

## Asset Risk Report

Lat: 43.55189, Lon: 10.30784

15 September 2025

Address: Livorno, ITA

Geocoding quality: 50 (City)



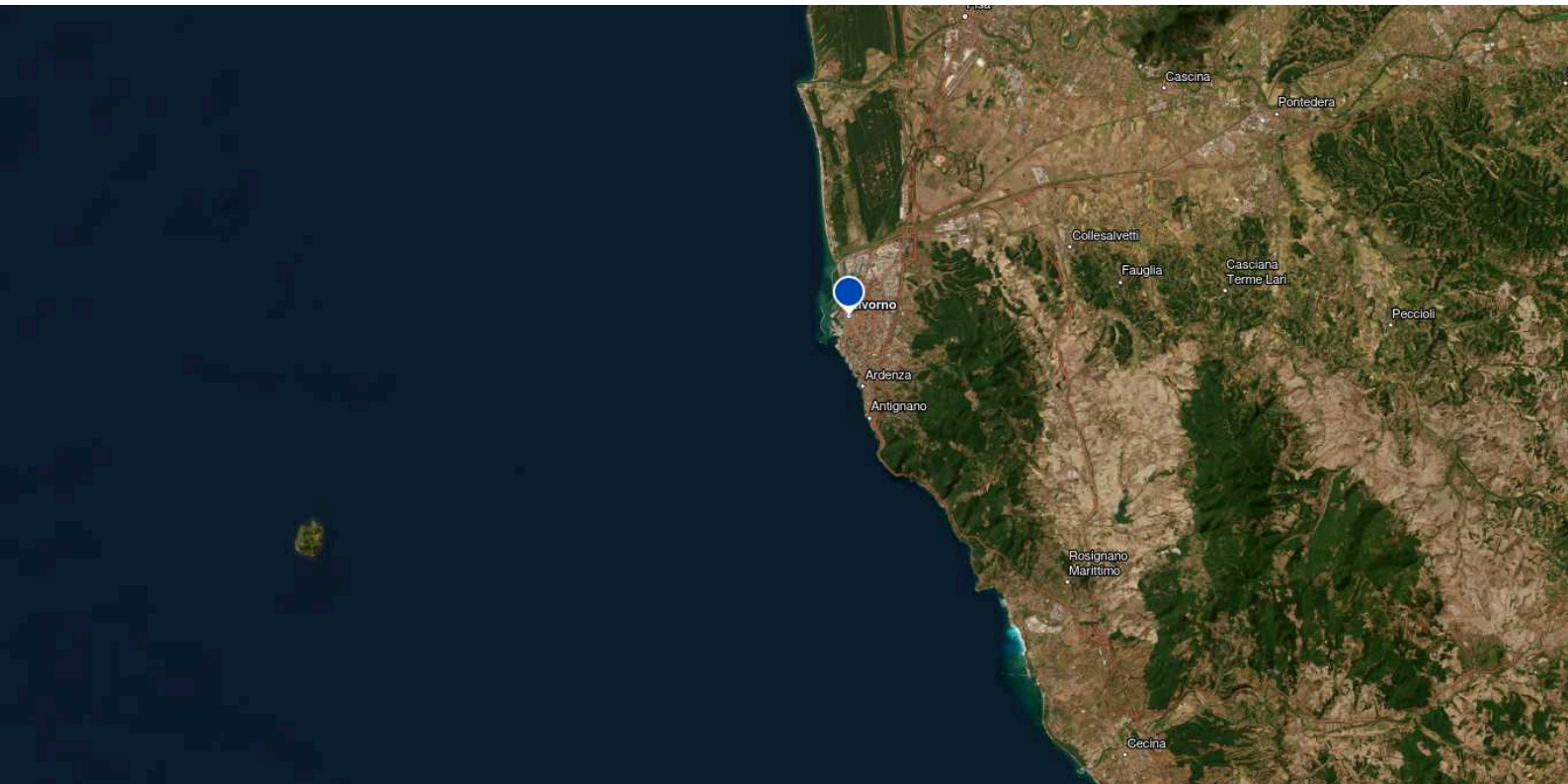
LOCATION RISK INTELLIGENCE







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# Asset Info



	Elevation	<div><div>728</div></div>	501 - 1000 m
	Worldcover 2020	<div><div>10</div></div>	Tree cover
	Population Density	<div><div>3</div></div>	Class 3: 10 - 49
	World Settlement Footprint Evolution	<div><div>0</div></div>	No Coverage (transparent)
	Distance to Coast	<div><div>38896</div></div>	25001 - 50000 m
	JBA Flood Defense Zones, Standard of Protection	<div><div>0</div></div>	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 21<sup>st</sup> 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<sup>2</sup> resulting from the scenario by the year 2100<sup>i</sup> (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<sup>2</sup> 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<sub>2</sub> emissions target being reached by around 2075. The SSP1–2.6 scenario is associated with radiative forcing of 2.6 W/m<sup>2</sup> by 2100, while global mean surface temperature is estimated to increase by 1.8°C (1.3–2.4°C).<sup>ii</sup> For the corresponding RCP2.6 scenario, the CMIP5 models estimate a mean temperature increase of 1.6°C by 2100.<sup>iii</sup>

**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<sub>2</sub> 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<sup>2</sup> by 2100 and a rise in global mean surface temperature is estimated to increase by 2.7°C (2.1–3.5°C).<sup>ii</sup> For the corresponding RCP4.5 scenario, the CMIP5 models estimate a mean temperature increase of 2.4°C by 2100.<sup>iii</sup>

# 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<sub>2</sub> emissions are expected to double by 2100 compared to 2015. The SSP3–7.0 scenario is associated with radiative forcing of 7.0 W/m<sup>2</sup> by 2100 and an increase in global mean surface temperature is estimated to increase by 3.6°C (2.8–4.6°C).<sup>ii,iv</sup>

**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<sub>2</sub> emissions to triple by 2075 compared to 2015. The SSP5–8.5 scenario is associated with radiative forcing of 8.5 W/m<sup>2</sup> by 2100 and a rise in global mean surface temperature is estimated to increase by 4.4°C (3.3–5.7°C).<sup>ii</sup> For the corresponding RCP8.5 scenario, the CMIP5 models estimate a mean temperature increase of 4.3°C by 2100.<sup>iii</sup>

<sup>i</sup> 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.

<sup>ii</sup> Best estimates based on multiple lines of evidence 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: Summary for Policymakers. In: 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. p. 14

<sup>iii</sup> 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.

<sup>iv</sup> Note: The RCP framework does not include a scenario corresponding to SSP3–7.0.

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# 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: 44

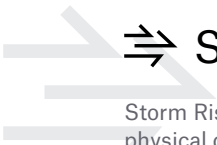


## Earthquake

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

High

Risk Index: 31

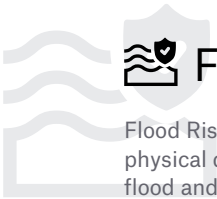


## Storm

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.

Low




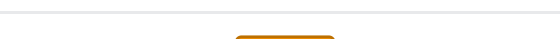
Risk Index: 2



# Natural Hazards

Supplementary Hazards	Score	Low Hazard	High Hazard
 Peak Ground Acceleration	● Zone 9 0.351 - 0.550		

# Natural Hazards

Supplementary Hazards	Score	Low Hazard	High Hazard
 Soil & Shaking	● Zone 3 soft rock/dense soil		
 Distance to Active Faults	● 1001 - 5000 m		



## NATHAN Hazards

	Earthquake	<ul style="list-style-type: none"> <li>Zone 0 MM V and below</li> <li>Zone 1 MM VI</li> <li>Zone 2 MM VII</li> <li>Zone 3 MM VIII</li> <li>Zone 4 MM IX and above</li> </ul>	<p>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.</p>
	Volcanoes	<ul style="list-style-type: none"> <li>No Hazard</li> <li>Unclassified</li> <li>Zone 1 Minor Hazard</li> <li>Zone 2 Moderate Hazard</li> <li>Zone 3 High Hazard</li> </ul>	<p>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.</p> <p>Zone 1: &gt; 15,000-year return period, Zone 2: 200 to 15,000-year return period, Zone 3: ≤ 200-year return period</p>
	Tsunami	<ul style="list-style-type: none"> <li>No Hazard</li> <li>Zone 0 minimal flood risk</li> <li>Zone 1000 year return period</li> <li>Zone 500 year return period</li> <li>Zone 100 year return period</li> </ul>	<p>Zones based on 100m SRTM (Version 4.1) elevation model, taking into account height above sea level and distance from coasts.</p>
	Tropical Cyclone	<ul style="list-style-type: none"> <li>No Hazard</li> <li>Zone 0 76 - 141 km/h</li> <li>Zone 1 142 - 184 km/h</li> <li>Zone 2 185 - 212 km/h</li> <li>Zone 3 213 - 251 km/h</li> <li>Zone 4 252 - 299 km/h</li> <li>Zone 5 ≥ 300 km/h</li> </ul>	<p>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.</p>
	Extratropical Storm	<ul style="list-style-type: none"> <li>No Hazard</li> <li>Zone 0 ≤ 80 km/h</li> <li>Zone 1 81 - 120 km/h</li> <li>Zone 2 121 - 160 km/h</li> <li>Zone 3 161 - 200 km/h</li> <li>Zone 4 &gt; 200 km/h</li> </ul>	<p>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).</p>
	Hail	<ul style="list-style-type: none"> <li>Zone 1 Low</li> <li>Zone 2</li> <li>Zone 3</li> <li>Zone 4</li> <li>Zone 5</li> <li>Zone 6 High</li> </ul>	<p>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.</p>
	Tornado	<ul style="list-style-type: none"> <li>Zone 1 0.1 – 0.5 (per 10.000 km<sup>2</sup> and year)</li> <li>Zone 2 0.6 – 2.0 (per 10.000 km<sup>2</sup> and year)</li> <li>Zone 3 2.1 – 10.0 (per 10.000 km<sup>2</sup> and year)</li> <li>Zone 4 &gt; 10.0 (per 10.000 km<sup>2</sup> and year)</li> </ul>	<p>The Tornado Zones are based on frequency and intensity interpolated from meteorological data (Tornadoes per 10.000 km<sup>2</sup> and year).</p>

## NATHAN Hazards

	Lightning	<ul style="list-style-type: none"> <li>Zone 1 0.2 - 1.0 (per km<sup>2</sup> and year)</li> <li>Zone 2 1.1 - 4.0 (per km<sup>2</sup> and year)</li> <li>Zone 3 4.1 - 10.0 (per km<sup>2</sup> and year)</li> <li>Zone 4 10.1 - 20.0 (per km<sup>2</sup> and year)</li> <li>Zone 5 20.1 - 40.0 (per km<sup>2</sup> and year)</li> <li>Zone 6 40.1 - 80.0 (per km<sup>2</sup> and year)</li> </ul>	Global frequency of lightning strokes per km <sup>2</sup> and year. Lightning frequency is determined by counting the total number of lightning flashes independently of whether they strike the ground or not.
	River Flood (Defended)	<ul style="list-style-type: none"> <li>Zone 0 minimal flood risk</li> <li>Zone 500 year return period</li> <li>Zone 100 year return period</li> <li>Zone 50 year return period</li> </ul>	Areas threatened by floods. JBA flood maps with return periods of 50, 100 and 500 years. Includes information on local flood protection measures.
	Flash Flood	<ul style="list-style-type: none"> <li>Zone 1 Low</li> <li>Zone 2</li> <li>Zone 3</li> <li>Zone 4</li> <li>Zone 5</li> <li>Zone 6 High</li> </ul>	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)	<ul style="list-style-type: none"> <li>No Hazard</li> <li>Zone 1000 year return period</li> <li>Zone 500 year return period</li> <li>Zone 100 year return period</li> </ul>	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	<ul style="list-style-type: none"> <li>No Hazard</li> <li>Zone 1 Low</li> <li>Zone 2</li> <li>Zone 3</li> <li>Zone 4 High</li> </ul>	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.




## Solid-mass Hazards

	Subsidence	<ul style="list-style-type: none"> <li>Zone 1 Very Low</li> <li>Zone 2 Low</li> <li>Zone 3 Moderate</li> <li>Zone 4 Medium High</li> <li>Zone 5 High</li> <li>Zone 6 Very High</li> </ul>	The Subsidence Score describes the hazard of gradual sinking or sudden collapse of the ground. It accounts for natural shrink-swell subsidence in clay soils due to seasonal variations in soil moisture and water balance as well as anthropogenic subsidence due to groundwater depletion, groundwater depletion-related sinkholes and ground collapses in mining areas.
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## Solid-mass Hazards

	Avalanche	<div> <div></div> </div>	<p>The Avalanche Score describes the threat posed by snow avalanches and is derived from potential avalanche starting zones and likely flow paths, taking into account elevation and landuse data.</p>
		Zone 1 No or Very Low	
		Zone 2 Low	
		Zone 3 Medium	
		Zone 4 High	
	Landslide	<div> <div></div> </div>	<p>The Landslide Score is based on the World Bank's "Global landslide hazard map", which describes the landslide hazard on a global scale, combining rainfall-triggered and earthquake-triggered landslide hazards. While rainfall-triggered landslide is modelled using rainfall data, the earthquake-triggered landslide hazard considers the peak ground acceleration of seismic events with a return period of 475 years.</p>
		Zone 1 Very Low	
		Zone 2 Low	
		Zone 3 Medium	
		Zone 4 High	

## Supplementary Hazards

	Peak Ground Acceleration	<div> <div></div> </div>	<p>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, <math>V_s</math>, 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.</p>
		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	
	Soil & Shaking	<div> <div></div> </div>	<p>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. Global Vs30 model based on topographic slope, with custom embedded maps.</p>
		Zone 1 Low, hard bedrock	
		Zone 2 rock	
		Zone 3 soft rock/dense soil	
		Zone 4 stiff soil	
		Zone 5 soft soil	
		Zone 6 High, reclaimed land	
	Distance to Active Faults	<div> <div></div> </div>	<p>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.</p>
		> 50000 m	
		25001 - 50000 m	
		5001 - 25000 m	
		1001 - 5000 m	
		501 - 1000 m	
		101 - 500 m	
		≤ 100 m	

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# Climate Change Overview

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Scenario: SSP1-/ RCP2.6

Climate Change Scenario Matrix	Current	2030	2040	2050	2100
 Tropical Cyclone	No Hazard	Data is not modelled	Data is not modelled	Data is not modelled	Data is not modelled
 River Flood (Defended)	Zone 0	Data is not modelled	Data is not modelled	Data is not modelled	Data is not modelled
 Storm Surge (Defended)	No Hazard	No Hazard	No Hazard	No Hazard	No Hazard
 Subsidence	Zone 6	Zone 6	Zone 6	Zone 6	Zone 6
 Heat Stress Index	3.1 - 4.5	4.6 - 6.0	4.6 - 6.0	4.6 - 6.0	4.6 - 6.0
 Heat-Humidity Stress Index	0.0 - 1.5	1.6 - 3.0	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5
 Cold Stress Index	4.6 - 6.0	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5
 Fire Weather Stress Index	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5
 Precipitation Stress Index	4.6 - 6.0	4.6 - 6.0	4.6 - 6.0	4.6 - 6.0	4.6 - 6.0
 Drought Stress Index	1.6 - 3.0	Data is not modelled	Data is not modelled	Data is not modelled	Data is not modelled
 Sea Level Rise	Data is not modelled	No SLR	No SLR	No SLR	No SLR
 Water Scarcity	4.1 - 5.0	4.1 - 5.0	4.1 - 5.0	4.1 - 5.0	4.1 - 5.0
 Permafrost Extent	No Hazard	Data is not modelled	Data is not modelled	No Hazard	No Hazard

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# Climate Change Overview

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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 0	Zone 0	Data is not modelled	Zone 0	Zone 0
 Storm Surge (Defended)	No Hazard	No Hazard	No Hazard	No Hazard	No Hazard
 Subsidence	Zone 6	Zone 6	Zone 6	Zone 6	Zone 6
 Heat Stress Index	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5	4.6 - 6.0	4.6 - 6.0
 Heat-Humidity Stress Index	0.0 - 1.5	1.6 - 3.0	3.1 - 4.5	3.1 - 4.5	4.6 - 6.0
 Cold Stress Index	4.6 - 6.0	4.6 - 6.0	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5
 Fire Weather Stress Index	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5
 Precipitation Stress Index	4.6 - 6.0	4.6 - 6.0	4.6 - 6.0	4.6 - 6.0	4.6 - 6.0
 Drought Stress Index	1.6 - 3.0	4.6 - 6.0	6.1 - 7.5	6.1 - 7.5	7.6 - 9.0
 Sea Level Rise	Data is not modelled	No SLR	No SLR	No SLR	No SLR
 Water Scarcity	4.1 - 5.0	Data is not modelled	Data is not modelled	Data is not modelled	Data is not modelled
 Permafrost Extent	No Hazard	Data is not modelled	Data is not modelled	No Hazard	No Hazard

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# Climate Change Overview

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Scenario: SSP3-/ RCP7.0






Climate Change Scenario Matrix	Current	2030	2040	2050	2100
 Tropical Cyclone	No Hazard	Data is not modelled	Data is not modelled	Data is not modelled	Data is not modelled
 River Flood (Defended)	Zone 0	Data is not modelled	Data is not modelled	Data is not modelled	Data is not modelled
 Storm Surge (Defended)	No Hazard	No Hazard	No Hazard	No Hazard	No Hazard
 Subsidence	Zone 6	Zone 6	Zone 6	Zone 6	Zone 6
 Heat Stress Index	3.1 - 4.5	4.6 - 6.0	4.6 - 6.0	4.6 - 6.0	6.1 - 7.5
 Heat-Humidity Stress Index	0.0 - 1.5	1.6 - 3.0	3.1 - 4.5	3.1 - 4.5	6.1 - 7.5
 Cold Stress Index	4.6 - 6.0	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5
 Fire Weather Stress Index	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5	4.6 - 6.0
 Precipitation Stress Index	4.6 - 6.0	4.6 - 6.0	4.6 - 6.0	4.6 - 6.0	4.6 - 6.0
 Drought Stress Index	1.6 - 3.0	Data is not modelled	Data is not modelled	Data is not modelled	Data is not modelled
 Sea Level Rise	Data is not modelled	No SLR	No SLR	No SLR	No SLR
 Water Scarcity	4.1 - 5.0	4.1 - 5.0	4.1 - 5.0	4.1 - 5.0	4.1 - 5.0
 Permafrost Extent	No Hazard	Data is not modelled	Data is not modelled	Data is not modelled	Data is not modelled

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# Climate Change Overview

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Scenario: SSP5-/ RCP8.5

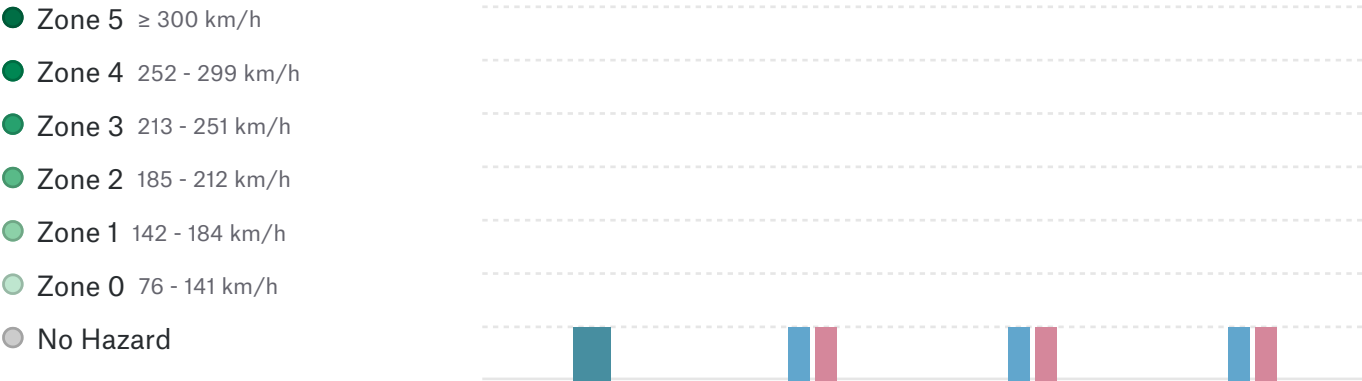
Climate Change Scenario Matrix	Current	2030	2040	2050	2100
 Tropical Cyclone	No Hazard	No Hazard	Data is not modelled	No Hazard	No Hazard
 River Flood (Defended)	Zone 0	Zone 0	Data is not modelled	Zone 0	Zone 0
 Storm Surge (Defended)	No Hazard	No Hazard	No Hazard	No Hazard	No Hazard
 Subsidence	Zone 6	Zone 6	Zone 6	Zone 6	Zone 6
 Heat Stress Index	3.1 - 4.5	3.1 - 4.5	4.6 - 6.0	4.6 - 6.0	6.1 - 7.5
 Heat-Humidity Stress Index	0.0 - 1.5	1.6 - 3.0	3.1 - 4.5	3.1 - 4.5	7.6 - 9.0
 Cold Stress Index	4.6 - 6.0	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5
 Fire Weather Stress Index	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5	3.1 - 4.5	4.6 - 6.0
 Precipitation Stress Index	4.6 - 6.0	4.6 - 6.0	4.6 - 6.0	4.6 - 6.0	4.6 - 6.0
 Drought Stress Index	1.6 - 3.0	6.1 - 7.5	7.6 - 9.0	7.6 - 9.0	9.1 - 10.0
 Sea Level Rise	Data is not modelled	No SLR	No SLR	No SLR	No SLR
 Water Scarcity	4.1 - 5.0	4.1 - 5.0	4.1 - 5.0	4.1 - 5.0	4.1 - 5.0
 Permafrost Extent	No Hazard	Data is not modelled	Data is not modelled	No Hazard	No Hazard

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# Climate Change

## Tropical Cyclone

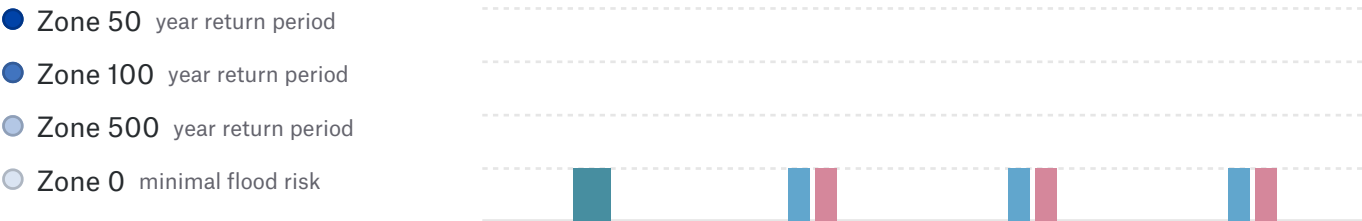
The Tropical cyclone hazard score is derived from globally consistent, basin-specific models for tropical cyclones, and is based on probable maximum wind intensities with a return period of 100 years. Current and for respective projection year and RCP scenario.



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



Return Period:	Current	2030	2050	2100
● SSP2-/ RCP4.5	0	0	0	0
● SSP5-/ RCP8.5		0	0	0



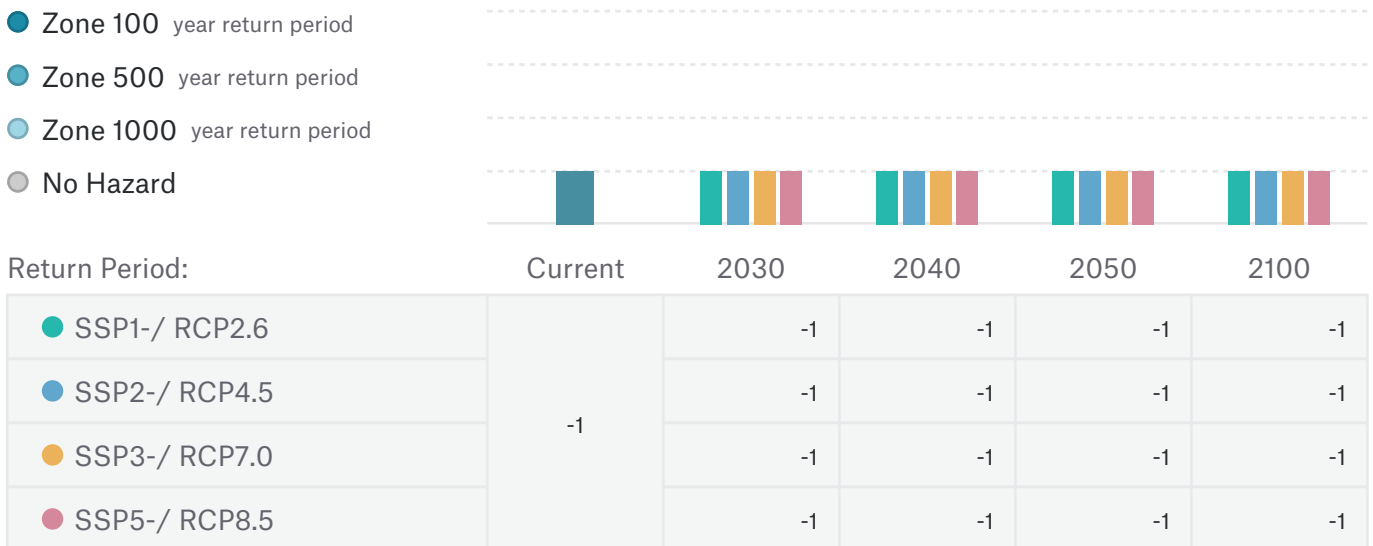
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# Climate Change

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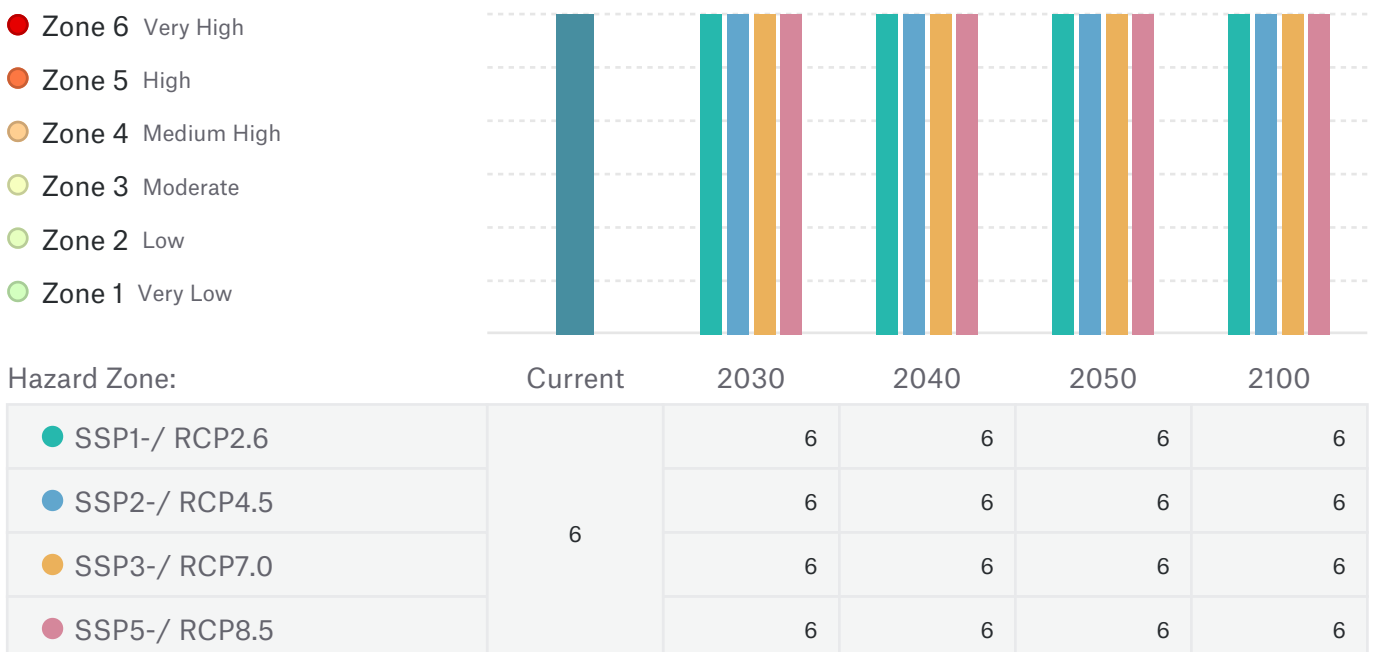
## Storm Surge (Defended)

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.



## Subsidence

The Subsidence Score describes the hazard of gradual sinking or sudden collapse of the ground. It accounts for natural shrink-swell subsidence in clay soils due to seasonal variations in soil moisture and water balance as well as anthropogenic subsidence due to groundwater depletion, groundwater depletion-related sinkholes and ground collapses in mining areas.



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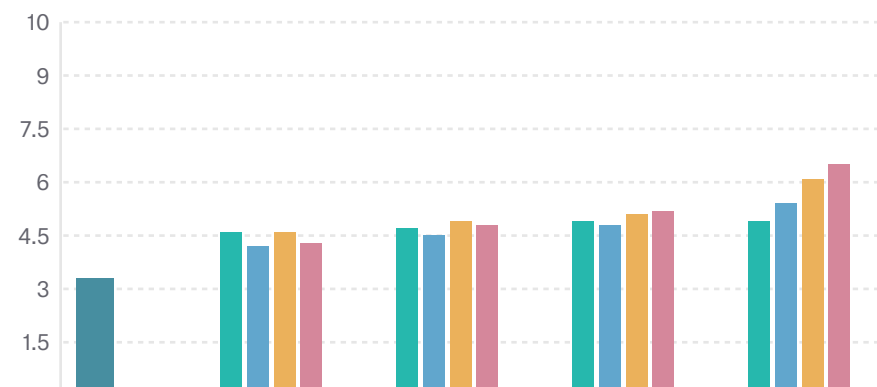
# Climate Change

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## 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

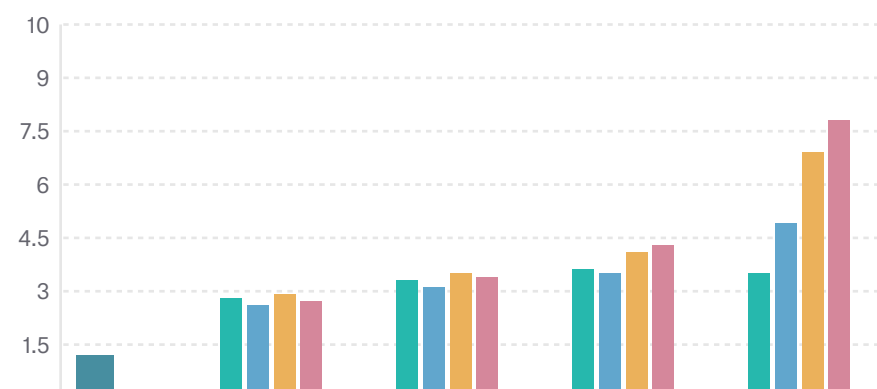


Stress Index:	Current	2030	2040	2050	2100
SSP1-/ RCP2.6	3.3	▲ 4.6	▲ 4.7	▲ 4.9	▲ 4.9
SSP2-/ RCP4.5		▲ 4.2	▲ 4.5	▲ 4.8	▲ 5.4
SSP3-/ RCP7.0		▲ 4.6	▲ 4.9	▲ 5.1	▲ 6.1
SSP5-/ RCP8.5		▲ 4.3	▲ 4.8	▲ 5.2	▲ 6.5

## Heat-Humidity Stress Index

Heat-Humidity Stress Index combines heat-humidity-related parameters based on the Wet-Bulb Temperature to classify the severity of extreme heat-humidity events 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	1.2	▲ 2.8	▲ 3.3	▲ 3.6	▲ 3.5
SSP2-/ RCP4.5		▲ 2.6	▲ 3.1	▲ 3.5	▲ 4.9
SSP3-/ RCP7.0		▲ 2.9	▲ 3.5	▲ 4.1	▲ 6.9
SSP5-/ RCP8.5		▲ 2.7	▲ 3.4	▲ 4.3	▲ 7.8

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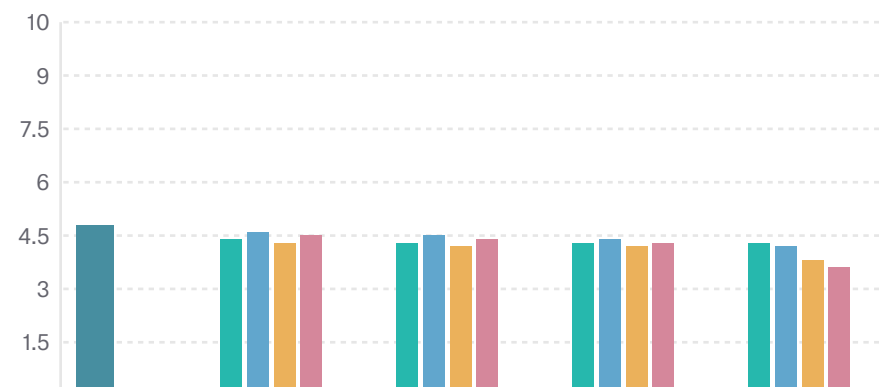
# Climate Change

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## \* 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



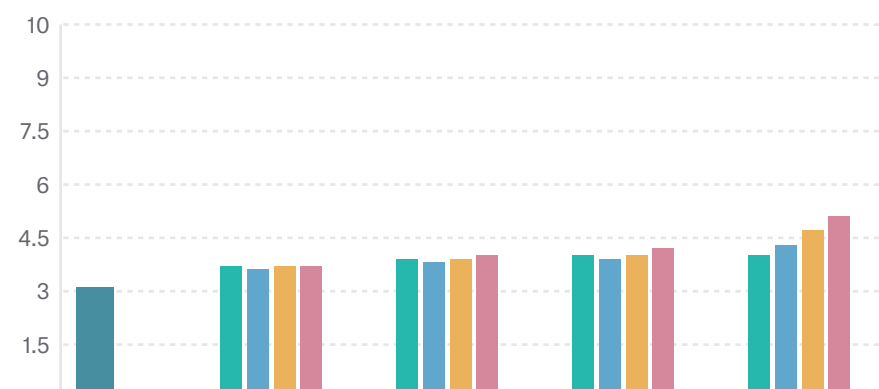
Stress Index:

	Current	2030	2040	2050	2100
SSP1-/ RCP2.6	4.8	▼ 4.4	▼ 4.3	▼ 4.3	▼ 4.3
SSP2-/ RCP4.5		▼ 4.6	▼ 4.5	▼ 4.4	▼ 4.2
SSP3-/ RCP7.0		▼ 4.3	▼ 4.2	▼ 4.2	▼ 3.8
SSP5-/ RCP8.5		▼ 4.5	▼ 4.4	▼ 4.3	▼ 3.6

## 🔥 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	3.1	▲ 3.7	▲ 3.9	▲ 4.0	▲ 4.0
SSP2-/ RCP4.5		▲ 3.6	▲ 3.8	▲ 3.9	▲ 4.3
SSP3-/ RCP7.0		▲ 3.7	▲ 3.9	▲ 4.0	▲ 4.7
SSP5-/ RCP8.5		▲ 3.7	▲ 4.0	▲ 4.2	▲ 5.1

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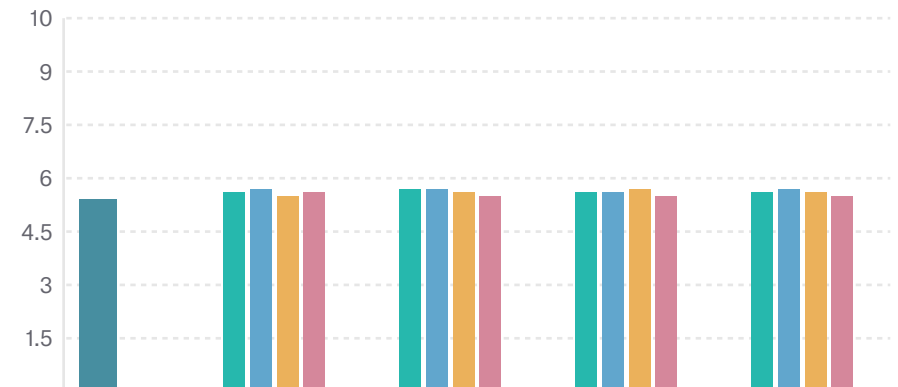
# Climate Change

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## 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

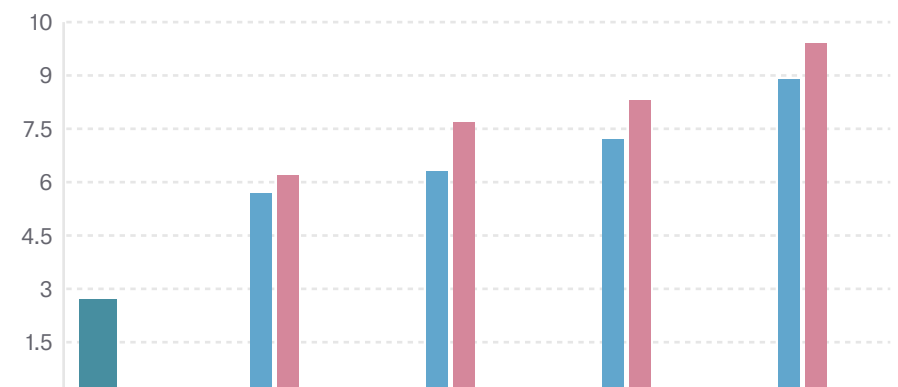


Stress Index:	Current	2030	2040	2050	2100
SSP1-/ RCP2.6	5.4	▲ 5.6	▲ 5.7	▲ 5.6	▲ 5.6
SSP2-/ RCP4.5		▲ 5.7	▲ 5.7	▲ 5.6	▲ 5.7
SSP3-/ RCP7.0		▲ 5.5	▲ 5.6	▲ 5.7	▲ 5.6
SSP5-/ RCP8.5		▲ 5.6	▲ 5.5	▲ 5.5	▲ 5.5

## 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	2.7	▲ 5.7	▲ 6.3	▲ 7.2	▲ 8.9
SSP5-/ RCP8.5		▲ 6.2	▲ 7.7	▲ 8.3	▲ 9.6

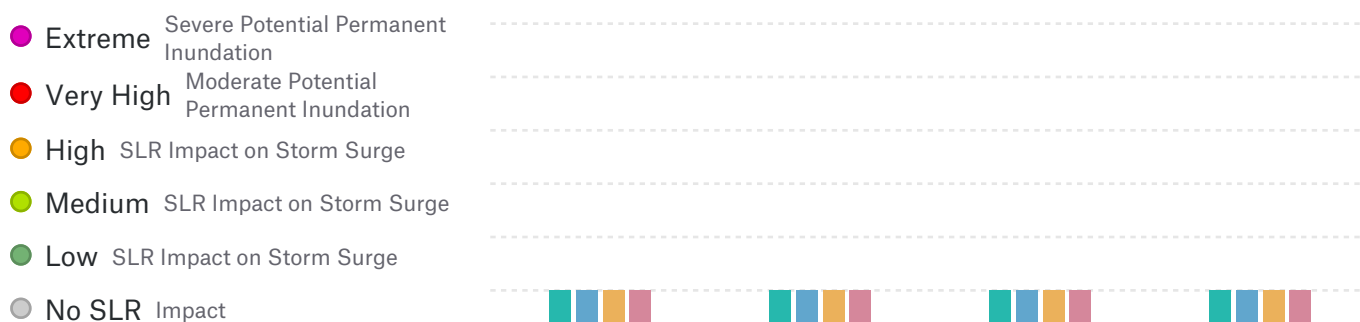
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# Climate Change

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## Sea Level Rise

The Sea Level Rise (SLR) hazard score depicts areas with risk of permanent water inundation and storm surge intensification due to rising sea levels, based on IPCC AR6 projections and referenced against the historical baseline (1995-2014). The sea level rise hazard level is categorized using a score from 1 (low) to 5 (extreme). Scores 1 to 3 depict increases in the frequency and intensity of flood events due to storm surge, whereas scores 4 and 5 characterise areas that may become permanently inundated due to sea level rise in the absence of flood protection systems. Zones not impacted by sea level rise have score -1.

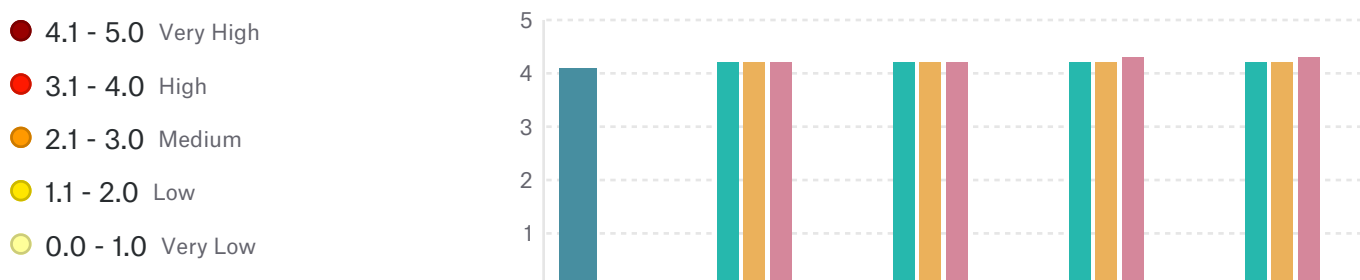


Hazard Zone:

	2030	2040	2050	2100
SSP1-/ RCP2.6	-1	-1	-1	-1
SSP2-/ RCP4.5	-1	-1	-1	-1
SSP3-/ RCP7.0	-1	-1	-1	-1
SSP5-/ RCP8.5	-1	-1	-1	-1

## Water Scarcity

The Water Scarcity index describes the hazard of a location facing a deficit in the availability of freshwater supply on a scale from 1 (very low) to 5 (very high).



Index:

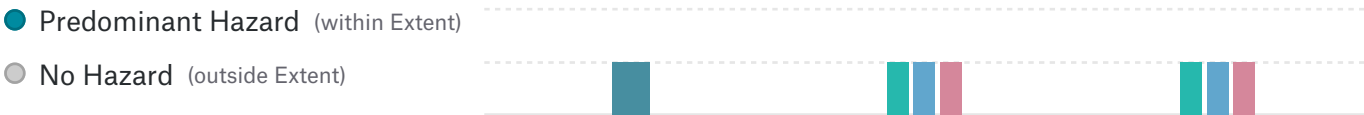
	Current	2030	2040	2050	2100
SSP1-/ RCP2.6	4.1	▲ 4.2	▲ 4.2	▲ 4.2	▲ 4.2
SSP3-/ RCP7.0		▲ 4.2	▲ 4.2	▲ 4.2	▲ 4.2
SSP5-/ RCP8.5		▲ 4.2	▲ 4.2	▲ 4.3	▲ 4.3

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# Climate Change

## Permafrost Extent

The Permafrost Extent describes the existence and spatial distribution of permanently frozen ground for the northern hemisphere.






Extent:

	Current	2050	2100
<div><div></div>SSP1-/ RCP2.6</div>	-1	-1	-1
<div><div></div>SSP2-/ RCP4.5</div>		-1	-1
<div><div></div>SSP5-/ RCP8.5</div>		-1	-1

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# Climate Change Variables Overview

Scenario: SSP1-/ RCP2.6




Climate Change Variables Scenario Matrix	Current	2030	2040	2050	2100
 Annual Maximum Temperature	30.1 - 33.0	33.1 - 36.0	33.1 - 36.0	33.1 - 36.0	33.1 - 36.0
 High 5-Day Precipitation	75.1 - 97.5	75.1 - 97.5	75.1 - 97.5	75.1 - 97.5	75.1 - 97.5
 Fire Season Length	9.1 - 25.5	9.1 - 25.5	25.6 - 65.0	25.6 - 65.0	25.6 - 65.0

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# Climate Change Variables Overview

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Scenario: SSP2-/ RCP4.5




Climate Change Variables Scenario Matrix	Current	2030	2040	2050	2100
 Annual Maximum Temperature	30.1 - 33.0	33.1 - 36.0	33.1 - 36.0	33.1 - 36.0	36.1 - 39.0
 High 5-Day Precipitation	75.1 - 97.5	75.1 - 97.5	75.1 - 97.5	75.1 - 97.5	75.1 - 97.5
 Fire Season Length	9.1 - 25.5	9.1 - 25.5	25.6 - 65.0	25.6 - 65.0	25.6 - 65.0



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# Climate Change Variables Overview




Scenario: SSP3-/ RCP7.0

Climate Change Variables Scenario Matrix	Current	2030	2040	2050	2100
 Annual Maximum Temperature	30.1 - 33.0	33.1 - 36.0	33.1 - 36.0	33.1 - 36.0	36.1 - 39.0
 High 5-Day Precipitation	75.1 - 97.5	75.1 - 97.5	75.1 - 97.5	75.1 - 97.5	75.1 - 97.5
 Fire Season Length	9.1 - 25.5	9.1 - 25.5	25.6 - 65.0	25.6 - 65.0	25.6 - 65.0

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# Climate Change Variables Overview

Scenario: SSP5-/ RCP8.5

Climate Change Variables Scenario Matrix	Current	2030	2040	2050	2100
 Annual Maximum Temperature	30.1 - 33.0	33.1 - 36.0	33.1 - 36.0	33.1 - 36.0	39.1 - 42.0
 High 5-Day Precipitation	75.1 - 97.5	75.1 - 97.5	75.1 - 97.5	75.1 - 97.5	75.1 - 97.5
 Fire Season Length	9.1 - 25.5	9.1 - 25.5	25.6 - 65.0	25.6 - 65.0	65.1 - 136.5

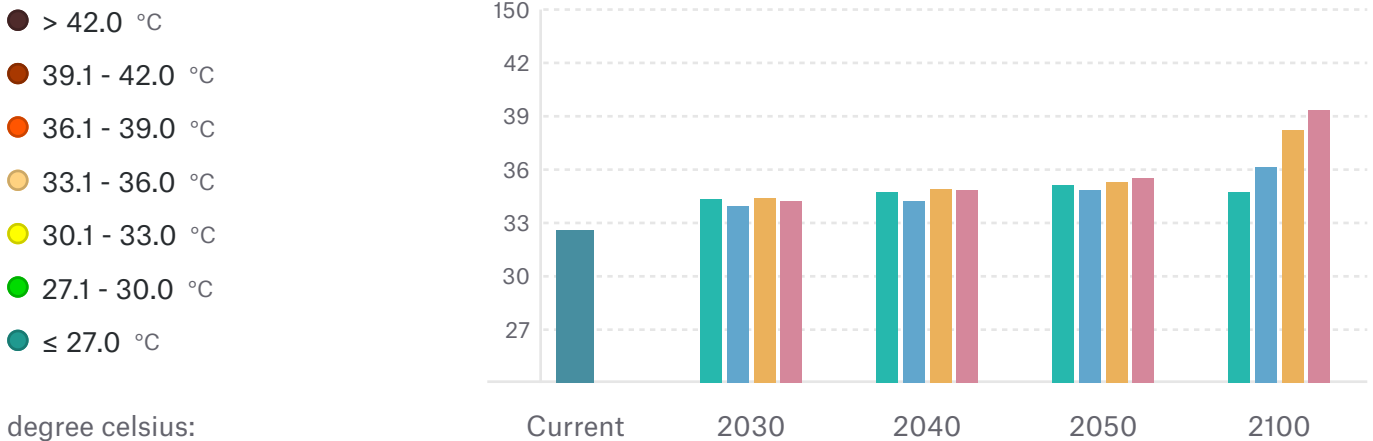
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# Climate Change Variables

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## Annual Maximum Temperature

Annual maximum of daily maximum temperature

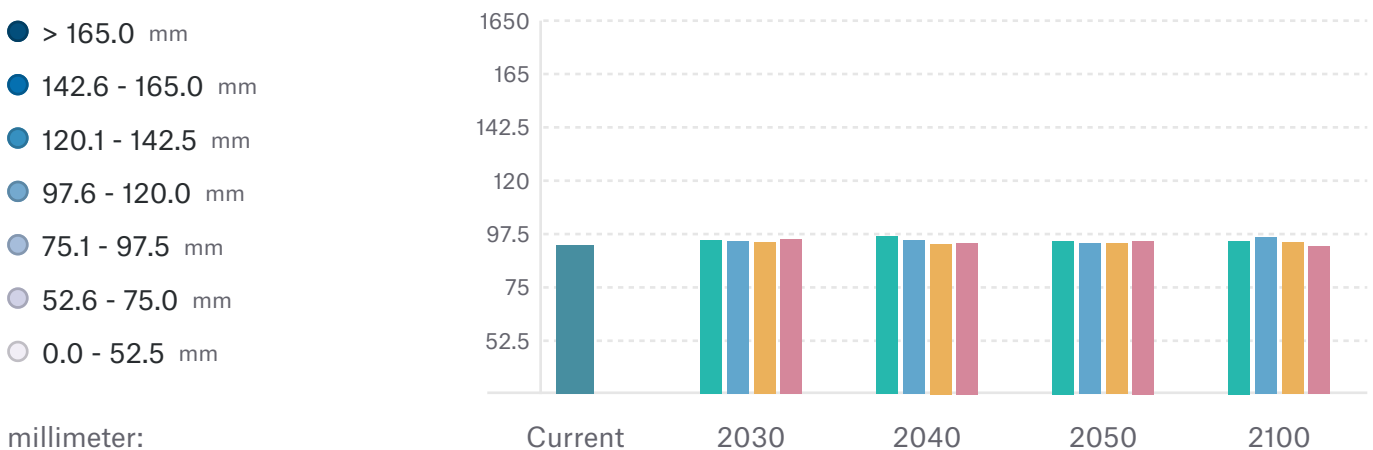


degree celsius:

Scenario	Current	2030	2040	2050	2100
SSP1-/ RCP2.6	32.6	▲ 34.3	▲ 34.7	▲ 35.1	▲ 34.7
SSP2-/ RCP4.5	32.6	▲ 33.9	▲ 34.2	▲ 34.8	▲ 36.1
SSP3-/ RCP7.0	32.6	▲ 34.4	▲ 34.9	▲ 35.3	▲ 38.2
SSP5-/ RCP8.5	32.6	▲ 34.2	▲ 34.8	▲ 35.5	▲ 39.3

## High 5-Day Precipitation

Annual maximum of 5-day consecutive precipitation



millimeter:

Scenario	Current	2030	2040	2050	2100
SSP1-/ RCP2.6	92.6	▲ 94.7	▲ 96.4	▲ 94.6	▲ 94.6
SSP2-/ RCP4.5	92.6	▲ 94.4	▲ 94.8	▲ 93.5	▲ 96.1
SSP3-/ RCP7.0	92.6	▲ 93.9	▲ 93.3	▲ 93.4	▲ 93.8
SSP5-/ RCP8.5	92.6	▲ 95.3	▲ 93.7	▲ 94.6	▼ 92.4

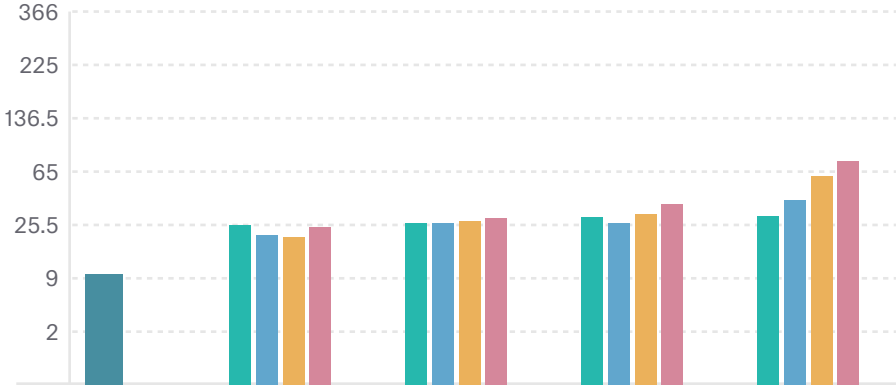
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# Climate Change Variables

## Fire Season Length

Annual number of days corresponding to the fire season

- > 225.0 days
- 136.6 - 225.0 days
- 65.1 - 136.5 days
- 25.6 - 65.0 days
- 9.1 - 25.5 days
- 2.1 - 9.0 days
- 0.0 - 2.0 days



time interval:

	Current	2030	2040	2050	2100
SSP1-/ RCP2.6		▲ 25.4	▲ 26.3	▲ 31.1	▲ 31.9
SSP2-/ RCP4.5		▲ 22.1	▲ 26.8	▲ 26.5	▲ 43.7
SSP3-/ RCP7.0		▲ 21.7	▲ 28.3	▲ 33.1	▲ 61.3
SSP5-/ RCP8.5		▲ 24.8	▲ 30.4	▲ 40.8	▲ 78.0

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