

EGU21-205

<https://doi.org/10.5194/egusphere-egu21-205>

EGU General Assembly 2021

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Alpine drought impact chains for sector-based climate-risk assessments

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Droughts are slow and silent natural hazards that can lead to long-lasting environmental, societal and economic impacts. Mountain regions are also experiencing drought conditions with climate change affecting their environments more rapidly than other places and reducing water availability well beyond their geographical locations. These conditions call for better understanding of drought events in mountains with innovative methodologies able to capture their complex interplays.

Within this context, the Alpine Drought Observatory (ADO) Interreg Project aims to further improve the understanding of drought conditions in the Alpine Space, with activities spanning from the characterization of drought types' components in five heterogeneous case studies in Austria, France, Italy, Slovenia and Switzerland. For each case study, different sectors exposed to drought, ranging from hydropower, agriculture to tourism are considered. Moreover, specific socio-economic characteristics were collected for each sector in order to better understand the main drivers leading to drought impacts.

Starting from the risk concept in the IPCC AR5, the Impact Chains (IC) methodology has been applied to characterize the hazard, exposure and vulnerability components in the ADO case studies. IC allowed to pinpoint the main factors affecting drought risk and the relevant socio-economic sectors integrating a mixed-method approach. Quantitative data collection on the hazard and exposure components were coupled with local experts' knowledge on the main vulnerability factors (e.g., through a questionnaire). Although validation represents a critical part of drought modelling, IC analysis and results were therefor compared with information from the European Drought Impact Inventory (EDII) on local drought impacts collected from scientific publications, unions press releases and newspaper articles over a long time period.

While drought risk assessment through IC can improve the understanding of the main drought events and their underlying factors, they also provide insights to improve planning and management of future drought events in the Alpine Space.