



## **Drought definitions and processes: how do humans fit in?**

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Drought is commonly defined as a temporary lack of water compared to normal conditions. In the traditional definition used in the natural sciences (climate science, hydrology, earth science) only natural drivers are included and the human effect on water resources is excluded. Drought impact studies, however, using observed crop yields, wildfire data, reservoir information, etc., can hardly make this division. The interdisciplinarity of drought asks for a broader definition that considers the interplay between the hazard, impacts and management. In flood research, human effects on the volume and timing of the flood event are traditionally taken into account and there is the awareness that human factors like channel modification, land surface changes and water supply engineering can both intensify and reduce flooding. Drought researchers can learn from the flooding community and try to elucidate the effects of human factors on drought duration and severity. This is not only a necessary step to answer relevant societal questions in the anthropocene, but also the IAHS Panta Rhei initiative urges hydrologists to include the connection with human systems. We propose a paradigm shift in the definition of drought, namely to expand it to include the effects of human action. Here, we will present a conceptual diagram that will do justice to the interdisciplinarity of drought. We will discuss the complex interconnected system of climate – hydrology – society – ecosystem and which processes in that system are most relevant to take into consideration when studying drought. The revised definition provides recognition and a common ground to researchers in all fields of research and is better aligned with drought impacts and with stakeholders' and policy maker's views on drought. We will also go into some of the pitfalls and challenges that come with applying this revised definition. For example, the natural and human-induced processes related to drought can have different scales and it is important that we consider both natural and human-induced variability instead of long-term change (such as climate change, desertification and depletion). This discussion of revised drought definitions and processes should inform drought quantification, so that the effects of human factors on drought can also be quantified. Just as for floods, the results of these analyses can then feed into the management of highly anthropogenic water systems.