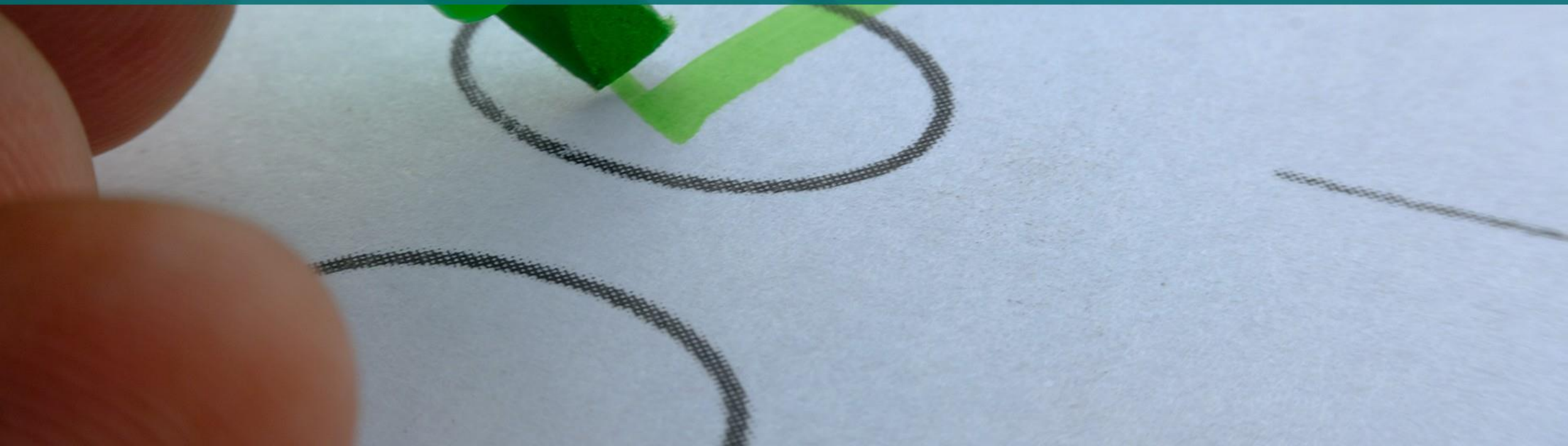
Swiss Re

Physical Climate Risk Assessment in Practice

Sharing from the Financial Sectors



Swiss Re

Introduction

About Swiss Re

Founded
19th December 1863

1863
Swiss Re is founded in Zurich, Switzerland

1906
Swiss Re pays its largest claims so far for the San Francisco Earthquake

1910
Swiss Re opens its first foreign office in New York laying the foundations for its international expansion

1950s
Swiss Re extends its global presence with offices in Canada, Australia, South Africa, and Hong Kong

1960
Swiss Re founds the Swiss Insurance Training Centre to support emerging markets

1968
Swiss Re launches its famous *sigma* publications to serve clients around the globe

1992
Swiss Re takes the lead in developing insurance-linked securities to supply additional cover In the wake of Hurricane Andrew

1995
Swiss Re signs the 'Statement of Environmental Commitment by the Insurance Industry' in the context of the United Nation's Environmental Programme (UNEP)

2000
Swiss Re opens its Centre for Global Dialogue in Rueschlikon

2007
Swiss Re expands its commitment to sustainability considerations in investment decision making by signing UN Principles for Responsible Investment (UNPRI)

2023
Swiss Re marks its 160 years anniversary

Our vision

We make the world more resilient

Our mission

Together, we apply fresh perspectives, knowledge and capital to anticipate and manage risk. That's how we create smarter solutions for our clients, helping the world rebuild, renew, and move forward.

Risks are getting unpredictable

181 bn USD

Protection gap

By 2023, the global natural disaster protection gap has reached $181 billion**

5-7%

Growing trend

Due to the accumulation of value such as human and physical assets, the real annual growth rate of normalised losses from natural catastrophes measured 5-7% over the last 30 years, showing a rising trend.

328bn USD

Economic Losses

Global economic losses from natural catastrophe events in 2023 were USD 318 billion*. The frequency and severity of losses resulting from catastrophe events have increased over time.

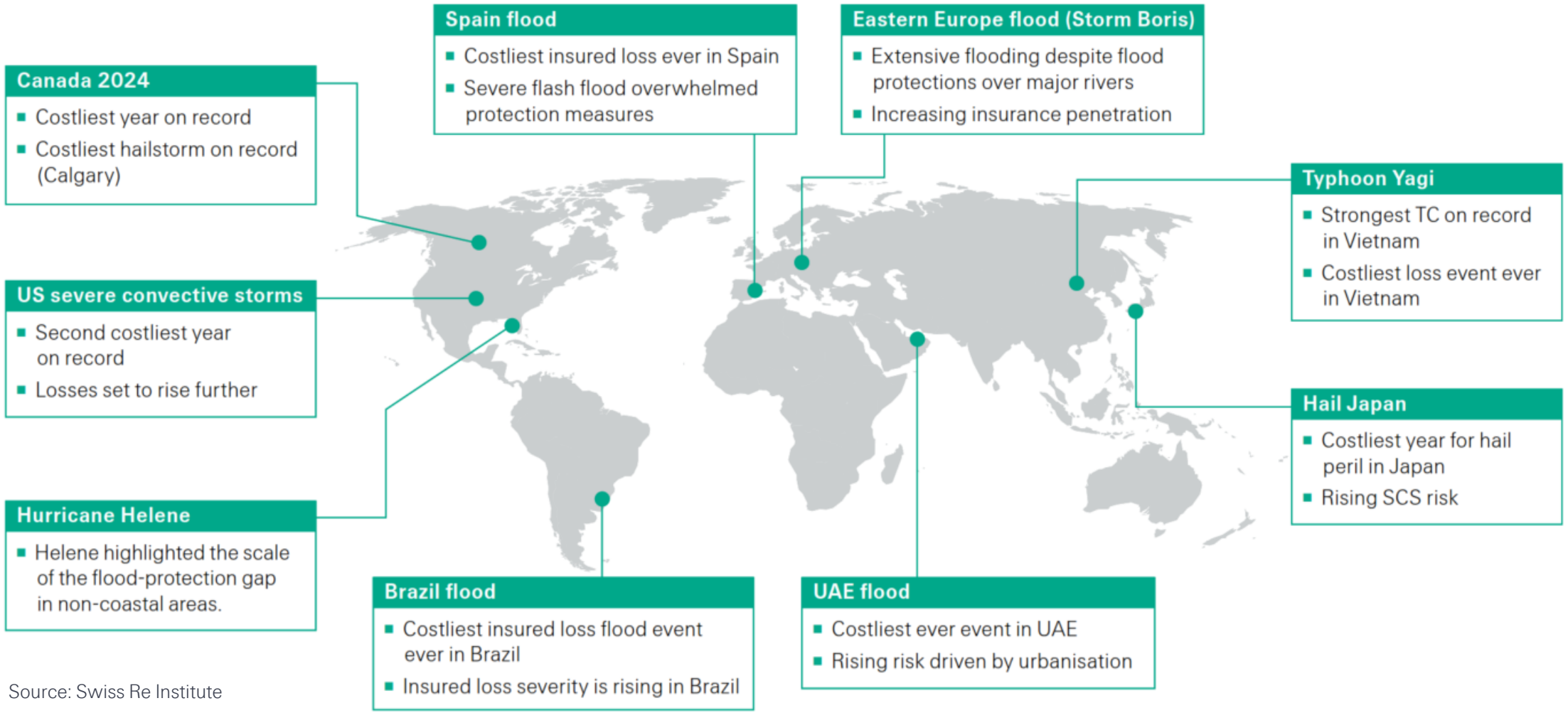
336

Catastrophe events***

Data shows that historic loss data is not enough in a world of increased socio-economic changes such as urbanisation, population growth and economic development.

*Man-made disasters losses USD 10 billion
**insured natural catastrophes losses: USD 146 billion, 57% of the economic losses are not covered by insurance
***in 2024 (Sigma 1/2025, Swiss Re Institute)

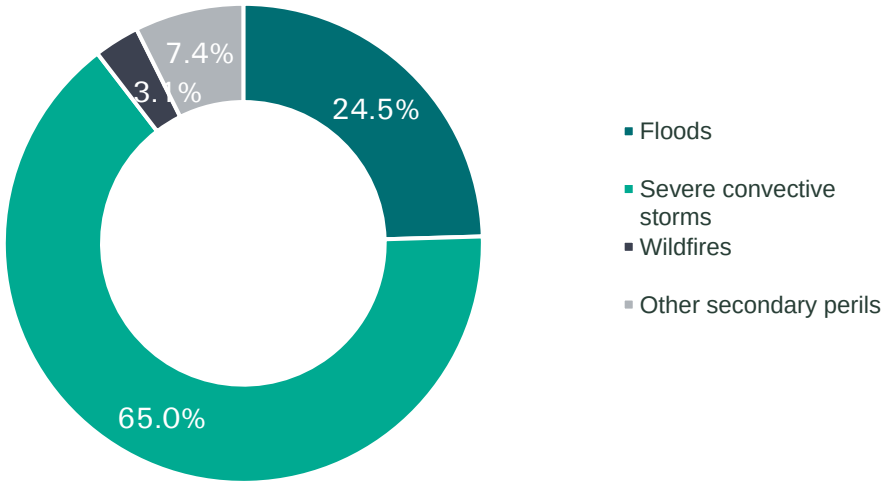
Learnings from Key Events of 2024



Source: Swiss Re Institute

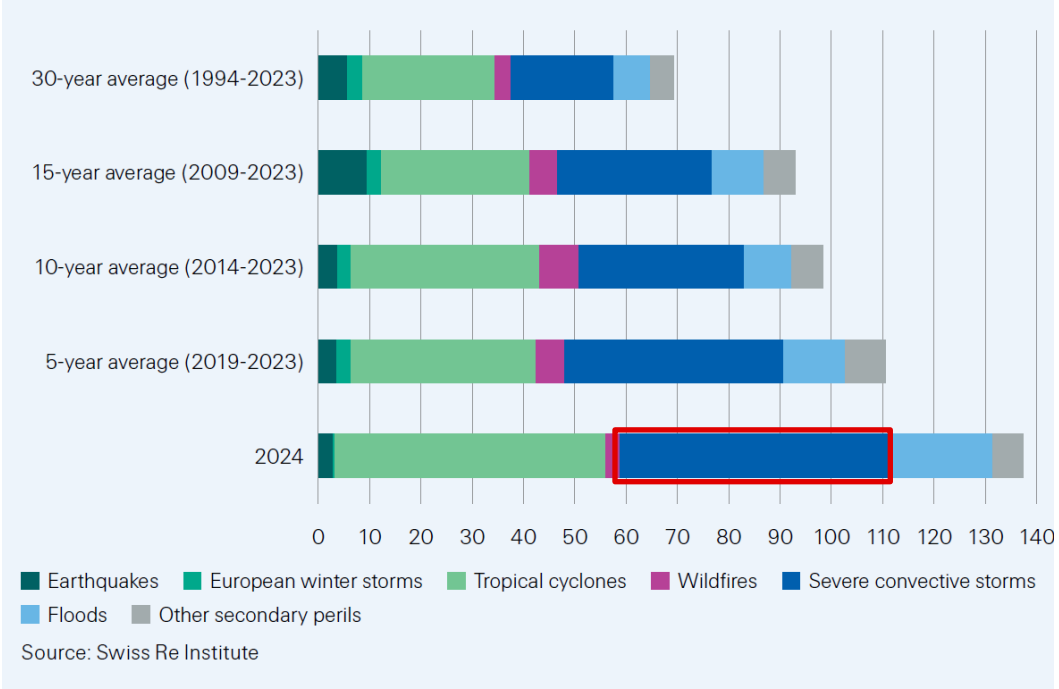
Trending: Severe convective storms accounted for most of the global insured losses.

	Event Type	Examples
Primary Perils	• Natural catastrophes that tend to happen less frequently, but with high loss potential for the global re/insurance industry. • Include secondary effects.	Tropical cyclones (including tropical cyclone-induced inland flooding and storm surge), earthquakes (including tsunamis, liquefaction and fires following earthquakes), winter storms in Europe.
Secondary Perils	• Natural catastrophes that can happen relatively frequently, and typically generate low to medium sized losses, from a global re/insurance industry perspective. • Refer to independent secondary perils only.	Severe convective storms (including thunderstorms, hail and tornadoes), floods, droughts, wildfires, landslides, snow, freeze.



SCS continued their recent trend of causing elevated losses.

Once again SCS were main drivers of last year's losses, with the overall cost to the global insurance industry mounting to USD 53 billion (see Figure 3). It was the second year running that SCS-related losses were above USD 50 billion. It was also the second costliest year for this peril after 2023, when insured losses were USD 70 billion (in 2024 prices).



Swiss Re

Swiss Re's Risk and Data Solutions

to Address Physical Climate Risk Assessment

Proprietary Nat Cat Model

Proprietary Hazard Layers

Sustainability Analytics

Portfolio, Market Analytics

Expertise

Unmatched insurance and actuarial expertise

- Over 160 years of managing risk
- Bespoke insights and tools built on data driven insights to power growth, profitability and efficiency
- Global risk expertise, best practices, Swiss Re's proprietary tools, models and data

Assets

In-house proprietary data, models and tools

- Deep insurance industry insights and unique access to exposure and claims data
- 50+ years of software development experience together with 160+ years of NatCat experience
- Holistic approach: Global perspective that extends beyond developed markets, addressing a wider range of perils rather than solely focusing on financial opportunities

Partners

Supported by 3rd party tech and data partners

RMS D+B S&P Global Ratings CAPE Analytics Verisk Google X one concern GUIDEWIRE

Swiss Re Climate/Nature/Biodiversity Data Assets

Wind

- Wind speed at three Return Periods (10, 50, and 100-year)
- Daily extreme wind speed

Wildfire

- Annual days with Fire Weather Index (FWI) > 21.3 (High)
- Annual days with Fire Weather Index (FWI) > 50 (Extreme)

Cold

- Annual frost days (T < 0°C)
- Annual days below −20°C

Precipitation and water

- Extreme 1-day precipitation
- Extreme 3-day precipitation
- Mean precipitation in wettest month
- Annual accumulated precipitation
- Seasonal precipitation (DJF, MAM, JJA, SON)
- Sea level rise

Drought

- Annual Standardised Precipitation Evapotranspiration Index (SPEI) minimum
- Average Aridity Index

Temperature

- Mean annual temperature
- Extreme 24h mean temperature
- Annual extreme 24h mean temperature
- Days per year above 30°C, 35°C, and 40°C
- Cooling degree days
- Heating degree days
- Number of heat waves per year
- Heat wave days per year
- Annual days with wetbulb globe temperature exceeding 32°C

IPCC Scenarios
SSP1-2.6, SSP2-4.5, SSP3-7.0, SSP5-8.5

Time coverage
2030 to 2100 in 5-year increments

Resolution
Spatial resolution of 25km

Uncertainty
10th, ensemble mean, and 90th percentile of climate model spread

Nature and Biodiversity

- Biodiversity and Ecosystem Services Index
- Water Security
- Water Quality
- Habitat Intactness
- Pollination
- Air Quality & Local Climate
- Soil Fertility
- Erosion Control
- Coastal Protection
- Food Provision
- Timber Provision
- Saline intrusion
- Ocean acidification
- Water stress
- Water depletion
- Ground water

Hazard layers

- River Flood (Fluvial)
- Flash Flood (Pluvial)
- Storm Surge
- Windstorm
- Wildfire
- Hailstorm
- Tornado
- Lightning
- Landslide
- Earthquake
- Volcanic Ash Thickness
- Glacial lake outburst floods
- Permafrost thawing
- Avalanche
- Subsidence
- Solifluctuation

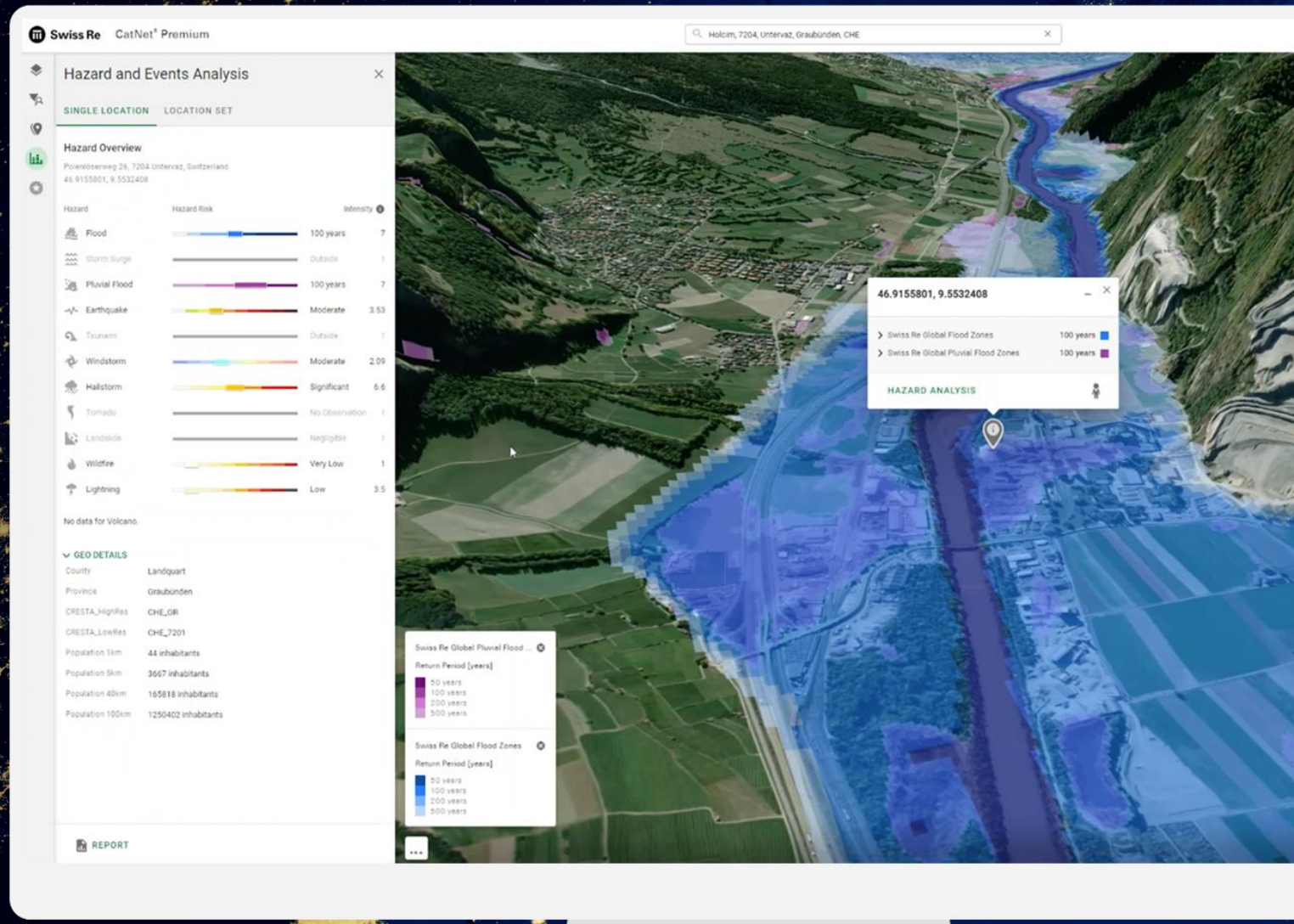
Time coverage
Present climate (2020s)

Resolution
Spatial resolution 30m to 25km

Evolve beyond uncertainties with CatNet® Suite

CatNet® is Swiss Re's global location intelligence tool that allows you to assess and visualise your natural hazard exposure for any location in the world and assess your accumulation across entire portfolios.

- Fluvial Flood
- Windstorm
- Hailstorm
- Tornado
- Earthquake
- Pluvial Flood
- Lightning
- Volcano
- Tsunami
- Wildfire
- Storm Surge
- Landslide



Future Climate Risk

Climate Risk Scores and Future Hazard for Climate Change Scenarios

The ***Climate Risk Scores*** directly map a peril metric to a standardized scale from 0 to 10, reflecting changes between the historical reference period (1991-2020) and a future time step. For instance, if the historical 1-day extreme precipitation amount is 150mm and the projected 2080 value under SSP5-8.5 is 220mm, the difference of 70mm is mapped to the scale.

In contrast, ***Future Hazards*** represent the absolute peril metric on the same standardized scale. Using the same example, instead of mapping the 70mm change, we map the future 220mm value directly.

This mapping approach enables comparisons across different IPCC scenarios and assets globally. As a result, these two products provide insights into regions experiencing the **most significant changes** and those with the **highest overall hazard** exposure.

IPCC Scenarios
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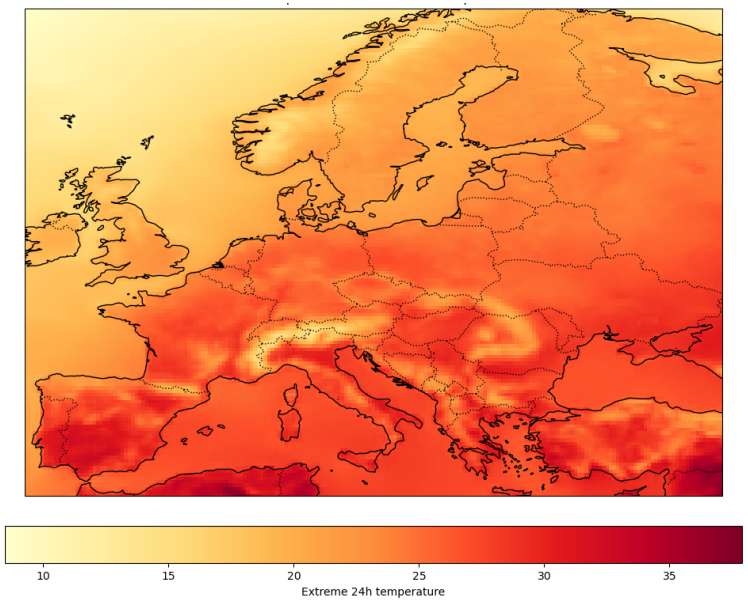
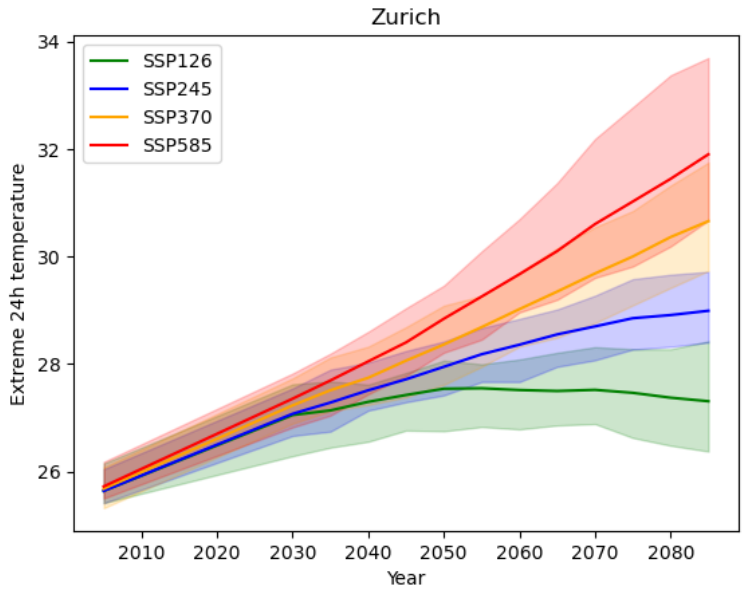
Climate Variables

In addition to the mapped **Climate Risk Scores** and **Future Hazards**, we also provide the underlying variables and indicators used in their calculations. Furthermore, we have expanded the dataset to include over 30 different metrics related to extreme precipitation, wildfire conditions, drought, cold stress, and more. These variables serve as the foundation for the risk assessment calculations.

These variables can be used to future assess the changes in exposure to climate change and hence make the Climate Risk Scores and Future Hazards more tangible.





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Swiss Re

Case Study

Challenges

Data Availability and Quality

Available Tools

Evolving Climate Risk Landscape

PROVIDING CLIMATE EXPERTISE TO SUPPORT A BANK'S INVESTMENT DECISIONS

The challenge

Increasing attention to climate risks

Large and longer-term infrastructure projects

Quantifying the financial implications

The solution

- Swiss Re's proprietary CatNet® tool to support the triage of projects:
  - I. Equips the bank to screen their investment pipelines efficiently.
  - II. Identifies the projects with higher physical risks and helps to shortlist those for further investment consideration.
- For those shortlisted projects, customised climate reports are generated providing the following:
  - I. Deep-dive analysis of the key perils affecting the projects by Swiss Re's in-house climate experts.
  - II. Risk mitigation measures recommended by Swiss Re risk engineers.

The impact

Efficiency and detailed insights
Cost Saving

Assess all projects in pipeline
Unified evaluation standards

Better understand natural hazards, like flood risk and potential vulnerability of biodiversity and ecosystem services

Any questions?

Swiss Re

Thank you!

Contact us

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