

Multiple factors contribute to flooding

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Flooding knows no boundaries. Research shouldn't either. Credit: R. Merz

Extreme events, such as floods or droughts, are caused by multiple factors - and must therefore be studied from many different perspectives. This is what international experts on water and climate research call for in the current issue of a renowned scientific journal. The Doctoral Program "Water Resource Systems", which is funded by the Austrian Science Fund FWF, is considered a precursor for interdisciplinary approach in this field. Thanks to the interactive education it offers, graduates from the program are able to solve complex problems facing water research.

Torrential rains, floods and record <u>flood</u> tides in some places; catastrophic droughts in others - one water-related disaster seems to follow the next in rapid succession. Many attribute the increasing occurrence of such <u>extreme events</u> to <u>climate change</u>. However, if indeed, and in that case, to what extent, global warming is actually the cause, has not been exhaustively investigated. One thing is nevertheless



clear: if at all involved, global warming is only one of many causes of water-related <u>natural phenomena</u>, as such crises stem from several different factors. Which is why extensive research can only be conducted using an interdisciplinary approach - something that experts on hydrology and <u>climate research</u> call for in a recent publication in an internationally-renowned academic journal.

An important step toward interdisciplinarity in climate and water research has been taken by one of the experts, Professor Gunter Bloschl. The expert on water resources is head of "DK-plus", a doctoral program that focuses on the cross-linking of different disciplines. In this program, scientists from hydrology, hydrogeology, water quality management, aquatic microbiology, structural mechanics, resource management and remote sensing are all working together. The aim of the program is to provide graduates with the necessary skills and knowledge to understand and solve complex problems relating to the climate and to water resources.

Symbiosis vs. isolation

Professor Blöschl of the Institute of Hydraulic Engineering and Water Resources Management at the Vienna University of Technology explains the necessity of interdisciplinary research: "Water-related problems, such as floods, stem from a wide range of factors: rapidly increasing water demands due to demographic growth and changing lifestyles, the depletion of freshwater resources due to environmental pollution, and the poor distribution of freshwater in relation to needs and demand. Land use planning and hydrological constructions also have a great impact. Due to this complexity, it is not useful to investigate climate, water and people in their isolated disciplines." Blöschl and his colleagues therefore urge that the water-related risks be viewed as the result of the interplay between mankind, nature and the environment: a requirement that he implements in the doctoral program "DK-plus".



International and interdisciplinary

The program has evidently sparked interest among colleagues around the world, as can be seen from the list of applicants. Around 600 prospective students from 74 countries applied last year. The best doctoral students were chosen through an elaborate selection process. They are working on topics such as water flow in aquifers and soil structures, water infrastructure, predicting flooding and the climate impact on soil moisture or water pollution.

The synergy of these different areas allows the program, with the aid of FWF, to train specialists who can hold their own at the forefront of international research. "This interactive education provides our students with the necessary toolkit to make reliable forecasts about water quantity and water quality", says Professor Blöschl. This means that these interdisciplinary scientists may be able to ward off water-related catastrophes and ensure that <u>water</u> will be available in both the quantity and quality that is required in the future.

More information: Original publication: Getting on target, A. Montanari, et al, *Public Service Review: Science and Technology* (2010) 7, 167 - 169.

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