CLIMAAX COMMUNITY OF PRACTICE

Wildfire Risk Assessment: Learning from regions

December 11, 2025

10:30-12:00 CET

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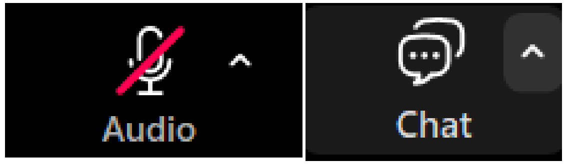
CLIMAAX
climate ready regions

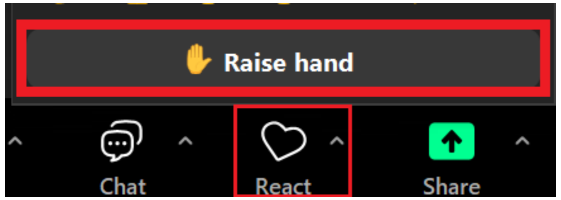
HOUSEKEEPING

- Please note that the meeting is being **recorded**.

- Please, keep your **mic off**.



- Feel free to post your **questions in the chat** (bottom of the screen) or raise your hand to talk



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MEETING AGENDA

- ✓ 10:30- 10:35 **Welcome & introduction to the webinar**
- ✓ 10:35-10:50 **Introduction to the Wildfire workflow**
  - Speaker: Andrea Trucchia (CIMA research Foundation)
- ✓ 10:50- 11:20 **Regional experiences: Applying and adapting the workflow**
  - Beira Baixa Comunidade Intermunicipal, Portugal
    Speakers: João Carvalhinho (Beira Baixa Comunidade Intermunicipal) & João Santos (Greenmetrics)
- ✓ 11:20-11:35 **Q&A and interactive discussion**
  - Moderators: Fulvio Biddau, Majid Njazkar (CMCC), Christopher Polster (ECMWF)
- ✓ 11:35-11:55 **ASPECT Governance case study**
  - Speaker: Simone Taddeo (CMCC)
- ✓ 11:45-12:00 **Closing remarks**

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NEW HAZARD- AND WORKFLOW-FOCUSED SERIES

Moving forward in CLIMAAX CoP from:

- **Thematic webinars** and workshops connecting science, policy and practice to support CRAs using the CLIMAAX Framework and Toolbox
- **Demo & co-design sessions** for refining and fostering usability of CLIMAAX outcomes

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COP NEW PHASE: CONSOLIDATING LEGACY AND IMPACT

- **Regional showcase webinars and dialogues**

Connecting toolbox developers and regional practitioners to exchange lessons learned from regional CRAs

- **Dedicated online community forum**

A new space for P2P exchange and knowledge sharing

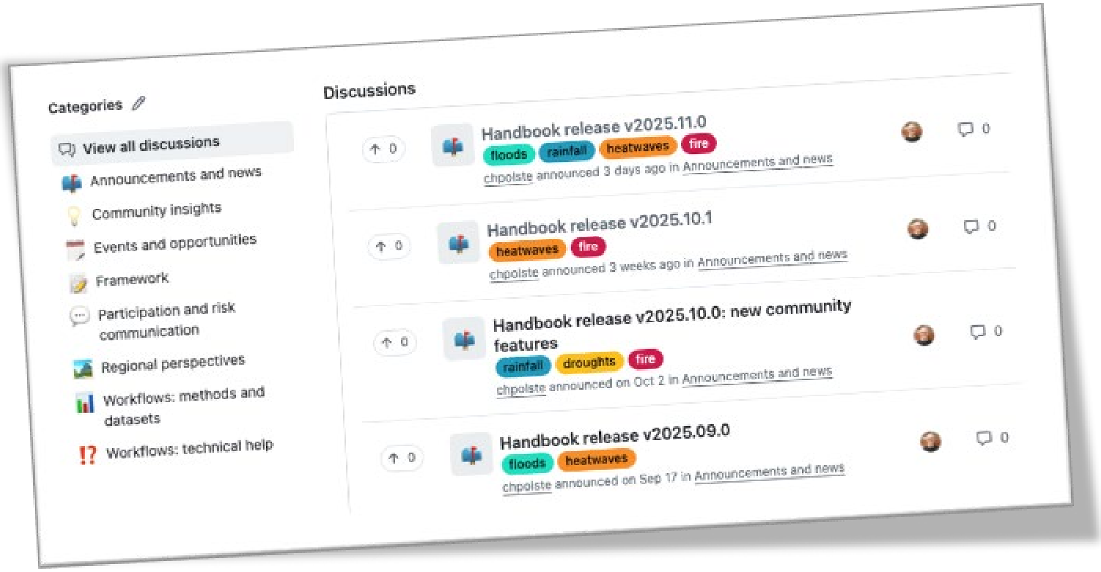
- **Promote exchange across climate service communities**

To foster awareness, collaboration, and uptake of solutions for climate resilience in Europe.

Move beyond traditional developer-end user model

Empowering local practitioners to take ownership and an active role in the use, extension and adaptation of CLIMAAX resources

Facilitate the uptake and continuous improvement of CLIMAAX tools and framework



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INTRODUCTION TO THE WILDFIRE WORKFLOW

Andrea Trucchia
(CIMA Research Foundation)

REGIONAL EXPERIENCES

SPEAKERS

João Santos
(Greenmetrics)

João Carvalhinho
(Beira Baixa Comunidade Intermunicipal)

Phase 2 Wildfire Climate Risk Assessment for Beira Baixa under the CLIMAAX Framework

Comunidade Intermunicipal da Beira Baixa

João Santos, greenmetrics.ai

11 December 2025

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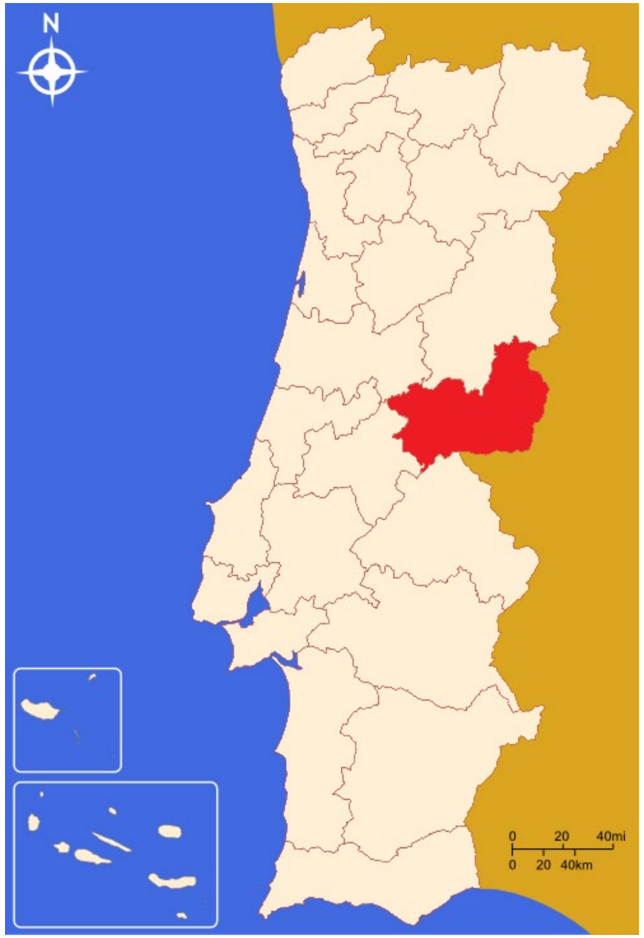
CLIMAAX
climate ready regions



Region of Beira Baixa
Located in central region of Portugal

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Introduction:

Beira Baixa faces significant climate risks, particularly from wildfires and heatwaves, due to its dry Mediterranean climate, high summer temperatures, and extensive forested areas dominated by flammable species such as Maritime pine and Eucalyptus. The prevalence of unmanaged lands, smallholdings, and invasive vegetation further amplifies fire susceptibility, especially west of the Ocreza River. Additionally, recurring heatwaves, with temperatures exceeding 41°C, intensify the region's exposure. These risks are compounded by demographic decline and land abandonment, which weaken local capacity for landscape management and adaptation. As such, Beira Baixa requires focused climate risk mitigation and adaptation strategies addressing both fire and heat stress.

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Introduction: Characteristics of the Region

- **Highly flammable forest composition** (Dominance of pine and eucalyptus forests, with extensive shrubland and unmanaged biomass that significantly increase fuel load)
- **Challenging topography** (Mountainous terrain such as Serra da Gardunha and Serra da Malcata, which accelerates fire spread and limits accessibility for firefighting)
- **Land abandonment and fragmented property structure** (Large areas of abandoned farmland and highly fragmented land ownership that hinder coordinated fuel management)
- **Aging and dispersed population** (Many small settlements with predominantly elderly residents, increasing vulnerability and complicating evacuation and emergency response)
- **Critical infrastructure exposure** (Road networks, health services, energy infrastructure, and settlements intersect with high projected wildfire risk zones)

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Wildfires: Introduction

The wildfire risk workflow was selected to address the **Beira Baixa** region's recurrent and severe wildfire activity, historically concentrated in forested and mountainous municipalities such as Oleiros, Vila de Rei, and parts of the western region impacted by the 2017 Pedrógão Grande fire, as well as more recently in Portugal's 2025 Wildfires.

This workflow applies hazard modeling based on climate and land-use data to identify zones of increased fire ignition and spread potential. The analysis is critical for informing forest management and civil protection planning.

Vulnerable groups identified include elderly residents in dispersed rural settlements, forestry sector workers, and emergency response personnel operating in high-risk, low-access areas.

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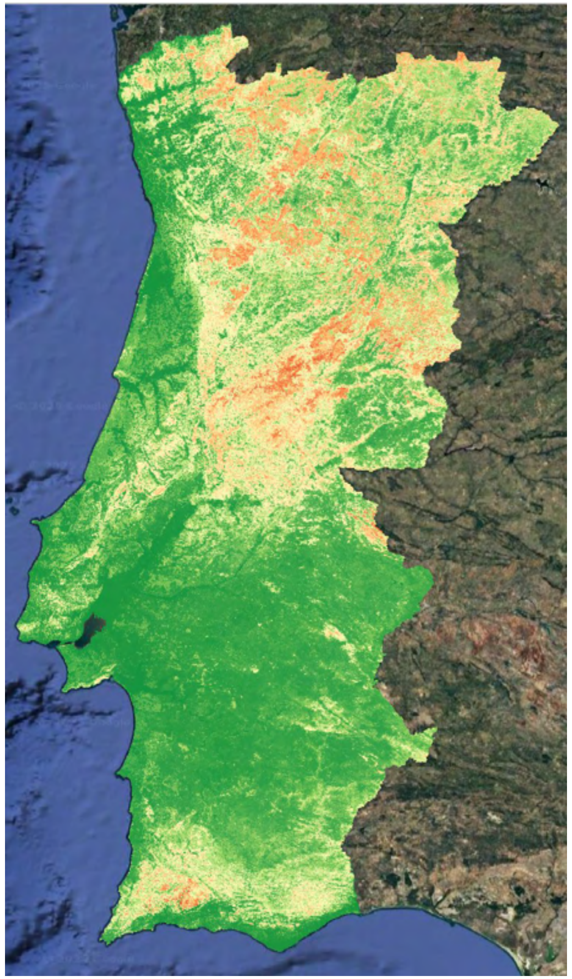
Wildfires: Hazard Analysis

RCP 4.5
2021-2040



The machine learning model for wildfire risk prediction has been updated and specifically adapted to the territory of Mainland Portugal, based on the climatic data from the CLIMAAX – ECLIPS2.0 toolbox.

The original predictive analysis methodology from CLIMAAX was reviewed and replaced with an approach better suited to regional conditions, ensuring greater accuracy and consistency in the results obtained.

The model training was based on a historical reference period from 1991 to 2010, incorporating three main climatic variables:

- **Summer Heat-Moisture Index (SHM)**
- **Mean Annual Precipitation (MAP)**
- **Mean Annual Temperature (MAT)**

Additionally, climate-alignment mechanisms were introduced, allowing the model to account more realistically for the temporal evolution of meteorological conditions, for example through the use of monotonic constraints.

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Wildfires: Hazard Analysis

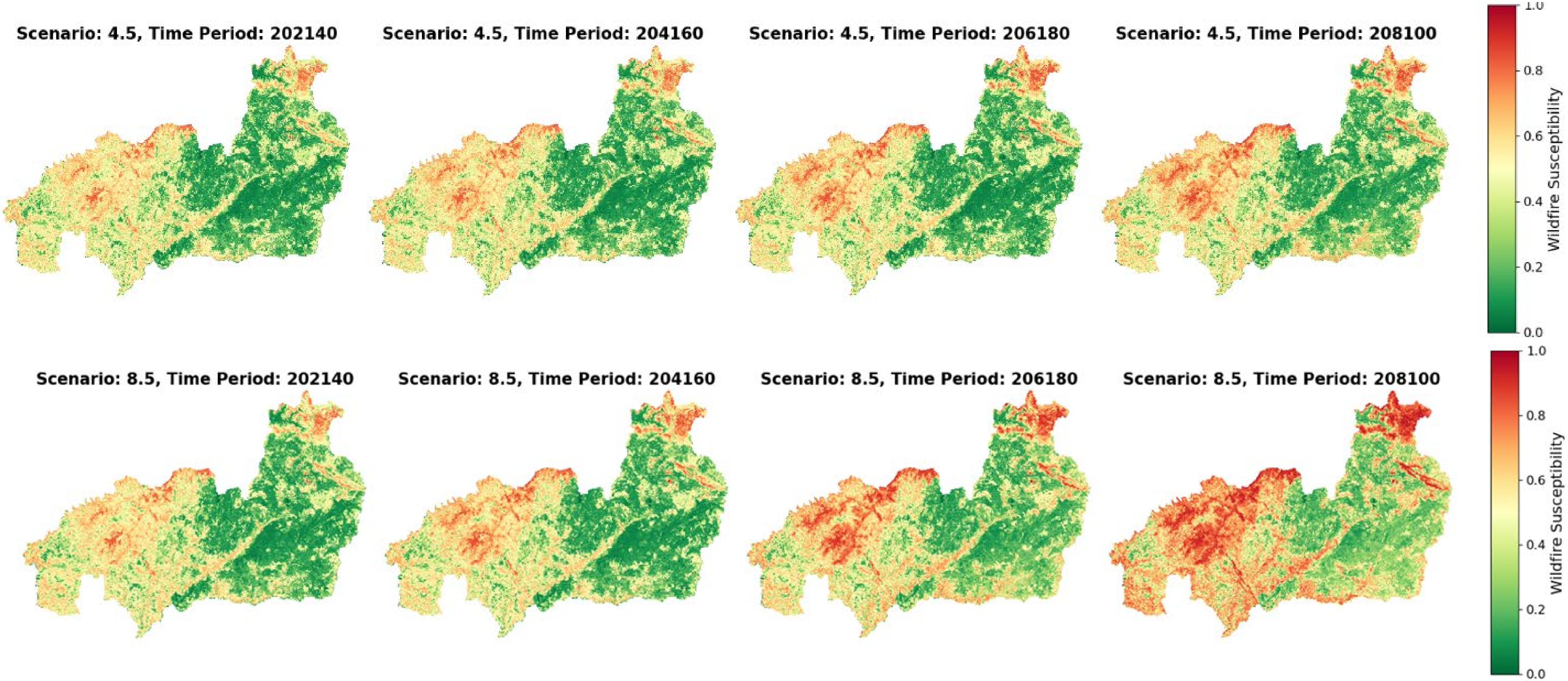

Figure 1. Results of the new model for scenarios 4.5 and 8.5, for the time periods 2021–2040, 2041–2060, 2061–2080, and 2081–2100.

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Wildfires: Risk – Risk Matrix

Definition of risk classes established through the combination of hazard classes (from 1 to 6), derived from the wildfire risk prediction of the first phase, with vulnerability classes (from 1 to 5), defined using an automatic classification of the previously presented availability metric.

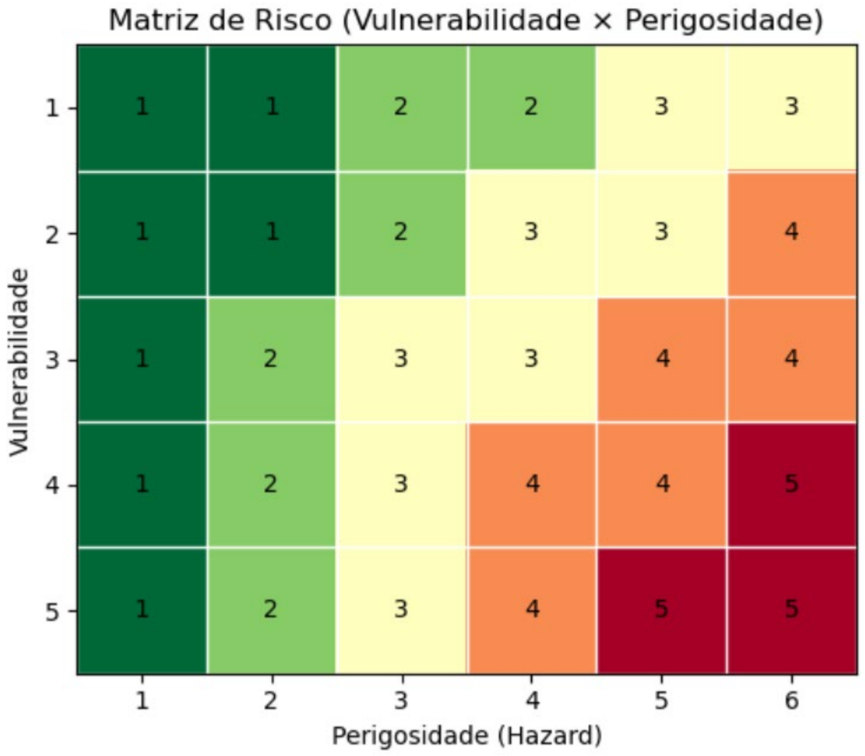

Figure 3. Risk matrix for our risk analysis regarding wildfires

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Wildfires: Risk – Water availability for firefighting aircraft

To assess the spatial availability of water in the territory for wildfire suppression using aircraft, the following methodology was applied to derive a metric that accounts for both the distance to water points and their respective volumes:

1 - For each water point in the provided database, a map was generated with a proximity-based classification within a defined radius

0 – 2,5 km → Classification of 4
2,5 – 5 km → Classification of 3
5 – 7,5 km → Classification of 2
7,5 – 10 km → Classification of 1
10+ km → Classification of 0

2 - Each map was weighted by the volume associated with that water point:

Proximity classification × water volume

3 - A regional map was then produced by summing all weighted maps from step 2, resulting in an output map that represents this water availability metric.

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Wildfires: Risk

Method 1 – Focused on water point density

Volume of each water point limited to 10,000 m³

- Gives higher weight to multiple nearby water points rather than to the volume of each individual point.
- Large reservoirs with very high volume do not stand out.

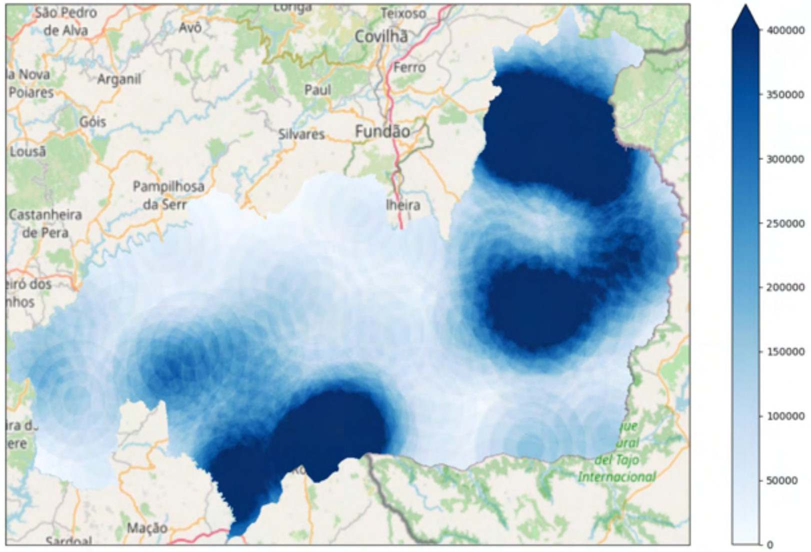

Figure 2. Representative metric of the coverage of water points that can be used by aerial firefighting resources. Method 1

Method 2 – Focused on total water availability (by volume)

No volume limit, visualization in logarithmic scale

- Gives greater weight to the water volume of each individual point rather than to multiple points combined.
- Due to the logarithmic scale, differences in larger v

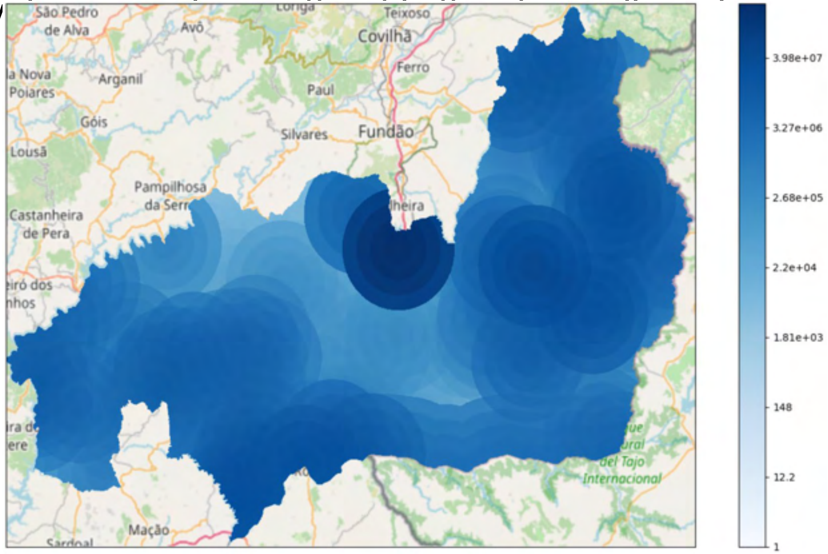

Figure 3. Representative metric of the coverage of water points that can be used by aerial firefighting resources. Method 2

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Wildfires: Risk

Method 1

Focused on water point density

Concentration Pathway

RCP 4.5

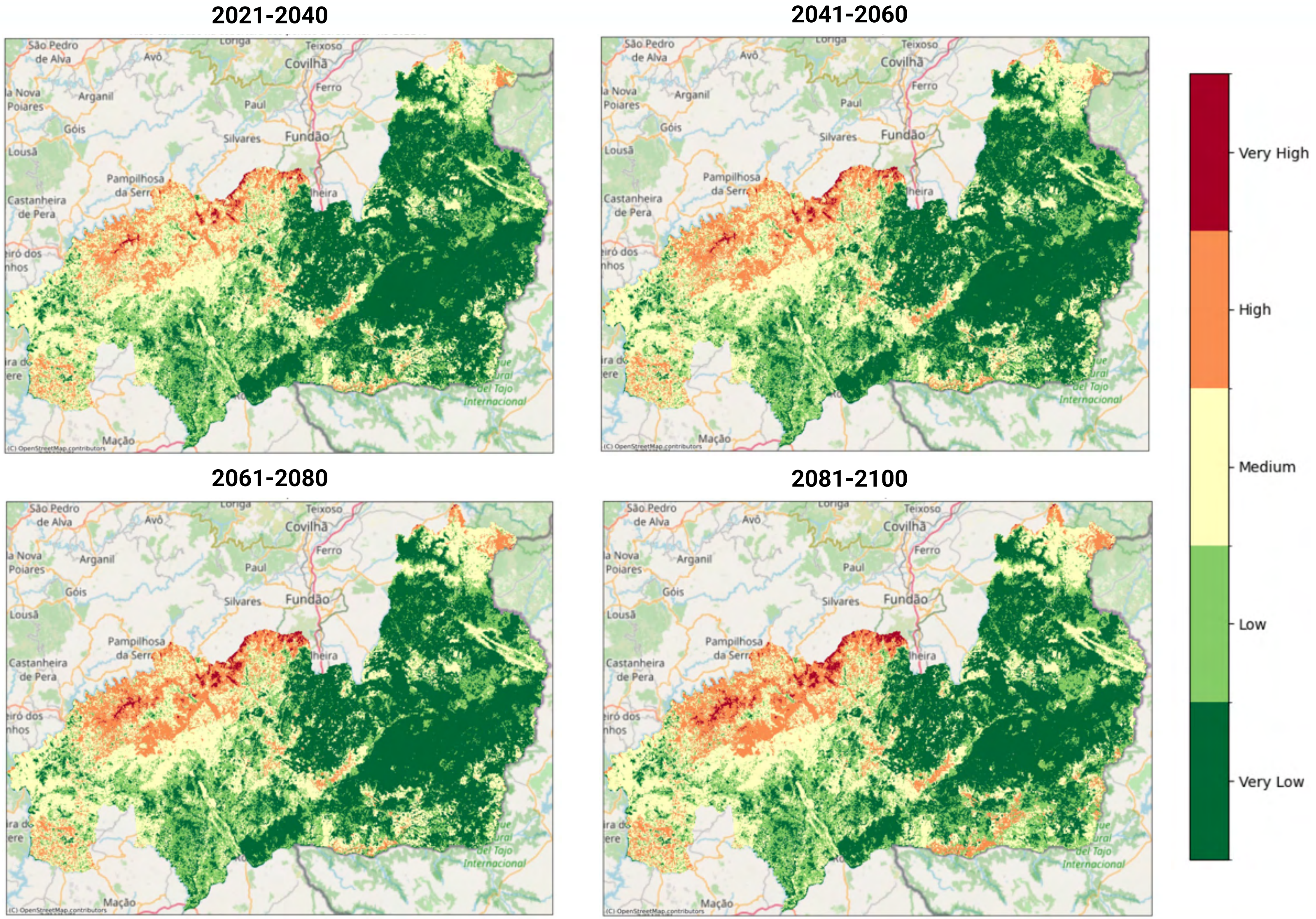

Figure 4. Wildfire risk based on the coverage metric of water points used by aerial firefighting resources.

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Wildfires: Risk

Method 2

Focused on total water volume

Concentration Pathway

RCP 4.5

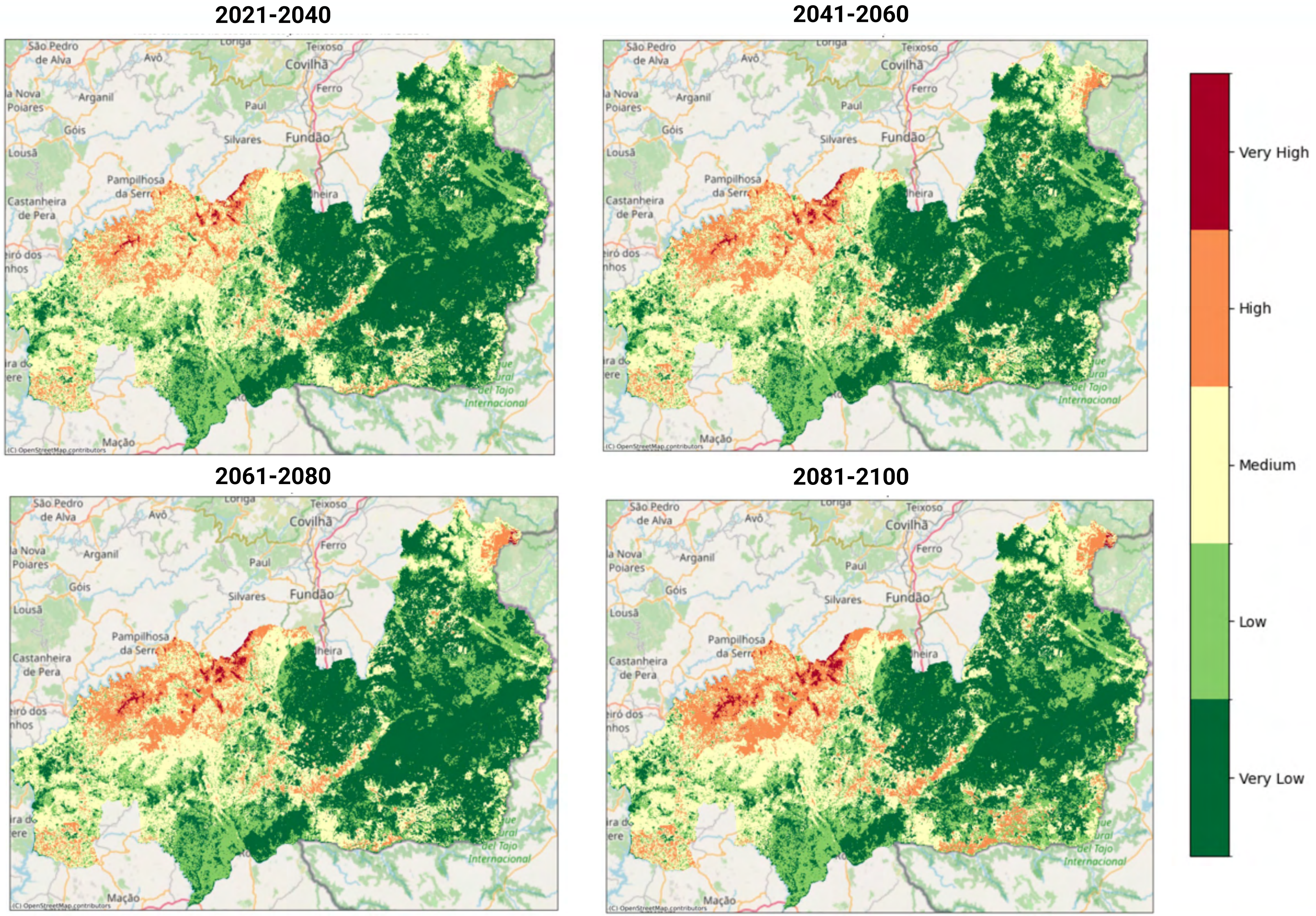

Figure 5. Wildfire risk based on the coverage metric of water points used by aerial firefighting resources.

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Wildfires: Risk - Distance to the water points used by ground-based firefighting

To assess vulnerability related to the spatial availability of water in the territory, considering ground-based firefighting vehicles.

The following methodology was applied, based solely on route distances between multiple points in the territory and their nearest water points:

1 - A grid of *1 km × 1 km* cells was created, covering the entire Beira Baixa region.

2 - For each grid cell, the distance to the nearest water point was calculated using an openly available route-calculation service, and this value was assigned to the cell.

3 - Once this process was completed for the entire region, a general accessibility map was obtained, measured in meters, representing terrestrial firefighting accessibility to water sources.

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Wildfires: Risk - Distance to the water points used by ground-based firefighting

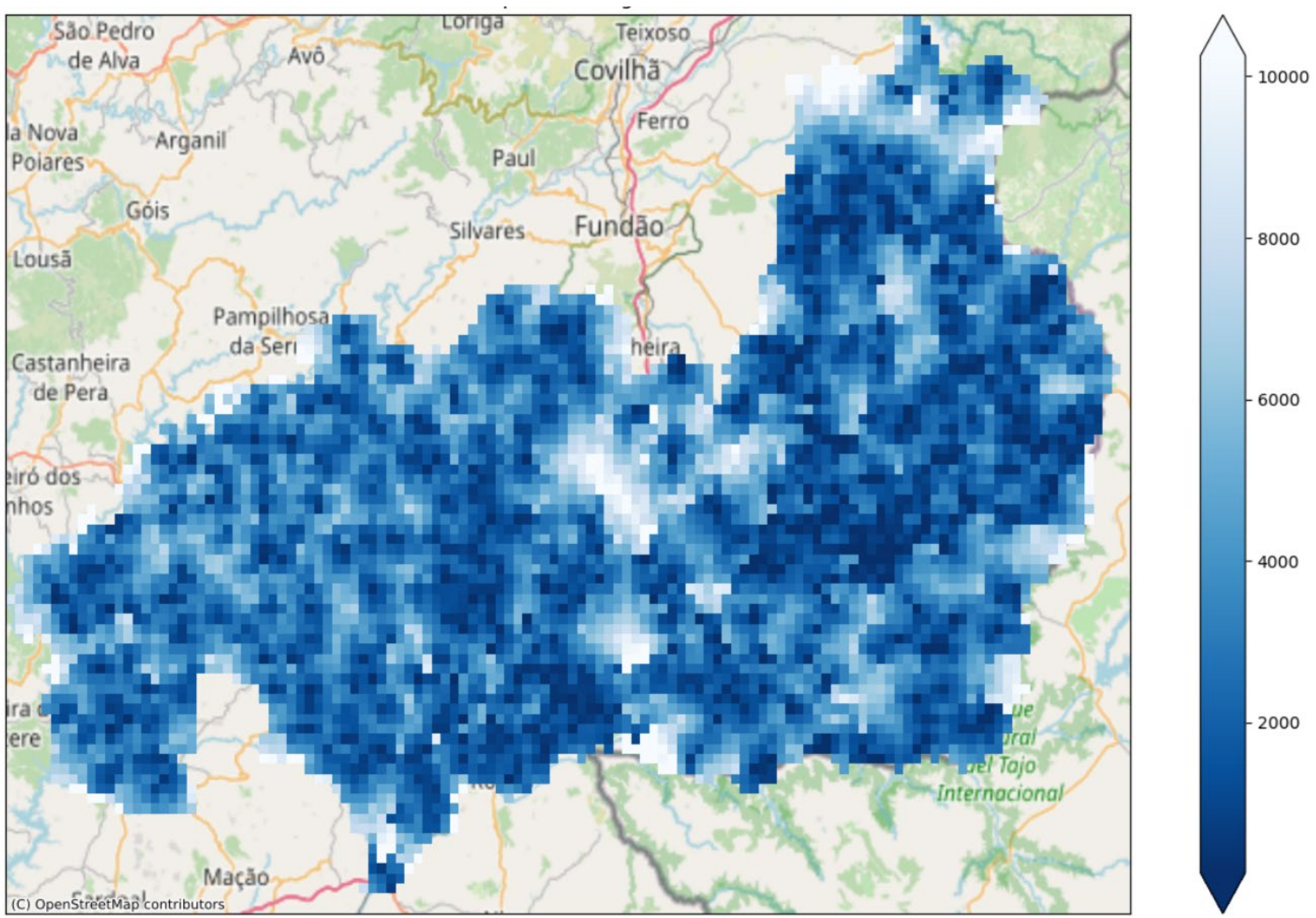

Figure 6. Distance of each pixel to the water points used by ground-based firefighting vehicles.

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Wildfires: Risk - Distance to the water points used by ground-based firefighting

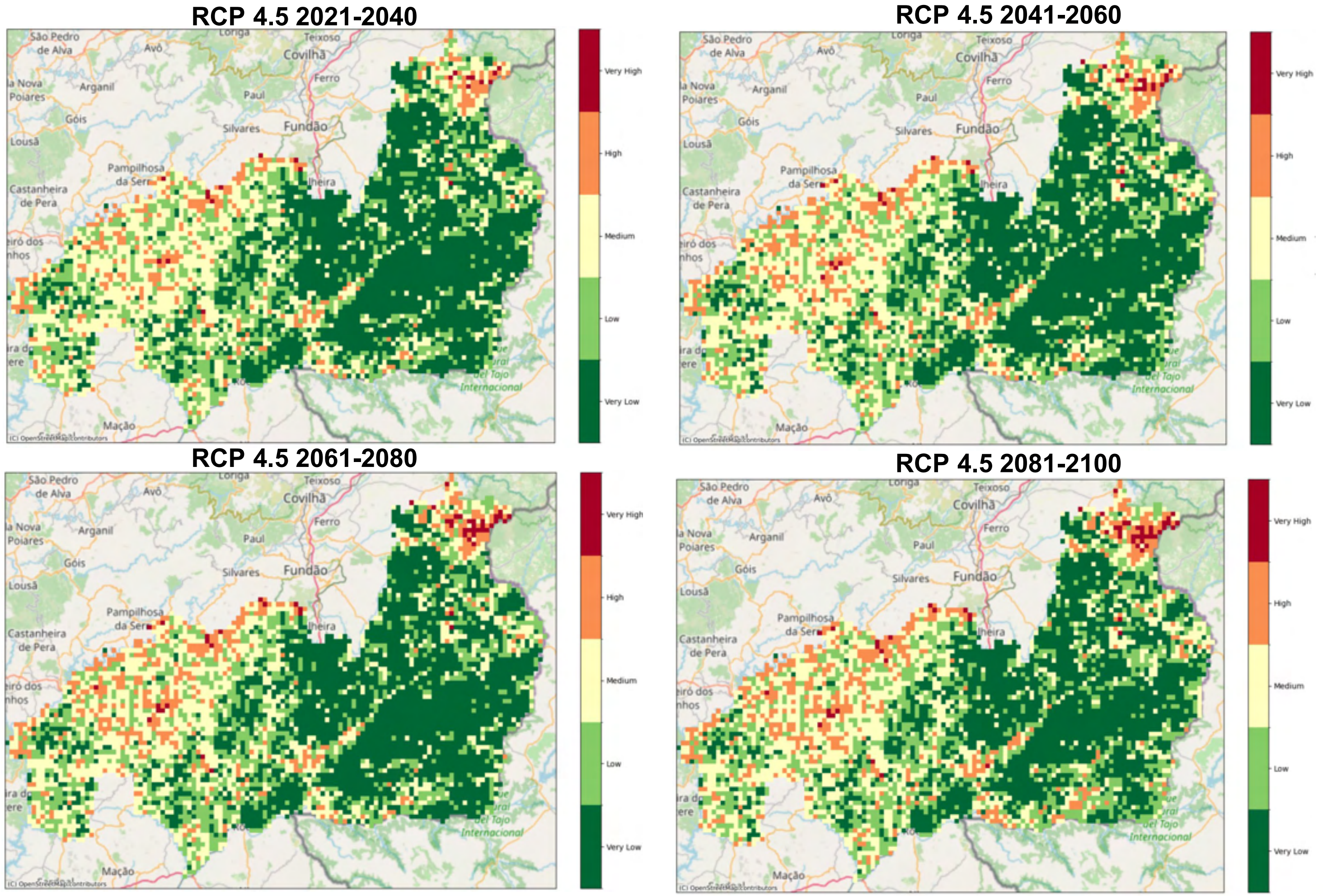

Figure 7. Wildfire risk based on the distance of each pixel to the water points used by ground-based firefighting vehicles.

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Wildfires: Risk – Response unit distances to hazardous areas

Similar to the methodology applied in the analysis of the availability of terrestrial water points for firefighting, this approach evaluates the response times of emergency resources.

The analysis computes the distance and average travel time between each point in the Beira Baixa region and the nearest response unit (or LEE), taking into account the existing road network. The calculation was carried out using a public GPS service, which enables the estimation of the fastest routes and the most realistic travel times.

The result is an operational accessibility map that identifies areas with faster response times and areas that may be more vulnerable due to longer mobilization times for firefighting resources.

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Wildfires: Risk - Response unit distances to hazardous areas

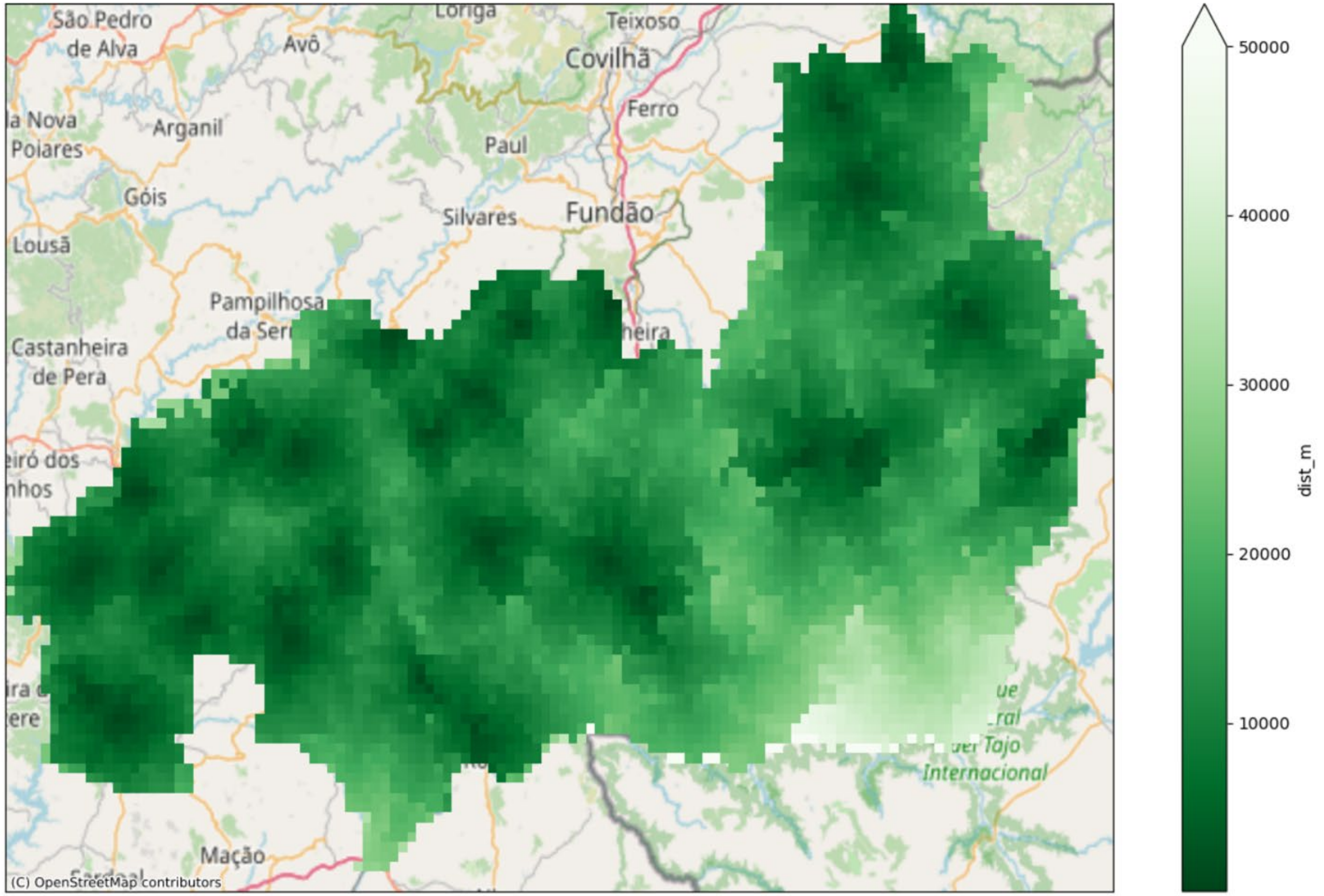

Figure 8. Distance to fire stations and strategic locations.

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Wildfires: Risk - Distance to Fire Stations and strategic parking locations

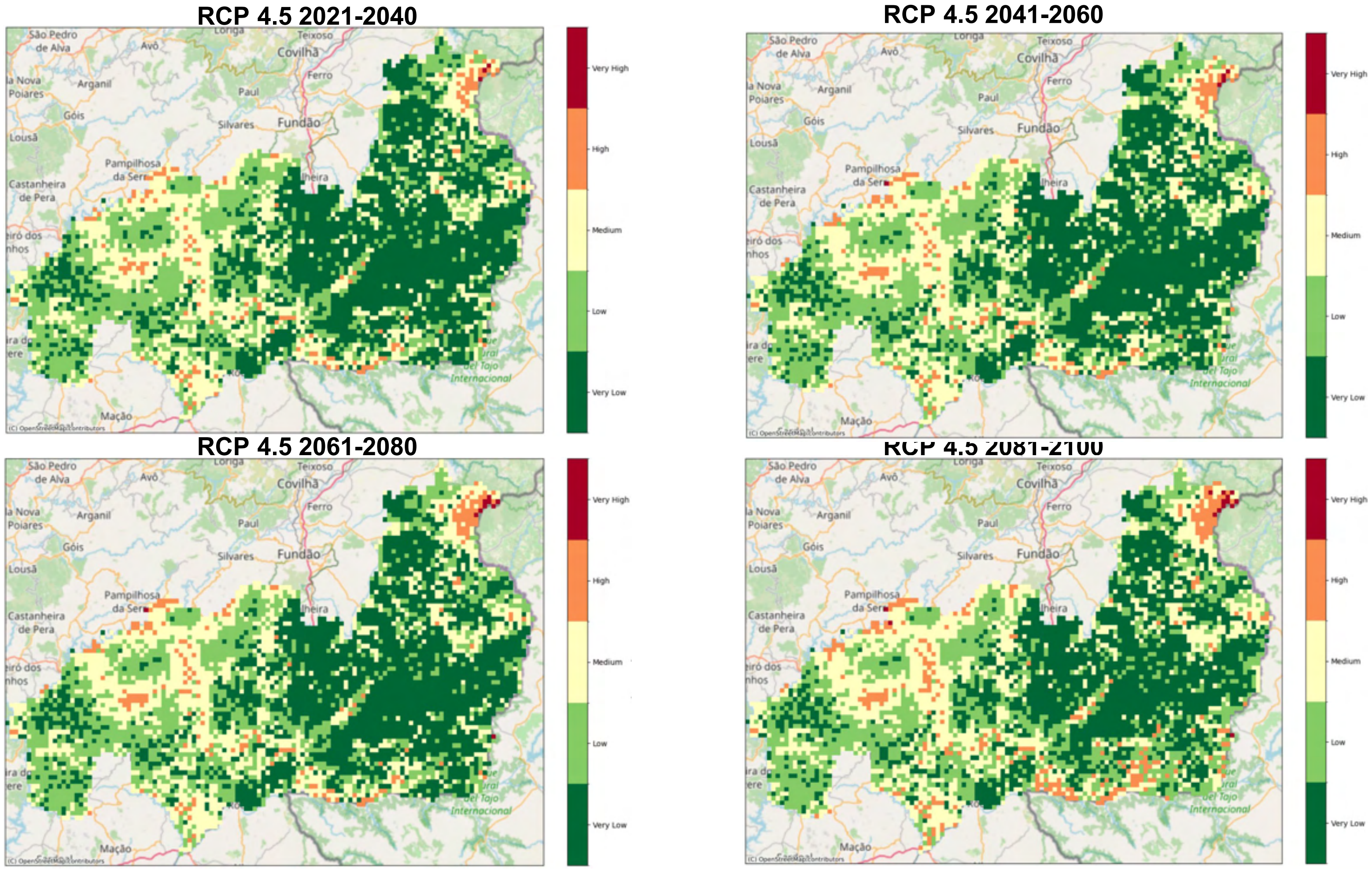

Figure 9. Wildfire risk based on the distance to Fire Stations and strategic parking locations.

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Wildfires: Risk – Infrastructure Exposure

Using infrastructure and location data provided by CIMBB, future wildfire hazard projections were overlaid to assess the potential exposure of existing infrastructure to rural fires under future scenarios.

The methodology consisted of spatially intersecting the projected risk maps with vector data on critical infrastructure—such as roads, healthcare facilities, schools, and power networks—allowing for the quantification of exposure levels and the identification of priority areas for mitigation and adaptation planning.

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Wildfires: Risk – Healthcare services Exposure

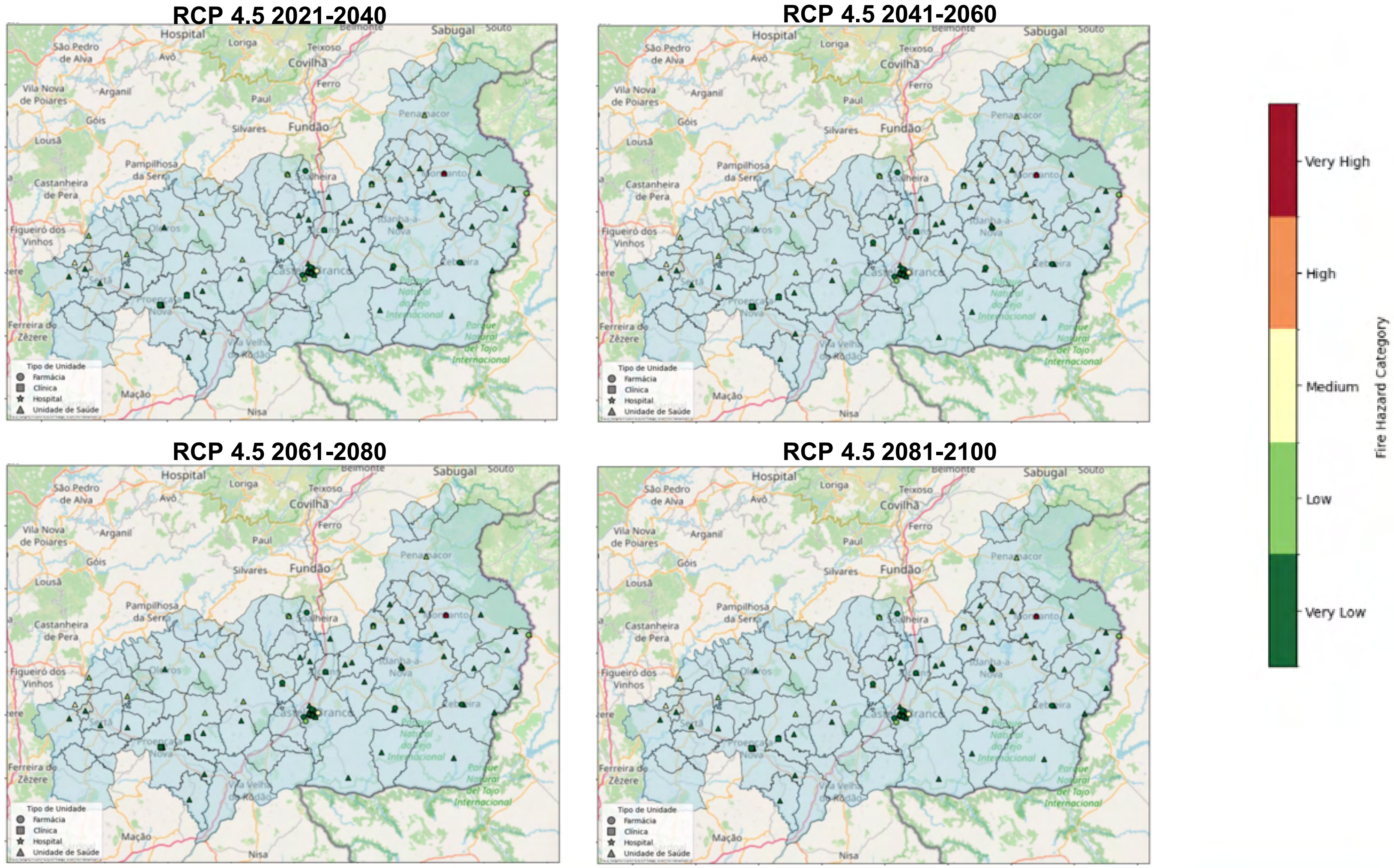

Figure 10. Exposure of Healthcare Services to wildfire risk, scenario 4.5

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Wildfires: Risk – Forest Road Network Exposure

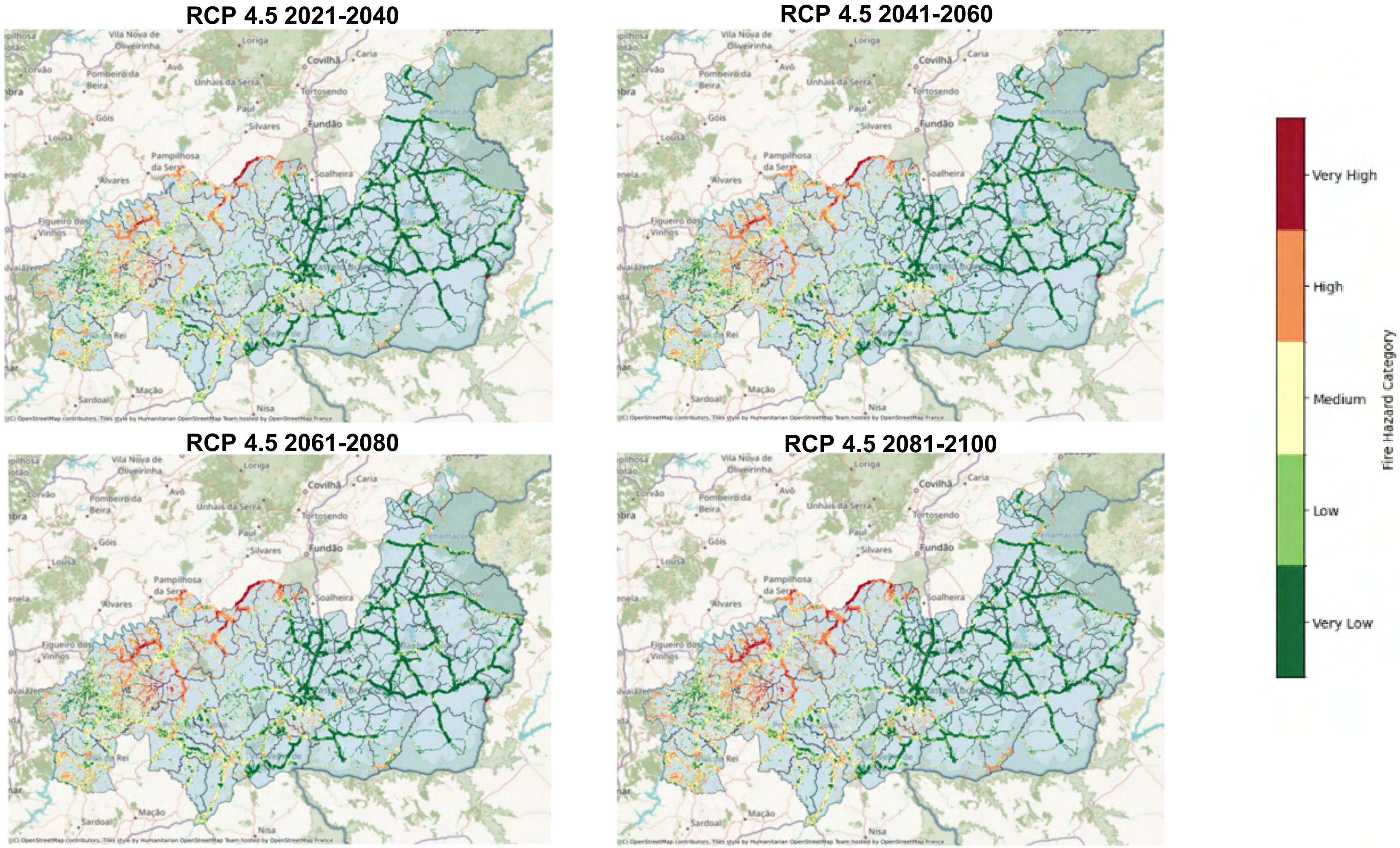

Figure 11. Exposure of the primary and secondary Forest Road Network to rural wildfire risk, scenario 4.5

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Wildfires: Elderly care homes Exposure

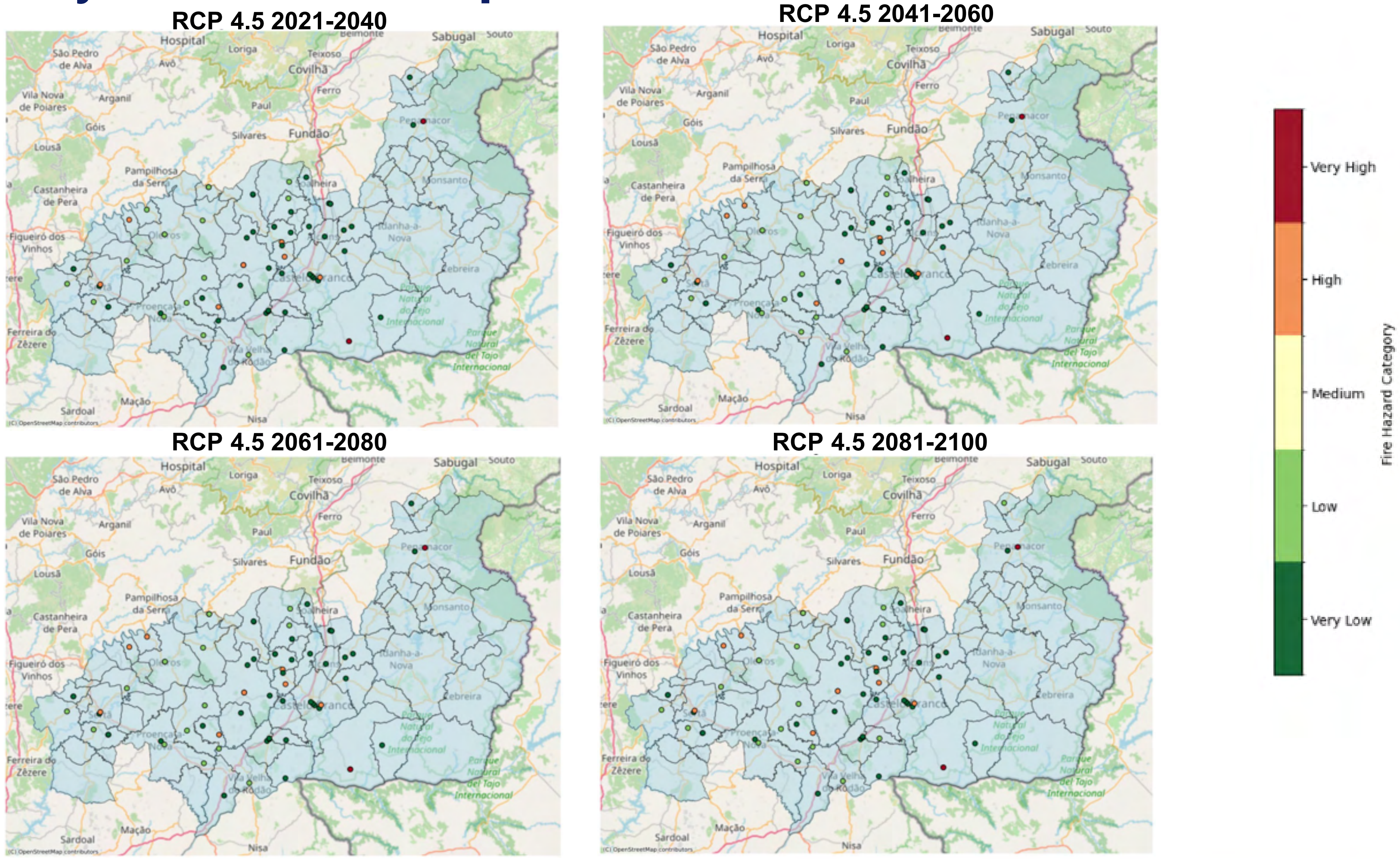

Figure 12. Exposure of Elderly Care Homes to wildfire risk, scenario 4.5

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Wildfires: Datasets

Climatic variables	ECLIPSE2.0
Land Use Type	Carta de ocupação de Solo 2023 (COS23)
Topography (Elevation and derivations)	Ciimar Uporto
Exposition data	Regional datasets
Fire stations/strategic locations	Regional datasets
Water points	ICNF national water point catalogue + regional datasets

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Q&A AND DISCUSSION

João Santos
(Greenmetrics)

João Carvalhinho
(Beira Baixa Comunidade Intermunicipal)

Christopher Polster
(ECWMF)

Majid Niazkar
(Euro-Mediterranean Centre on Climate Change, CMCC)

ASPECT
FACILITATING SEAMLESS CLIMATE ADAPTATION

ASPECT GOVERNANCE CASE STUDY

Simone Taddeo
(Euro-Mediterranean Centre on Climate Change, CMCC)

ASPECT

FACILITATING SEAMLESS CLIMATE ADAPTATION

Adaptation-oriented Seamless Predictions of European ClimaTe

Community of Practice CLIMAAX
11th December 2025

Funded by the European Union

ASPECT Background

ASPECT is a Horizon Europe Research and Innovation Action project that will produce and improve seamless climate predictions covering the next 30 years to facilitate adaptation decisions in a range of sectors.

Climate information will be co-produced by working closely with stakeholders from societally important sectors, such as agriculture, finance and governance, to ensure their needs are addressed.

ASPECT aims to provide useful and usable seamless climate predictions that span across timescales, spatial scales and decision-making levels.

ASPECT Objectives

ASPECT

#1

Improving seasonal-to-decadal (S2D) forecasts, where improvements are targeted on user-driven metrics

#2

Pioneering new extended initialised forecasts up to 30 years ahead

#3

Pioneering new approaches to join the best forecasts on seasonal / 1–5-year / 5–30-year time-scales together

#4

Designing and implementing new ways to extract high-resolution information on extremes

#5

Exploring how users can get value from considering information on seasonal / 1–5-year / 5– 30-year time-scales together to improve decision making

#6

Designing and implementing a delivery system for the data and methods produced

Background of the CMCC Governance Case Study

The **Emilia-Romagna Region** is one of the most productive regions in Italy and stands out as one of the most advanced centres of climate-related innovation in both national and European context. It hosts major institutions such as the EIT Climate-KIC, the Copernicus Data Centre, and the National Agency for Meteorology and Climatology.

The Emilia-Romagna Region has identified two priority climate challenges:

- **extreme heat** affecting its major urban areas, and
- **severe convective rainfall** events impacting the low-lying former floodplain zones.

The concept of Super Users in ASPECT

In ASPECT, **Super Users** are organisations that work closely with researchers to co-produce climate information spanning from seasons to decades, which can help make better informed decisions for adaptation, enhancing resilience to climate change and extreme weather.

In the CMCC Governance case study, the **Super User** is **ARPAE Emilia Romagna**, which is a research-oriented public agency with a longstanding track record in developing statistical downscaling methods, climate predictions, and climate projections to inform and support regional policy and planning.

Technical dimensions of Governance Case Study

Three technical dimensions underpinning **CMCC Governance case study** will be focused particularly on *three components*, which are closely aligned with the climate challenges and adaptation priorities identified for the Emilia Romagna Region:

1. **high-resolution convective-permitting climate modelling** (led by SMHI and University of Zagreb)

2. **the downscaling of predictions to regional planning scales** (led by CMCC Bologna)

3. **the application of climate projections in hydrological models** (led by CMCC Venice)

The aim of the ASPECT/ Governance survey in CLIMAAX COP

The launch of the CMCC- Governance survey in the **CLIMAAX COP** has both strategic aim and rationale behind:

- Replicability across regions
- Flexibility of formats
- Transferability of insights
- Adaptability to diverse governance systems
- Scalable integration into CLIMAAX workflows

Link to the survey: https://leedsubs.eu.qualtrics.com/jfe/form/SV_4ITmUCGTTosAwC2

ASPECT

FACILITATING SEAMLESS CLIMATE ADAPTATION

Adaptation-oriented Seamless Predictions of European ClimaTe

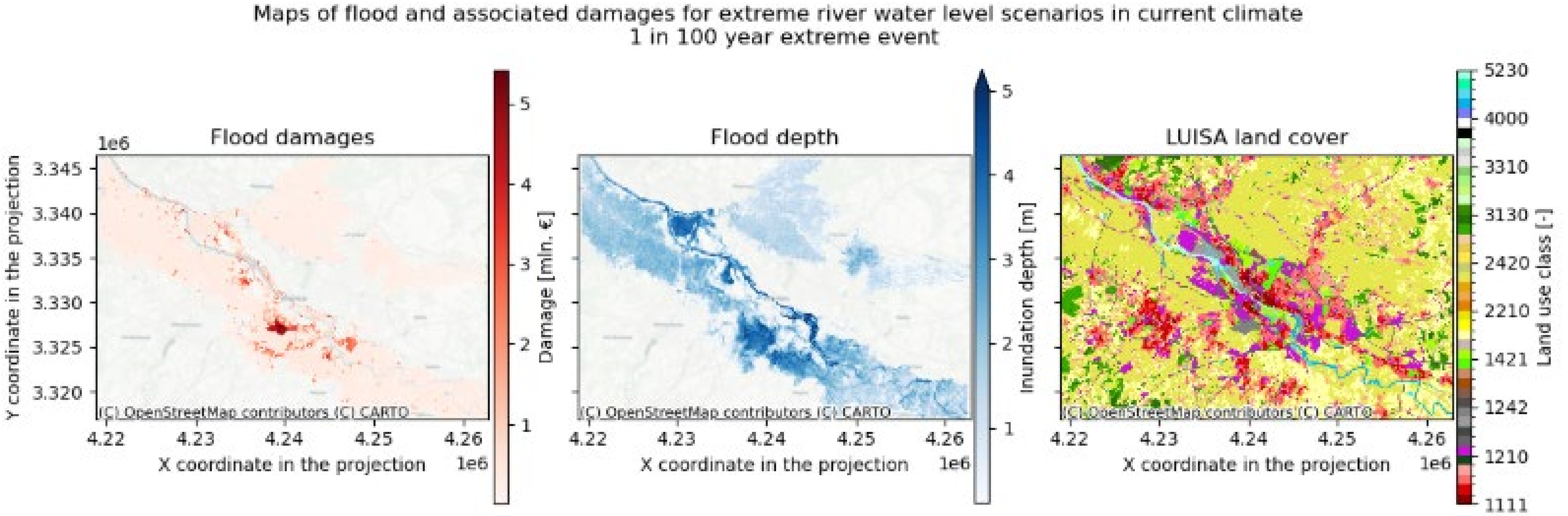
For additional information please e-mail to:

simone.taddeo@cmcc.it

Funded by the European Union

UPCOMING EVENTS

- **19 Feb 2026 10.30 CET River floods**
- **… more hazard-specific sessions will follow — stay tuned!**



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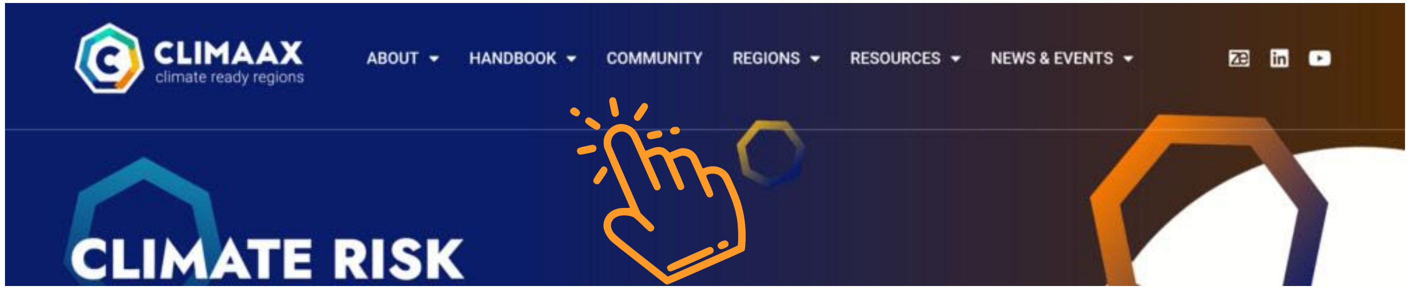
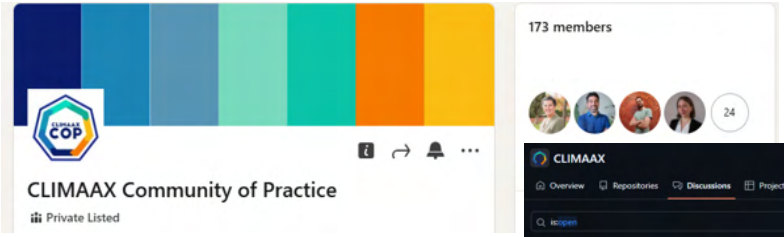
HOW TO ENGAGE IN THE COMMUNITY OF PRACTICE

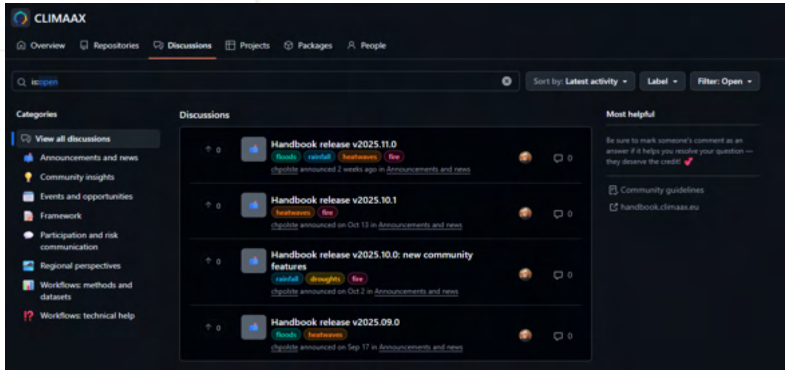


- Join our LinkedIn group and community forum
- Take our surveys
- Subscribe to the CoP to receive communication of further updates

https://www.climaax.eu/community-of-practice/

!! SCAN THIS !!





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Thank you and see you next time!

cop@climaax.eu

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