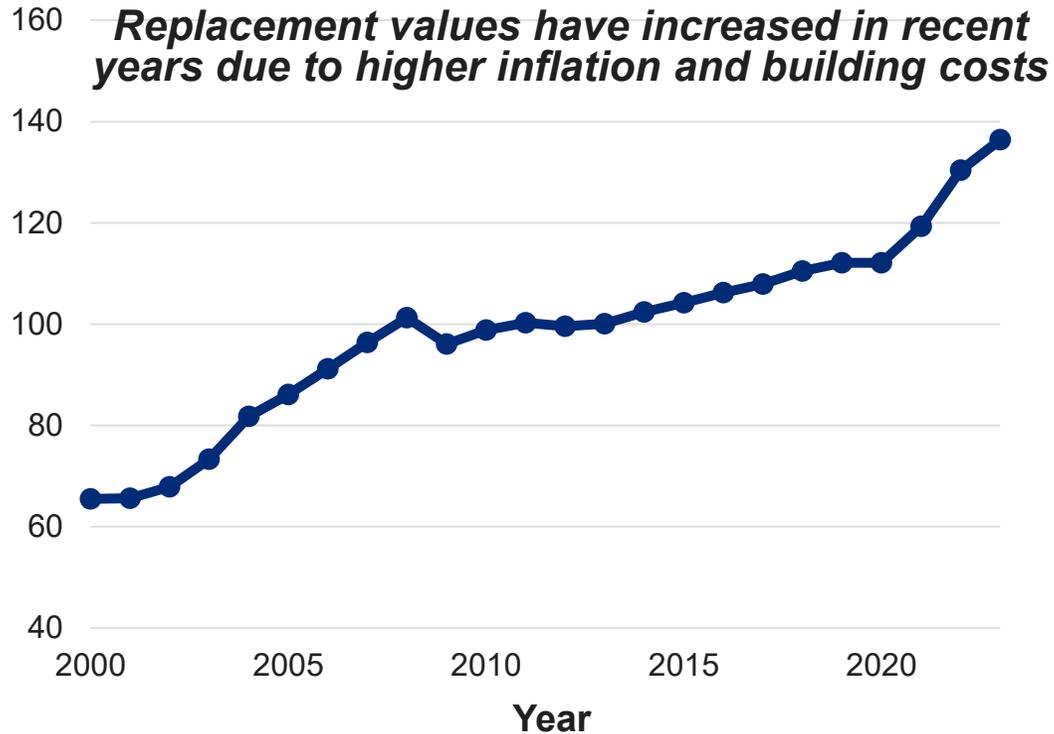
Identifying the location of individual buildings on campuses to provide more reliable risk assessment

Replacement Values – a key input to the CAT models



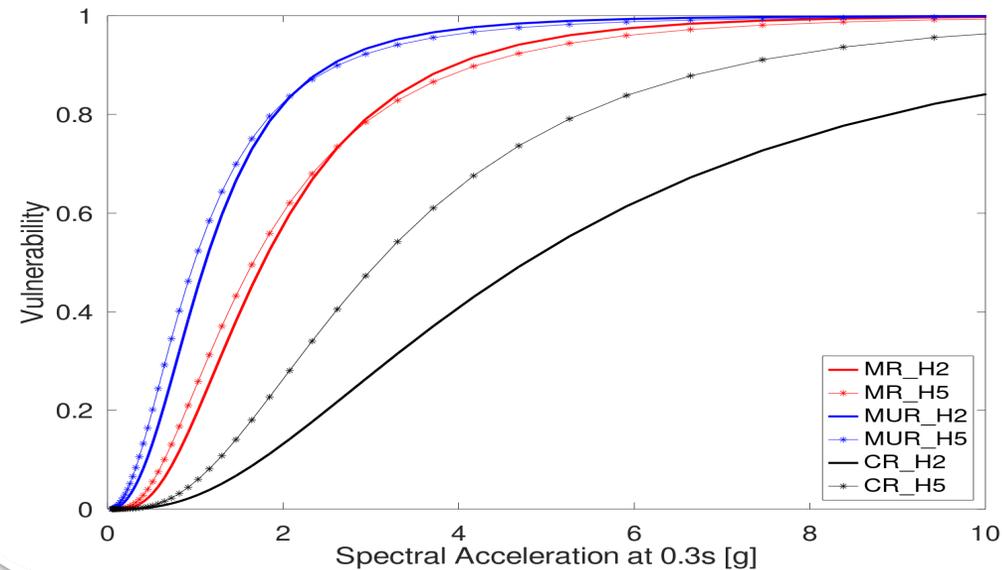
Replacement values have increased in recent years due to higher inflation and building costs

Construction Output Index



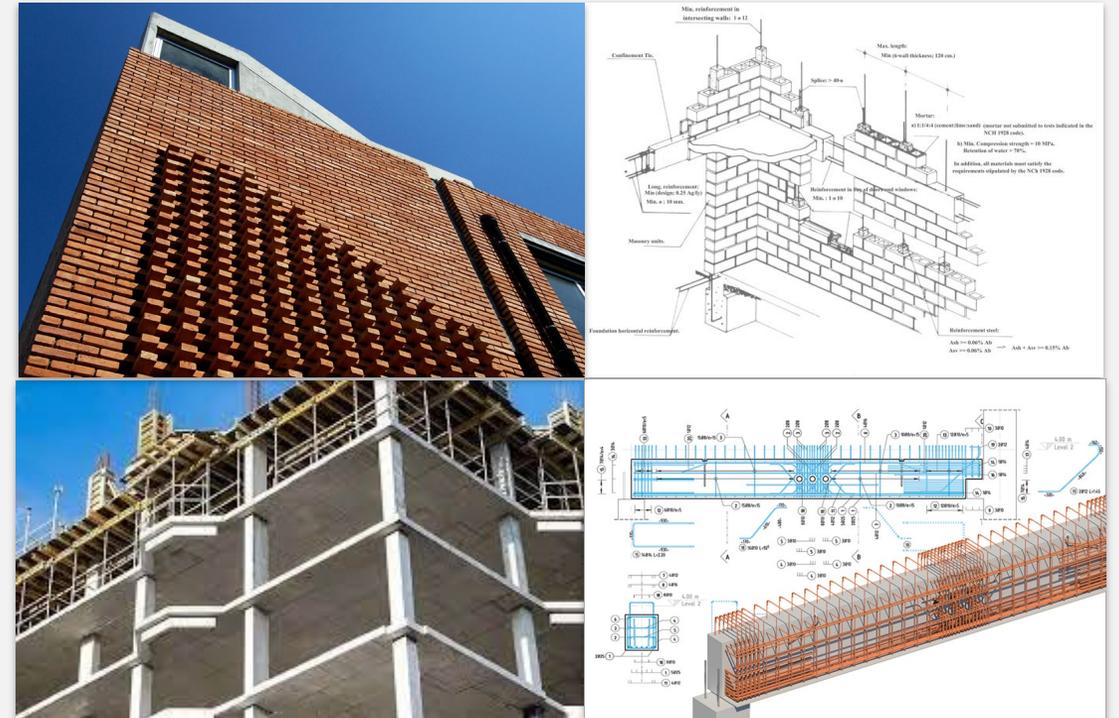
The replacement values are a key input in the models and directly impact losses

Building characteristics – Structure Type



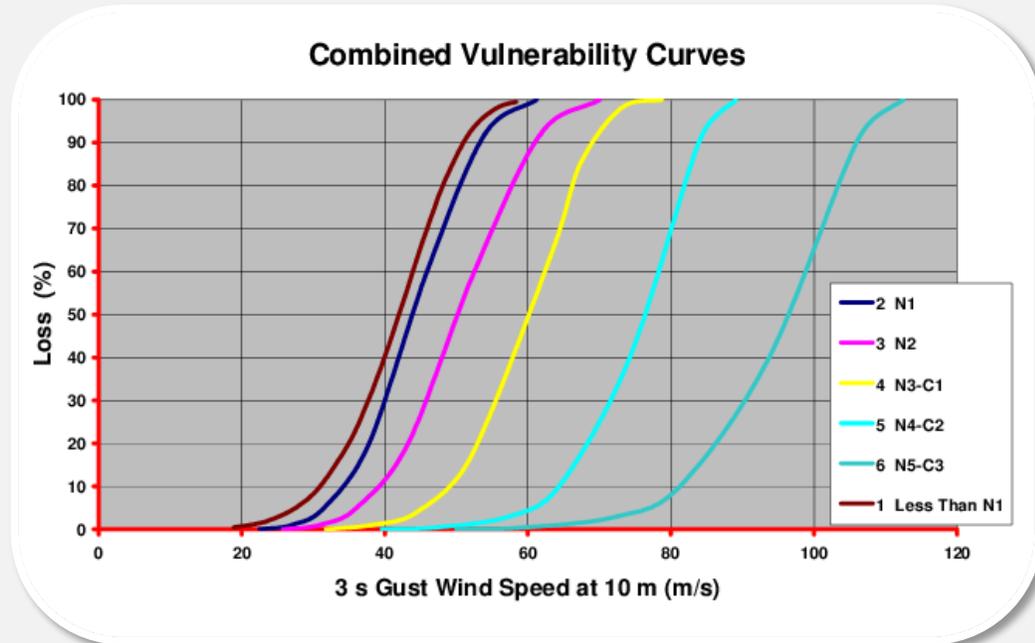
Structure Type

- Key input in the EQ model and results vary considerably by structure type
- Steel frame or reinforced concrete frame have lower damages than unreinforced masonry in the models
 - If no data is available, model will assume a representative construction based on occupancy type



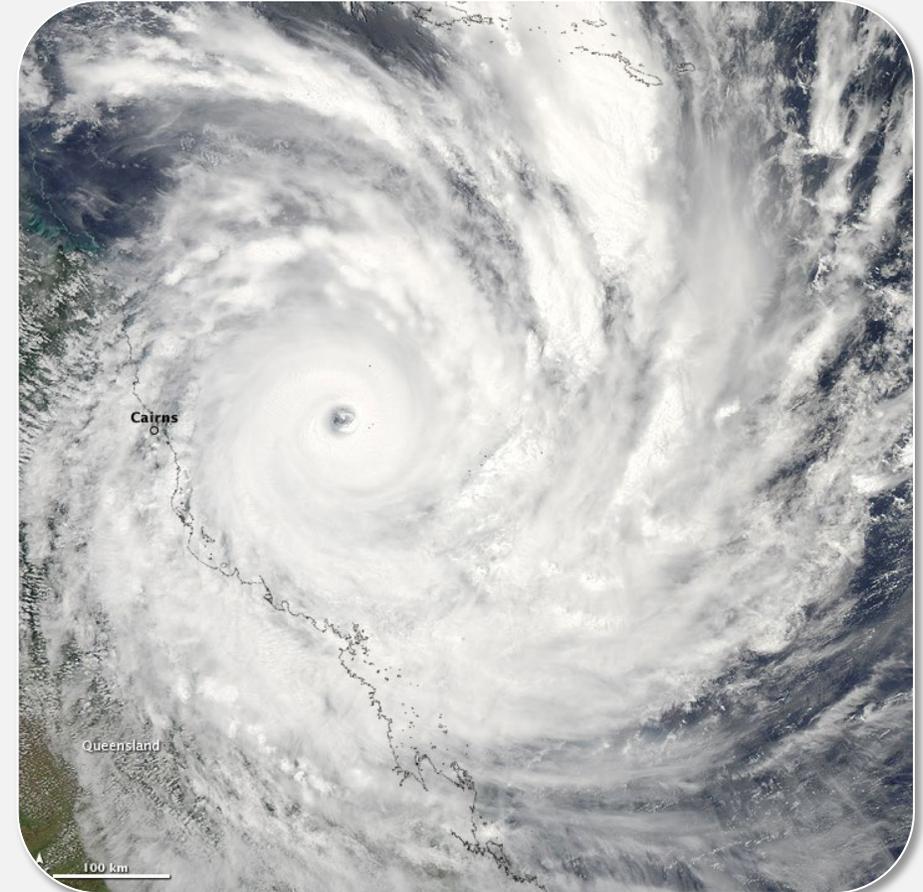
Example of structure types for Masonry and reinforced concrete. Source: Global Earthquake Model

Building characteristics – Year Built



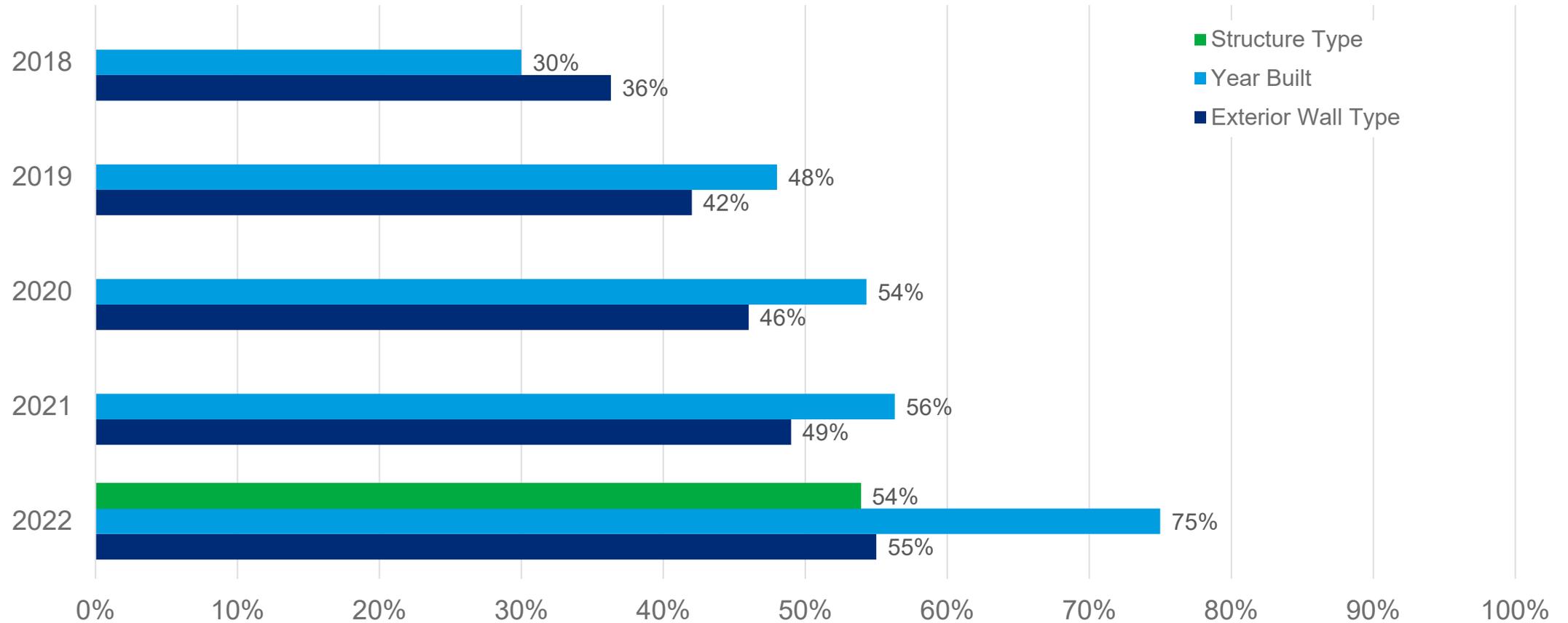
Year Built

- Key input in the cyclone models
- Newer buildings have lower levels of damage than older buildings in the models
 - If no data is available, model will assume a representative year band based on occupancy type



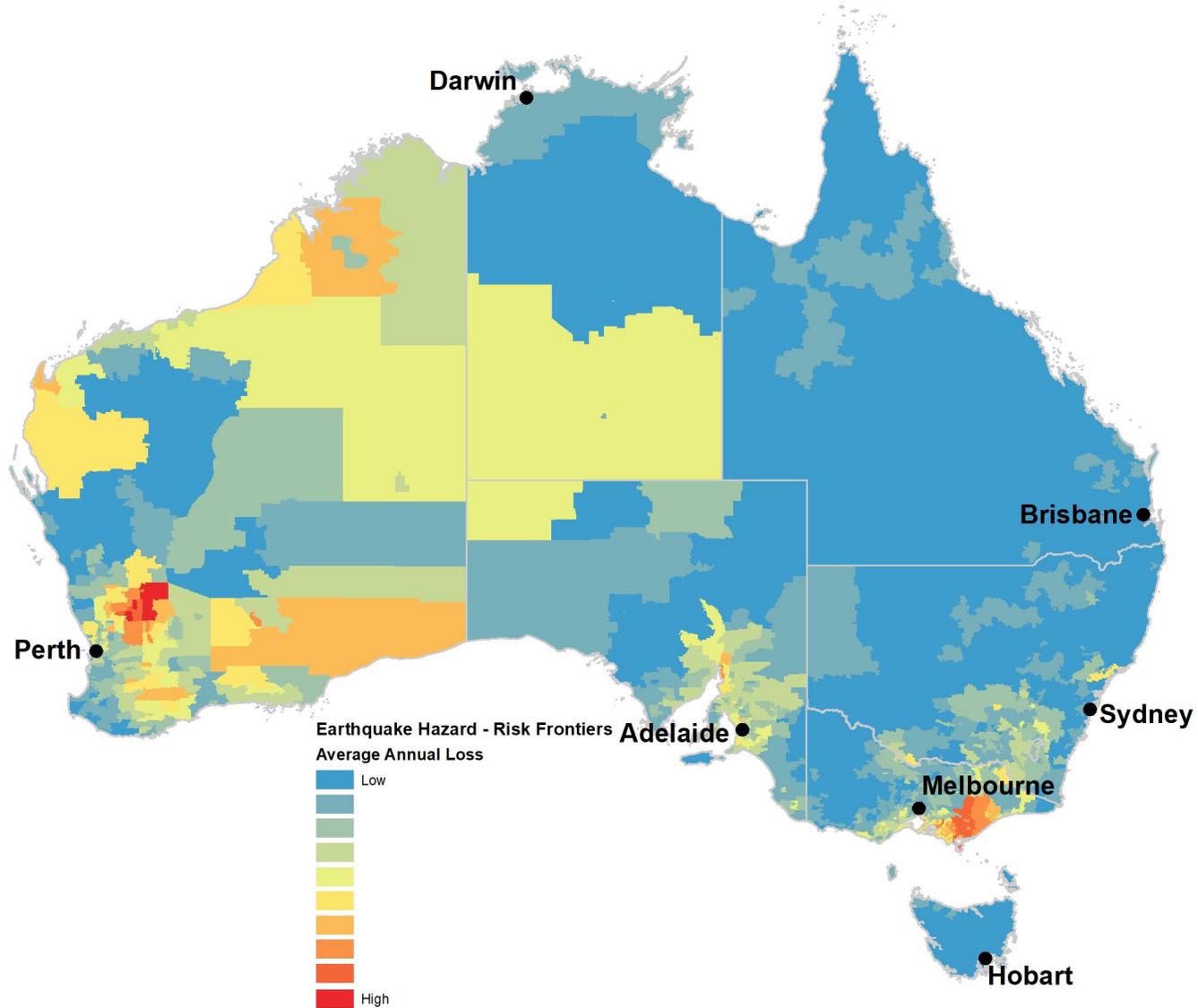
Tropical Cyclone Yasi (2011) Satellite Image
Source: NASA Earth Observatory.
Left image source: Geoscience Australia.

Improvement of data completeness for Unimutual members



Increase in the proportion of asset values with wall type and year built over the last 5 years, with additional details of the structure type in 2022

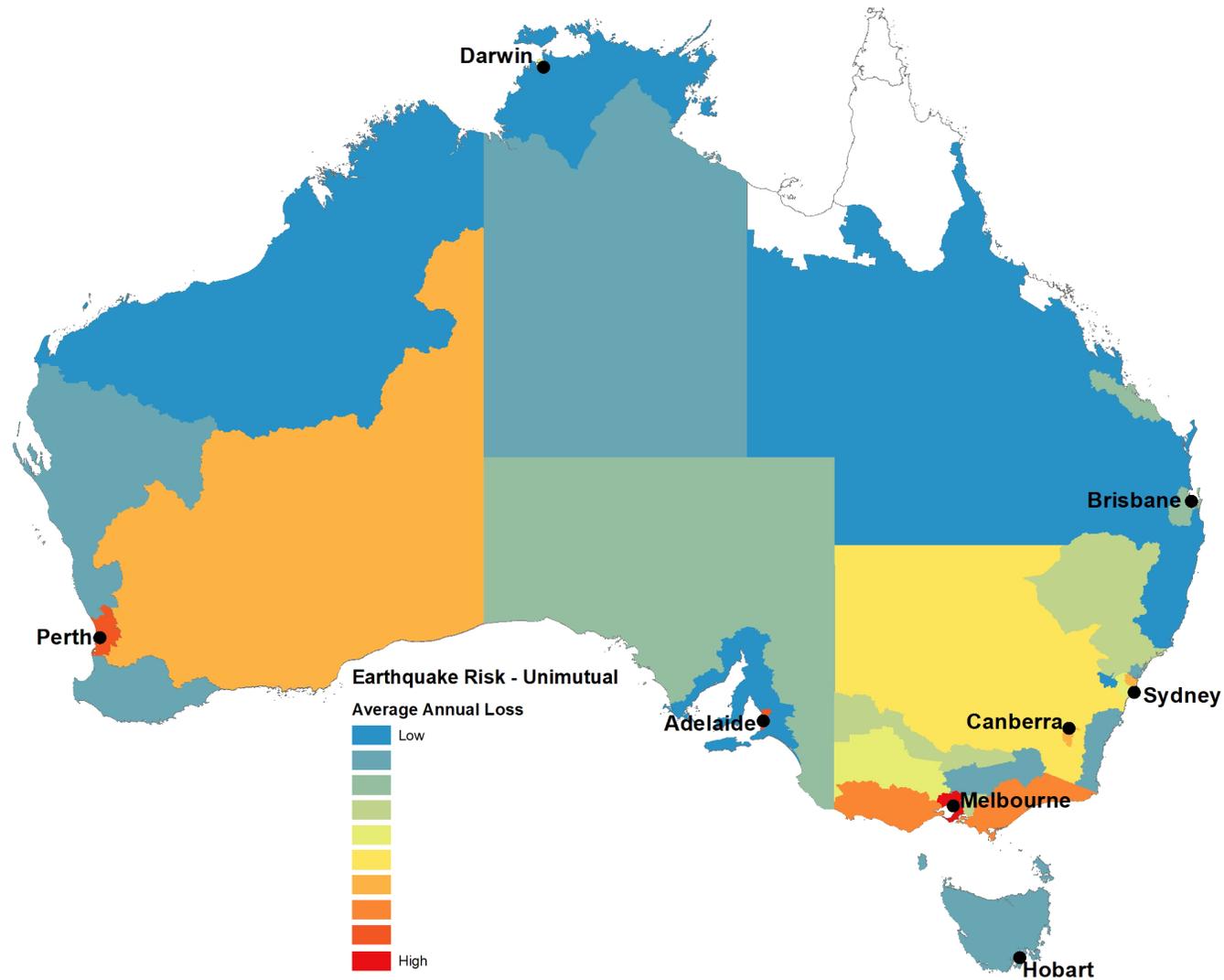
Earthquake hazard in Australia



Earthquake hazard across Australia based on Risk Frontiers modelling

Highest earthquake hazard in areas east of Perth, east of Melbourne and Adelaide.

Earthquake risk for Unimutual



Earthquake risk for the Unimutual's portfolio based on average annual loss by CRESTA zone

Highest risk areas are in Melbourne, Perth and Adelaide.

Cyclone hazard in Australia

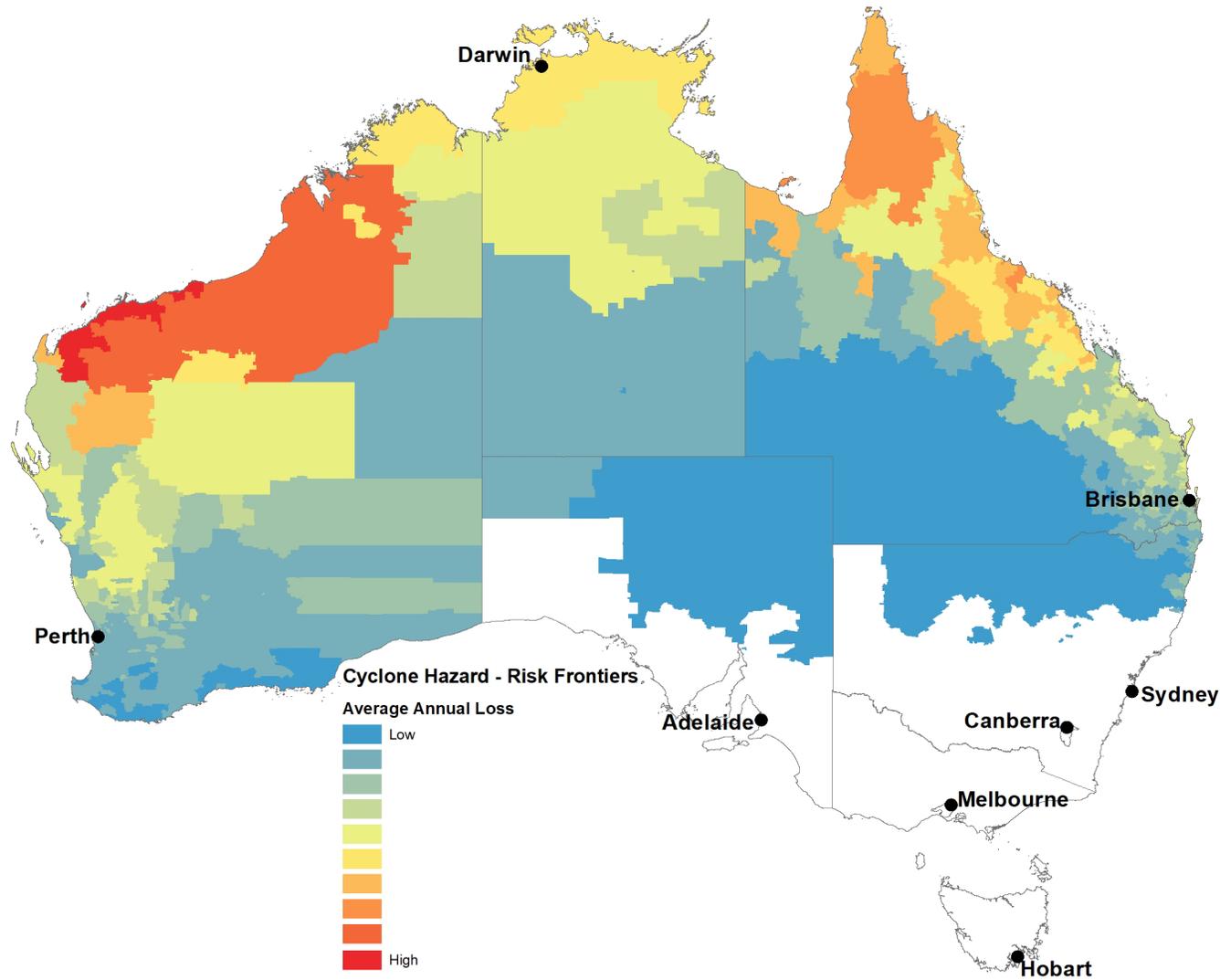
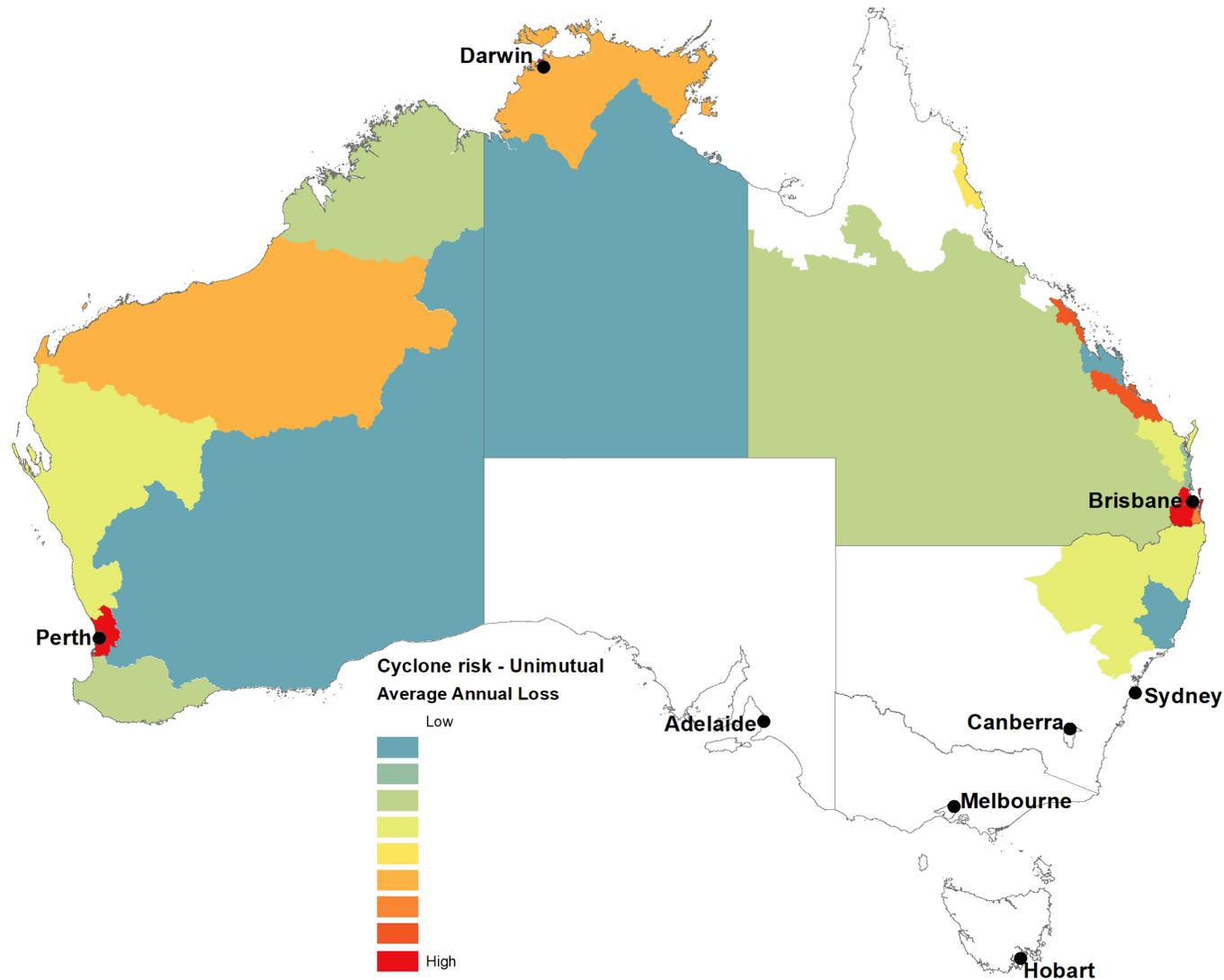


Figure shows the cyclone hazard across Australia based on Risk Frontiers modelling

Highest cyclone hazard in Northern WA, North Queensland and Northern Territory.

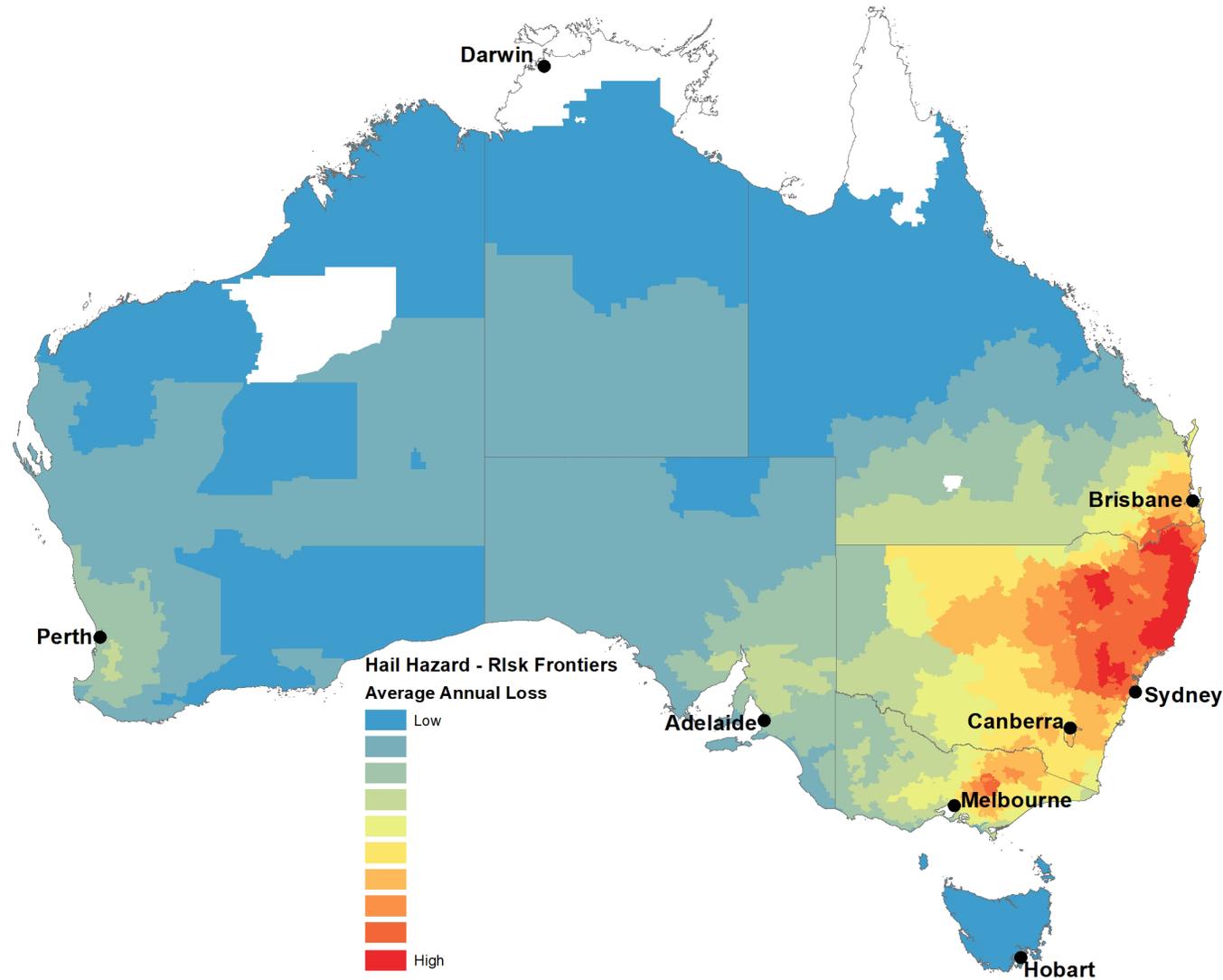
Cyclone risk for Unimutual



Cyclone risk for the Unimutual's portfolio based on average annual loss by CRESTA zone

Highest modelled AALs are in Darwin, Perth and Brisbane.

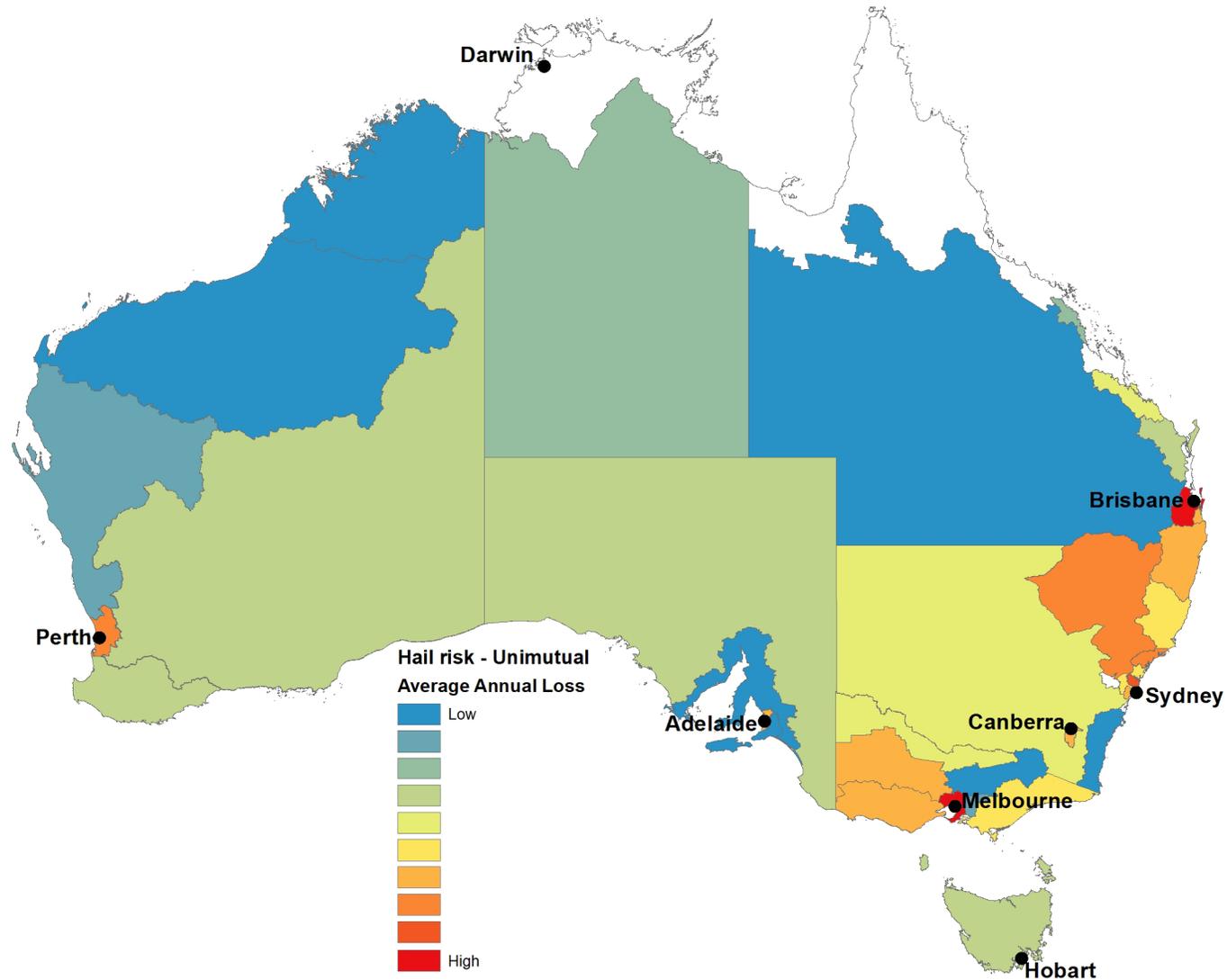
Hail hazard in Australia



Hail hazard across Australia based on Risk Frontiers modelling

Highest hail hazard on the east coast of Australia from Melbourne up to SE QLD.

Hail risk for Unimutual

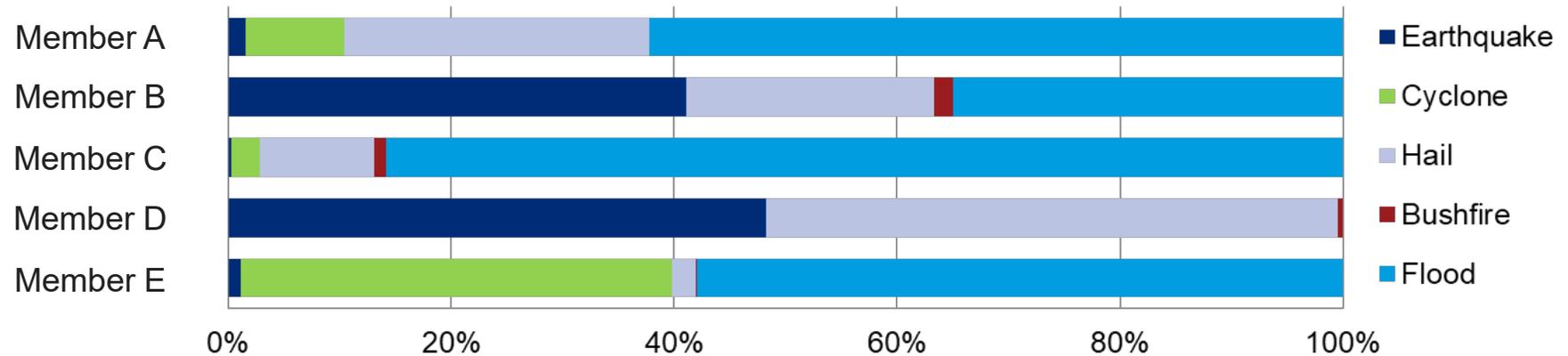


Hail risk for the Unimutual's portfolio based on average annual loss by CRESTA zone

Highest modelled AALs are in Brisbane, Sydney and Melbourne.

Model results – portfolio drivers and peril contributions

University	Earthquake	Cyclone	Hail	Bushfire	Flood	Total
Member A	0.04 M	0.25 M	0.78 M	0.00 M	1.77 M	2.85 M
Member B	0.42 M	0.00 M	0.23 M	0.02 M	0.36 M	1.03 M
Member C	0.00 M	0.03 M	0.10 M	0.01 M	0.87 M	1.01 M
Member D	0.48 M	0.00 M	0.52 M	0.00 M	0.00 M	1.00 M
Member E	0.01 M	0.37 M	0.02 M	0.00 M	0.56 M	0.97 M



Identify the contribution of losses by member and perils driving the losses

Summary

Models



- CAT Modelling is one of several approaches we use for Unimutual
- Model results are dependent on the quality of the underlying data and how complete that data is.

Data collection



- Focus on the highest value assets across the portfolio and prioritize inputs with the largest impact

Know data limitations upfront



- Understand limitations and inaccuracies of the data upfront before commencing modelling
- Less accurate data can be managed in the modelling process

Communication and risk awareness



- Continue discussions with risk engineers and modellers to understand exposure peril exposure across the portfolio



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