New research exposes limitations of environmental models and data sets

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Credit: Chris Smith

Our data on the natural world is uncertain. And so are the models we use to make sense of it. The Uncertweb project, funded by the EU, aims to clarify both of these sources of doubt. The project is designed to ensure that users appreciate the uncertainties contained within the environmental data and models. Many of these are increasingly found on the web and come without much indication as to their limitations. "If we don't have procedures that prevent anyone doing anything they like with data and models, you get a mashup, not reliable outputs, says project investigator Lucy Bastin, a software developer with a special interest in environmental data at Aston University in the UK. This approach has a wide range of applications in areas such as remote sensing and ecological forecasting.

Bastin points, as an example, to the series of models and data which is needed to calculate how much air pollution people are exposed to. "This requires data on the atmosphere and on human activity, both of which have to be modelled even before the results are combined. The same applies to climate change and food production," she tells youris.com. " It is easy to download information on soil types and on the weather, but it has to be chained with a series of models to see whether a given area would still grow wheat with a particular level of climate change."

The project has produced a range of web tools to help. Some are used to quantify uncertainty in measurements. Others show how uncertainty in data propagates through models. The key, says Bastin, is to produce a series of web tools that are simple to use and which "lower the barriers to visualising and communicating uncertainty."

As a result le, uncertainty will be built into Modelweb, a global project intended to improve our mapping of the world environment, according to Stefano Nativi, a division head at the Institute of Atmospheric Pollution Research at project partner CNR, the national Italian research agency, based in Rome.

Independent experts can only welcome this application, which is long overdue. "The project addresses a very fundamental problem," Alexis Comber, reader in geographic information at the University of Leicester in the UK tells youris.com. "Uncertainty is embedded in every data set, even about apparently simple issues such as sea level. You might think it is obvious where the sea is, but sea level is measured in different ways around the world."

Users need to be able to decide whether data is appropriate for the use they want to make of it. It is now simpler to do this. The same applies to models, which, Comber says, are approximations just as data is. He said: "Data quality is relative, depending on the use you want to put the data

to, and Uncertweb allows you to get a handle on that. It'll be very interesting to see how this work progresses in future years."

This initiative is welcomed because it addresses a significant and difficult problem. "There is an increasingly active community of people taking models and data from the web, and we need to know more about the uncertainty that results when you use a chain of models in succession," explains a UK professor of tropical forestry, who asked not to be named. He concludes: "At the moment there are very few rules for the use of global data."

Provided by Youris.com

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