Risk Management Partners

Munich RE

Location Risk Intelligence

Climate Change Edition. Don’t be surprised by the impacts of climate change, but clearly understand the related risks

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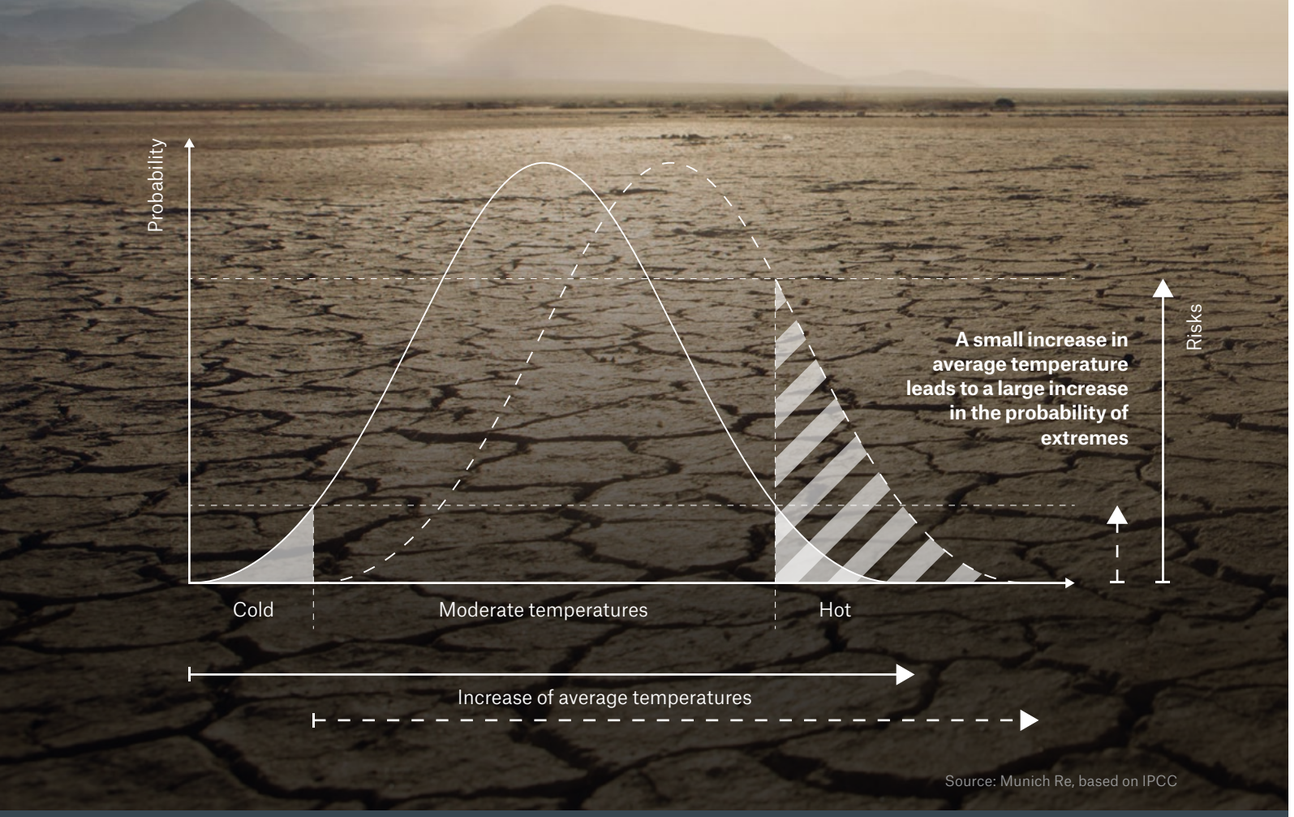
Overview



Extreme weather events are becoming more likely due to climate change

How will your business and assets be affected?

Be prepared for the effects of climate change.
Make sure you can assess and understand natural disaster risks such as hurricanes, floods, droughts, etc. up to the year 2100 by using different climate change scenarios representing the impacts of global warming.

Climate change impacts losses from natural disasters. **That's a fact**

In 2023 natural hazards caused a total global loss of around US$ 250 billion. What is striking is that, rising temperatures can result in more frequent and intense weather events, leading to higher losses. 45 such events worldwide each caused damage of at least one billion US dollars or significantly more.

The question of how likely your company could also be affected by a similar natural disaster and how climate change will impact your exposure to such physical climate events in the future can hardly be answered responsibly without reliable expert insights. Especially in view of the dramatically increasing numbers, it is essential that climate risks data are included as an integral part of your business decisions to protect your company from their increasingly frequent consequences. You'd better take climate change into account.

Source: Munich Re, NatCatSERVICE, January 2024

Your biggest risk is not knowing the risks of climate change because ...

... due to their geographical location, your assets and portfolios such as buildings, facilities and infrastructure may be in danger. You can only take action to mitigate an increase in your risk exposure if you are aware of the threat. This is all the more true if you are aiming for optimal risk diversification and risk-balanced portfolio management.

... your shareholders and stakeholders are increasingly demanding reliable answers on this topic. If you are unable to meet the growing call for more transparency and accurate reporting, you will lose investor confidence in your company's future viability and your corporate image will suffer.

... if your strategic business decisions do not include such risk assessments, **not only your top and bottom line results may be at risk but the future viability of the entire company** could also be at stake.

How you can turn climate risks into business opportunities with Climate Change Edition

Benefit from the integration of climate risk data into your business processes and decisions to stay ahead of the game.

- **Invest safely:** Check the risk of individual assets or entire portfolios using Climate Change Edition's set of global warming scenarios, looking up to 80 years into the future.
- **Avoid revenue losses and reputational damage:** Identify potential risks from climate change before they materialise in your assets and portfolios to proactively steer your investments towards profitable and secure returns now and in the future.
- **Maintain your business continuity and resilience:** With the globalisation of almost all business sectors, it is vital that your supply chains remain future-proof and exposed to as little climate risk as possible. With Climate Change Edition you can stay on top of things - worldwide.
- **Keep an eye on the future of your business:** With Climate Change Edition you can not only protect your business by anticipating the threat of natural disasters, but also assess how markets are changing and where new opportunities are emerging for your company.
- **Identify risks quickly and reliably:** Thanks to Climate Change Edition, you can easily identify areas of high risk concentration and assess them with an overall risk score or a detailed risk evaluation consisting of over 20 individual risk scores.
- **Meet your increasing disclosure obligations:** Climate Change Edition provides you with sound answers to the increasingly extensive regulatory and voluntary requirements relating to the disclosure of your climate change risk exposure, creating the transparency you need.

> "Thanks to the detailed and meaningful assessment of physical risks from natural disasters and climate change using Climate Change Edition, **we can make an informed credit decision in our risk analysis.**"

BayernLB

Patrick Th. Gruninger
Chief Specialist in Credit Management
Bayerische Landesbank

Prepared for anything. **Today, tomorrow and for 2100, too!**

Climate Change Edition is a modular SaaS solution that helps you not only to understand your exposure to current physical risks, but more importantly to assess and understand the physical risks associated with climate change in different future scenarios.

Integrated into your digital workflows, Climate Change Edition supports your spatial exploration, visualisation and evaluation for purposes of global portfolio management and investment decisions. From a single property to entire portfolios which are vulnerable to acute and chronic climate risks such as extreme temperatures, extreme precipitation, sea level rise, etc. And not just based on data from past events, but as a scientifically sound projection into the future. The year 2100, to be precise.

Benefit from comprehensive coverage of all relevant climate risks without the need to consolidate or harmonise the data, as all the required information comes from one source and is delivered in an identical format.

Global data coverage gives you access to data of consistently high quality worldwide, so you can rely on it no matter where your assets are located. Munich Re uses these data models itself for its own day-to-day business.

Understand all aspects of climate change thanks to four available climate scenarios and five different time projections up to 2100. Five-year steps available via API.

Gain trust and transparency through 35 underlying climate change variables which are optionally available for the purpose of understanding climate change and its consequences in detail.

Based on the latest scientific models, data is produced using the internationally recognised IPCC criteria, which ensures that companies work with reliable and accepted data.

Use expert knowledge, such as the two "defended" and "undefended" data calculations, to adapt your risk assessments to both of these scenarios and display the different scores.

Use cases that benefit in particular:

Investment security
Exposure to natural disasters can make all the difference between a profitable investment and a loss. With Climate Change Edition you can assess the risk exposure of individual assets as well as entire portfolios of up to five million assets, enabling you to make and justify informed decisions instead of guesswork.

Strategic underwriting
Climate Change Edition provides you with a reliable overview of all relevant natural catastrophe risks in strategic underwriting - projected to the year 2100 - enabling you not only to make quick and risk-aware decisions, but also to make future-proof decisions and significantly increase your profitability.

Risk modelling
Risk models need to adequately capture the most significant risks to which your business is exposed. With Climate Change Edition you always get a nuanced view of your investment in terms of rapidly occurring and long-term climate risks. It enables you to add new assets or filter or segment portfolios when you price or assess your capital requirements. Or you can aggregate different portfolios to compare them and better understand your risks.

Balance sheet management
Thanks to the customised reporting functionalities in Climate Change Edition, you can create meaningful reports that you can share with your respective stakeholders and decision-makers as part of your balance sheet management, ensuring greater transparency and credibility.

Risk management
Up-to-date, reliable data is the key to successful risk management. Thanks to API data transfer, you can integrate Climate Change Edition risk data directly into your existing risk management systems. This not only saves time and increases efficiency, but also gives you a holistic view of your risks.

Reporting & disclosure
Physical climate risk is expected to have a significant impact on our communities and businesses. This will increase the complexity and granularity of reporting. With Climate Change Edition you can significantly reduce the work involved, for example by easily exporting all the relevant data you need for your reporting.

Regulatory response
Compliance with emerging physical climate change regulations represents a growing challenge for you and your company. The rapid pace of regulatory development and the inherent uncertainty and variability of physical climate risks add to the complexity. With Climate Change Edition, which is continually expanding its depth of information to meet regional requirements such as the EU Taxonomy, you can effectively address this.

Scores that score points when it comes to climate change

Climate Change Edition supports you not only with information regarding the exposure of your assets to current physical risks, but above all in analysing and assessing the physical risks associated with climate change in various future scenarios.

In terms of both acute and chronic climate risks, this edition includes not only 12 NATHAN Hazard Scores and four NATHAN Risk Scores, but also eight additional Climate Hazard Scores which consider the effects of climate change. And unlike the Natural Hazards Edition, the risk scores are not only calculated on the basis of past events, but also include projected changes in the intensity and frequency of future events under different climate scenarios and projection years right up to 2100.

Climate Hazard Scores

The Climate Hazard Scores cover either RCP scenarios[2] (RCP4.5 and 8.5) or SSP scenarios[3] (SSP1-2.6, SSP2-4.5, SSP3-7.0 and SSP5-8.5) as well as the current, 2030, 2040, 2050 and 2100 projection years.[1]

[1]For some Climate Hazard Scores only a part of the scenarios or projection years is available.
[2]Representative Concentration Pathway
[3]Shared Socioeconomic Pathway

River Flood[1]	Munich Re models the future River Flood Hazard Score using the River Flood model for current atmospheric conditions as a basis and estimating changes in flood risk using an aggregate of climate and hydrological models.
Tropical Cyclone[1]	Munich Re creates its future Hazard Scores by combining its proprietary tropical cyclone model with a high-atmospheric-resolution climate model to incorporate projected changes in the intensity and frequency of tropical cyclones.
Sea Level Rise[1]	The Sea Level Rise Score shows the areas with elevated risk of flooding due to rising sea levels in 2100. The model is based on storm surge hazard zones, IPCC data on sea-level rise and elevation information.
Fire Weather Stress	The Fire Weather Stress Index describes meteorological fire conditions based on the Fire Weather Index (FWI), combining the probability of ignition, the speed and likelihood of fire spread and the availability of fuel.
Drought Stress[1]	The Drought Stress Index is based on the Standardised Precipitation Evapotranspiration Index (SPEI) and dry-spell conditions. SPEI is a multi-scalar drought index that is used to determine the onset, duration and magnitude of drought conditions.
Heat Stress	The Heat Stress Index combines information on increasing temperatures, extreme heat and heat waves.
Precipitation Stress	The Precipitation Stress Index describes the meteorological threat from high precipitation, combining data on precipitation duration, intensity and frequency.
Cold Stress	The Cold Stress Index combines several temperature-related parameters and classifies climatological cold stress.

NATHAN Hazard Scores

NATHAN Hazard Scores describe the hazard level of a location for all hazards.

River Flood	The River Flood Hazard Score is based on a global flood model from JBA, describing flood extents for return periods of 50, 100 and 500 years, and is available on both an undefended and defended basis, i.e. taking flood protection into account.
Flash Flood	The Flash Flood Hazard Score describes the hazard level, based on meteorological data, soil sealing information as well as terrain and hydrographic data (slope and flow accumulation).
Storm Surge	Storm surges are coastal floods caused by storms such as tropical cyclones and extratropical storms. The Storm Surge Hazard Score reflects the inundation area for return periods of 100, 500 and 1000 years and is available in an undefended as well as defended view, i.e. taking flood protection into account.
Tropical Cyclone	The Tropical Cyclone Hazard Score is derived from globally consistent, basin-specific models for tropical cyclones, and is based on probable maximum wind intensities with a return period of 100 years.
Extratropical Storm	The Extratropical Storm Hazard Score shows the probable maximum wind intensity occurring during extratropical storms in the region (approx. 30 – 70° north and south of the equator) for a 100-year return period.
Tornado	The Tornado Hazard Score is based on the annual frequency of tornadoes over an area of 10,000 km², interpolated from meteorological data
Hail	The Hail Hazard Score describes the hail potential by combing meteorological data, elevation and the global distribution of lightning activity.
Lightning	This Hazard Score shows the global frequency of lightning strikes per km² and year recorded by satellites and ground-based lightning detection networks.
Earthquake	The Earthquake Hazard Score is graded according to the probable maximum intensity of earthquakes on the Modified Mercalli Intensity (MMI) scale for an event with a return period of 475 years.
Volcano	The Volcano Hazard Score is based on volcanic activities, which are classified depending on their VEI (Volcano Explosivity Index) and annual return periods.
Tsunami	The Tsunami Hazard Score reflects the flood inundation areas for return periods of 100, 500 and 1000 years.
Wildfire	The Wildfire Hazard Score describes the hazard of wildfire, based on climatological data and land cover data.

NATHAN Risk Scores

NATHAN Risk Scores provide an overview and identify high-risk assets. They aggregate the risk of each asset in the portfolio in terms of geophysical, hydrological, meteorological and climatological hazards.

Overall	The Overall Risk Score can be used as a primary identifier of red flags. It combines the Earthquake, Storm and Flood Risk Scores, while also taking Wildfire Risk into account.
Earthquake	The Earthquake Risk Score can be used to identify earthquake-related risks and includes Earthquake, Volcano and Tsunami risks.
Storm	The Storm Risk Score can be used to identify storm-related risks and includes Tropical Cyclone, Extratropical Storm, Hail, Tornado and Lightning risks.
Flood	The Flood Risk Score can be used to identify flood-related risks and includes River Flood, Flash Flood and Storm Surge risks.

Climate Change Expert Module

Many business decisions depend on how accurately you can understand, measure and manage the risk of climate change, and the decision-making process therefore requires the latest and most relevant data.

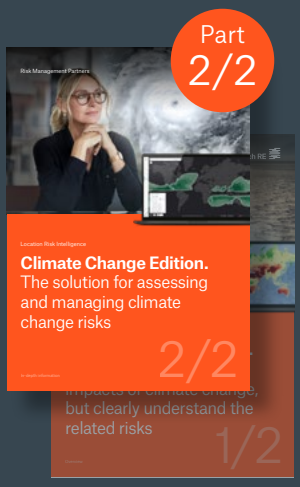
Transparency and trust in the data form the basis for excellence in risk management and modelling. The Climate Change Expert Module provides an extensive set of climate metrics which enable you to to conduct in-depth analyses into the concrete climate risks threatening your business operations. It puts you in a position to provide very specific answers to the way in which climate change will affect your risk exposure, your investment and your decision-making. In addition to our globally consistent Climate Stress Indices from Climate Change Edition, which capture the different facets of climate risk (too hot, too cold, too wet, too dry...) in a high-level universal way, Climate Change Variables allow you to deep dive local, sector-specific drivers of climate risk threating your business success.

35 Climate Change Variables
or 35 ways to assess risks in more detail

The Climate Change Expert Module provides you with a total of 35 additional detailed scores, the so-called Climate Change Variables, for the five Climate Hazard Scores (Fire Weather Stress, Drought Stress, Heat Stress, Precipitation Stress and Cold Stress) for an in-depth assessment of your assets.

If you need to base your business decisions on extremely detailed data assessments, our REST API enables seamless integration of the entire underlying statistical uncertainty measures data. Each Climate Change Variable value is backed by six Climate Change Statistics to ensure highest data accuracy and provide transparency.

Fire Weather Stress Index	Length Of Fire Season
	Annual FWI Sum
	Fire Season FWI Intensity
	Moderate Fire Danger Days
	High Fire Danger Days
	Very High Fire Danger Days
	Maximum FWI
Drought Stress Index	Drought Duration Per Year
	Drought Severity Per Event
	Maximum Dry Spell Duration
	Annual SPEI Sum
	Meteorological Dry Days
	10-Day Dry Spell Duration
Heat Stress Index	Annual Maximum Temperature
	Annual Mean Daily Maximum Temperature
	Days above 30°C
	Days above 35°C
	Days above 40°C
	Tropical Nights
	Days In Heatwave
	Annual Number Of Days In Hot Period
	Annual Warm Spell Duration Index Days
Precipitation Stress Index	Maximum Daily Precipitation
	Annual Precipitation Sum
	Maximum 5-Day Precipitation
	Moderate Precipitation Days
	Very Heavy Precipitation Days
	Extreme Precipitation Days
	Precipitation On Very Wet Days
	Precipitation On Extreme Wet Days
Cold Stress Index	Annual Minimum Temperature
	Annual Mean Daily Minimum Temperature
	Annual Cold Spell Duration Index Days
	Frost Days
	Ice Days



Want to know more? Get part 2/2 of our Climate Change Edition brochure for more in-depth information

Download part 2/2

See our other editions as part of our Location Risk Intelligence Platform:

Natural Hazards Edition
Wildfire HD Edition
Climate Financial Impact Edition

Get your personal demo of the edition you are interested in:

Get a demo

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