



Explaining and Predicting Climate Changes and Extremes

ABOUT THE EXPECT PROJECT?

EXPECT is a Horizon Europe research project dedicated to reducing the gaps in understanding and predicting regional climate changes.

EXPECT will deepen the comprehension of the factors driving changes in atmospheric circulation, land-atmosphere interactions, and their impact on European summer extremes from years to decades.

WHO IS INVOLVED?

Thanks to funding from the European Union's Horizon Programme, the Government of Canada, and UK Research & Innovation, a consortium of research institutions is leveraging advanced climate model simulations, Earth observations, and machine learning to drive innovation in climate science. Together, researchers are developing new tools to process a variety of large, multi-source datasets, which expand the ability to study and understand the climate system.

AIMS



Assess the impacts of natural and anthropogenic factors, atmospheric circulation and land-atmosphere interactions on European climate, including heatwaves, droughts, and extreme precipitation.



Improve regional climate predictions and projections, by integrating process understanding, Earth observation data and climate simulations.



Develop the infrastructure for efficient and flexible analysis of high-resolution climate data.



Build scientific capacity through training in advanced climate data analysis.

EXPECT'S 4 KEY THEMES

1. Data for the generation of new climate knowledge

Focus:

EXPECT aims to integrate diverse datasets to generate new climate knowledge, in particular exploiting Earth observation data and high-resolution climate model simulations.

How?

Employing AI, machine learning, data assimilation, and process-based evaluations to fill in gaps in observational data, infer physical process understanding and enhance climate model accuracy.

2. Integrated attribution, prediction and projection

Focus:

EXPECT furthers knowledge of the processes driving climate variability over annual to decadal timescales, improving how these processes are represented in models to produce more reliable predictions and projections of future climate conditions.

How?

Building on process-based evaluations of large climate model ensembles, EXPECT will calibrate model output to correct for errors and reduce uncertainties.

3. Past, current and future climate hazards

Focus:

EXPECT examines how large-scale atmospheric circulation patterns and land-atmosphere interactions contribute to extreme weather events such as heatwaves, droughts and extreme precipitation.

How?

By combining large climate model ensembles and explainable AI methods to identify how different variables, such as sea surface temperatures, atmospheric circulation and land-surface conditions, drive extreme weather events.

4. Underpinning infrastructure for the efficient and flexible analysis of large climate datasets

Focus:

EXPECT develops a distributed analysis system that enables the analysis of large climate datasets at the location where they are stored, rather than requiring data to be moved between computing infrastructures, thereby streamlining research.

How?

By building on existing platforms to ensure data is FAIR (Findable, Accessible, Interoperable, and Reusable), and providing new tools and workspaces for efficient, complex analyses across diverse, geographically distributed datasets.

CONTACT

To know more about us:
expect-project.eu



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Funding

