



# Global Catastrophe Modelling and Secondary Perils

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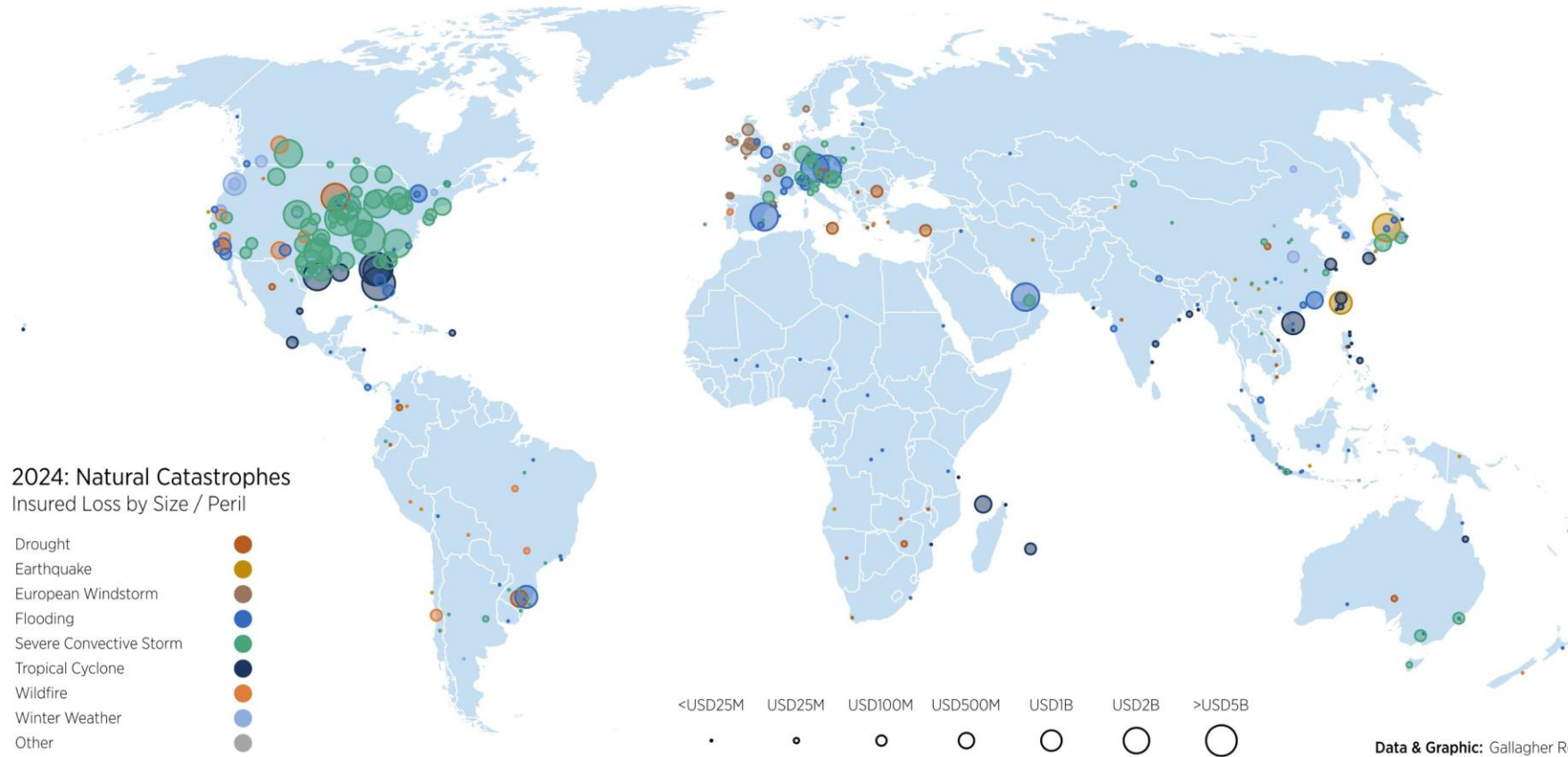
ICMIF MORO Helsinki, 4<sup>th</sup> June 2025

Michael Thomas – Head of Insight Development - Global Property Analytics



# Insured Nat Cat losses reach \$154bn for 2024

Are annual insured Nat Cat losses of ~\$150bn to become the 'new normal'? \$146bn annual loss (2017 - 2024)

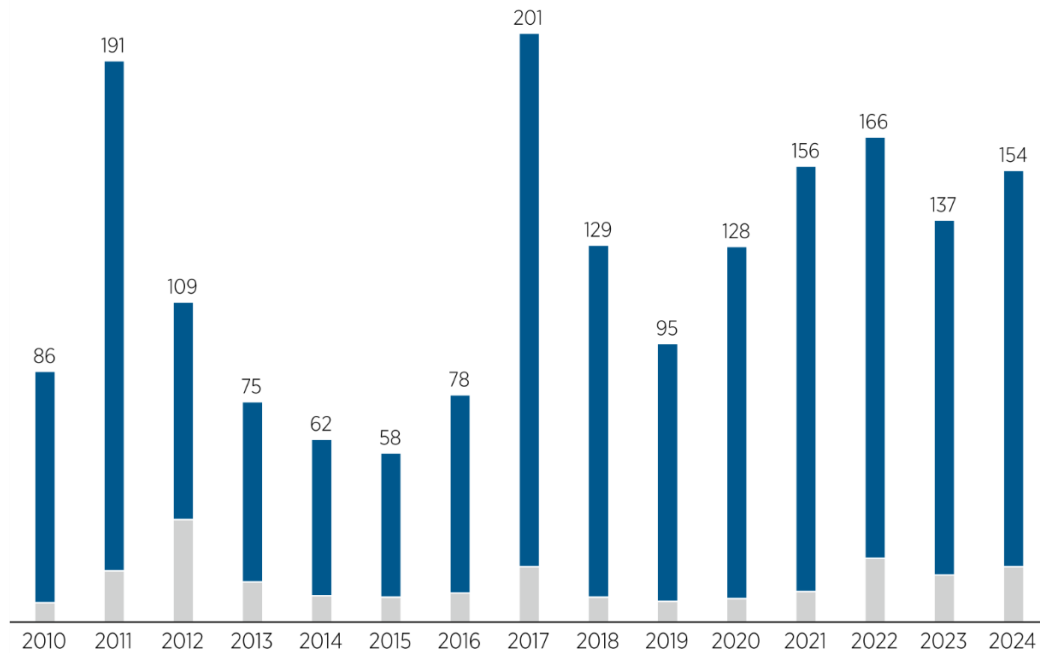


Source: [Gallagher Re Natural Catastrophe and Climate Report 2024](#) | GallagherRe

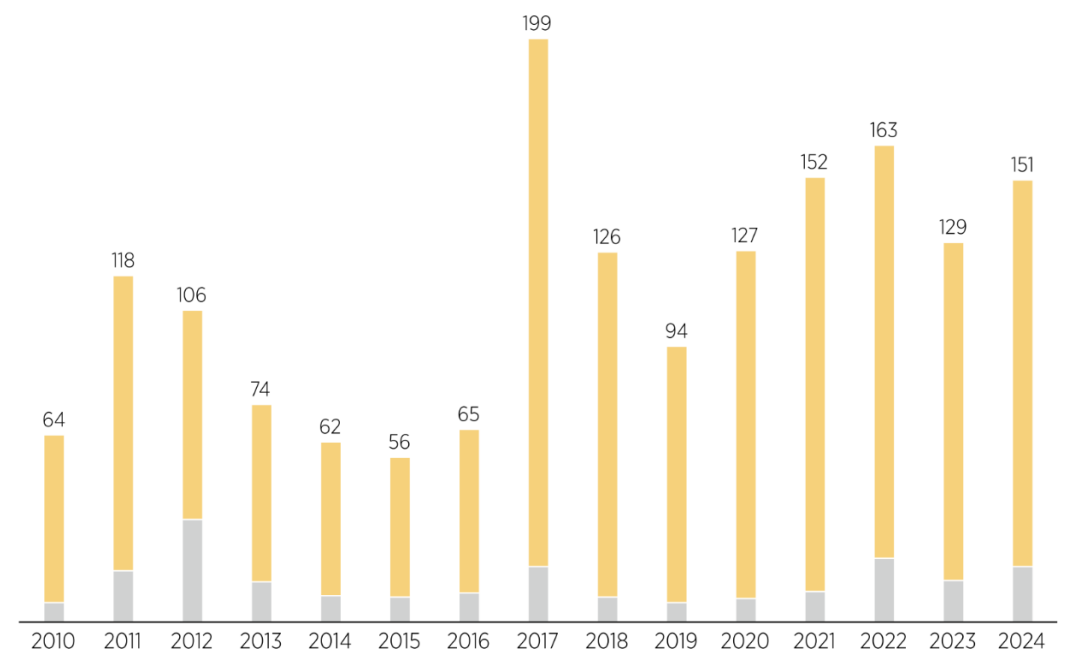
# Weather-related events continue to dominate total insured losses

## Global Insured Nat Cat Losses 2024

All Natural Catastrophe Events



Weather / Climate Events



Data & Graphic: Gallagher Re

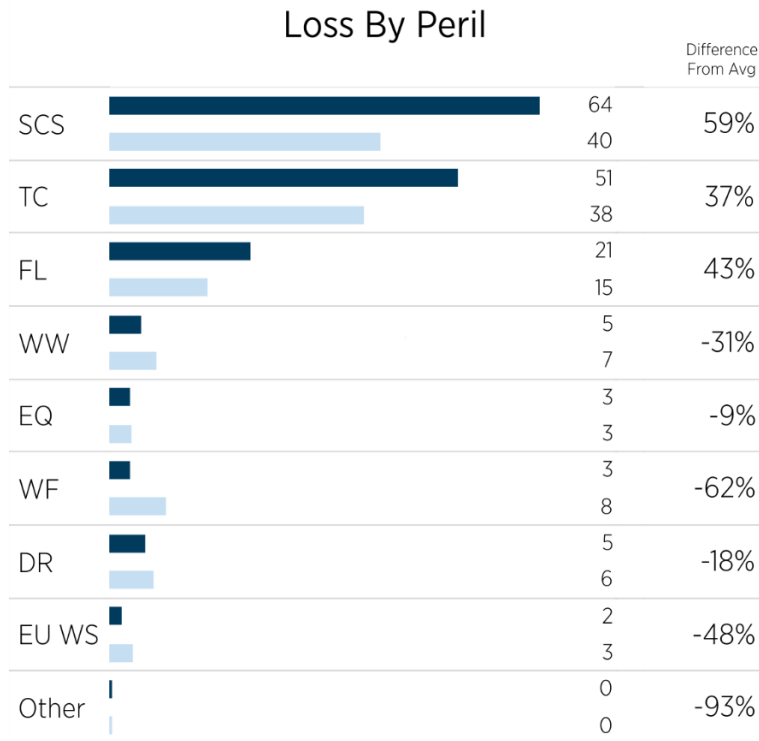
Previous year values in 2024 USD using US CPI and a construction / cost of labor factor adjustment. Some values may be rounded.

■ Public Insurance Entity

Source: [Gallagher Re Natural Catastrophe and Climate Report 2024 | GallagherRe](#)

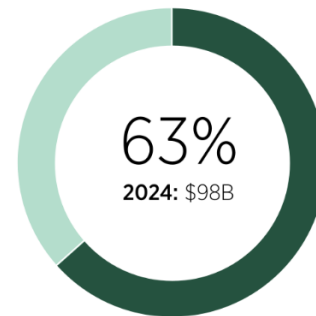
# Global Insured Nat Cat Losses by Peril

Heightened SCS activity – a new normal?

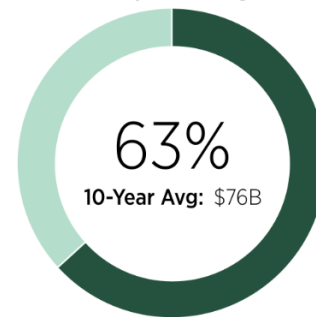


Note: Losses in USD billions and totals are rounded

Portion of Loss: Non-Peak Perils

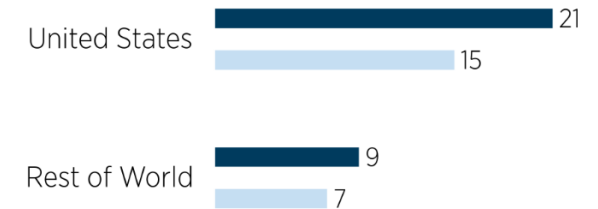


Data & Graphic: Gallagher Re

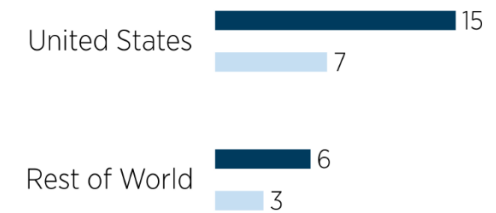


Peak: TC, EQ, EU WS  
Non-Peak: SCS, FL, WW, WF, DR, Other

Billion-Dollar Events



Multi Billion-Dollar Events

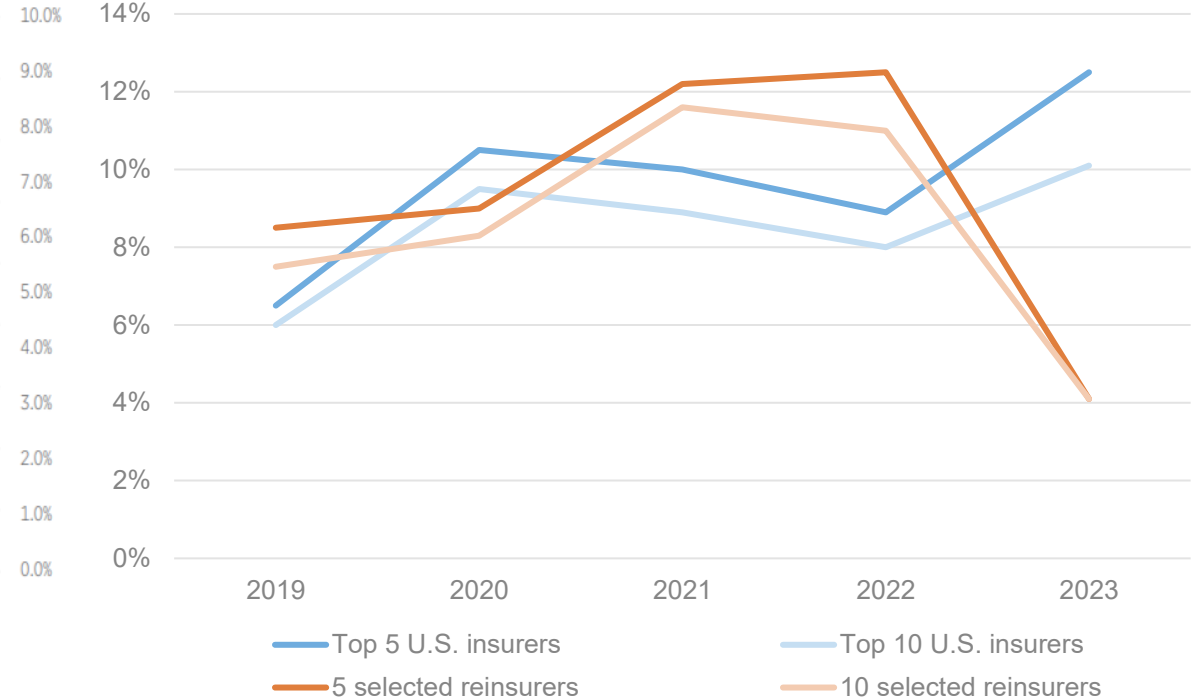
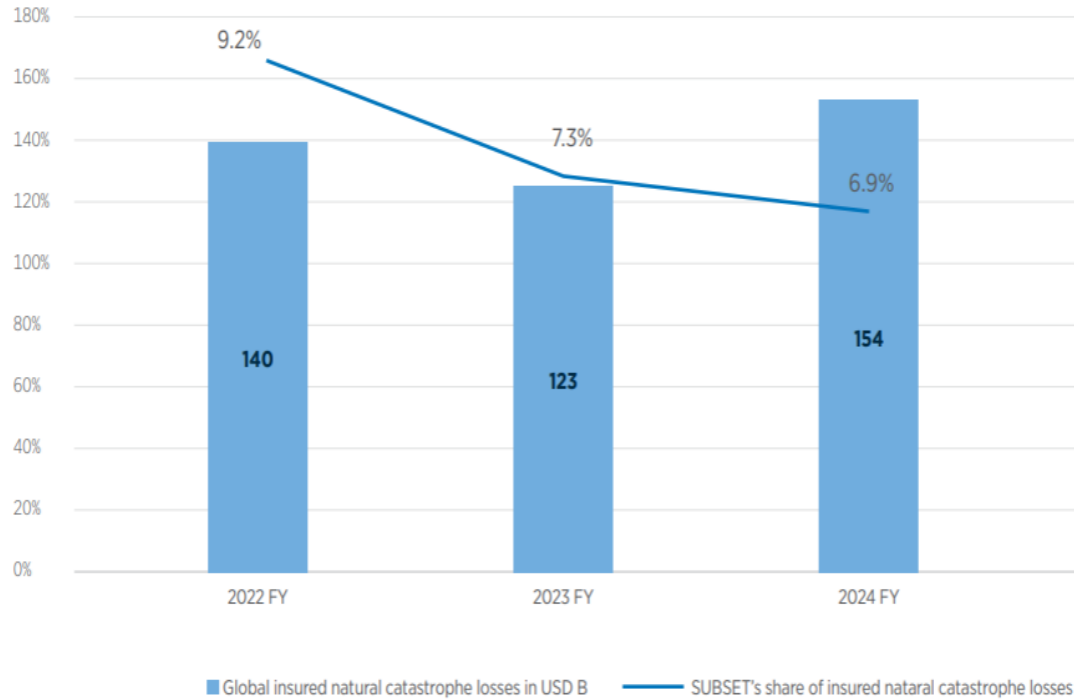


■ 2024    ■ 10-Year Avg

Source: [Gallagher Re Natural Catastrophe and Climate Report 2024](#) | GallagherRe

# Insurers carrying the weight of Nat Cat losses in recent years

Trend reflects the not only the higher attachment points but also the nature of Nat Cat losses



Global Insured Nat Cat losses and SUBSET's<sup>1</sup> share of insured Nat Cat losses

<sup>2</sup>Net natural catastrophe losses effect on the combined ratio

Source: [Gallagher Re Natural Catastrophe and Climate Report 2024](#) | GallagherRe

Source: [Reinsurance Market Report: Results for Full-Year 2024](#) | GallagherRe

<sup>1</sup>Those companies that make relevant disclosures to nat cat losses

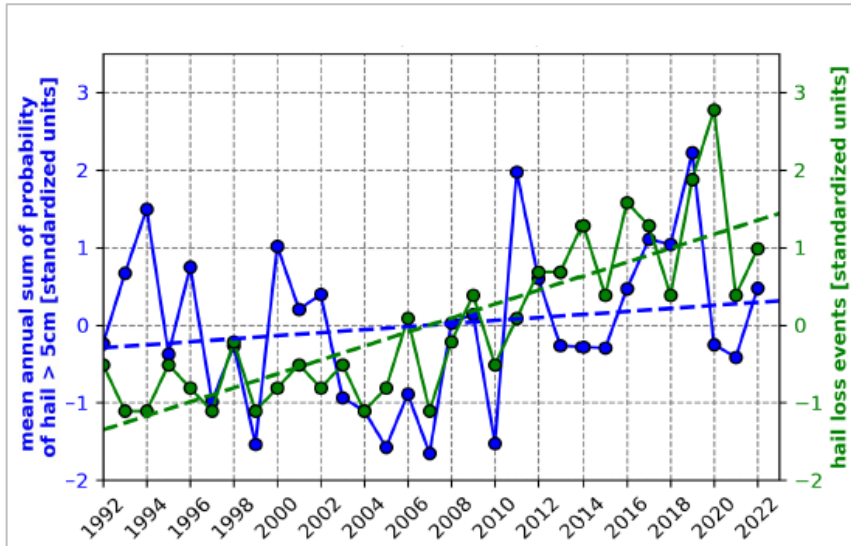
<sup>2</sup>Source: S&P Global Ratings - Global Reinsurance Sector View 2025 (Jan. 29, 2025)

# Global SCS Trends

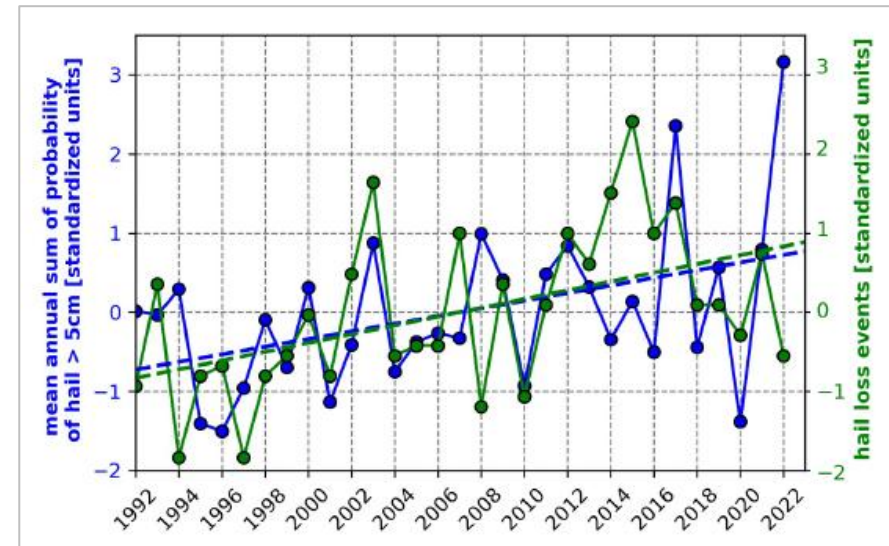
For Europe, the rise in hail loss events can be attributed to an increase in hail frequency

For the US it is mainly linked to socio-economic shifts, exposure growth or increased vulnerabilities

## United States



## Europe

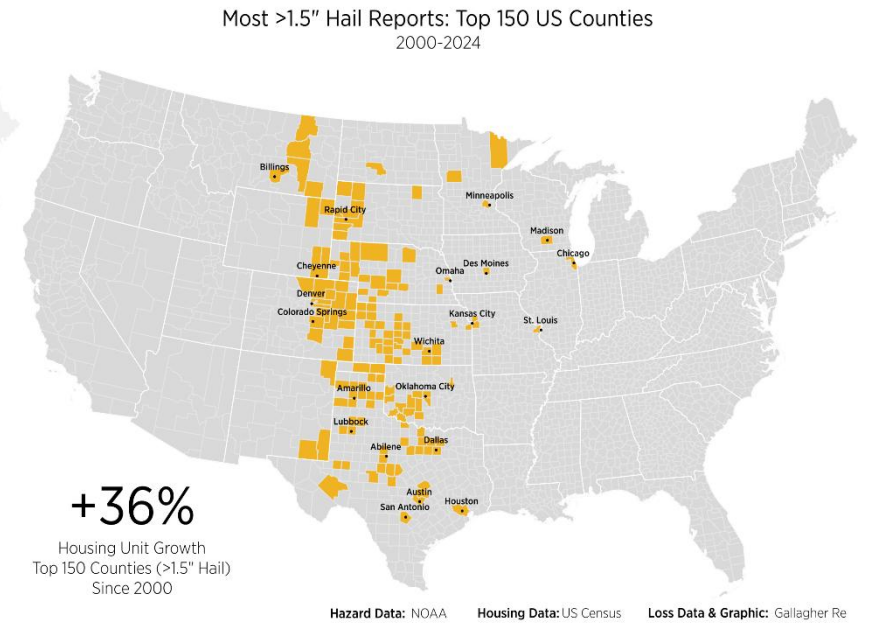
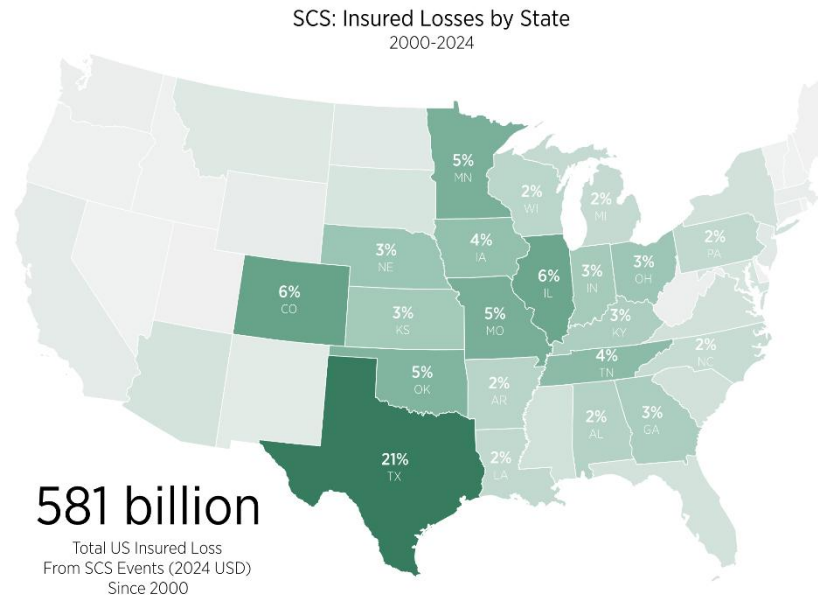
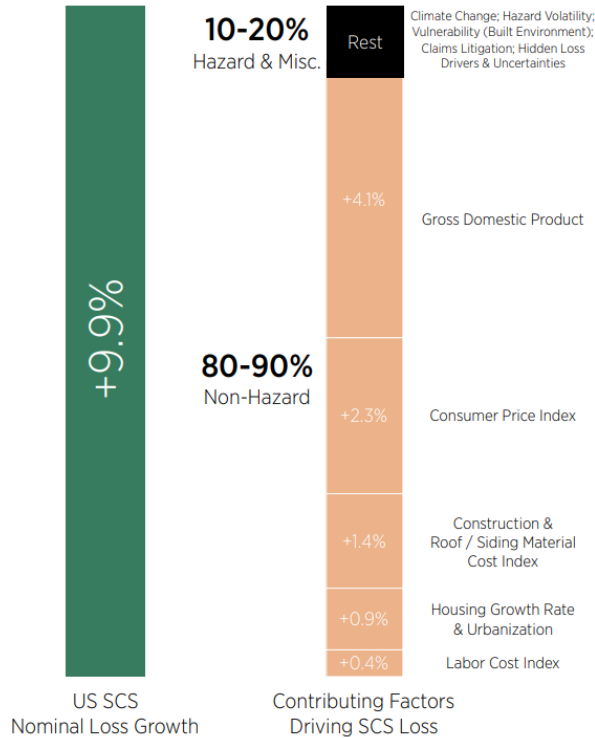


Frequency of very large hail (blue) vs frequency of hail loss events (green) over time

Source: Battaglioli et al. (2022). Very Large Hail in a Changing Climate: Global Climatology, Trends and Losses.

# Drivers of US SCS Loss Trends

Socio-economic factors by far the most significant contributor to increases



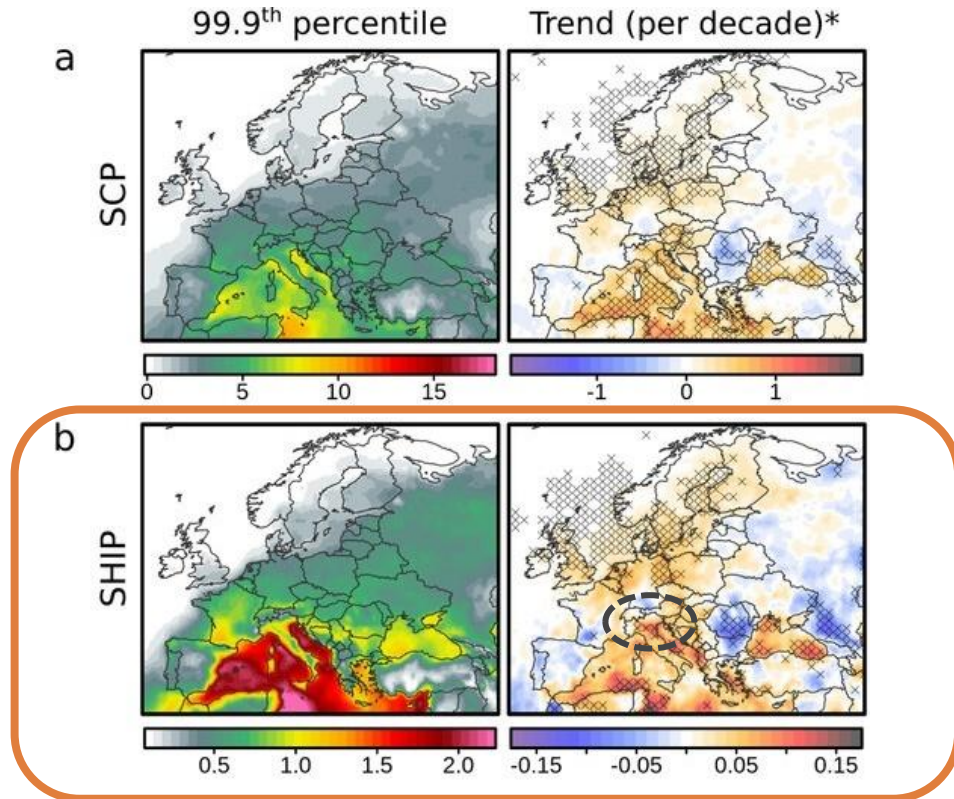
TIMEFRAME: 2000-2024

Source: [Gallagher Re Natural Catastrophe and Climate Report 2024](#) | GallagherRe

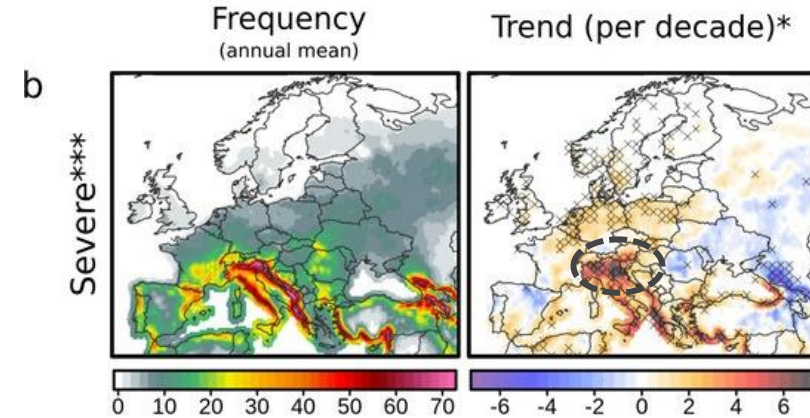
# Drivers of European SCS Loss Trends

Climate-related increase in frequency and severity, notably in Italy

## Supercell Composite and Significant Hail Parameters



## Severe Thunderstorms

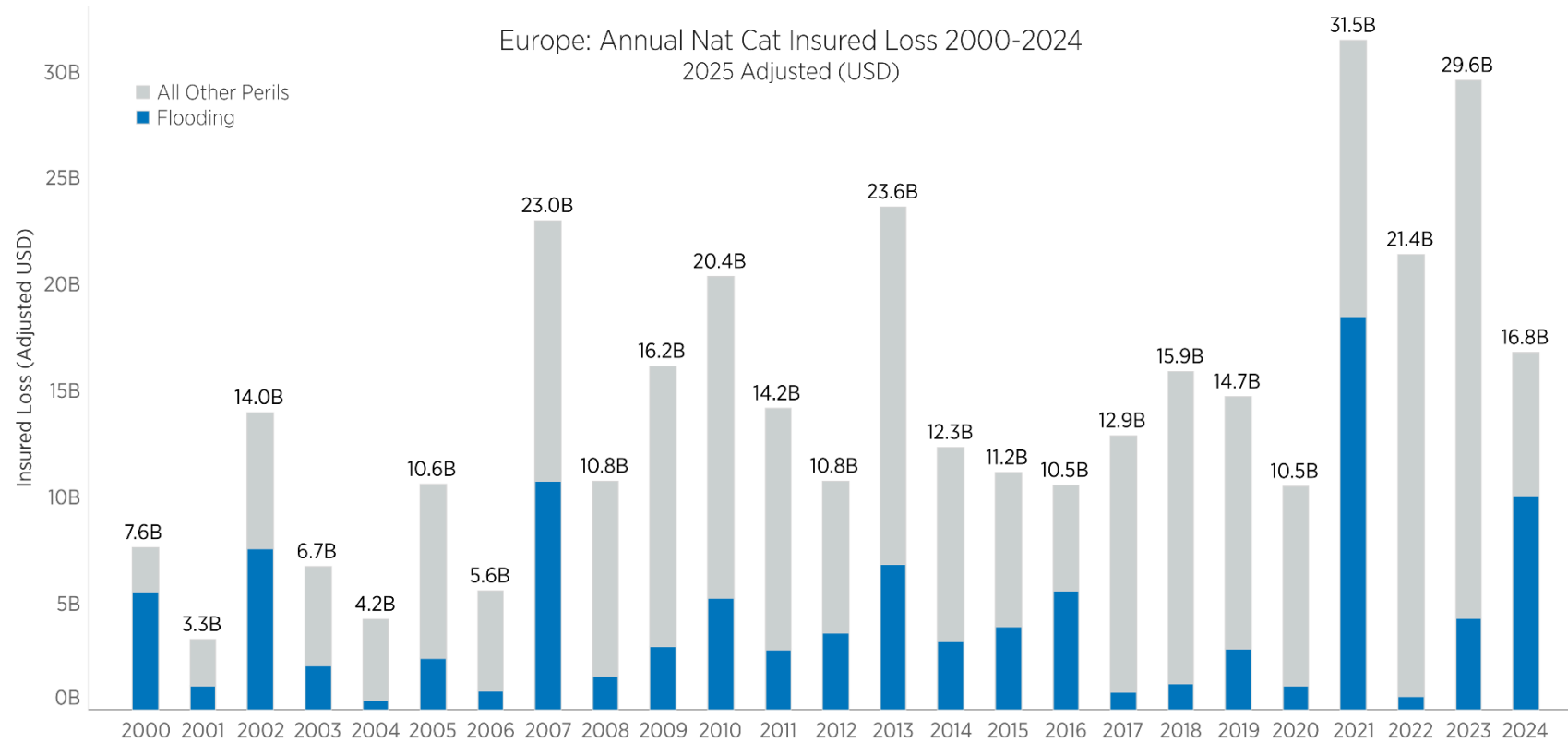


“ There is a considerable increase in the number of periods with conditions favourable to (severe) thunderstorms [...]. **This change is most pronounced over Italy**, contrasting smaller decreases over eastern Europe. ”

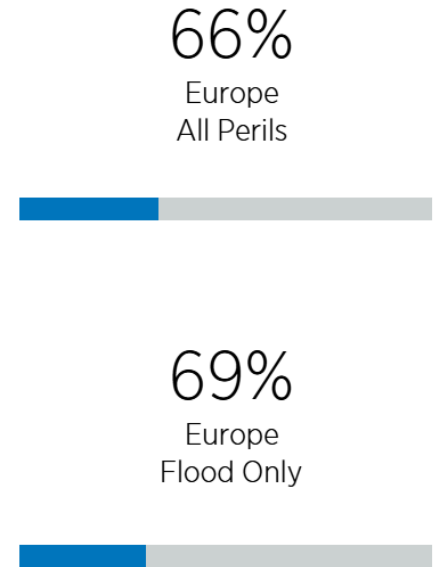
Source: Taszarek et al. (2021): Differing Trends in United States and European Severe Thunderstorm Environments in a Warming Climate  
 Note: This study was published in 2021, before the 2023 Italy hail event

# Insured Losses in Europe

No clear trend in flood losses



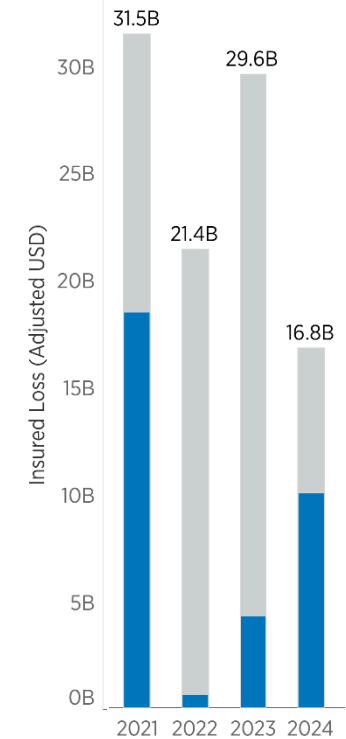
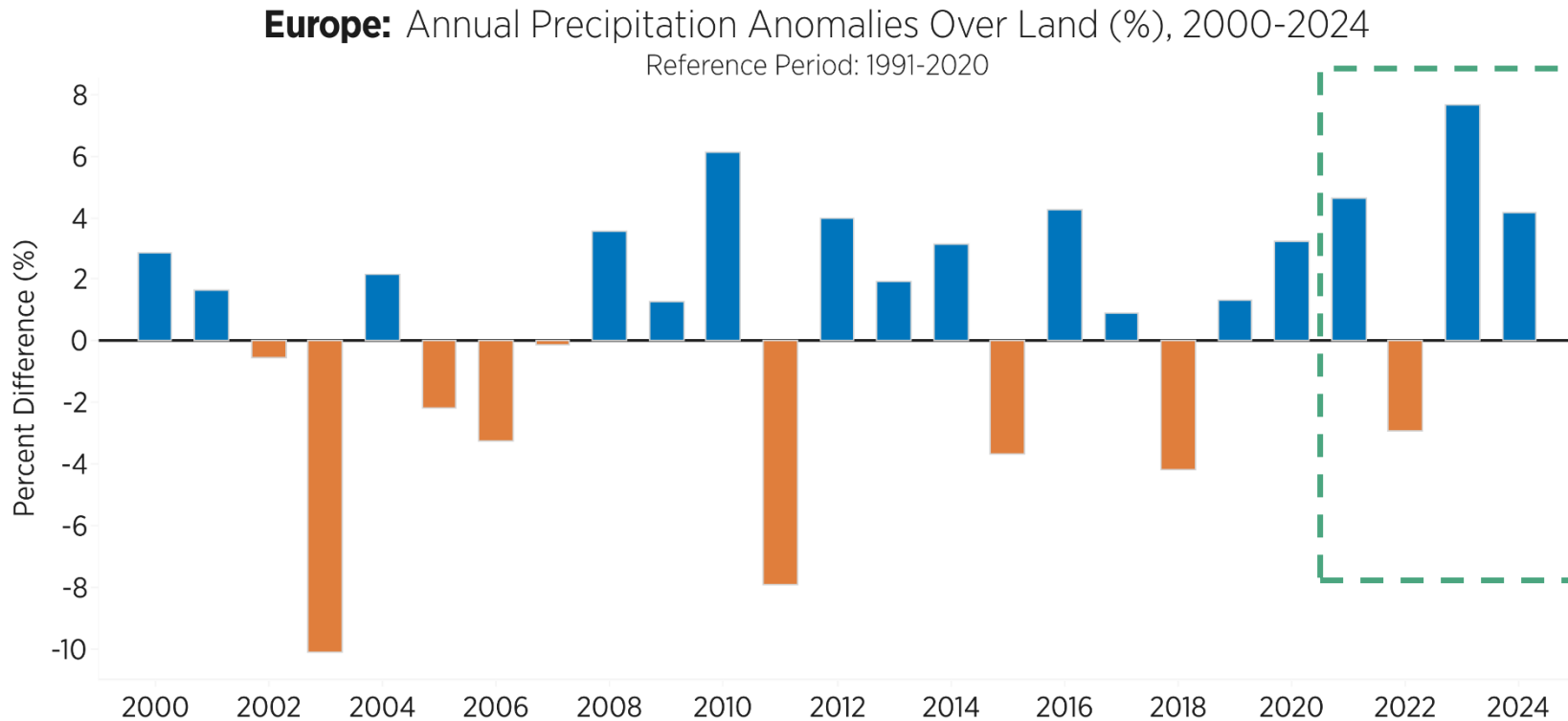
Europe Decadal Protection Gap (2015-2024)



Source: Gallagher Re

# Rainfall Trends Across Europe

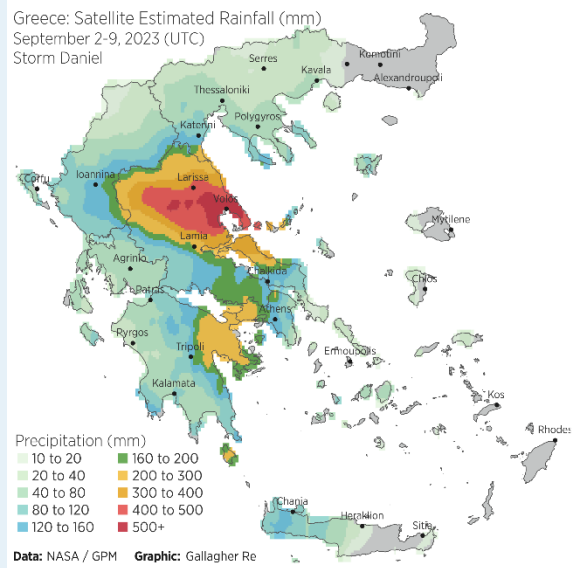
The last 10 years have shown average increase in precipitation with respect to the previous decade  
 In recent years, this has not always equated to higher losses



Data Source: ERA5: [ERA5 monthly averaged data on single levels from 1940 to present](#)  
 Reference Period definition: [WMO Climate Normals | National Centers for Environmental Information \(NCEI\)](#)

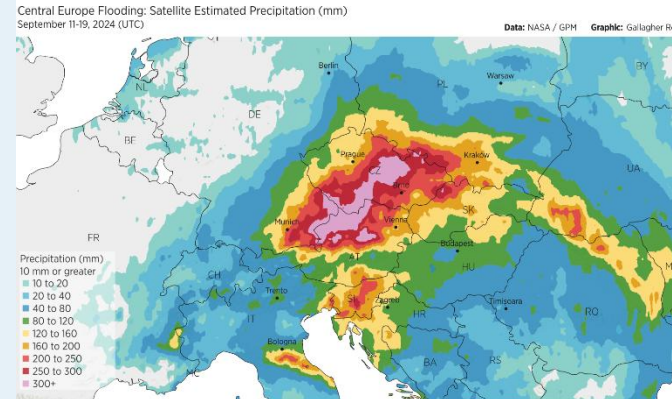
# Recent Events in Europe

## Storm Daniel: 5-7th September 2023



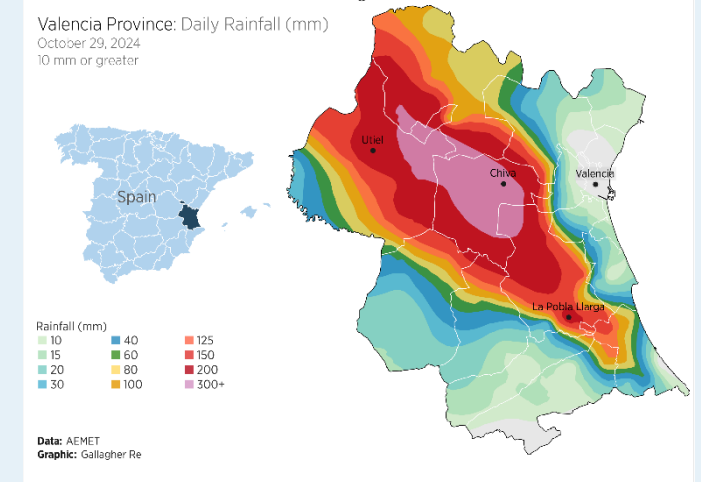
- **Low pressure system:** omega ( $\Omega$ ) blocking pattern
- Most powerful storms to hit Greece since 2006
- **Record daily rainfall recorded:** Portaria, Greece - 762mm
- **Countries affected:** Greece, Turkey, Bulgaria, Libya

## Storm Boris: 12-19<sup>th</sup> September 2024



- **Low pressure system:** Genoa Low or Vb cyclone
- Same type of storm that provided the flood events of 1997, 2002 and 2013
- **3 months worth of rainfall** – eastern Austria
- **Countries affected:** Poland, Czech Republic, Slovakia, Austria, Hungary, Slovenia, Romania, Italy and other surrounding countries.

## Spain floods: 28-30<sup>th</sup> October 2024

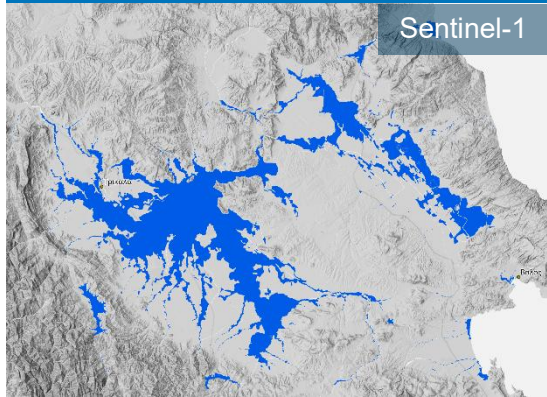


- **Low pressure system:** DANA (Depresión Aislada en Niveles Altos)
- **Record daily rainfall recorded:** Chiva, Valencia – 491mm
- **Countries affected:** Spain

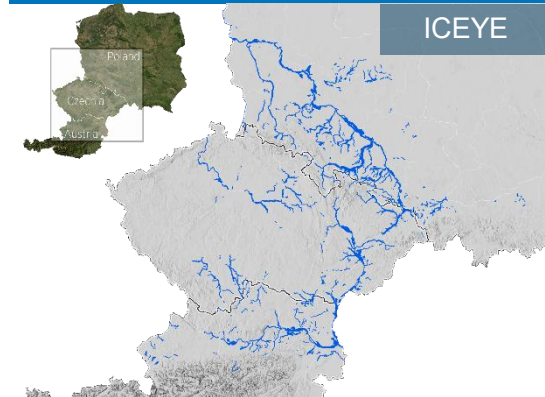
# Observed versus Modelled Events

Observed-like events enabling estimates of financial impact to (re)insurers portfolios

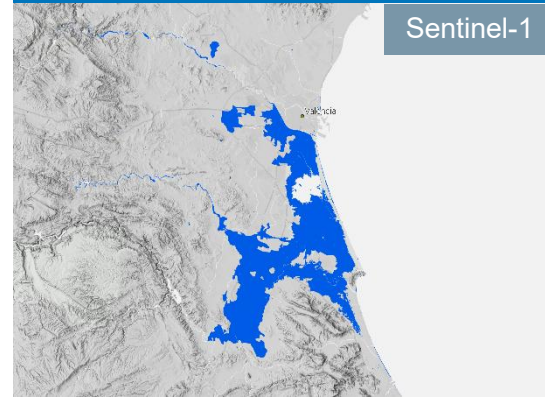
**Storm Daniel**



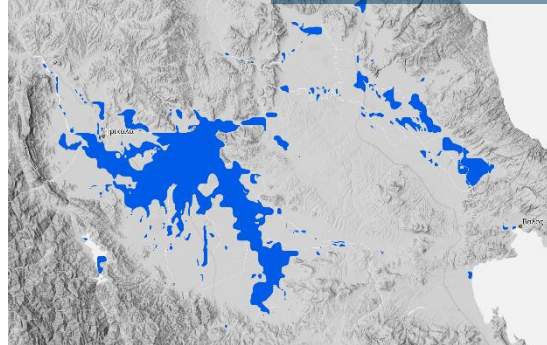
**Storm Boris**



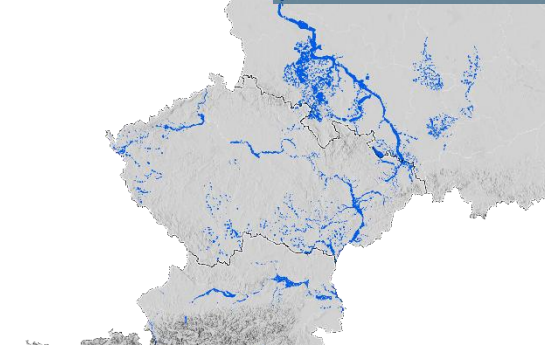
**Spain DANA floods**



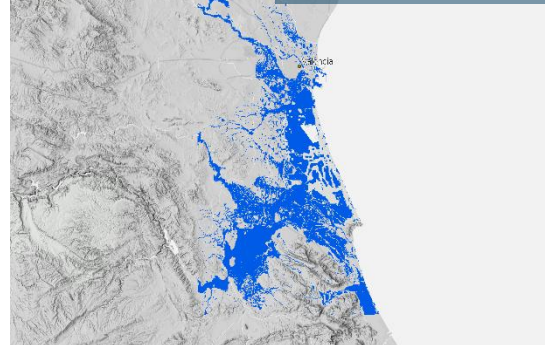
**Modelled Footprint**



**Modelled Footprint**

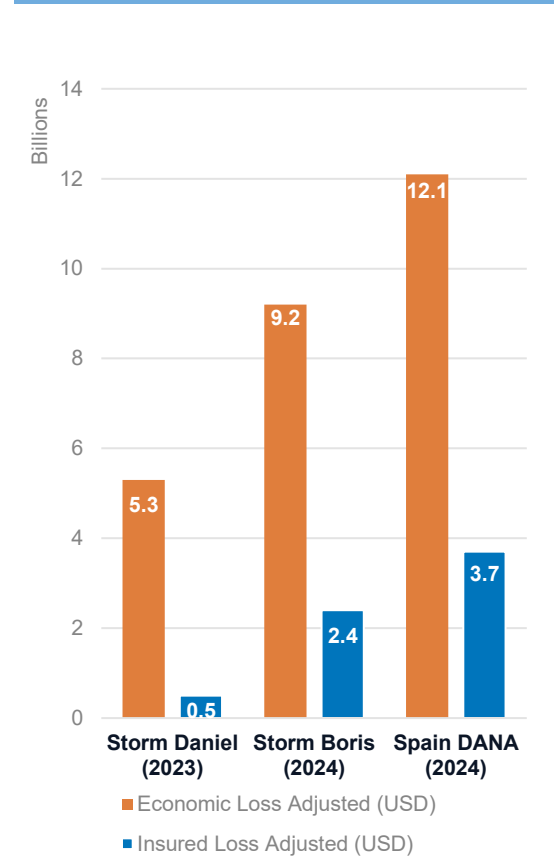


**Modelled Footprint**



Modelled Footprints: Gallagher Re Europe Flood Model, powered by KatRisk hazard

**Market losses**



# Importance of Mitigation Measures

Flood defences play a crucial role to reduce the financial and humanitarian impact of flood events

40  
Years

## Return Period of Modelled Loss

for Storm Boris on a typical portfolio with current flood defences

2x

## Increase in Modelled Loss

for Storm Boris on a typical portfolio without flood defences

10  
Years

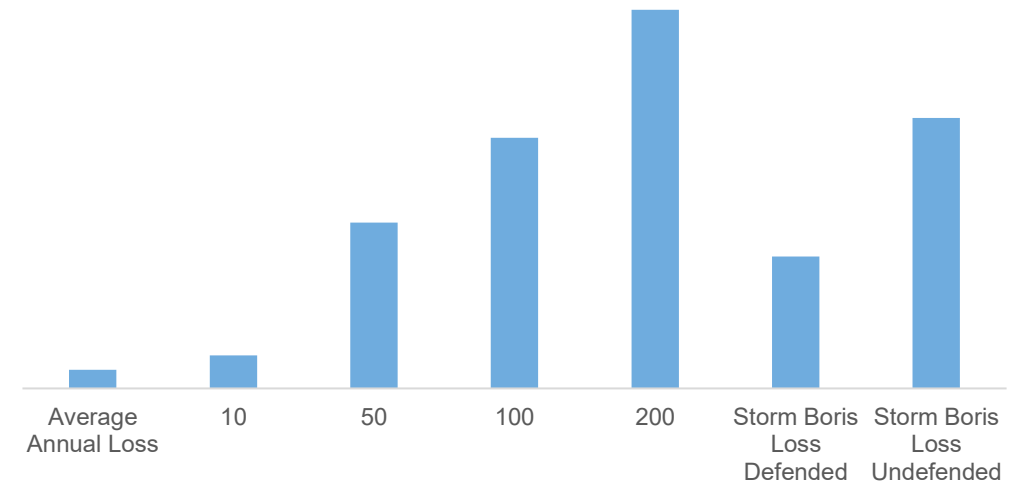
## Positive Precipitation Anomaly

over Europe in the last 13 years



## Catastrophe Models

can support (re-)insurers preparedness to natural catastrophes



**Modelled Losses**  
using the Gallagher Re Europe Flood Model



## It's the way we do it.

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