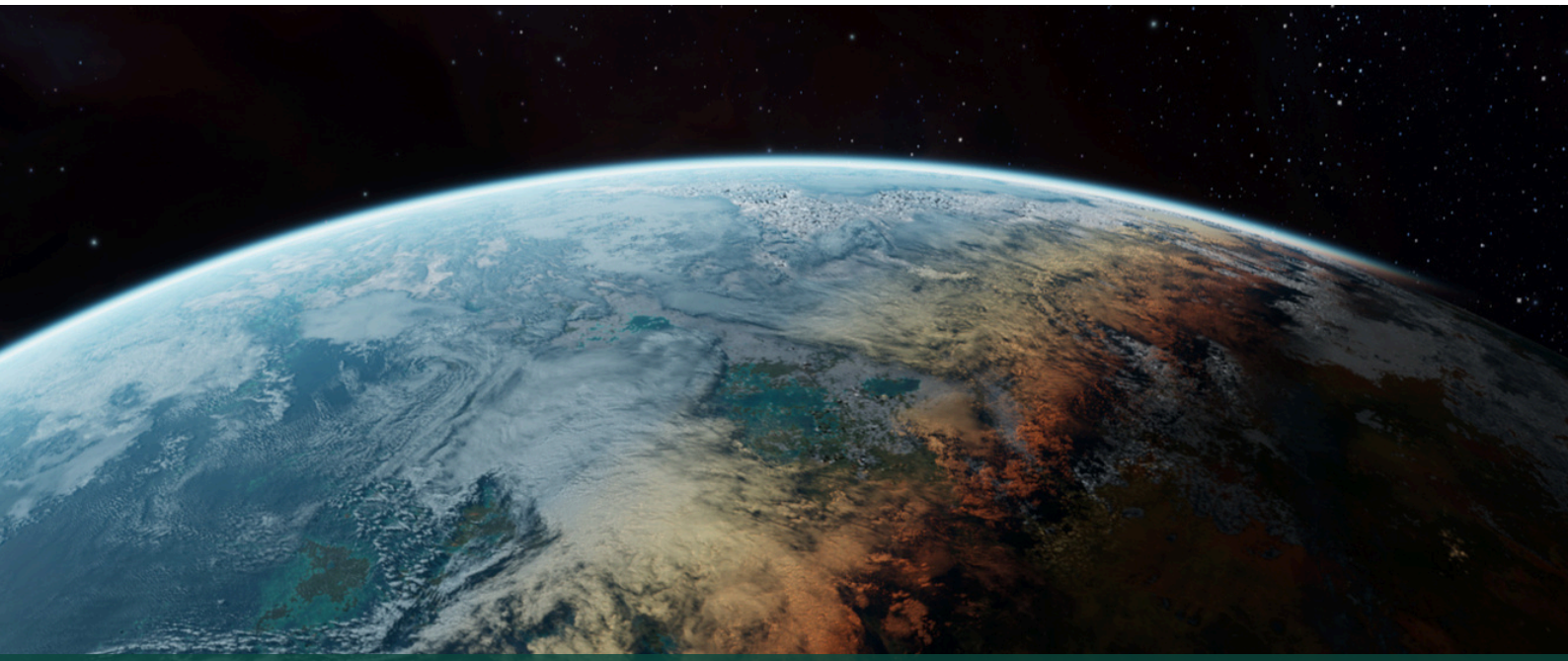


Climate predictions, projections, and seamless climate information

This infosheet explores the difference between climate predictions and climate projections and how the ASPECT project uses these to develop improved seamless climate information.

The ASPECT programme explores how **seamless climate information** can be used for decision-making over a range of timescales, from months to years to decades. It primarily looks at **climate predictions** – which provide information over months to years, to several decades – as well as **climate projections** which provide information for many decades into the future.

What is seamless climate information?

Decision-makers often use climate information from different sources, and using different methods, which may make it difficult for users to compare across timescales.

To address this, **seamless climate information** spans timescales, locations and decision contexts. The ASPECT project aims to help users access more consistent and useful seamless climate information to support adaptation planning and decision making across a range of sectors and timescales.

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What is the difference between a prediction and a projection?

Climate predictions are an estimate of how the current conditions of the climate system will evolve over the coming months to years, whereas **climate projections** which are the long-term simulated response of the climate system to a scenario of future changes in atmospheric greenhouse gases and land use.

Predictions start with observations of the current conditions of the climate system (just as weather forecasts do), such as ocean temperatures and atmospheric conditions, to capture natural climate variation. The process of incorporating observed climate conditions at the start of a model simulation is known as initialisation. Climate predictions are regularly updated, e.g. by starting or initialising the model simulation every month for seasonal predictions, or every year for decadal predictions.

In contrast to predictions, climate projections do not usually start with observations of the current climate conditions. This is because on longer timescales, the influence of external factors such as greenhouse gas emissions are more significant on the long-term average state of the climate than today's climate conditions. For this reason, projections are often used for future climate planning on timescales beyond 20 to 30 years ahead and should not be used as if they are near term predictions. Climate projections are not regularly updated with updates over five years apart.

Climate predictions and projections categories

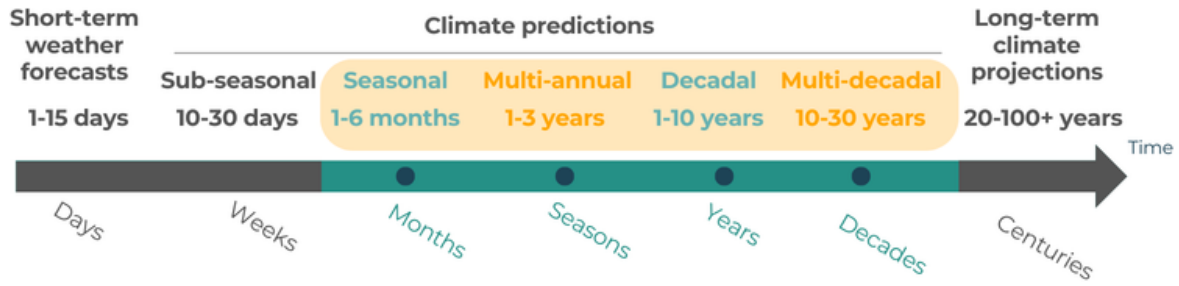


Figure: The timescales covered by different climate prediction and projection categories. The orange box denotes the focus of new prediction simulations being created in the ASPECT project, including longer term climate predictions out to 30 years. Source: ESS, Barcelona Supercomputing Center.

ASPECT climate information timescales

ASPECT focuses on the following climate predictions and projections:



Seasonal predictions:

These are predictions of the broad climate conditions expected over the next one to six months. Rather than predicting daily weather, they estimate the likelihood of conditions such as a warmer or cooler season than average, supporting planning in sectors such as agriculture, water management, and energy.



Multi-annual predictions:

These are predictions of climate conditions over the next one to three years, helping decision-makers manage near-term climate risks and opportunities. New predictions in ASPECT run two years into the future to explore bridging the gap between seasonal and decadal predictions.

Decadal predictions:

These predictions traditionally go up to ten years into the future, supporting medium-term adaptation, infrastructure, and policy planning.



Multi-decadal predictions:

These predictions focus on the next ten to thirty years and could help inform long-lived investments and resilience strategies. New multi-decadal predictions in ASPECT explore extending initialised prediction capability beyond traditional horizons.

Long-term climate projections:

These are often used to answer questions around longer term climate change from twenty years into the future onwards. Projections extend decades into the future, up to 100 years or more, guiding strategic adaptation and mitigation decisions.

How is ASPECT improving delivery of seamless climate information

ASPECT is improving seamless climate information and developing prototype climate services which combine information from seasonal forecasts, multi-annual forecasts, decadal predictions and climate projections more coherently.

Activities include:

- Research to understand how climate-sensitive organisations in Europe use climate information.
- Working together with users to identify how they can get value from seamless climate information and co-developing concepts for seamless climate advice through prototype services. You can find out more about this work in the project's Case Studies Booklet.
- Producing and analysing new model simulations specifically designed to bridge gaps between timescales, such as multi-annual and multi-decadal predictions.
- Improving spatial seamlessness through new downscaling methods that transform global climate model outputs into high-resolution, regionally relevant information.
- Exploring new scientific approaches to join or compare climate information across timescales, including through temporal merging.
- Creating a data catalogue of new ASPECT datasets and tools.



Find out more

Producing seamless climate information requires climate predictions that are reliable across different timescales. You can find out more about this in our other infosheets on the ASPECT website.

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