Combining global climate models for more accurate forecasting

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Credit: Markus Spiske from Pexels

The EU-funded ENSEMBLES ('Ensemble-based Predictions of Climate Changes and their Impacts') project has made a significant contribution towards achieving better climate risk forecasts. By combining different

global climate models and by generating samples of the future state of the earth system, scientists should have a better idea of what our climate will be like in five, ten or even two decades from now.

Assessing what our climate will be like in the future has always been a major challenge, due to the inherent complexity and uncertainty of our planet's climate system. The extent and effect of natural climate variability and man's impact on the environment are very difficult to predict. In fact, recent research suggested that the chances are high that our planet is being hit by a global warming between 1.4 and 3 degree Celsius by 2050.

Because it is difficult to project far-off future emissions and other human factors that influence climate, scientists have turned to a range of scenarios using various assumptions about future economic, social, technological, and environmental conditions. The ENSEMBLES project sought to build on this concept by integrating, in a systematic and comprehensive manner, a range of different climate-measuring models. The main objective of the project was to utilise and combine current technology to give scientists the tools necessary to make more accurate forecasts.

This new 'ensemble' climate forecast system can be used across a range of timescales and geographies, in order to construct more accurate scenarios of future climate change. It has been extensively validated; probability forecasts made with the model system were thoroughly checked against existing data.

From the beginning of the project, emphasis was placed on changes in extreme events - for example the severity and frequency of heat waves, drought, forest fires and flooding - and the effects of high-impact but low-probability events such as a shutdown of warm currents in the North Atlantic.

Initial results from the project show how the impacts resulting from climate change will affect all the systems and sectors studied. Indeed, it is expected that the project, which involved 66 institutions from 19 countries, mainly from Europe, will likely have major implications for a wide range of applications including agriculture, health, energy and water resources.

In fact, any of the new results gleaned from the project reinforce the conclusions of earlier studies of climate change projections and impacts. What is new about the ENSEMBLES' results, however, is that they describe in far greater detail how the climate is expected to change under standard scenarios of future emissions. They also include, for the first time, multi-model climate projections for a greenhouse gas mitigation scenario leading to emissions and temperature stabilisation in line with European policy aims.

Added value also comes from the use of improved models, developing new and better techniques to analyse and disseminate climate change projections and their uncertainties, and demonstrating how this information can be applied in policy-relevant impact assessments.

Another impact of the project is the fact that it has brought together an impressive variety of experts from diverse disciplines and sectors. The ENSEMBLES project has therefore supported efforts to build a dynamic European Research Area.

More information: ENSEMBLES www.ensembles-eu.org/

Provided by CORDIS

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