University of Maribor

Faculty of Tourism

Cultural tourism and climate change adaptation strategy building: Case of Slovenia

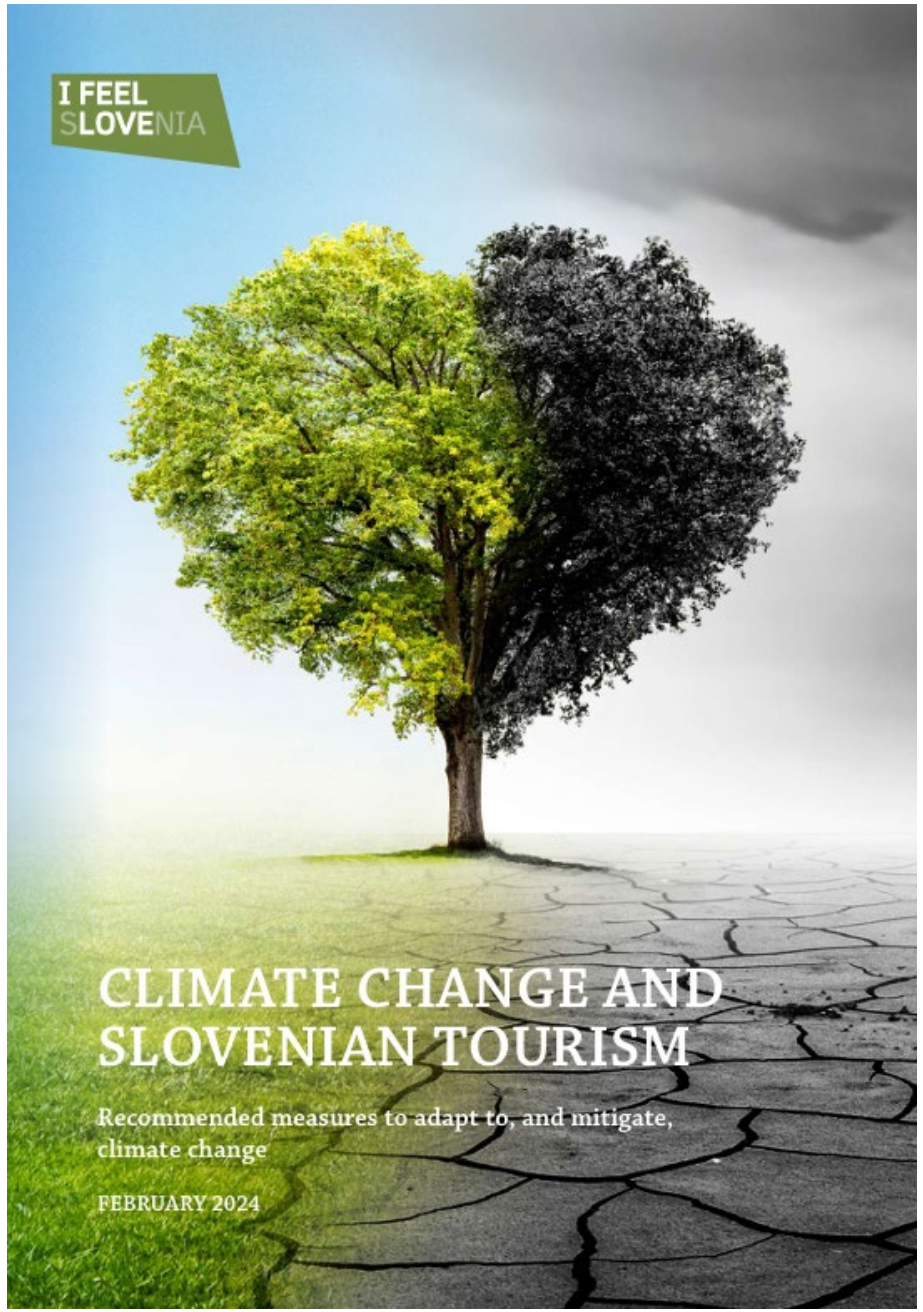
Presentation of results of Slovenian national research project “Climate change and sustainable tourism in Slovenia” and their application to cultural tourism.

MAJA TURNŠEK

Event:

Heritage, landscape, urban development
Cultural, sustainable and inclusive tourism offer

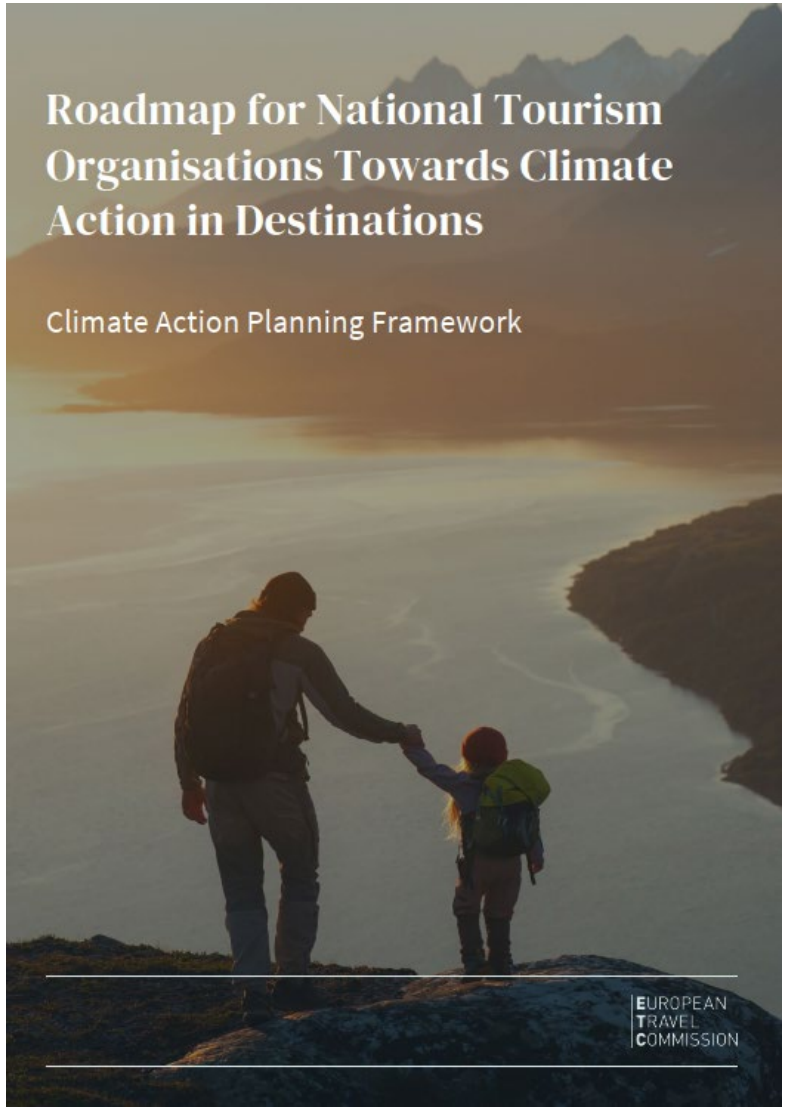
Cervia 7th - 9th April 2025

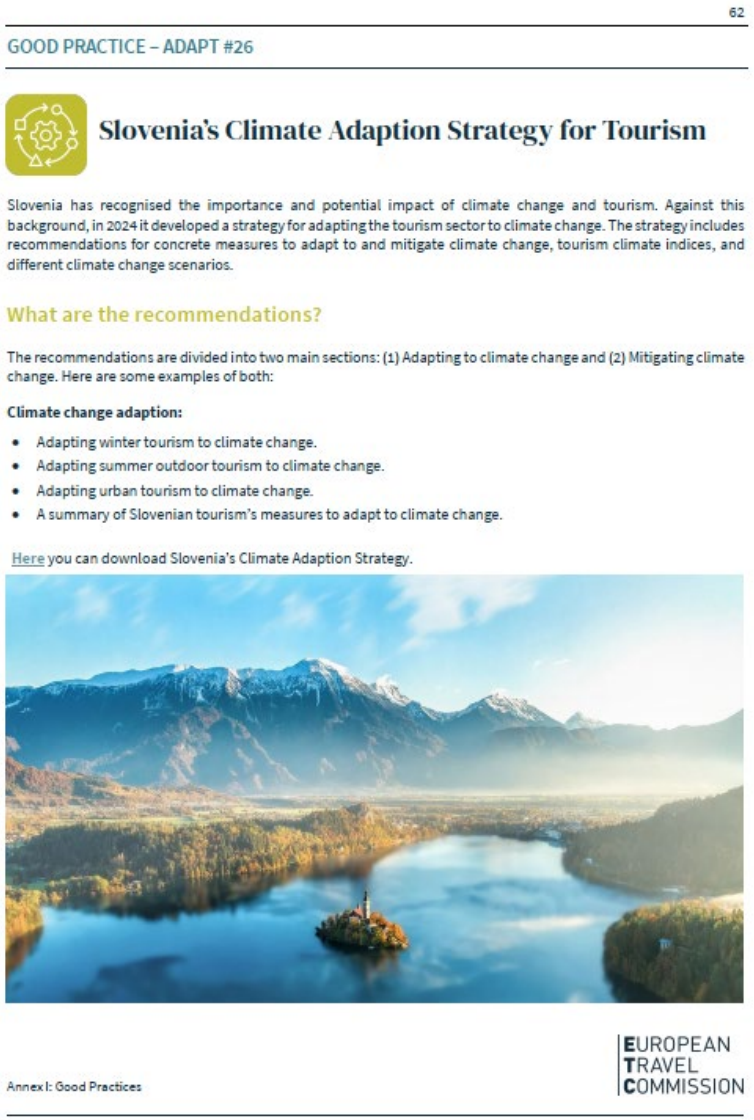


REPUBLIC OF SLOVENIA
MINISTRY OF THE ECONOMY, TOURISM AND SPORT

ARIS Slovenian Research and Innovation Agency

https://www.slovenia.info/uploads/poslovno/poslovno/druzbeno_odgovoren_delodajalec/2024_05_STO_Vodnik_po_podnebnih_spremembah_ANG_komp.pdf





GOOD PRACTICE – ADAPT #26

Slovenia's Climate Adaption Strategy for Tourism

Slovenia has recognised the importance and potential impact of climate change and tourism. Against this background, in 2024 it developed a strategy for adapting the tourism sector to climate change. The strategy includes recommendations for concrete measures to adapt to and mitigate climate change, tourism climate indices, and different climate change scenarios.

What are the recommendations?

The recommendations are divided into two main sections: (1) Adapting to climate change and (2) Mitigating climate change. Here are some examples of both:

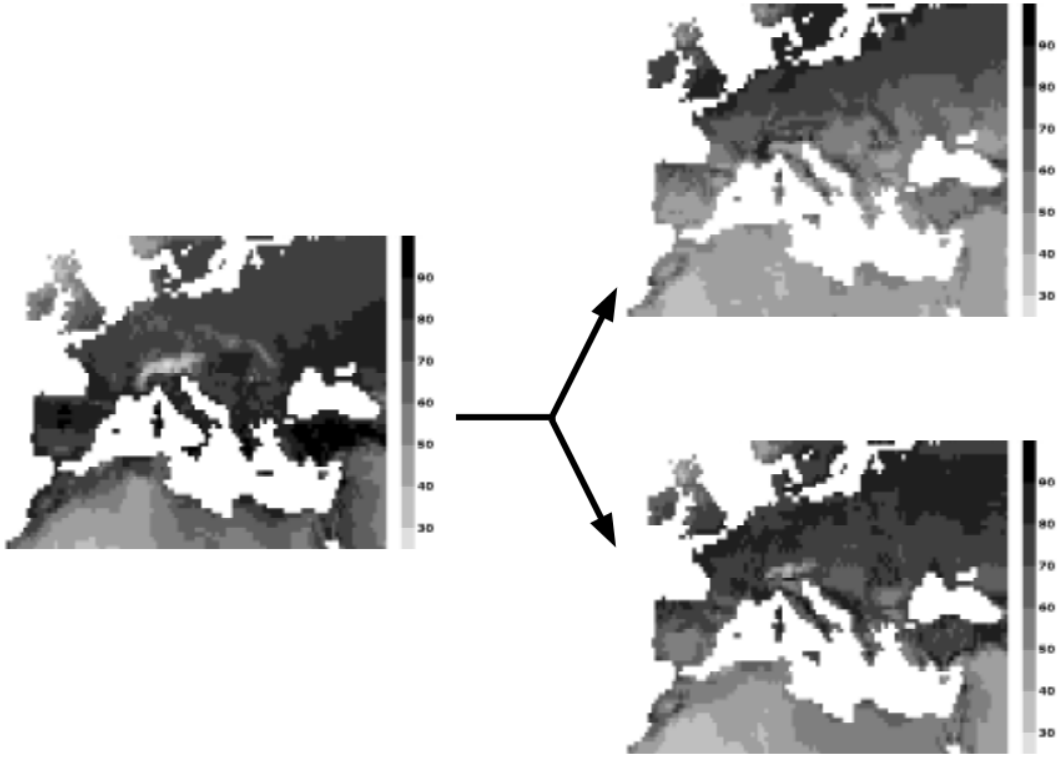
Climate change adaption:

- Adapting winter tourism to climate change.
- Adapting summer outdoor tourism to climate change.
- Adapting urban tourism to climate change.
- A summary of Slovenian tourism's measures to adapt to climate change.

Here you can download Slovenia's Climate Adaption Strategy.

https://etc-corporate.org/news/etc-launches-a-roadmap-for-climate-action-in-destinations/

Personal frustration



Amelung, B., & Viner, D. (2006). Mediterranean tourism: exploring the future with the tourism climatic index. Journal of Sustainable Tourism, 14(4), 349-366.

In 2003 the UNWTO held its 1st International Conference on Climate Change and Tourism in Djerba, Tunisia, resulting in the Djerba Declaration essentially urging tourism stakeholders to take action on both climate change adaptation and mitigation.

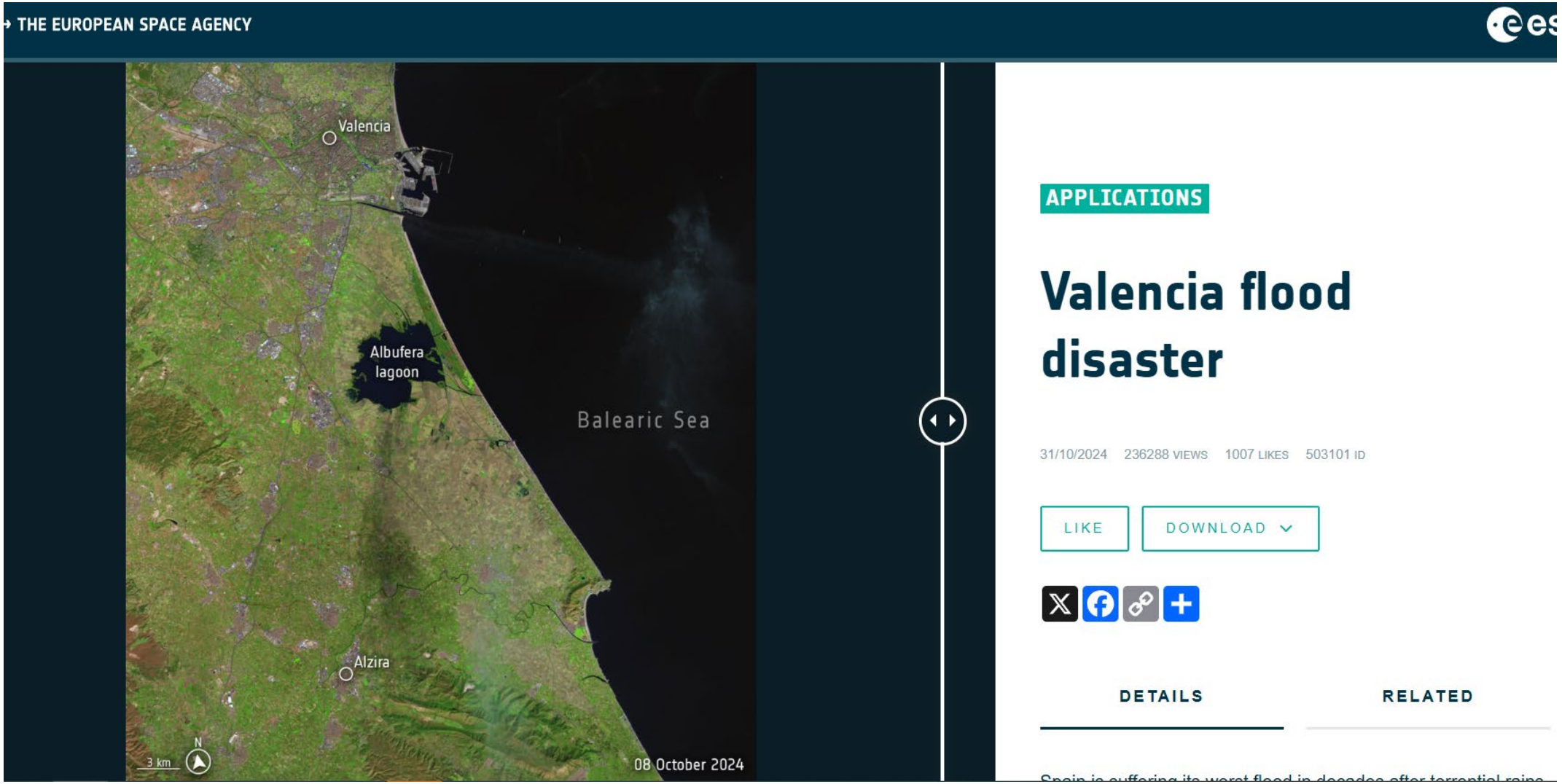
Todd, G. (2003). *WTO background paper on climate change and tourism: In Proceedings of the 1st International Conference on Climate Change and Tourism, 9.-11. April 2003 in Djerba, Tunisia, pp. 17-40*. UNWTO.

Slovenia: 2022

https://www.rtvslo.si/okolje/vecina-evakuiranih-se-je-vrnila-sestan-to-je-najvecji-pozar-v-zgodovini-slovenije/634728

Slovenia: 2023

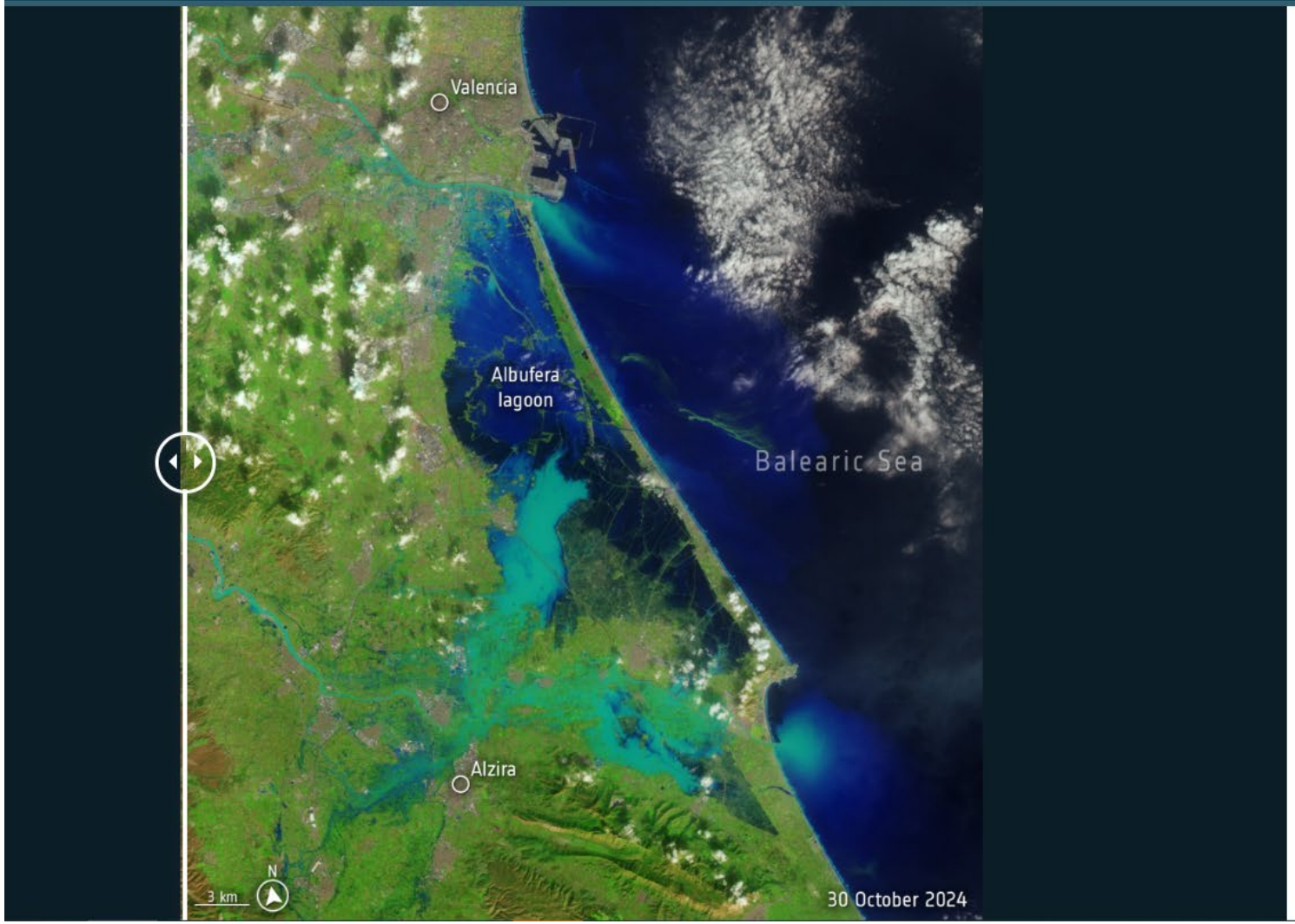
https://www.rtvslo.si/ 4. 8. 2023



https://www.esa.int/ESA_Multimedia/Images/2024/10/Valencia_flood_disaster

→ THE EUROPEAN SPACE AGENCY

esa



APPLICATIONS

Valencia flood disaster

31/10/2024 236288 VIEWS 1007 LIKES 503101 ID

LIKE DOWNLOAD

DETAILS RELATED

Spain is suffering its worst flood in decades after torrential rains

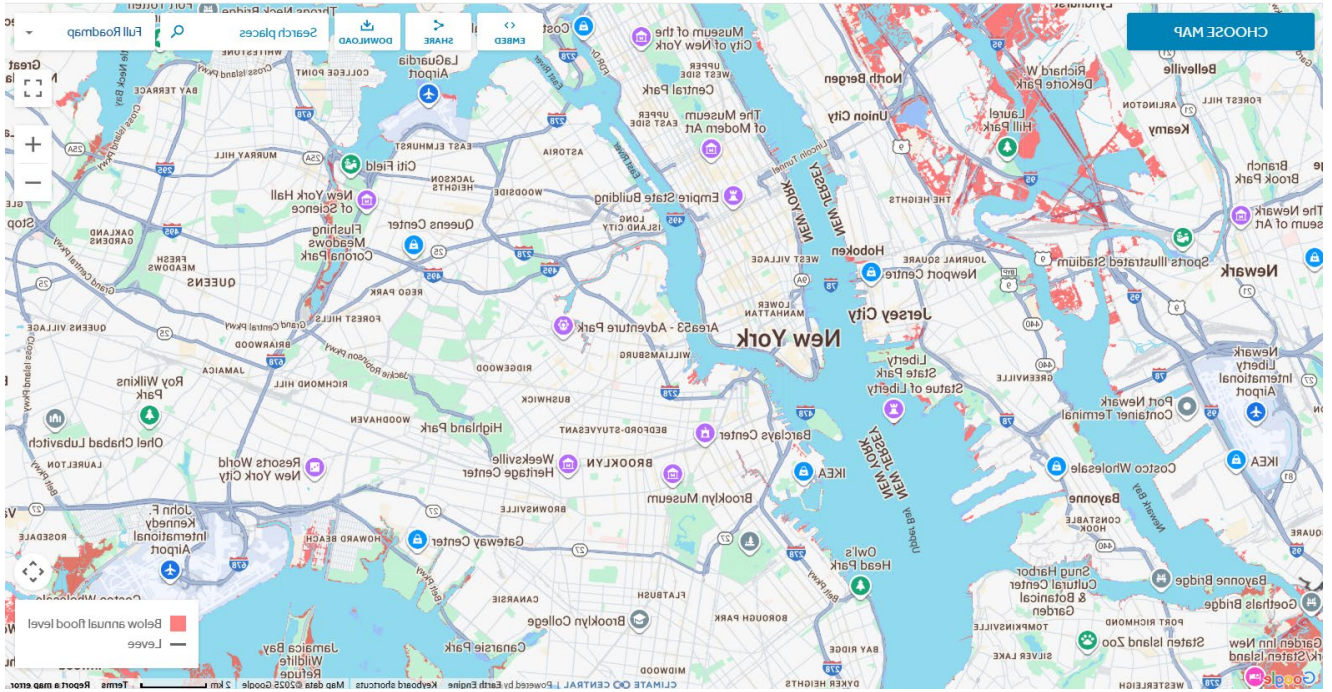
https://www.esa.int/ESA_Multimedia/Images/2024/10/Valencia_flood_disaster

Challenge – Find your current location on Climate Central map

Coastal Risk Screening Tool: Map By Water Level

The water level map allows users to explore what land is at risk from specific water levels (decimal feet, meters) that could be reached through combinations of sea level rise, tides, and storm surge.

View now »



https://sealevel.climatecentral.org/maps/

CLIMATE CENTRAL

COASTAL RISK SCREENING TOOL

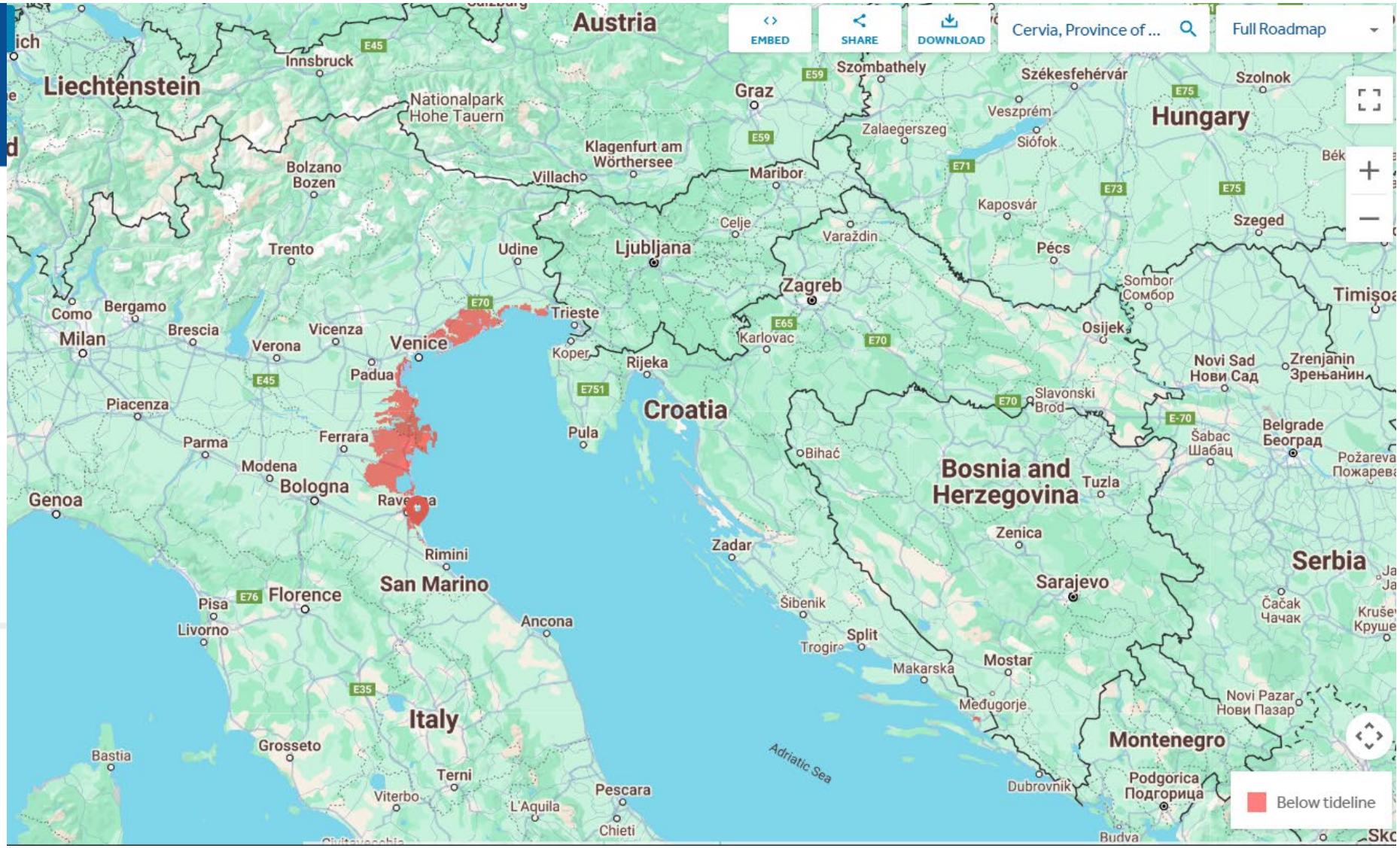
LAND PROJECTED TO BE BELOW TIDELINE IN 2050

Explore sea level rise and coastal flood threats by adjusting the controls below.

DETAILS AND LIMITATIONS

YEAR

2050



PROJECTION TYPE

sea level rise

POLLUTION PATHWAY OR SEA LEVEL SCENARIO

current trajectory

LUCK

medium

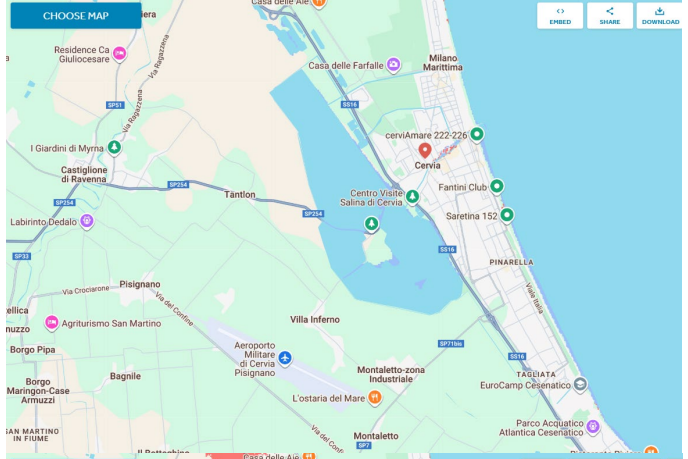
AREAS TO SHOW AS THREATENED

- ○ All land below water level
- ◉ Exclude areas isolated by higher land

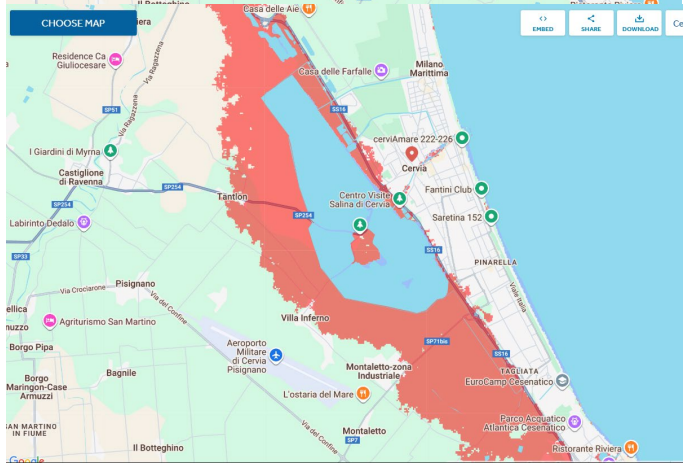
SEA-LEVEL-PROJECTION SOURCE

- ◉ Leading Consensus (IPCC 2021)
- ○ More Comprehensive and Less Certain (IPCC 2021)
- ○ NOAA 2022 (U.S. only)
- ○ Mid-range Legacy Projections (Kopp et al. 2014)
- ○ Pessimistic Legacy Projections (Kopp et al. 2017)

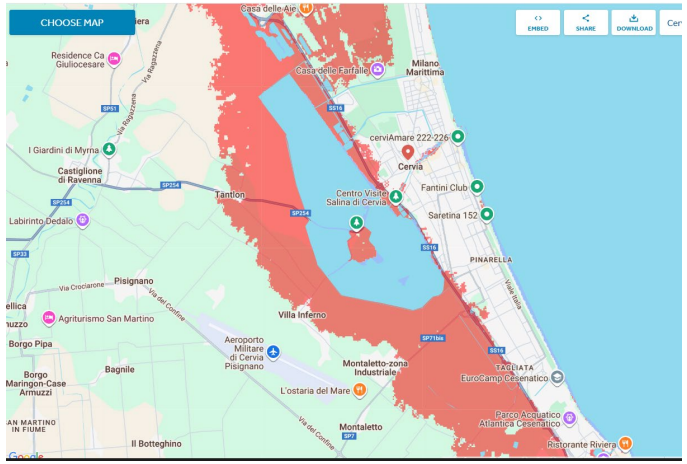
DONE



2040



2050



2060

https://sealevel.climatecentral.org/maps/

PROJECTION TYPE

sea level rise + 5-year flood

POLLUTION PATHWAY OR SEA LEVEL SCENARIO

current trajectory

LUCK

medium

AREAS TO SHOW AS THREATENED

- All land below water level
- Exclude areas isolated by higher land

SEA-LEVEL-PROJECTION SOURCE

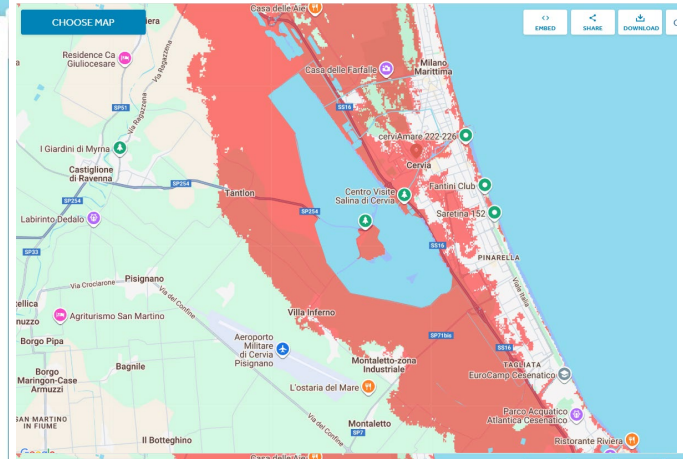
- Leading Consensus (IPCC 2021)
- More Comprehensive and Less Certain (IPCC 2021)
- NOAA 2022 (U.S. only)
- Mid-range Legacy Projections (Kopp et al. 2014)
- Pessimistic Legacy Projections (Kopp et al. 2017)

Sea level rise + 5-year flood:

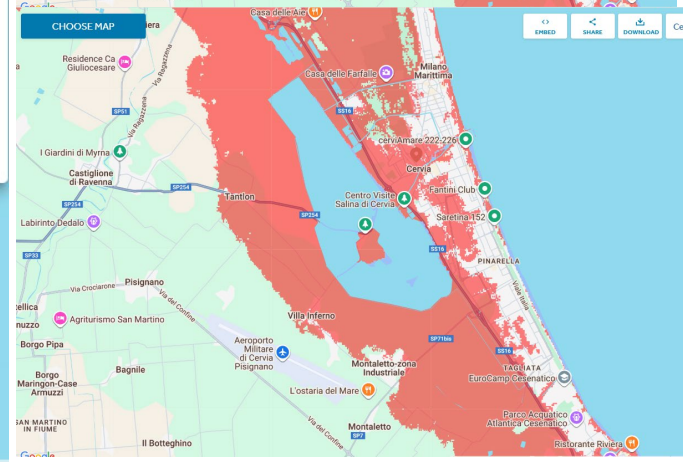
Local sea level projection plus the added height of a local 5-year flood. A 5-year flood has about a 20% chance of happening in a given year. In other words, two floods at or above this magnitude are statistically expected to occur in a 10-year period, but some decades might have more incidents, and other decades might have fewer. As seas rise, floods of this magnitude will arrive on top of a higher sea level and reach further inland.

Source for local flood height increments outside the contiguous US: Dullaart, J.C.M., Muis, S., Bloemendaal, N. et al. Accounting for tropical cyclones more than doubles the global population exposed to low-probability coastal flooding. *Commun Earth Environ* 2, 135 (2021). **https://doi.org/10.1038/s43247-021-00204-9**

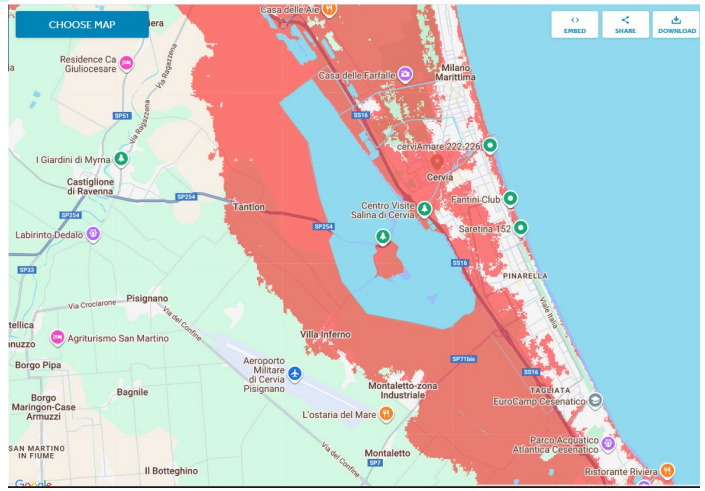
This flood level is not available inside the contiguous U.S.



2040



2050



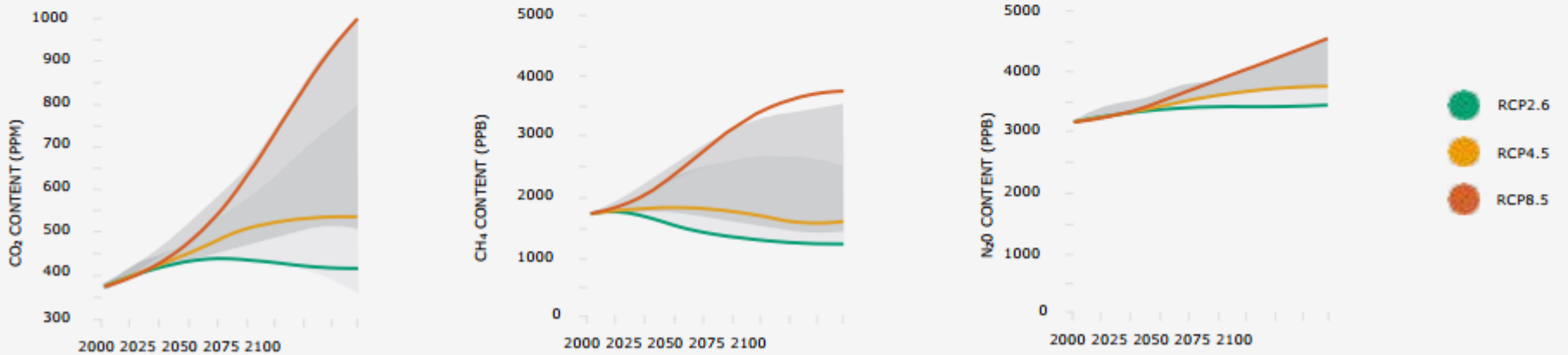
2060

https://sealevel.climatecentral.org/maps/

RCP scenarios

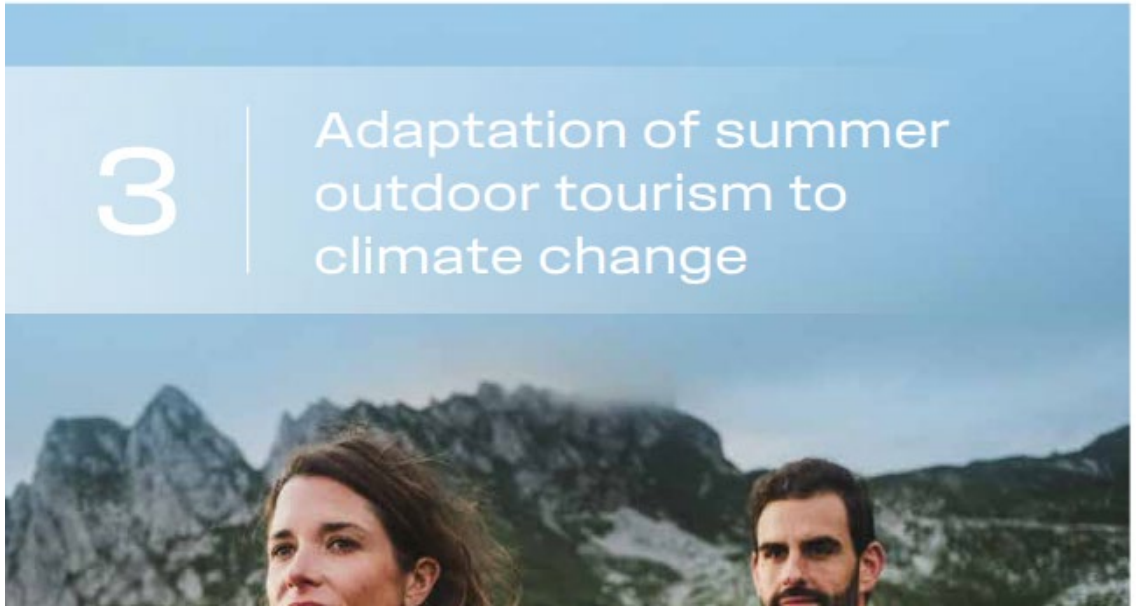
In the scientific community, the RCP (Representative Concentration Pathways) scenarios of climate change are established. These are also used in this research.

1. **RCP2.6:** The most **optimistic scenario**, which anticipates low emissions of greenhouse gases, the content of which in the atmosphere would reach its peak at the beginning of the 21st century and then gradually decline.
2. **RCP4.5:** A moderately optimistic scenario, which foresees a gradual reduction of emissions and stabilisation of thecontent of greenhouse gases in the atmosphere at the end of the 21st century.
3. **RCP8.5:** The most **pessimistic scenario** without an anticipated climate change mitigation, which assumes a high emission of greenhouse gases and a subsequent increase in their content even after the end of the century.



Source: ARSO adapted from Van Vuuren, et al., 2011.


2
Adaptation of winter tourism to climate change


3
Adaptation of summer outdoor tourism to climate change


4
Adaptation of urban tourism to climate change


5
Adaptation of waterside tourism to climate change

Tourism climate indexes

For tourism climate indexes, Holiday Climate Index **(HCI): Urba**n (urban tourism) and Climate Index for Tourism **(CIT): 3S** (beach tourism), the projections **by the end of the 21st century** were analysed on the selected locations in macro tourist destinations. They were calculated on the basis of air temperature, humidity, cloud cover, wind and precipitation based on the results of climate models within the European Union's **Copernicus C3S** programme for the three RCP scenarios. The data is provided on a 12.5km grid resolution. The **points** selected are close to typical tourist destinations and **ARSO** (Slovenian Environment Agency) monitoring stations. Values for past periods were used for comparison of the calculated values with data from the ARSO archives, on the basis of which additional CIT indexes and effective temperature were also calculated for past periods **(1971–2020)**.

Other indexes

The ARSO projections by the end of the 21st century were analysed. These were made on the basis of regional climate models and the mGROWA snow model for:

- **number of hot days,**
- **number of warm days,**
- **number of tropical nights,**
- **number of days with snow cover,**
- **number of days with precipitation over 1mm, and**
- **number of days with precipitation over 20mm.**

Winter tourism

The Copernicus C3S projections of climate change for eight ski resorts by the end of the 21st century were discussed:

- **number of days with at least 5cm or 30cm snow cover,**
- **amount of snowfall and**
- **number of hours with favourable conditions for snowmaking.**

The data is available at the level of NUTS-3 statistical regions with a height resolution of 100m. The ski resorts were classified into regions, the data for two altitudes per ski resort was used.

3 Adaptation of summer outdoor tourism to climate change

Impact of climate change on summer outdoor tourism

The past trends for hiking, cycling, football and golfing (1971-2020) show the extension of suitable conditions for these activities in all four macro destinations. In particular, May and September have become more suitable for summer outdoor activities.

On the other hand, July and August have become too hot for all-day outdoor activities in all macro destinations with the exception of Alpine Slovenia.

Future projections reveal an increase in temperature and humidity (average effective temperatures) in all analysed destinations, an increase in the number of warm and hot days and the extension of the season for outdoor activities in all macro regions.

More storms may be expected in the summer and thus an increased need to ensure the safety of tourists.

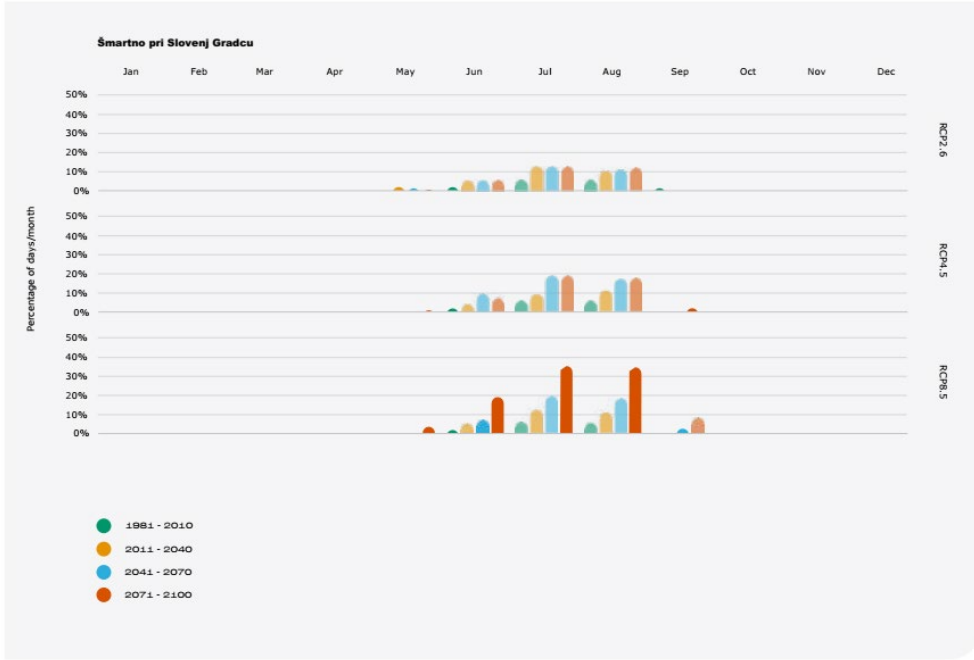
Will tourists avoid Slovenia due to heat?

An increase in temperature will not likely lead to tourists switching from Slovenia to another destination. It is more probable that the tourists will adapt to the heat by:

- avoiding mid-day activities,
- expecting air-conditioned facilities,
- adapting equipment and clothes: further increase in the use of e-bikes and motorhomes may be expected,
- retreating to higher altitudes,
- seeking waterside experiences.
- In this regard, the Slovenian tourist offer, marketing and work organisation must be adjusted accordingly.

It will be critical to seek appropriate forms of diversification of outdoor tourism, which denote an increase in carbon footprint (air-conditioning of facilities, increased use of motorhomes).

At the same time, the largest incentives can be expected for outdoor tourism by means of systemic changes of green mobility promotion, in which hiking and cycling represent the main forms of low-carbon tourism.

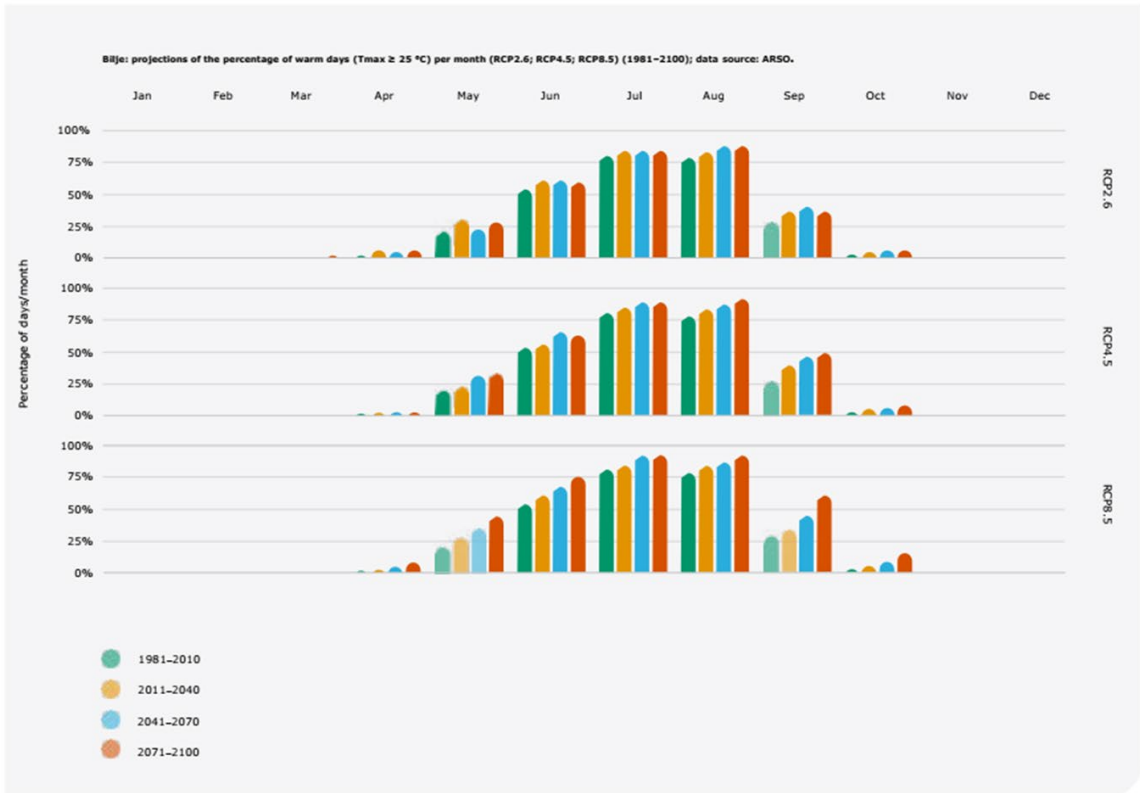


Extension of the season, but greater competition for these months

The extension of the season will likely benefit Slovenian outdoor tourism; however, greater competition from other European destinations for the same slots is expected. Due to the need for diversification from winter tourism in the Alps and great heat in the Mediterranean, it will be vital for these destinations to obtain tourists in the spring and autumn months, with which an ever increasing competition of destinations for tourism professionals in those periods is also linked.

An important question in the future will be how will climate change affect migration flows of seasonal work (in winter in the Alps and in summer in the Mediterranean).

The extension of the season is not a phenomenon merely dependant on the weather. Due to low productivity of workers in hot summer months and increased costs of cooling, employers will further strive towards the exploitation of annual leave entitlement in the summer, which is also linked with school holidays.



Impact on biodiversity and natural heritage

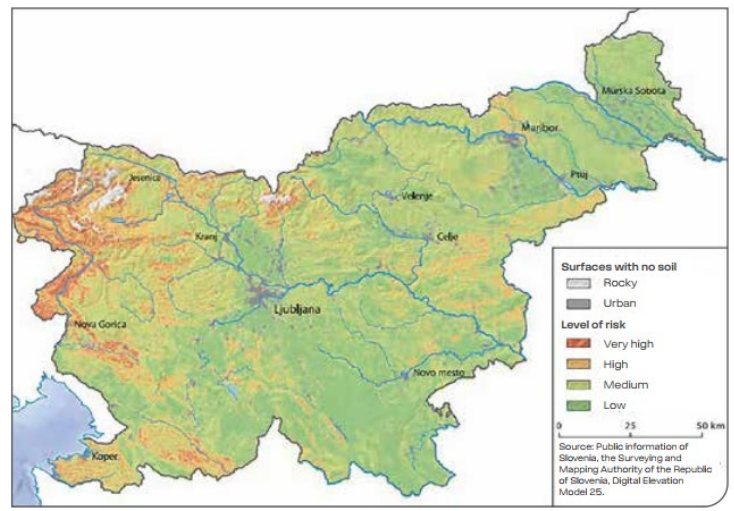
Biodiversity and climate change are closely linked: the deterioration of one causes a spiralling deterioration of the other. We can expect a redistribution of animal and plant species, an increase in fire risk and worsening of the conditions for natural heritage.

Tourism depends on natural heritage and also acts as its important guardian in suitable forms. As estimated by Chung, Dietz and Lui (2018) from the data on protected areas in 50 countries, a 1-per cent increase in biodiversity denotes a 0.87-per cent increase in visitation. On the other hand, tourism contributes significantly to all five main reasons for biodiversity loss: change of habitats, excessive use of resources, pollution, introduction of invasive species and climate change.

With direct consequences on nature, climate change will result in a triple impact of tourism on mountain areas due to:

1. **diversification from winter into summer tourism,**
2. **extension of the summer season,**
3. **expected retreat of tourists and hikers from heat to higher altitudes.**

In doing so, the issue of erosion of hiking trails, siting of tourist infrastructure and conservation of protected areas is particularly problematic.



Department of Geography of the Faculty of Arts of the University of Ljubljana, 2009.

Potential natural threat to Slovenia from the aspect of erosion of hiking trails.

Source: Repe and Mrak, 2018, p. 161.

Health problems: heat, allergies and insects

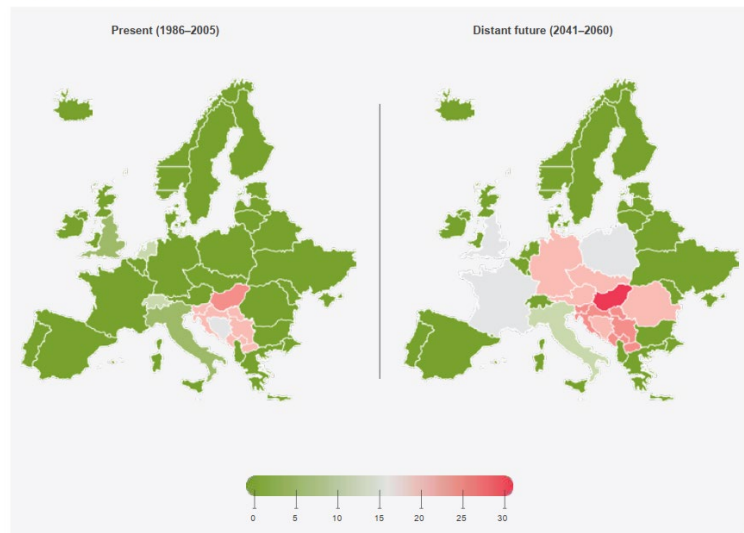
Extreme heat and humidity and the related health problems of tourists and workers in tourism will be most problematic for summer outdoor tourism.

According to the EASAC report (2019), the prevalence of allergic respiratory and skin diseases among the general population in Europe was estimated at 40% and has increased significantly in recent decades. In particular, sensitivity to ragweed pollen will be increasingly problematic for outdoor activities.

Outdoor tourism will also be affected by an increase in the number of insects and the spread of invasive species and the associated increase in transmittable diseases (e.g. tick-borne meningoencephalitis and caterpillar dermatitis caused by oak and pine processionary caterpillars).

Adjustments involving health protection are thus crucial:

- Appropriate number of defibrillators, accessibility of outpatient clinics, raising awareness among tourists about health risks, suitable education of tourism professionals to help tourists;
- Increased attention to safety at work and the issue of exposure to heat among tourism professionals and the adaptation of work organisation accordingly.



Percentage of European population sensitive to ragweed pollen; average results for WRF RegCM and CHIMERE, RCP4.5 and reference scenario of ragweed spread.

Source: Lake et al., (2017), p. 387.

4 Adaptation of urban tourism to climate change

Key points

Conditions for urban tourism in Slovenia are also improving due to better climate in all seasons, including winter.

The season of urban tourism can thus extend over all the seasons and offer experiences 365 days in a year.

Greater possibilities for the occurrence of extremely high air temperatures that lead to thermal discomfort. The proportion of hot days and extremely high temperatures will increase in Ljubljana, Koper and Nova Gorica, particularly in July and August.

Although urban tourists are prepared to withstand higher temperatures, more adaptation measures must be adopted for their health.

Ljubljana: projections of the percentage of hot days (Tmax ≥ 25 °C) per month (RCP2.6; RCP4.5; RCP8.5) (1981–2100); data source: ARSO.

When towns turn into heat islands

There are many surfaces in towns which absorb solar radiation well (asphalt, dark roofs, etc.) and store heat. Buildings create an urban canyon effect and an urban heat island is created due to the lack of green and water surfaces (higher temperatures of surfaces and air in the centres of towns if compared to the countryside).

The urban heat island has a dangerous impact on health conditions and understanding of living comfort, the quality of life and economic wellbeing, higher energy consumption for cooling, which results in higher greenhouse gas emissions due to the use of air conditioners.

Higher air temperature combined with humidity is an important reason for reduced thermal comfort of tourists and local residents. To this end, adaptation measures must be carried out in towns, particularly in the summer, as the proportion of warm and hot days is increasing.

Let our town become a green oasis

- Towns should provide more green and blue surfaces -> greenery (parks, alleys, trees, shrubbery, flowers) and water features (fountains, drinking fountains, sprinklers, rivers, lakes). These are areas that allow precipitation and reduce surface water runoff.

- Provide natural and artificial shelters for pedestrians -> enriched squares with trees and shade, benches and rest areas, variety of space to access sun/shade and exposure/protection against wind (arcades, parks, mobile gardens, pedestrian zones, open surfaces, windbreaks and canopies made from different materials, such as canvas, reeds, bamboo, vines).

- Promote the use of climate-friendly mobility within an urban destination and enable a network of public transport services.

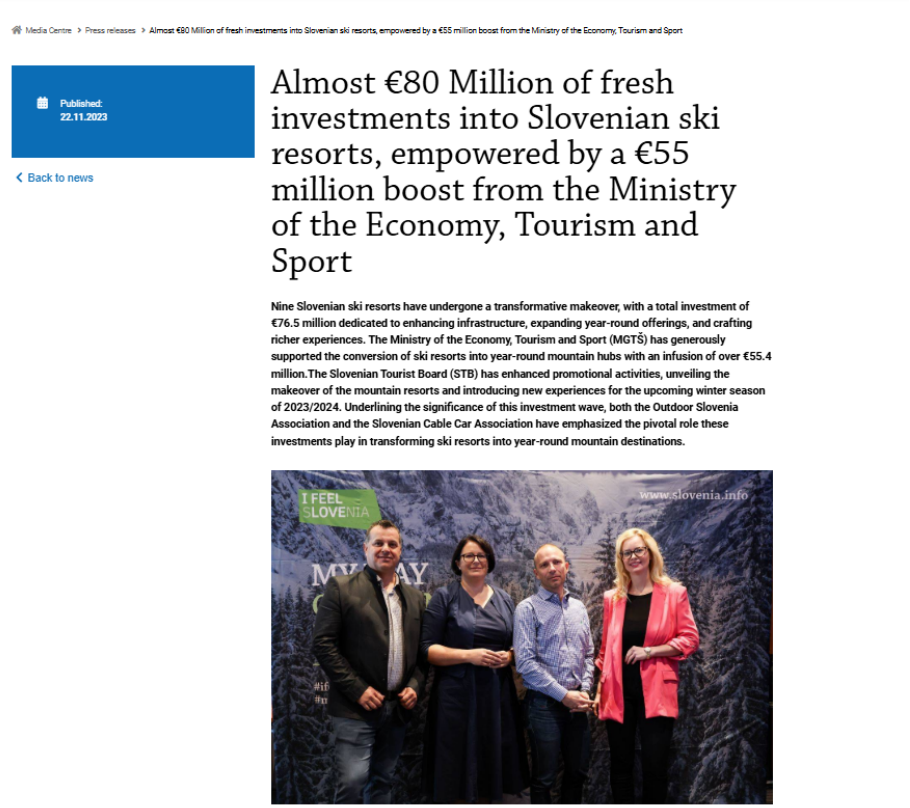
- Provide environment-friendly cooling of rooms, good insulation and the application of traditional skills in construction and renovation. Urban development should take into account exposure to sun, shading, wind flows through streets and squares (while taking into account the density of urban textures, orientation of open areas and buildings, width of streets, height of buildings, accessibility to services without the use of cars, etc.).

- Offer package services to tourists in spring, autumn or winter. Summer activities should be done in the cooler hours of the day and healthcare should be provided accordingly.

- Summer outdoor events should be planned to take place in the morning or the evening or in shade. Plan more events to take place outside the summer season.

First national adaptation investments

winter tourism diversification: €55 mil.
Ministry of the Economy, Tourism and Sport



Media Centre › Press releases › Almost €80 Million of fresh investments into Slovenian ski resorts, empowered by a €55 million boost from the Ministry of the Economy, Tourism and Sport

Published: 22.11.2023

Back to news

Almost €80 Million of fresh investments into Slovenian ski resorts, empowered by a €55 million boost from the Ministry of the Economy, Tourism and Sport

Nine Slovenian ski resorts have undergone a transformative makeover, with a total investment of €76.5 million dedicated to enhancing infrastructure, expanding year-round offerings, and crafting richer experiences. The Ministry of the Economy, Tourism and Sport (MGTŠ) has generously supported the conversion of ski resorts into year-round mountain hubs with an infusion of over €55.4 million.The Slovenian Tourist Board (STB) has enhanced promotional activities, unveiling the makeover of the mountain resorts and introducing new experiences for the upcoming winter season of 2023/2024. Underlining the significance of this investment wave, both the Outdoor Slovenia Association and the Slovenian Cable Car Association have emphasized the pivotal role these investments play in transforming ski resorts into year-round mountain destinations.

https://www.slovenia.info/en/press-centre/press-releases/26048-almost-80-million-of-fresh-investments-into-slovenian-ski-resorts-empowered-by-a-55-million-boost-from-the-ministry-of-the-economy-tourism-and-sport

Cultural heritage protection – recovery after the flood and future resilience: €14,5 mil.
Ministry of Culture

Ministri podpisali program za zaščito kulturnih spomenikov pred naravnimi nesrečami

28. 2. 2025 Ministrstvo za kulturo Ministrstvo za zdravje Ministrstvo za naravne vire in prostor Ministrstvo za solidarno prihodnost

Ministrici in ministra, pristojni za področja kulture, zdravja, naravne vire in prostor ter solidarno prihodnost, so podpisali medresorski program celovitih krajinskoarhitekturnih zunanjih ureditev za povečanje odpornosti kulturnih spomenikov na podnebne spremembe in ekstremne vremenske dogodke za obdobje 2025–2028.

Na Ministrstvu za kulturo bomo v okviru programa izvedli javni razpis za krajinske ureditve spomenikov v lasti občin, pravnih in fizičnih oseb, za kar je predvidenih 3,5 milijona evrov. Preostala sredstva v višini 11,5 milijona evrov so namenjena sanaciji okolice državnih kulturnih spomenikov, ki jih za svojo dejavnost uporabljajo državni in občinski javni zavodi.

https://www.gov.si/novice/2025-02-28-ministri-podpisali-program-za-zascito-kulturnih-spomenikov-pred-naravnimi-nesrecami/

FUTURE STEPS

- Assessing feasibility and effectiveness of implemented measures
- Intrasectoral cooperation: Tourism & Culture
- Including tourism in the national adaptation plan
- Fluvial floods data and tourism development
- Regional tourism adaptation strategies

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University of Maribor

Faculty of Tourism

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