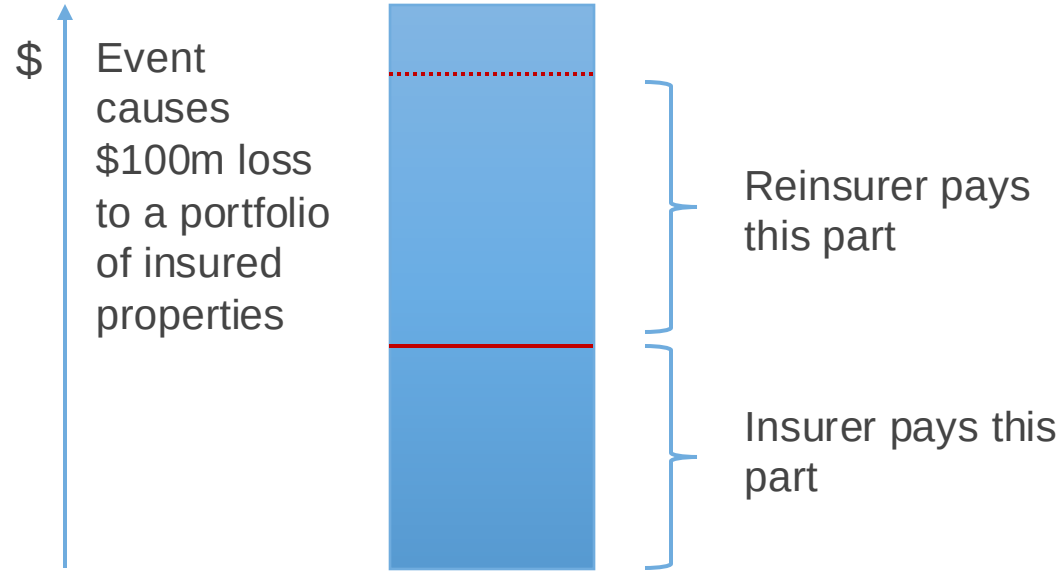
Gallagher Re

Multi-risk perils: The view, needs and gap from the (re)insurance industry

27th November 2024

How Does the Reinsurance Industry Work?

Property catastrophe reinsurance “Excess of Loss” contract



The broker helps design the contract, price the contract, find reinsurer(s) who want to participate, and provides advice and analytics to the insurer.

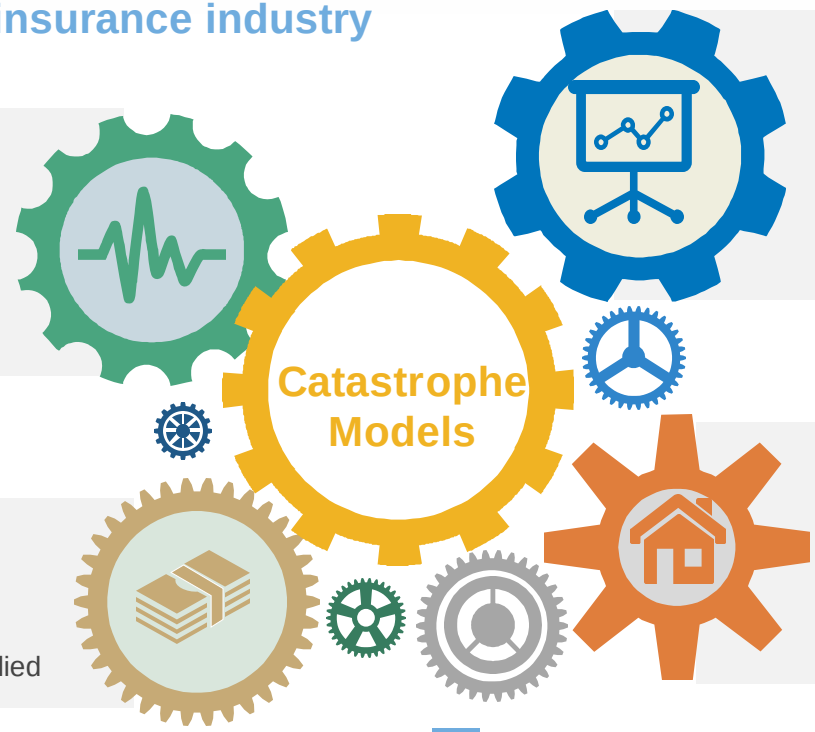
But how do you estimate the probabilities of catastrophes occurring to ensure you buy enough reinsurance?

Catastrophe Modelling: Main Components

Catastrophe models used by (re)insurance industry

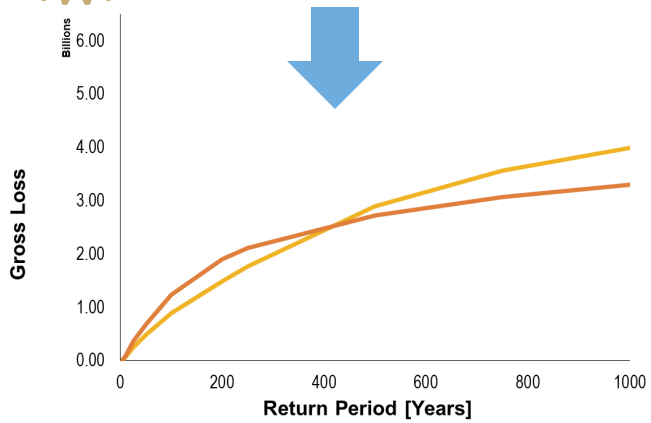
Hazard
magnitude & frequency
- Hazard development methodology dependent on data type and availability
- Building a stochastic event catalogue

Vulnerability
of properties
- Developing vulnerability/damage curves
- Different Lines of Business
- Different Coverages



Financial
model
- Internal financial engine
- Insurance and reinsurance terms applied

Exposures
of the (re) insured
- Location & characteristics of insured assets
- Built to support different resolutions



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Gallagher Research Centre – In Numbers

2022

Launched as a **global network** of academic and industry partnerships dedicated to **connecting world-leading research** with the **needs of the (re)insurance industry.**

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Gallagher Re insurance product lines directly benefitting from cutting-edge research**,** including **Cyber**; **Casualty** & **Financial Lines**; **Property**; **Life, Accident** & **Health**; and **Marine** & **Energy**.

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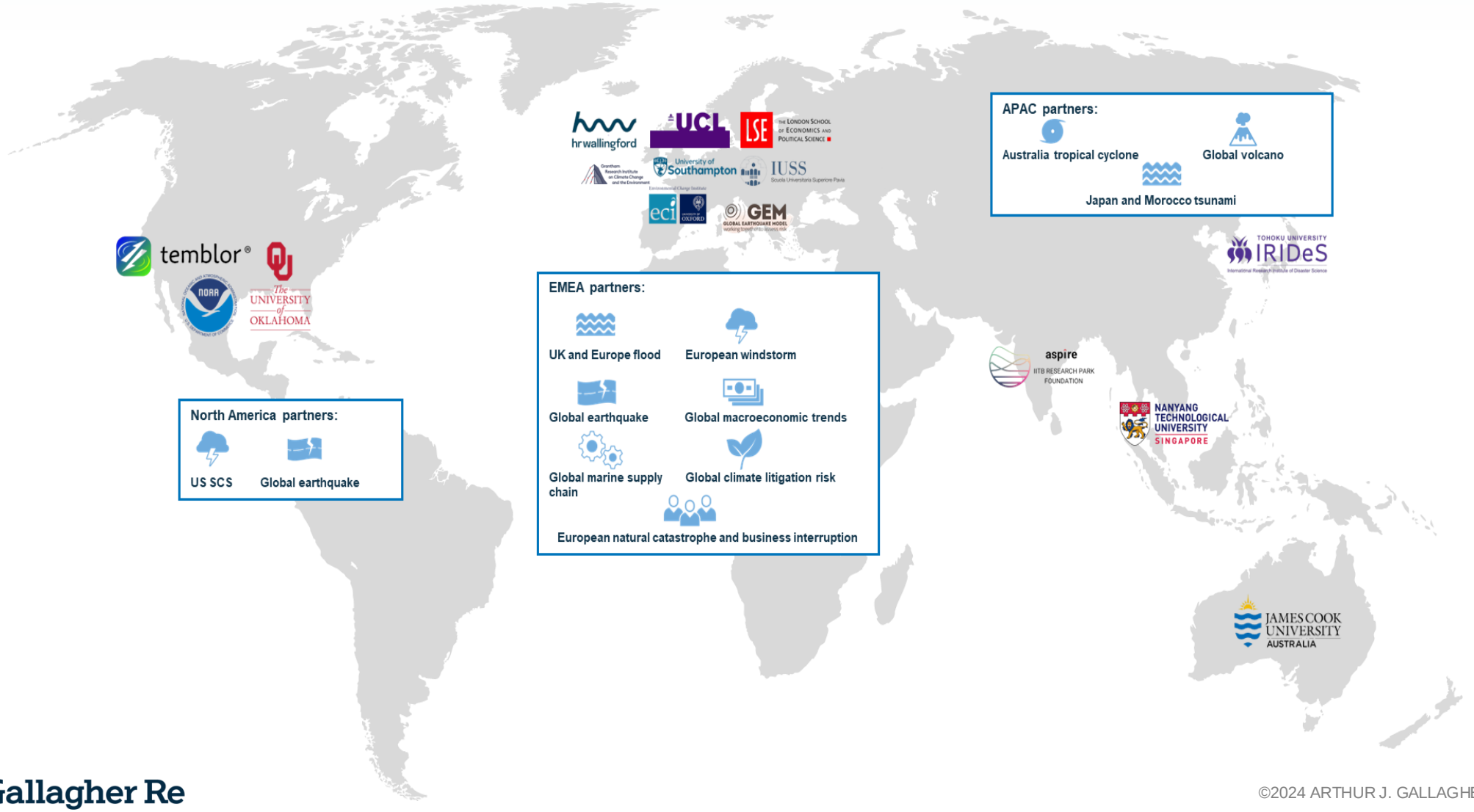
Research partners across academia and industry sectors, including **think tanks**, **universities**, **consultancies** and **not-for-profit** industry organizations.

$546m

Estimated value of **Gallagher Re international client brokerage supported by Gallagher Research Centre** partner outputs.

Gallagher Research Centre – A Global Initiative



Earthquake Risk Modelling

Ground shaking

Landslides

Liquefaction

Tsunami

Volcanic risk typically excluded from insurance policies

TOHOKU UNIVERSITY IRIDeS
International Research Institute of Disaster Science

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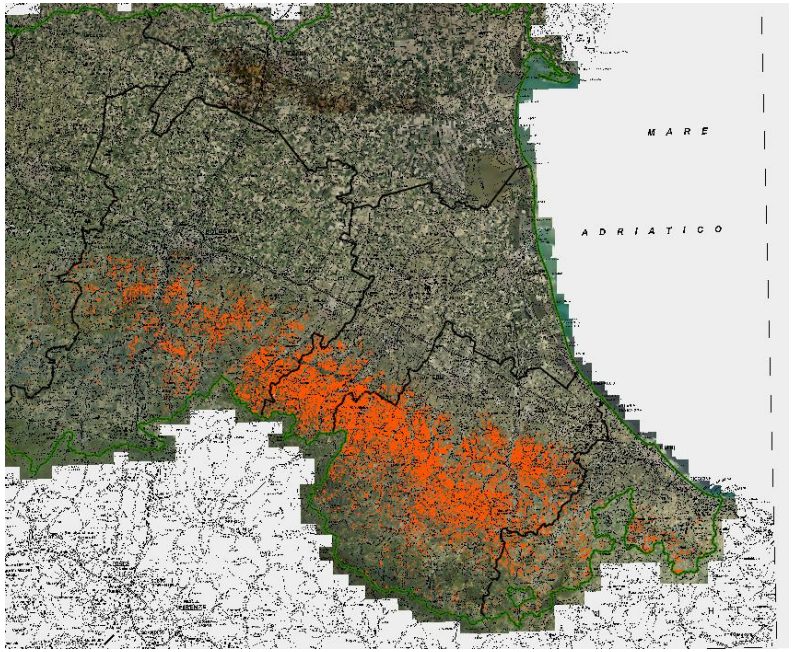
Atmospheric perils

- Atmospheric perils typically show hazard correlation
- Perils are modelled separately in most cases, except TC models
- To assess risk to a portfolio loss aggregation is necessary
- Accounting for their correlation is necessary to correctly capture the risk, typically this is done using actuarial approaches, but these do not account for physical correlation

- Correlated perils are:
  - Wind and flood
  - Drought and flood (correlation and causality)
  - Hail, tornadoes and flash flood (not captured in the SCS models)
  - Flood and precipitation-induced landslides – More than 80,000 landslides observed in May 2023 meteorological events in Italy



Map of the areas affected by the slope instability of May 2023
Source: https://servizimoka.regione.emilia-romagna.it/mokaApp/apps/frane_202305/index.html

Wind – Flood Correlation

- The hazard in Western Europe is driven by storms that bring extreme winds and rainfall
- Strong winds and heavy rainfall can occur simultaneously - increased joint risk
- Storm Kyrill 2007 : Extensive damage across the UK and central Europe (winds >160 km/h & widespread flooding) – **Insured losses £6.3 billion (Europe)**
- Storm Desmond 2015: Peak gusts (40 m/s) and record-breaking precipitation, resulting in extensive flooding in Cumbria and Lancashire - **Insured losses of ~ £1 billion (UK)**

Flooding during Storm Desmond (BBC, 2015)

Wind – Flood Correlation

Windstorms and inland flooding are treated as independent perils in insurers' European catastrophe models and in risk management analyses.

Accurate consideration should be given to potential unforeseen scenarios, correlating across different hazards.

Underestimation of correlation risk in insurers' models -> decline in financial protection.

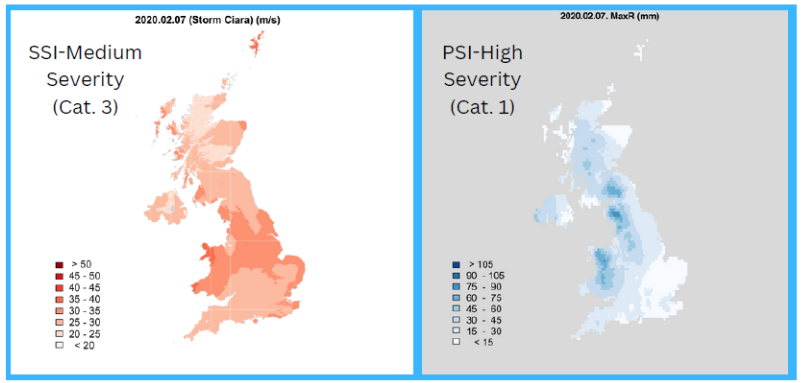
Wind – Flood Correlation

Gallagher Re supervised a UCL master's student to study correlation between windstorm and precipitation extremes in UK windstorms from 1979 to 2021

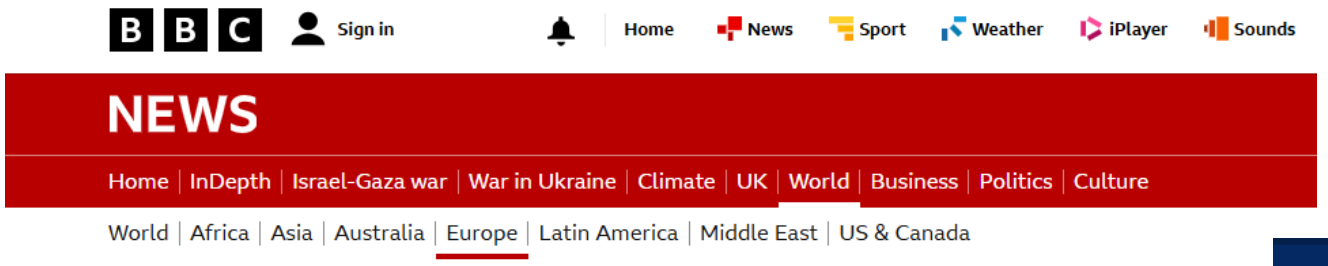
Correlation was observed collectively across 65% of the windstorms studied

The majority of high severity events frequently featured simultaneous occurrence of heavy rainfall and high wind speeds

A more comprehensive comparative assessment is highly suggested in order to support the findings of this study



Earthquake Correlation with Atmospheric Perils?



More research is necessary to establish if vulnerability correlation is material

Needs and Gaps in the (Re)Insurance Industry

Earthquake Peril

Probabilistic modelling of tsunamic risk is important in some regions and needs to be accounted for in the earthquake models

Risk from earthquake sub-perils better captured

Atmospheric Perils

Correlation across different atmospheric perils has been observed in recent events i.e. wind-flood and flood-precipitation induced landslide

More comprehensive studies that support these observations will help

Earthquake – Atmospheric Peril Correlation

Flood events following large earthquakes have been observed recently

Vulnerability correlation needs to be studied

Multi-peril models is the future?

Contact us

Get in touch to let us know how we can help.

Alexandra Tsioulou

Divisional Director

Gallagher Re

alexandra_tsioulou@GallagherRe.com

