

MCC Press Release

MCC generates a comprehensive map of climate change research

More than 400,000 studies analysed with big data technology. Approach provides a new way of dealing with the rapid growth of scientific literature.

Berlin, 28/01/2020. Research on climate solutions has so far been under-represented in UN climate reports. These topics are often on technical matters, and have received little attention from the social sciences – so scientific agendas and even funding priorities should be revised. This is the result of a landmark new study, which is the first to map out the content of hundreds of thousands of scientific articles covering the breadth of climate change research. The “topography of climate change research” was produced in collaboration between the Berlin climate research institute MCC (Mercator Research Institute on Global Commons and Climate Change) and the Priestley International Centre for Climate at the University of Leeds. The study has just been published in the renowned journal *Nature Climate Change*.

“In the new age of big literature, it is impossible for scientists to keep an overview of the publications even in their own field”, reports [Max Callaghan](#), a researcher in the MCC’s working group Applied Sustainability Science, who coordinated the study. “We have now found and mapped out more than 400.000 studies on climate change from a single scientific literature database – the Web of Science. This is an enormous number, and half of these studies were published in the five years since the last Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)”. The UN body has a mandate to provide regular, transparent, and comprehensive assessments of the scientific literature on climate change. The rapid literature growth poses real challenges to the IPCC, as well as to scientists attempting literature reviews on specific topics.

“Innovative machine learning techniques like topic modelling can help to understand what is going on in a complex and vast research field like climate change”, explains Callaghan. “Because the topic model is unsupervised, meaning the model discovers topics without human input, we can find things we didn’t know we were looking for”. New research topics, for example on negative emissions, carbon capture or green cement, can be identified without prior knowledge of the field. By matching the documents with their citations in IPCC reports, the study shows that such fast-growing topics on technical solutions are less well represented than studies on the basic science of climate change.

Further analysis of IPCC citations against the map reveals that the social sciences are not under-represented in recent assessment reports. “The IPCC does a good job in representing them in their assessments of the literature”, clarifies Callaghan. “However, many scholars are still very unhappy about the role of social

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science knowledge in IPCC reports. The problem may be more fundamentally about the low proportion in the climate change literature as a whole". Calls for more solutions-relevant IPCC assessments with prominent social sciences therefore also imply structural shifts in funding.

"Scientists need to provide knowledge maps to guide political actions on climate change", says [Jan Minx](#), co-author of the study and head of the MCC working group. "But purely manual assessments of the literature as commonly undertaken by the IPCC are reaching their limits. Our study demonstrates the power of big data applications to prepare IPCC assessments for the age of big literature".

About the MCC

The MCC explores sustainable management as well as the use of common goods such as global environmental systems and social infrastructures against the background of climate change. Our seven working groups are active in the fields of economic growth and development, resources and international trade, cities and infrastructure, governance and scientific policy advice. The MCC was co-founded by the Mercator Foundation and the Potsdam Institute for Climate Impact Research (PIK).

Reference of the cited article:

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