



## A new perspective on hydrological drought: a process-based classification into different drought types

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Almost ten years ago, the well-known flood typology of Merz and Blöschl (2003) was published. Up to now, such a typology does not exist for hydrological drought, while both drought management and research could strongly benefit from a thorough understanding and associated specific description of different drought types. Here, we present a hydrological drought typology based on underlying drought propagation processes.

In the proposed hydrological drought typology six drought types are distinguished, i.e. i) classical rainfall deficit drought, ii) rain-to-snow-season drought, iii) wet-to-dry-season drought, iv) cold snow season drought, v) warm snow season drought, and vi) composite drought. The processes underlying these drought types are the result of the interplay of precipitation and temperature at catchment scale in different seasons. The most common drought type in five contrasting European catchments is the classical rainfall deficit drought, caused by an anomaly in precipitation. However, when only the most severe drought events are selected, anomalies in temperature play an increasingly important role in hydrological drought development. For severe hydrological drought events, the most common types are rain-to-snow-season drought (rainfall deficit causes hydrological drought that continues into snow season due to below-zero temperatures) and warm snow season drought (complete melt of snow cover, due to high temperatures, in combination with rainfall deficit causes hydrological drought). The occurrence of hydrological drought types in a specific catchment is based on climate and catchment control, which makes it possible to infer the drought type occurrence from information on climate and catchment characteristics (i.e. response to precipitation) using a general framework.

This hydrological drought typology is based upon a thorough analysis of the processes underlying a high number of hydrological drought events in European case study catchments. The typology has a worldwide applicability, because it is based on general drought propagation principles. The proposed typology can be used to improve understanding of drought generating processes and to support the comparison of drought occurrence in different regions, the statistical analysis and prediction of drought, the development of drought indices, and research on the impact of global change on drought.

The paper will present the main characteristics of the different drought types, their occurrences in contrasting European catchments, and how this can be translated to catchments around the world using the general framework. With this elaborated hydrological drought typology, river basin management, which in many places needs to balance between the two hydrological extremes flood and drought, gets the appropriate tool to take both extremes into account equally. After ten years, the flood typology of Merz and Blöschl (2003) finally has a successor in the field of drought.

Merz, R. and Blöschl, G.: A process typology of regional floods, *Water Resour. Res.*, 39, 1340, doi:10.1029/2002WR001952, 2003