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www.drought.ch – A 10-year span from technology readiness level 1 to 8

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Up to 2003, a collective memory on severe drought-events in Switzerland has been pretty much inexistent. There has been no targeted research on hydrological drought and no early detection instrument was available for guiding decision makers. Research within the framework of the National Research Program 61 (www.nrp61.ch) “Sustainable Water Use” (2010-2013) provided the cornerstones for prototyping the early drought detection platform www.drought.ch. In June 2013, the platform was launched and provided useful information during two severe drought events in 2015 and 2018. At the same time, awareness about future increases in the frequency of such events has been confirmed by several studies considering future streamflow projections. Drought and water scarcity are now found on the list of the most threatening hazards for Switzerland. Several political initiatives call for increased efforts in the deployment of a national early warning system for critical droughts. This led to the proposition, that www.drought.ch should be integrated as the main tool for official national drought warnings in Switzerland.

This contribution summarizes the 10-year process of developing the drought warning system drought.ch from technology readiness level 1 (TRL 1, “basic principles observed”) to TRL 8 (“system complete and qualified”). TRL1 started in 2010 with a two-stage dialogue with stakeholders from different sectors including national administration, hydropower, forestry, agriculture, and river navigation. TRL 3 (“experimental proof of concept”) began in 2013. Over the years, the initial focus on drought-specific monitoring of precipitation, streamflow, lake levels, groundwater levels, soil moisture deficit, snow resources, and dryness in forests and stream temperatures has been expanded to advanced countrywide sub-seasonal ensemble prediction of drought-parameters. The last major upgrade was the deployment of monthly forecasts (issued twice a week) during the extreme summer drought in 2018. Analyses of public drought perception after the 2018 event demonstrated that TRL 8 has been achieved, i.e. that the drought platform is useful.