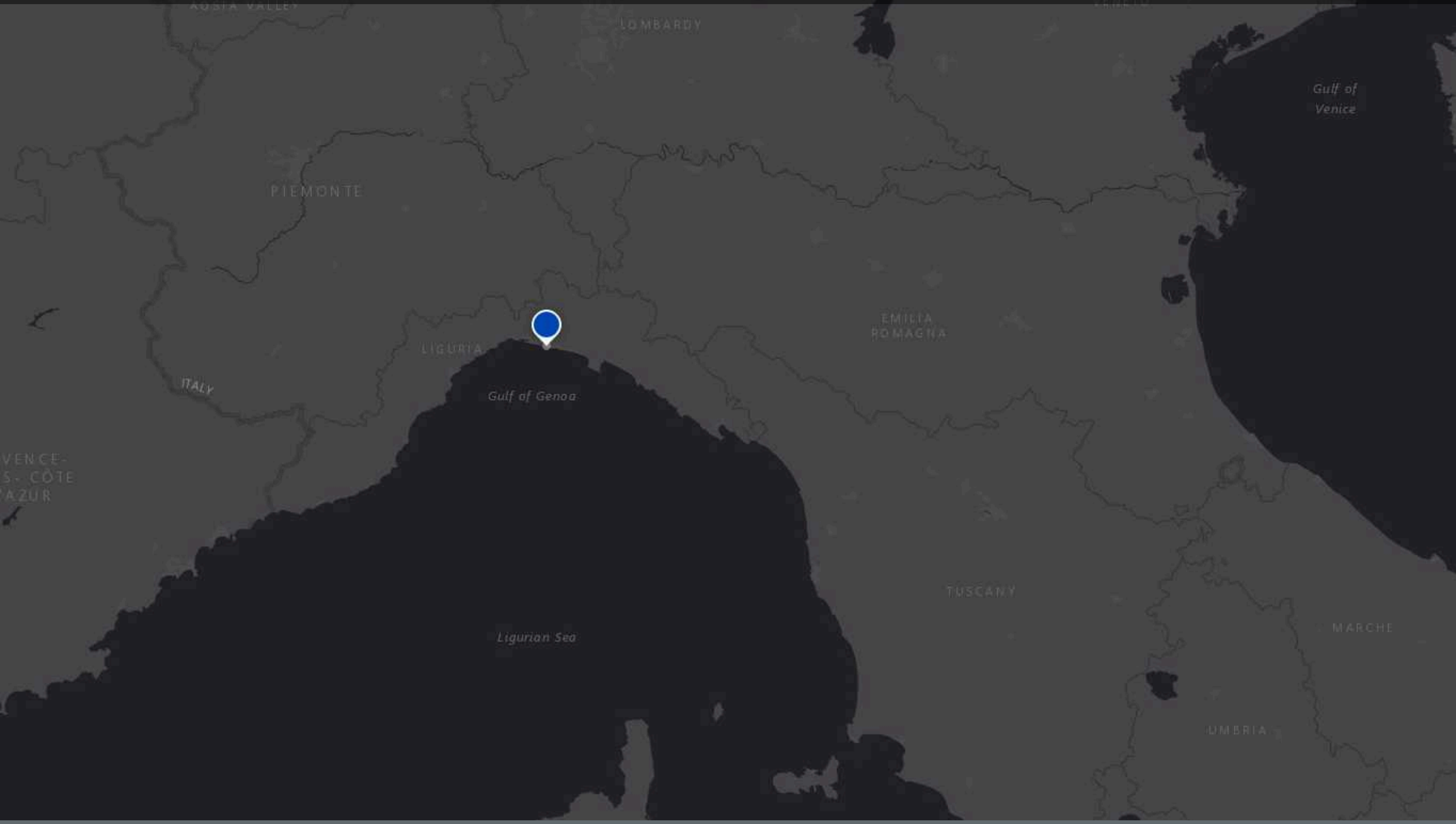
Risk Management Partners

Munich RE



Asset Risk Report

Sample Report - Asset Genova, Italy

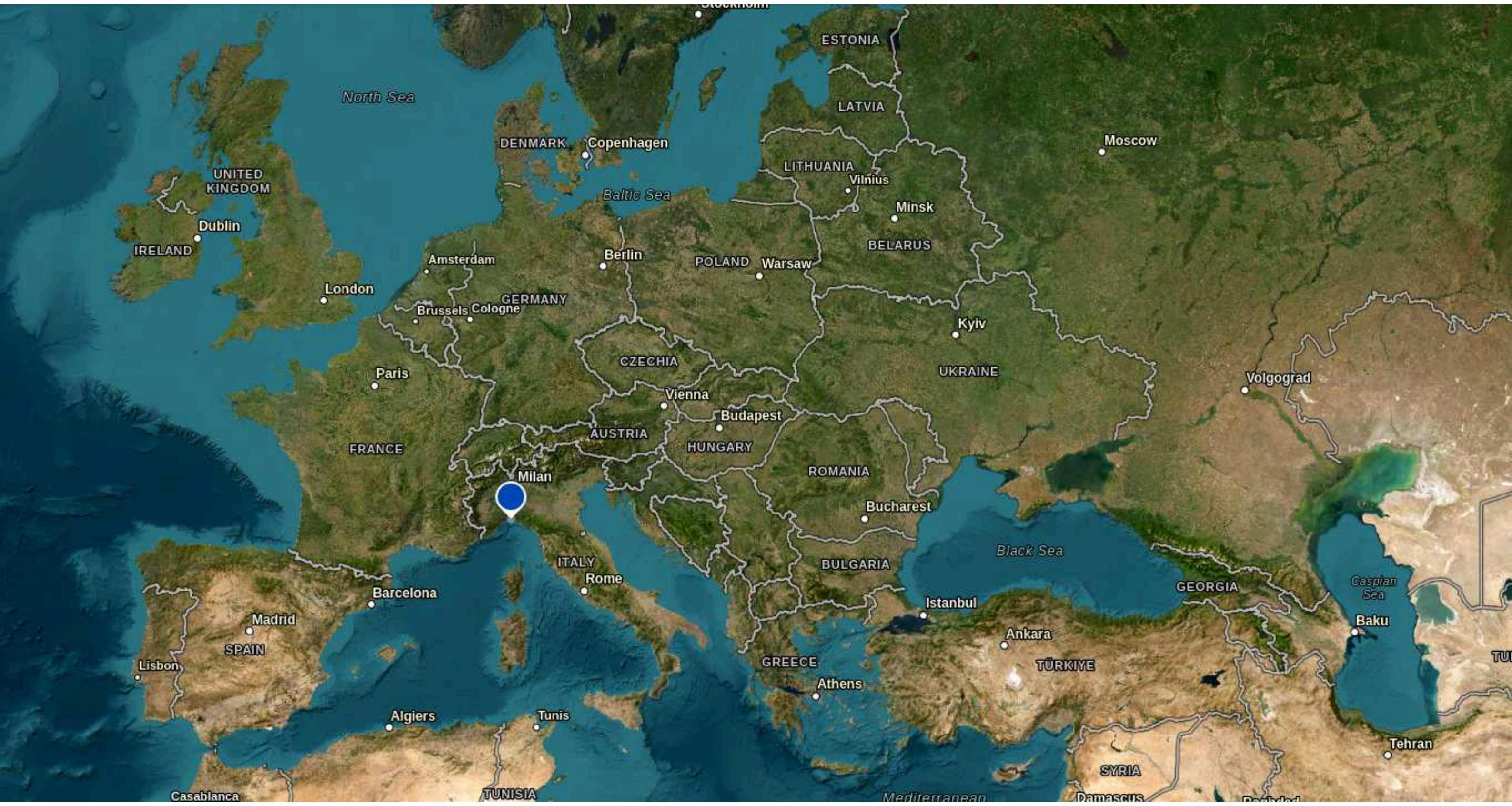
29 October 2024

Latitude:	44.395795
Longitude:	8.937828
Geocoding quality:	100 (Coordinates)

LOCATION RISK INTELLIGENCE

Table of Contents

Asset Info



Elevation	19	Class: 11 - 50 m
Worldcover 2020	10	Tree cover
Population Density	5	Class 5: ≥ 200
World Settlement Footprint Evolution	0	No Coverage (transparent)
Distance to Coast	14	Class: <= 100 m
JBA Flood Defense Zones, Standard of Protection	0	0 (no Flood Defense)

Climate Change Scenarios

In its latest Assessment Report (AR6), the Intergovernmental Panel on Climate Change (IPCC) analyses the results of climate models participating in the Coupled Model Intercomparison Project Phase 6 (CMIP6), which include improved representations of physical processes and higher resolutions compared to the CMIP5 generation of climate models. One of the key changes: CMIP6 models make use of climate change scenarios based on “Shared Socioeconomic Pathways” (SSPs), which include socio-economic factors, instead of the previous “Representative Concentration Pathways” (RCPs). The SSP framework provides a novel set of detailed narratives describing different paths society could take during the 21st century in response to climate change, with regard to economic, technological, social and geopolitical factors. As these narratives are used to derive development pathways, not only for greenhouse gas (GHG) emissions but also for economic measures such as population growth and per capita GDP, they can help companies anticipate risks to their business in an integrated, holistic manner.

The release of additional GHGs affects the atmosphere’s level of radiative forcing (a metric which describes the change in the Earth’s energy balance due to factors like greenhouse gases) and therefore the extent of global warming. SSP-based scenarios are referred to as SSPx-y, where ‘SSPx’ refers to the Shared Socioeconomic Pathway describing the socioeconomic trends underlying the scenarios, and ‘y’ refers to the level of radiative forcing (in watts per square metre, W/m^2 resulting from the scenario by the year 2100[i] (like in the RCP scenarios). For example, in the SSP1–2.6 scenario, humanity must work together to forge a more equitable, sustainable future, which results in additional radiative forcing of 2.6 W/m^2 by 2100, like in the RCP2.6 scenario.

As not all of the underlying data required as model inputs is currently available for SSP scenarios, we still offer future projections based on RCP scenarios for selected perils. Accordingly, we use a naming convention that includes both the SSP and corresponding RCP scenario. However, it’s important to note that while the SSP and RCP scenarios are based on the same radiative forcing by 2100, the pathways differ across time and could result in different risk levels. Therefore, the available climate change scenarios are denoted on the individual peril level.

Scenario descriptions

SSP1-/ RCP2.6: SSP1, known as the “Sustainability” or “Taking the Green Road” pathway, describes an increasingly sustainable world. Global commons are preserved and the limits of nature are respected. The focus is more on human well-being than on economic growth. Income inequalities between and within states are reduced. Consumption is oriented towards minimising material resource and energy usage. These efforts result in the net-zero CO_2 emissions target being reached by around 2075. The SSP1–2.6 scenario is associated with radiative forcing of 2.6 W/m^2 by 2100, while global mean surface temperature is estimated to increase by 1.8°C (1.3–2.4°C).[ii] For the corresponding RCP2.6 scenario, the CMIP5 models estimate a mean temperature increase of 1.6°C by 2100.[iii]

SSP2-/ RCP4.5: SSP2, called the “Middle of the Road” or medium pathway, extrapolates the past and current global development into the future. Income trends in different countries diverge significantly. Though there is a certain degree of cooperation between states, it barely improves. Global population growth is moderate, levelling off in the second half of the century. Environmental systems are somewhat degraded. CO_2 emissions remain around current levels until 2050, then decline but fail to reach net zero by 2100. The SSP2–4.5 scenario is associated with radiative forcing of 4.5 W/m^2 by 2100 and a rise in global mean surface temperature is estimated to increase by 2.7°C (2.1–3.5°C).[ii] For the corresponding RCP4.5 scenario, the CMIP5 models estimate a mean temperature increase of 2.4°C by 2100.[iii]

Scenario Description

SSP3-/ RCP7.0: SSP3, known as the "Regional Rivalry" or "A Rocky Road" pathway, sees a revival of nationalism and regional conflicts that push global issues into the background. Policies increasingly focus on questions of national and regional security. Over time, the gap widens between an internationally connected society that contributes to knowledge- and capital-intensive sectors of the global economy, and a fragmented collection of lower-income, poorly educated societies that work in a labour-intensive, low-tech economy. Investments in education and technological development decrease. Inequalities worsen. Some regions suffer drastic environmental damage and CO_2 emissions are expected to double by 2100 compared to 2015. The SSP3–7.0 scenario is associated with radiative forcing of 7.0 W/m² by 2100 and an increase in global mean surface temperature is estimated to increase by 3.6°C (2.8–4.6°C).[ii,iv]

SSP5-/ RCP8.5: In SSP5, known as the "Fossil-Fuelled Development" or "Taking the Highway" pathway, global markets are increasingly integrated, leading to innovations and technological progress. This social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal use and the prevalence of energy-intensive lifestyles worldwide, leading CO_2 emissions to triple by 2075 compared to 2015. The SSP5–8.5 scenario is associated with radiative forcing of 8.5 W/m² by 2100 and a rise in global mean surface temperature is estimated to increase by 4.4°C (3.3–5.7°C).[ii] For the corresponding RCP8.5 scenario, the CMIP5 models estimate a mean temperature increase of 4.3°C by 2100.[iii]

[i] IPCC, 2023: Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, p.9.

[ii] Compared to the reference period 1850–1900 with very likely range in parentheses, based on AR6 Climate Change 2021: The Physical Science Basis — IPCC.

IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[iii] Compared to the reference period 1850–1900, based on AR5 Climate Change 2013: The Physical Science Basis — IPCC.

Collins, M., R. Knutti, J. Arblaster, J.-L. Dufresne, T. Fichefet, P. Friedlingstein, X. Gao, W.J. Gutowski, T. Johns, G. Krinner, M. Shongwe, C. Tebaldi, A.J. Weaver and M. Wehner, 2013: Long-term Climate Change: Projections, Commitments and Irreversibility. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[iv] Note: The RCP framework does not include a scenario corresponding to SSP3–7.0.

Risk Scores

Overall (Defended)

The Overall Risk Score combines the Earthquake Risk Score, Storm Risk Score, Flood Risk Score as well as the locations risk to wildfire, giving an normalized reflection of an annual loss value for standard industrial business for the overall risk to physical damage of a location.

Extreme

Risk Index: **112**

Earthquake

Earthquake Risk Score quantifies a location's risk of physical damage caused by Earthquakes, Volcanos and Tsunamis.

Extreme

Risk Index: **46**

Storm

Storm Risk Score quantifies a location's risk of physical damage caused by Tropical cyclones, Extratropical storms, Hail, Tornadoes and Lightning.

Medium

Risk Index: **10**

Flood (Defended)

Flood Risk Score quantifies a location's risk of physical damage caused by River flood, Flash flood and Storm surge.

Extreme

Risk Index: **56**

Natural Hazards

NATHAN Hazards	Score	Low Hazard – High Hazard
Earthquake	Zone 1 (MM VI)	1
Volcanoes	No Hazard	-1
Tsunami	Zone 100 (year return period)	100
Tropical Cyclone	No Hazard	-1
Extratropical Storm	Zone 2 (121 - 160 km/h)	2
Hail	Zone 5	5
Tornado	Zone 2 (0.6 – 2.0)	2
Lightning	Zone 3 (4.1 - 10.0)	3
River Flood (Defended)	Zone 500 (year return period)	500
Flash Flood	Zone 4	4
Storm Surge (Defended)	Zone 100 (year return period)	100
Wildfire	No Hazard	-1

Supplementary Hazards	Score	Low Hazard – High Hazard
Peak Ground Acceleration	Zone 7 (0.131 - 0.200)	7
Soil & Shaking	No Information	
Distance to Active Faults	> 50000 m (Class: > 50000 m)	-1
Annual Water Stress	Zone 2 (Medium - High (20-40%))	2
Landslide	No Hazard	-1

Natural Hazards (Legends)

NATHAN Hazards

Earthquake	Zone 0: MM V and below Zone 1: MM VI Zone 2: MM VII Zone 3: MM VIII Zone 4: MM IX and above	Probable maximum intensity (MM: modified Mercalli scale) with an exceedance probability of 10% in 50 years (equivalent to a „return period" of 475 years) for medium subsoil conditions.
Volcanoes	No Hazard Unclassified Zone 1: Minor Hazard Zone 2: Moderate Hazard Zone 3: High Hazard	The hazard score is based on volcanic activities, which are classified depending on their VEI (Volcano Explosivity Index) and annual return periods. Secondary effects that can occur as a result of the large-scale distribution of volcanic particles (e.g. climate impacts, supraregional ash deposits) are not considered. Zone 1: > 15,000-year return period, Zone 2: 200 to 15,000-year return period, Zone 3: ≤ 200-year return period
Tsunami	No Hazard Zone 0: minimal flood risk Zone 1000: year return period Zone 500: year return period Zone 100: year return period	Zones based on 100m SRTM (Version 4.1) elevation model, taking into account height above sea level and distance from coasts.
Tropical Cyclone	No Hazard Zone 0: 76 - 141 km/h Zone 1: 142 - 184 km/h Zone 2: 185 - 212 km/h Zone 3: 213 - 251 km/h Zone 4: 252 - 299 km/h Zone 5: ≥ 300 km/h	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	No Hazard Zone 0: ≤ 80 km/h Zone 1: 81 - 120 km/h Zone 2: 121 - 160 km/h Zone 3: 161 - 200 km/h Zone 4: > 200 km/h	Probable maximum intensity with an average exceedance probability of 10% in ten years (equivalent to a „return period" of 100 years). Areas were examined in which there is a high frequency of extratropical storms (approx. 30°–70° north and south of the equator).
Hail	Zone 1: Low Zone 2 Zone 3 Zone 4 Zone 5 Zone 6: High	Frequency and intensity of hailstorms. The hail zoning expresses the location-specific hail potential, which is derived from lightning frequency, drop length, evapotranspiration and temperature. The hail zoning is based on the representation of atmospheric conditions that can lead to a hailstorm, and does not allow frequency (or return period) attributions for hailstorms of certain intensities and vice versa.
Tornado	Zone 1: 0.1 – 0.5 Zone 2: 0.6 – 2.0 Zone 3: 2.1 – 10.0 Zone 4: > 10.0	The Tornado Zones are based on frequency and intensity interpolated from meteorological data (Unit: Tornadoes per 10,000 km² and year).
Lightning	Zone 1: 0.2 - 1.0 Zone 2: 1.1 - 4.0 Zone 3: 4.1 - 10.0 Zone 4: 10.1 - 20.0 Zone 5: 20.1 - 40.0 Zone 6: 40.1 - 80.0	Global frequency of lightning strokes per km² and year. Lightning frequency is determined by counting the total number of lightning flashes independently of whether they strike the ground or not.

Natural Hazards (Legends)

NATHAN Hazards

River Flood (Defended)	Zone 0: minimal flood risk Zone 500: year return period Zone 100: year return period Zone 50: year return period	Areas threatened by extreme floods. JBA flood maps with return periods of 50, 100 and 500 years. Includes information on local flood protection measures.
Flash Flood	Zone 1: Low Zone 2 Zone 3 Zone 4 Zone 5 Zone 6: High	Frequency and intensity of flash floods. 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 (Defended)	No Hazard Zone 1000: year return period Zone 500: year return period Zone 100: year return period	Coastal areas threatened by storm surges for return periods 100, 500 and 1000 years, based on 30m FABDEM Digital Elevation Model (DEM). Does consider flood defenses.
Wildfire	No Hazard Zone 1: Low Zone 2 Zone 3 Zone 4: High	The wildfire hazard zones describe potential wildfire hazard levels, which are mainly driven by physical drought/dryness conditions and the existence of burnable material, following an empirical approach. While the drought/dryness conditions are determined by temperature and precipitation as key parameters, a vegetation parameter is incorporated based on vegetation and landcover/land-use data. This does not allow frequency estimates for wildfire. The effects of wind, arson and fire-prevention measures are not considered.

Supplementary Hazards

Peak Ground Acceleration	Zone 1: 0.000 - 0.010 Zone 2: 0.011 - 0.020 Zone 3: 0.021 - 0.030 Zone 4: 0.031 - 0.050 Zone 5: 0.051 - 0.080 Zone 6: 0.081 - 0.130 Zone 7: 0.131 - 0.200 Zone 8: 0.201 - 0.350 Zone 9: 0.351 - 0.550 Zone 10: 0.551 - 0.900 Zone 11: 0.901 - 1.500 Zone 12: > 1.500	The Global Earthquake Model (GEM) Global Seismic Hazard Map (version update 2019) depicts the geographic distribution of the Peak Ground Acceleration (PGA) with a 10% probability of being exceeded in 50 years, computed for reference rock conditions (shear wave velocity, V , of 760-800 m/s). The map was created by collating maps computed using national and regional probabilistic seismic hazard models developed by various institutions and projects, and by GEM Foundation scientists.
Soil & Shaking	Class 1: Low, hard bedrock Class 2: rock Class 3: soft rock/dense soil Class 4: stiff soil Class 5: soft soil Class 6: High, reclaimed land	The Soil and Shaking hazard shows underground conditions that influence earthquake intensity. This hazard score, which combines geological, soil and hydrological information, complements the interpretation of the earthquake perils by elaborating information about how fast earthquake waves move through the ground based on the soils natural composition and its impact on the area of interest.

Natural Hazards (Legends)

Supplementary Hazards

Distance to Active Faults	Class: > 50000 m Class: 25001 - 50000 m Class: 5001 - 25000 m Class: 1001 - 5000 m Class: 501 - 1000 m Class: 101 - 500 m Class: <= 100 m	The distance to active fault indicates how far the location is from the nearest active geological fault. The distance is calculated up to a maximum distance of 50 kilometers and the value is returned in meters. If the distance is further than 50 kilometers, the value -1 is returned.
Annual Water Stress	Arid and Low Water Use Zone 0: Low (<10%) Zone 1: Low - Medium (10-20%) Zone 2: Medium - High (20-40%) Zone 3: High (40-80%) Zone 4: Extremely High (>80%)	Baseline water stress measures the ratio of total water withdrawals to available renewable surface and groundwater supplies. Water withdrawals include domestic, industrial, irrigation, and livestock consumptive and nonconsumptive uses. Available renewable water supplies include the impact of upstream consumptive water users and large dams on downstream water availability. Higher values indicate more competition among users.
Landslide	No Hazard Zone 1: Very Low Zone 2: Low Zone 3: Medium Zone 4: High	The Global Landslide Hazard Map presents a qualitative representation of global landslide hazard at a global scale. It is the combination of the The Global Landslide Hazard Map: Median Annual Rainfall-Triggered Landslide Hazard (1980-2018) and The Global Landslide Hazard Map: Earthquake-Triggered Landslide Hazard which has then been simplified to four categories, ranging from Very low to High landslide hazard

Scenario: SSP1-/ RCP2.6

Climate Change Scenario Matrix	Current	**2030**	**2040**	**2050**	**2100**
Storm Surge (Defended)	Zone 100	Zone 100	Zone 100	Zone 100	Zone 100
Heat Stress Index	1.6 - 3.0	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5	4.6 - 6.0
Precipitation Stress Index	7.6 - 9.0	7.6 - 9.0	7.6 - 9.0	7.6 - 9.0	7.6 - 9.0
Fire Weather Stress Index	0.0 - 1.5	1.6 - 3.0	1.6 - 3.0	1.6 - 3.0	1.6 - 3.0
Cold Stress Index	3.1 - 4.5	1.6 - 3.0	1.6 - 3.0	1.6 - 3.0	1.6 - 3.0
Sea Level Rise	Data is not modelled	Data is not modelled	Data is not modelled	Data is not modelled	Zone 2

Climate Change Overview

Scenario: SSP2-/ RCP4.5

Climate Change Scenario Matrix	Current	**2030**	**2040**	**2050**	**2100**
Tropical Cyclone	No Hazard	No Hazard	Data is not modelled	No Hazard	No Hazard
River Flood (Defended)	Zone 500	Zone 500	Data is not modelled	Zone 500	Zone 500
Storm Surge (Defended)	Zone 100	Zone 100	Zone 100	Zone 100	Zone 100
Heat Stress Index	1.6 - 3.0	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5	4.6 - 6.0
Precipitation Stress Index	7.6 - 9.0	7.6 - 9.0	7.6 - 9.0	7.6 - 9.0	7.6 - 9.0
Fire Weather Stress Index	0.0 - 1.5	1.6 - 3.0	1.6 - 3.0	1.6 - 3.0	3.1 - 4.5
Drought Stress Index	1.6 - 3.0	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5	4.6 - 6.0
Cold Stress Index	3.1 - 4.5	1.6 - 3.0	1.6 - 3.0	1.6 - 3.0	1.6 - 3.0
Sea Level Rise	Data is not modelled	Data is not modelled	Data is not modelled	Data is not modelled	Zone 2

Climate Change Overview

Scenario: SSP3-/ RCP7.0

Climate Change Scenario Matrix	Current	**2030**	**2040**	**2050**	**2100**
Storm Surge (Defended)	Zone 100	Zone 100	Zone 100	Zone 100	Zone 100
Heat Stress Index	1.6 - 3.0	3.1 - 4.5	3.1 - 4.5	4.6 - 6.0	4.6 - 6.0
Precipitation Stress Index	7.6 - 9.0	7.6 - 9.0	7.6 - 9.0	7.6 - 9.0	9.1 - 10.0
Fire Weather Stress Index	0.0 - 1.5	1.6 - 3.0	1.6 - 3.0	1.6 - 3.0	3.1 - 4.5
Cold Stress Index	3.1 - 4.5	1.6 - 3.0	1.6 - 3.0	1.6 - 3.0	1.6 - 3.0

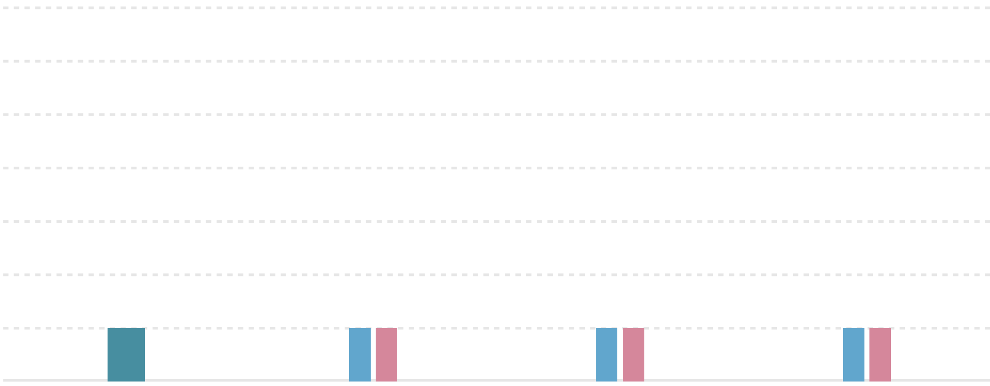
Scenario: SSP5-/ RCP8.5

Climate Change Scenario Matrix	Current	**2030**	**2040**	**2050**	**2100**
Tropical Cyclone	No Hazard	No Hazard	Data is not modelled	No Hazard	No Hazard
River Flood (Defended)	Zone 500	Zone 500	Data is not modelled	Zone 500	Zone 500
Storm Surge (Defended)	Zone 100	Zone 100	Zone 100	Zone 100	Zone 100
Heat Stress Index	1.6 - 3.0	3.1 - 4.5	3.1 - 4.5	4.6 - 6.0	6.1 - 7.5
Precipitation Stress Index	7.6 - 9.0	7.6 - 9.0	7.6 - 9.0	7.6 - 9.0	7.6 - 9.0
Fire Weather Stress Index	0.0 - 1.5	1.6 - 3.0	1.6 - 3.0	3.1 - 4.5	4.6 - 6.0
Drought Stress Index	1.6 - 3.0	3.1 - 4.5	4.6 - 6.0	4.6 - 6.0	7.6 - 9.0
Cold Stress Index	3.1 - 4.5	1.6 - 3.0	1.6 - 3.0	1.6 - 3.0	1.6 - 3.0
Sea Level Rise	Data is not modelled	Data is not modelled	Data is not modelled	Data is not modelled	Zone 3

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. Current and for respective projection year and RCP scenario.

- Zone 5 (≥ 300 km/h)
- Zone 4 (252 - 299 km/h)
- Zone 3 (213 - 251 km/h)
- Zone 2 (185 - 212 km/h)
- Zone 1 (142 - 184 km/h)
- Zone 0 (76 - 141 km/h)
- No Hazard

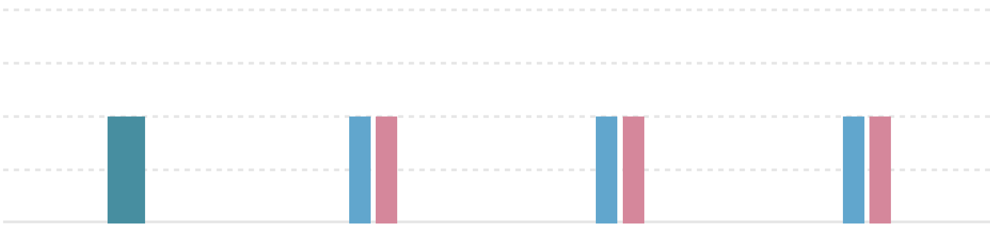


Hazard Zone:	Current	2030	2050	2100
SSP2-/ RCP4.5	-1	-1	-1	-1
SSP5-/ RCP8.5		-1	-1	-1

River Flood (Defended)

Areas threatened by extreme floods. JBA flood maps with return periods of 50, 100 and 500 years. Includes information on local flood protection measures.

- Zone 50 (year return period)
- Zone 100 (year return period)
- Zone 500 (year return period)
- Zone 0 (minimal flood risk)



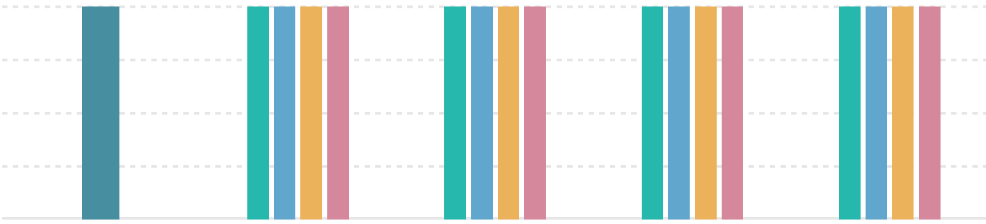
Return Period:	Current	2030	2050	2100
SSP2-/ RCP4.5	500	500	500	500
SSP5-/ RCP8.5		500	500	500

Climate Change

Storm Surge (Defended)

Coastal areas threatened by storm surges for return periods 100, 500 and 1000 years, based on 30m FABDEM Digital Elevation Model (DEM). Does consider flood defenses.

- Zone 100 (year return period)
- Zone 500 (year return period)
- Zone 1000 (year return period)
- No Hazard

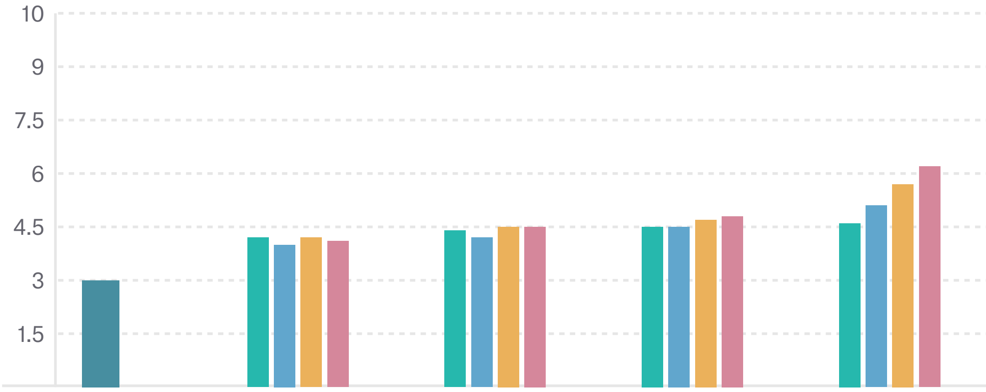


Return Period:	Current	2030	2040	2050	2100
SSP1-/ RCP2.6	100	100	100	100	100
SSP2-/ RCP4.5		100	100	100	100
SSP3-/ RCP7.0		100	100	100	100
SSP5-/ RCP8.5		100	100	100	100

Heat Stress Index

Heat Stress Index combines several temperature-related parameters and classifies the climatological heat stress situation on a scale ranging from 0 (very low) to 10 (very high).

- 9.1 - 10.0 (Extreme)
- 7.6 - 9.0 (Very High)
- 6.1 - 7.5 (High)
- 4.6 - 6.0 (High Medium)
- 3.1 - 4.5 (Low Medium)
- 1.6 - 3.0 (Low)
- 0.0 - 1.5 (Very Low)



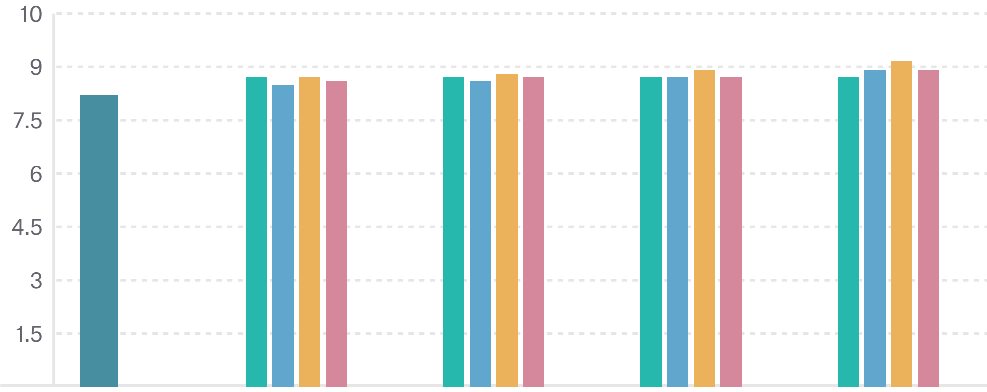
Stress Index:	Current	2030	2040	2050	2100
SSP1-/ RCP2.6	3.0	▲ 4.2	▲ 4.4	▲ 4.5	▲ 4.6
SSP2-/ RCP4.5		▲ 4.0	▲ 4.2	▲ 4.5	▲ 5.1
SSP3-/ RCP7.0		▲ 4.2	▲ 4.5	▲ 4.7	▲ 5.7
SSP5-/ RCP8.5		▲ 4.1	▲ 4.5	▲ 4.8	▲ 6.2

Climate Change

Precipitation Stress Index

Precipitation Stress Index combines several heavy-precipitation-related parameters and classifies climatological precipitation stress on a scale ranging from 0 (very low) to 10 (very high).

- 9.1 - 10.0 (Extreme)
- 7.6 - 9.0 (Very High)
- 6.1 - 7.5 (High)
- 4.6 - 6.0 (High Medium)
- 3.1 - 4.5 (Low Medium)
- 1.6 - 3.0 (Low)
- 0.0 - 1.5 (Very Low)

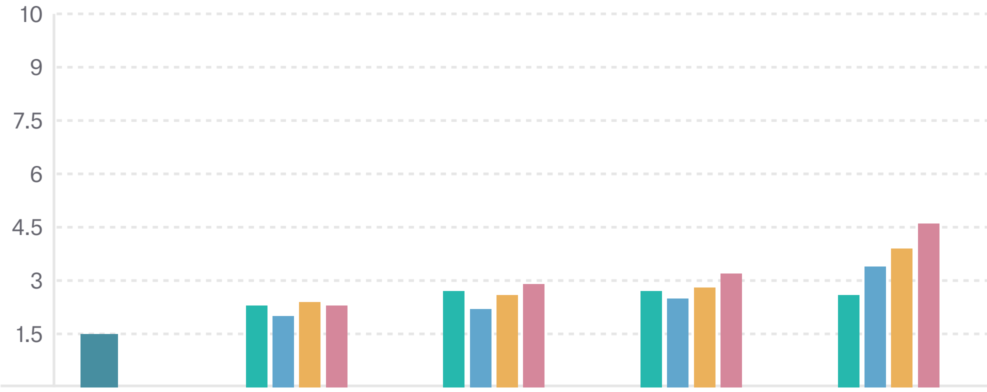


Stress Index:	Current	2030	2040	2050	2100
SSP1-/ RCP2.6	8.2	▲ 8.7	▲ 8.7	▲ 8.7	▲ 8.7
SSP2-/ RCP4.5		▲ 8.5	▲ 8.6	▲ 8.7	▲ 8.9
SSP3-/ RCP7.0		▲ 8.7	▲ 8.8	▲ 8.9	▲ 9.1
SSP5-/ RCP8.5		▲ 8.6	▲ 8.7	▲ 8.7	▲ 8.9

Fire Weather Stress Index

Fire Weather Stress Index describes the potential influence of atmospheric conditions on a wildfire, based on the climate variables of temperature, wind, precipitation, and relative humidity on a scale ranging from 0 (very low) to 10 (very high).

- 9.1 - 10.0 (Extreme)
- 7.6 - 9.0 (Very High)
- 6.1 - 7.5 (High)
- 4.6 - 6.0 (High Medium)
- 3.1 - 4.5 (Low Medium)
- 1.6 - 3.0 (Low)
- 0.0 - 1.5 (Very Low)

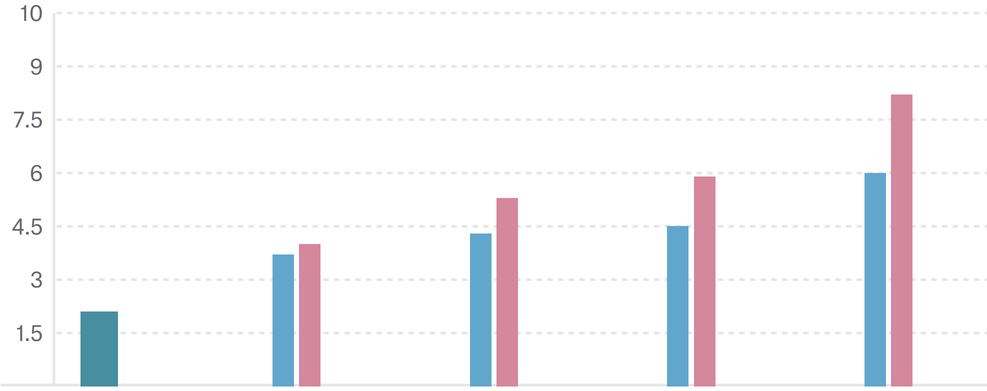


Stress Index:	Current	2030	2040	2050	2100
SSP1-/ RCP2.6	1.5	▲ 2.3	▲ 2.7	▲ 2.7	▲ 2.6
SSP2-/ RCP4.5		▲ 2.0	▲ 2.2	▲ 2.5	▲ 3.4
SSP3-/ RCP7.0		▲ 2.4	▲ 2.6	▲ 2.8	▲ 3.9
SSP5-/ RCP8.5		▲ 2.3	▲ 2.9	▲ 3.2	▲ 4.6

Drought Stress Index

Drought Stress Index based on SPEI (Standardised Precipitation-Evapotranspiration Index) and dry-spell conditions. SPEI is a multi-scalar drought index that is used to determine the onset, duration and magnitude of drought conditions in relation to normal conditions, where the climatic water balance over the second half of the 20th century is considered as reference conditions.

- 9.1 - 10.0 (Extreme)
- 7.6 - 9.0 (Very High)
- 6.1 - 7.5 (High)
- 4.6 - 6.0 (High Medium)
- 3.1 - 4.5 (Low Medium)
- 1.6 - 3.0 (Low)
- 0.0 - 1.5 (Very Low)

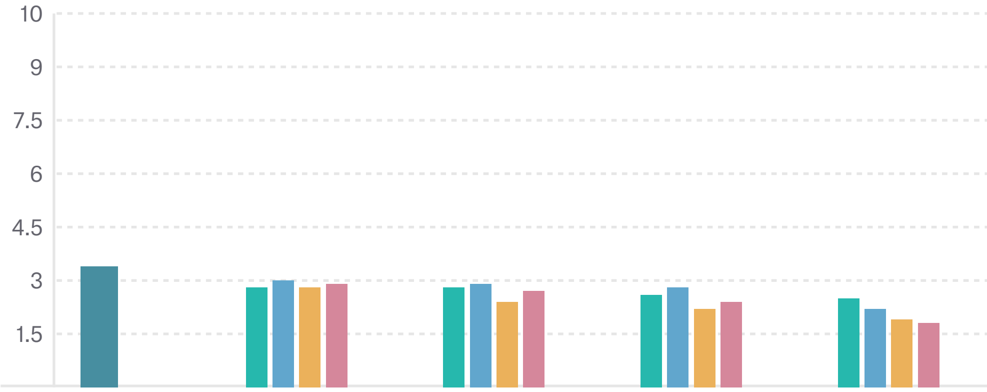


Stress Index:	Current	2030	2040	2050	2100
SSP2-/ RCP4.5	2.1	▲ 3.7	▲ 4.3	▲ 4.5	▲ 6.0
SSP5-/ RCP8.5		▲ 4.0	▲ 5.3	▲ 5.9	▲ 8.2

Cold Stress Index

Cold Stress Index combines several temperature-related parameters and classifies climatological cold stress on a scale ranging from 0 (very low) to 10 (very high).

- 9.1 - 10.0 (Extreme)
- 7.6 - 9.0 (Very High)
- 6.1 - 7.5 (High)
- 4.6 - 6.0 (High Medium)
- 3.1 - 4.5 (Low Medium)
- 1.6 - 3.0 (Low)
- 0.0 - 1.5 (Very Low)

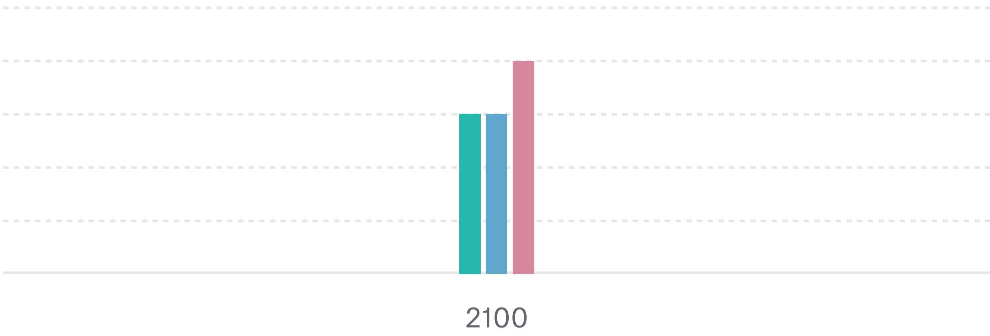


Stress Index:	Current	2030	2040	2050	2100
SSP1-/ RCP2.6	3.4	▾ 2.8	▾ 2.8	▾ 2.6	▾ 2.5
SSP2-/ RCP4.5		▾ 3.0	▾ 2.9	▾ 2.8	▾ 2.2
SSP3-/ RCP7.0		▾ 2.8	▾ 2.4	▾ 2.2	▾ 1.9
SSP5-/ RCP8.5		▾ 2.9	▾ 2.7	▾ 2.4	▾ 1.8

Sea Level Rise

Hazard zones derived from IPCC sea-level rise data and high-resolution elevation data for respective projection year and RCP scenario. Model is based on storm surge events with 100 years return period.

- Zone 4 (Extreme)
- Zone 3 (High)
- Zone 2 (Medium)
- Zone 1 (Low)
- No Hazard



Hazard Zone:

SSP1-/ RCP2.6	2
SSP2-/ RCP4.5	2
SSP5-/ RCP8.5	3

Data Sources

Risk Scores	Data Source
Overall (Defended)	Munich Re (MR)
Earthquake	Munich Re (MR)
Storm	Munich Re (MR)
Flood (Defended)	Munich Re (MR)

Natural Hazards - NATHAN Hazards	Data Source
Earthquake	Munich Re (MR)
Volcanoes	Munich Re (MR)
Tsunami	Munich Re (MR)
Tropical Cyclone	Munich Re (MR)
Extratropical Storm	Munich Re (MR)
Hail	Munich Re (MR)
Tornado	Munich Re (MR)
Lightning	Munich Re (MR)
River Flood (Defended)	Munich Re (MR), JBA Risk Management Limited (JBA)
Flash Flood	Munich Re (MR)
Storm Surge (Defended)	Munich Re (MR)
Wildfire	Munich Re (MR)

Natural Hazards - Supplementary Hazards	Data Source
Peak Ground	Globale Earthquake Model (GEM),

Data Sources

Natural Hazards - Supplementary Hazards	Data Source
Acceleration	M. Pagani, J. Garcia-Pelaez, R. Gee, K. Johnson, V. Poggi, R. Styron, G. Weatherill, M. Simionato, D. Viganò, L. Danciu, D. Monelli (2018). Global Earthquake Model (GEM) Seismic Hazard Map (version 2018.1 - December 2018), DOI: 10.13117/GEM-GLOBAL-SEISMIC-HAZARD-MAP-2018.1 https://www.globalquakemodel.org/gem https://www.globalquakemodel.org/hazard-model-documentation
Soil & Shaking	Munich Re (MR), United States Geological Survey (USGS) Global Vs30 model based on topographic slope, with custom embedded maps.
Distance to Active Faults	Munich Re (MR), Global Earthquake Model (GEM)
Annual Water Stress	Aqueduct, World Resources Institute (WRI) https://www.wri.org/aqueduct
Landslide	Global Facility for Disaster Reduction and Recovery (GFDRR), mattiaamadio https://www.geonode-gfdrrlab.org/layers/hazard:ls_arup

Climate Change	Data Source
Tropical Cyclone	Munich Re (MR)
River Flood (Defended)	Munich Re (MR), JBA Risk Management Limited (JBA)
Storm Surge (Defended)	Munich Re (MR)
Heat Stress Index	Munich Re (MR)
Precipitation Stress Index	Munich Re (MR)
Fire Weather Stress Index	Munich Re (MR)
Drought Stress Index	Munich Re (MR)
Cold Stress Index	Munich Re (MR)
Sea Level Rise	Munich Re (MR)

Data Sources

General Information	Data Source
Elevation	Japan Aerospace Exploration Agency (JAXA), United States Geological Survey (USGS)
Worldcover 2020	European Space Agency (ESA)
Population Density	Oak Ridge National Laboratory
World Settlement Footprint Evolution	German Aerospace Center (DLR), Earth Observation Center (EOC)
Distance to Coast	Munich Re (MR)
JBA Flood Defense Zones, Standard of Protection	JBA Risk Management Limited (JBA)

Confidentiality Notice

Munich Re invests substantial time and financial resources in developing its proprietary applications, models, and data.

Information concerning Munich Re applications, models, and data is protected under trade secret laws, among other intellectual property rights. Recipients of this documentation and materials contained herein are subject to the restrictions of the confidentiality provisions contained in applicable license agreements or any other applicable nondisclosure terms. Except to the extent permitted by the terms of a license agreement or non- disclosure agreement with Munich Re, no part of this document may be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form without prior written consent from Munich Re.

Warranty Disclaimer and Limitation of Liability

This document was prepared to assist users of the Munich Re products. Information in this document is subject to change without notice and does not represent a commitment on the part of Munich Re. The material contained herein is supplied "as-is" and without representation or warranty of any kind. By using the Information in this Document the user acknowledges that such Information shall not take the place of Customer's own judgement or experience, particularly regarding the analysis and assessment of loss and/or insurance risks. Munich Re assumes no responsibility and shall have no liability of any kind arising from the supply or use of this document or the material contained herein.

Map Screenshot Attributions:

'Grey', 'Dark Grey': Esri, HERE, Garmin, ©OpenStreetMap contributors, GIS user community
'Satellite': Esri, Maxar, Earthstar Geographics, GIS user community
'Hybrid': Esri, Maxar, Earthstar Geographics, TomTom, Garmin, FAO, NOAA, USGS, ©OpenStreetMap contributors, GIS user community
'Dark': ©OpenStreetMap contributors, ©CARTO
'OpenStreetMap': ©OpenStreetMap contributors
'OpenStreetMap-Hot': ©OpenStreetMap contributors, Tiles style byHumanitarian OpenStreetMap Team hosted byOpenStreetMap France
'OpenTopoMap': Map data: ©OpenStreetMap contributors,SRTM | Map style: ©OpenTopoMap (CC-BY-SA)
'Hillshade' and 'Hillshade Dark': Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community
'Ocean': Esri, Garmin, GEBCO, NOAA NGDC, and other contributors
'Earth@Night': imagery provided by services from GIBS, operated by the NASA/GSFC/ESDIS, funding by NASA/HQ
Administration & Postcodes: GfK
CRESTA: GfK/PERILS
HydroBasins: HydroSHEDS
NUTS: EU Eurostat

Send us Your Feedback
Location Risk Intelligence Support