



The impacts of major groundwater droughts based on the European Drought Impact Inventory (EDII)

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Groundwater represents the largest accessible terrestrial water storage. As such, it is of crucial importance for society, as it can uphold provision of hydrological services to society when there is a lack of water during drought. However, when droughts extend over longer periods of time and groundwater abstraction is increased, longer-lasting groundwater droughts can develop, aggravating existing water shortages. This complex interaction results in an ambivalence of groundwater as a drought mitigation agent, and groundwater as a drought hazard impacting society. In theory, it is understood that this interaction exists. However, to date no study exists looking at empirical data regarding how and when groundwater is factually reported as a mitigation agent or as an impact agent. In this study, we build on previous efforts to synthesize text-based reports on drought impacts in the European Drought Impact Inventory (EDII). We extended the EDII with additional, groundwater-related reports. We then analysed the EDII data to find out: a) how is society impacted groundwater drought?, b) how is groundwater used during drought and what is its role?, c) is it used differently in different climatic or legislative settings?, and d) did the role of groundwater change over time? To answer these questions, we isolated the Europe-wide reports in the EDII that directly relate to groundwater, and merged them to new groundwater-related impact categories. We qualitatively summarized the way groundwater is reported as an impact, or as a mitigation agent, and provide statistics on the frequency of each occurrence. We further present the temporal development of the reporting, and compare the type and number of occurrence of groundwater-related reports between the UK with a humid climate and the Iberian Peninsula (Spain and Portugal) with a Mediterranean climate. The study will provide the first systematic documentation of groundwater drought impacts. It will thus provide guidance for researchers and water resource professionals considering whether groundwater can be used sustainably as an alternative resource during drought under different circumstances.