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# Climate Modelling and Building a Safer Future in the Western Balkans

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## SUMMARY:

This paper examines the importance of climate modelling in addressing climate change risks in the Western Balkans. As the region faces increasing threats from floods, droughts, heatwaves, and environmental degradation, climate models help predict future conditions and support informed decision-making. The paper highlights the practical use of climate modelling in infrastructure, agriculture, water management, and urban planning, with special focus on the ClimaProof Platform as a regional tool for climate-resilient planning and sustainable development.

## KEYWORDS:

Climate modelling; climate change; Western Balkans; climate resilience; adaptation; ClimaProof Platform; sustainable development.



## Introduction

Climate change is expected to bring a wide range of challenges to the Western Balkan region, affecting economies, the environment, livelihoods, infrastructure, and human health. The region is likely to experience higher temperatures, more intense floods and droughts, and a variety of related impacts such as forest fires, desertification, and reduced agricultural productivity.

To prepare for these risks, countries need reliable scientific tools that can help them understand future climate conditions and plan effective responses. One of the most important of these tools is climate modelling.

## What Is Climate Modelling?

Climate modelling is the use of scientific computer models to represent and better understand the Earth's climate system. Climate models are simplified descriptions of complex natural processes involving the atmosphere, oceans, land surfaces, ice, and ecosystems. Using advanced computer programs and tools, climate models combine data such as temperature, rainfall, wind patterns, ocean currents, and greenhouse gas concentrations to simulate how the climate behaves and changes over time to estimate future climate conditions. The growing need for reliable climate forecasts has become increasingly important as human activities continue to influence the global climate. Climate modelling helps scientists, governments, and communities prepare for future risks and make informed decisions.

## Why Past Observations Alone Are No Longer Enough

For many years, planning decisions were often based on historical climate records such as past rainfall, average temperatures, flood frequency, or drought cycles. While these observations remain valuable, relying only on the past is no longer sufficient in a changing climate.

Climate conditions are changing faster than before. Heatwaves are becoming more frequent, rainfall patterns are shifting, and extreme weather events are becoming less predictable. This means that historical patterns may no longer provide a reliable guide to future conditions.

Climate modelling helps address this challenge by looking forward rather than backward. It allows planners and decision-makers to consider future risks and design infrastructure, policies, and investments that remain effective under changing climate conditions.

## Model scenarios

No one can predict future climate trends with complete certainty. Many factors depend on human choices, including greenhouse gas emissions, land use, technological development, and environmental policy. For this reason, climate models explore multiple future pathways using “what if” scenarios. These scenarios help scientists understand how different policy choices and development patterns may affect future temperatures, rainfall, sea levels, and extreme weather events. Many of these scenarios are assessed by the Intergovernmental Panel on Climate Change and are used worldwide to support evidence-based planning.

## Practical Applications of Climate Models

Climate models are not only scientific tools, they also have highly practical applications. Insurance companies use regional climate models to estimate future flood and storm risks. Municipalities can calculate the required size of drainage and sewage systems. Farmers can assess whether droughts may become more frequent and choose more resilient crops. Coastal planners can estimate future sea-level rise and storm surge risks. Transport authorities can design roads and bridges that can withstand future climate stress. These applications help reduce long-term costs, improve safety, and support smarter investments.

## Western Balkans and ClimaProof Platform

For the Western Balkans, climate modelling is especially valuable because the region faces increasing pressure from floods, droughts, heat stress, and environmental degradation. Infrastructure investments made today must remain safe and effective for decades. Using climate information in planning can help ensure that roads, public systems, water management, agriculture, and urban development are more resilient in the future.

A major regional response to these challenges is the ClimaProof project—the Development of a Regional Western Balkans Climate-Proofing Platform (WB-CPP), funded by Austrian Development Cooperation (ADC) and implemented by UN Environment Programme (UNEP).

The ClimaProof platform is the first integrated digital climate platform designed specifically for the entire Western Balkans region. It offers:

- Interactive geographic climate data for the whole region
- High spatial resolution of approximately 1 km
- Historical climate observations (1981–2010)
- Future projections for 2036–2065 and 2071–2100
- Low, moderate, and high emissions scenarios
- Sector guidance for transport, agriculture, energy, tourism, infrastructure, and nature protection

However, technology alone is not enough. The real value of climate modelling depends on how effectively it is integrated into policy, investment decisions, and everyday planning practices, as well as on the continuous updating and feeding of the platform with up-to-date, real-time, and recent observational data, in order to ensure that climate models and projections remain accurate, relevant, and responsive to ongoing environmental changes.

For the Western Balkans, where climate risks are already increasing, the ability to anticipate future conditions is essential for protecting people, infrastructure, and ecosystems. By combining scientific data, advanced modelling, and regional cooperation, decision-makers can move from reactive responses to proactive planning. Tools like the ClimaProof platform can help relevant institutions to integrate climate risks into planning decisions, infrastructure design, investment strategies, and public policy.