drought.ch - Swiss platform for early detection of drought

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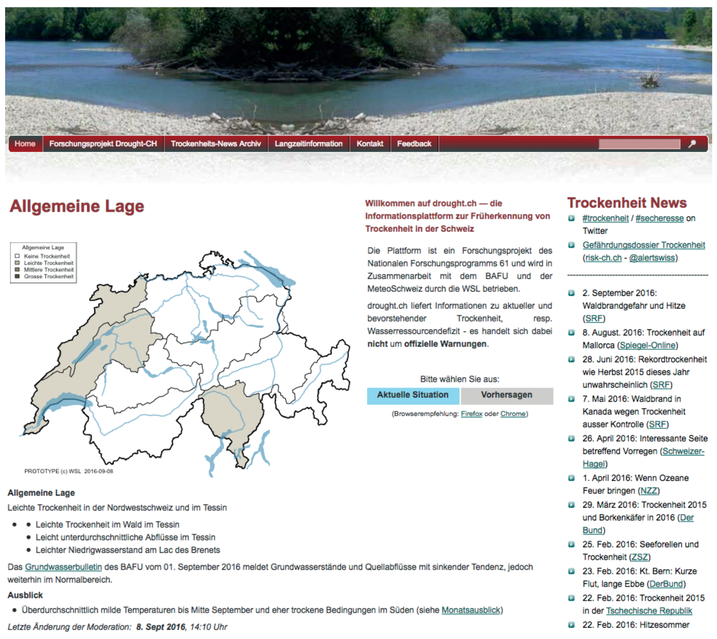
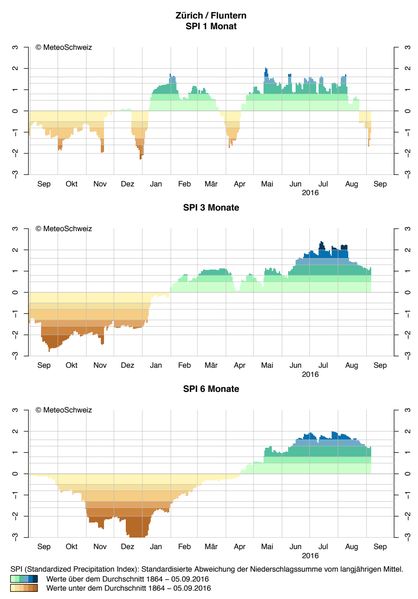
Introduction

In recent years Switzerland has experienced some unprecedent drought situations. At a political level solutions have been requested for early recognition of hydrological droughts. A prototype information platform has been developed to guide water resources management during situations where water resources drop below critical levels. The development was steered by stakeholders from national administrations and different economic sectors. Since June 2013 the platform has presented daily updated real-time information on several drought indicators including precipitation, streamflow, lake levels, groundwater levels, soil moisture deficit, snow resources, dryness in forests and stream temperatures. Information for earch variable has been used to create automatic "awareness maps" for nine large regions. Three levels of information with increasing detail and complexity can be accessed by over 400 registred users. The operators of the platform give interpreted comments on the content of the platform each week-day.
The currently implemented COSMO-LEPS forecasts are used for the upcoming five days. In addition, since April 2015 monthly ENS-forecasts were integrated experimentally. These two prediction systems have now been evaluated for the heat wave of summer 2015 and compared to the climatological forecasts.

How to present drought?





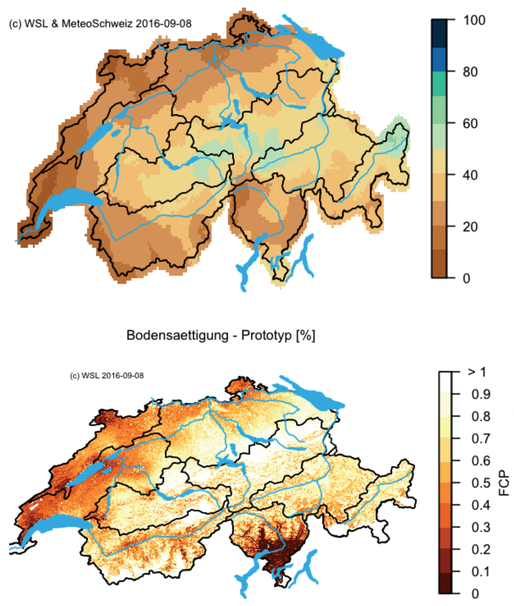


Figure 1
Left: Cartographic representation of the acutal dry situation. In addition, the situation is moderated daily in order to simplify the interpretation of the typed cards
Center: Visualization of the Standardized Precipitation Index for accumulated series of one month (top panel), three months (middle panel) and six months (bottom panel). The situation depicted refers to the MeteoSwiss Location "Zürich Fluntern" and for the period going from 1 September2015 to 5 September 2016
Right: Operational monitoring of drought indicators. The values shown indicate the area of the accumulated precipitation (20 days) compared to the past (1961 - 2010). Values <50% indicate relatively dry conditions, values >50% to more wet conditions. The more intense the color, the exceptional the event is (top). The bottom map correspond to the simulated soil saturation (FCP) on 8 September 2016

Analyses of the summer heatwave 2015

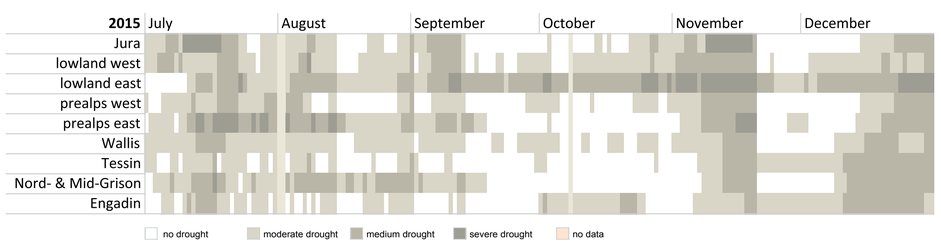


Figure 2: Overview of the distribution of the automatically generated drought levels in the nine regions for the second half of the year 2015

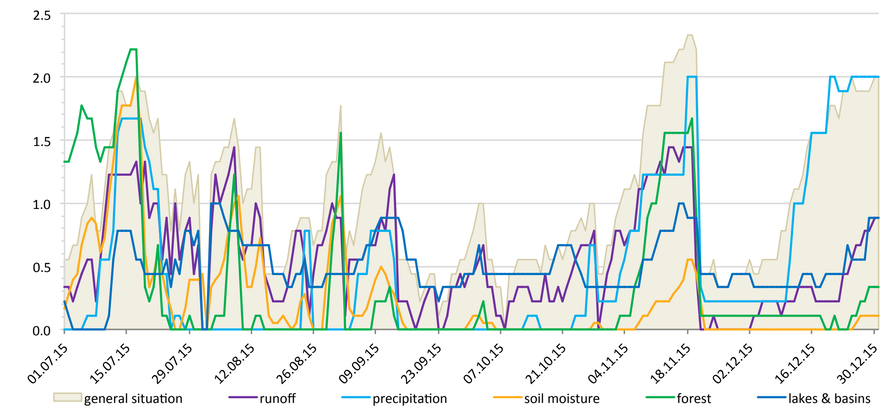


Figure 3: Averaged drought across all regions of the general situation and the characteristic quantities for runoff, precipitation, soil moisture, forest and lakes

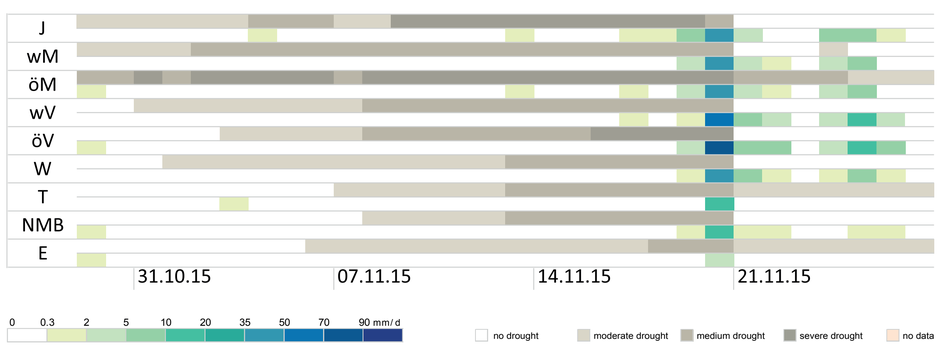


Figure 4: Comparison of the automatically generated drought levels of all regions with the average daily rainfall totals of selected stations

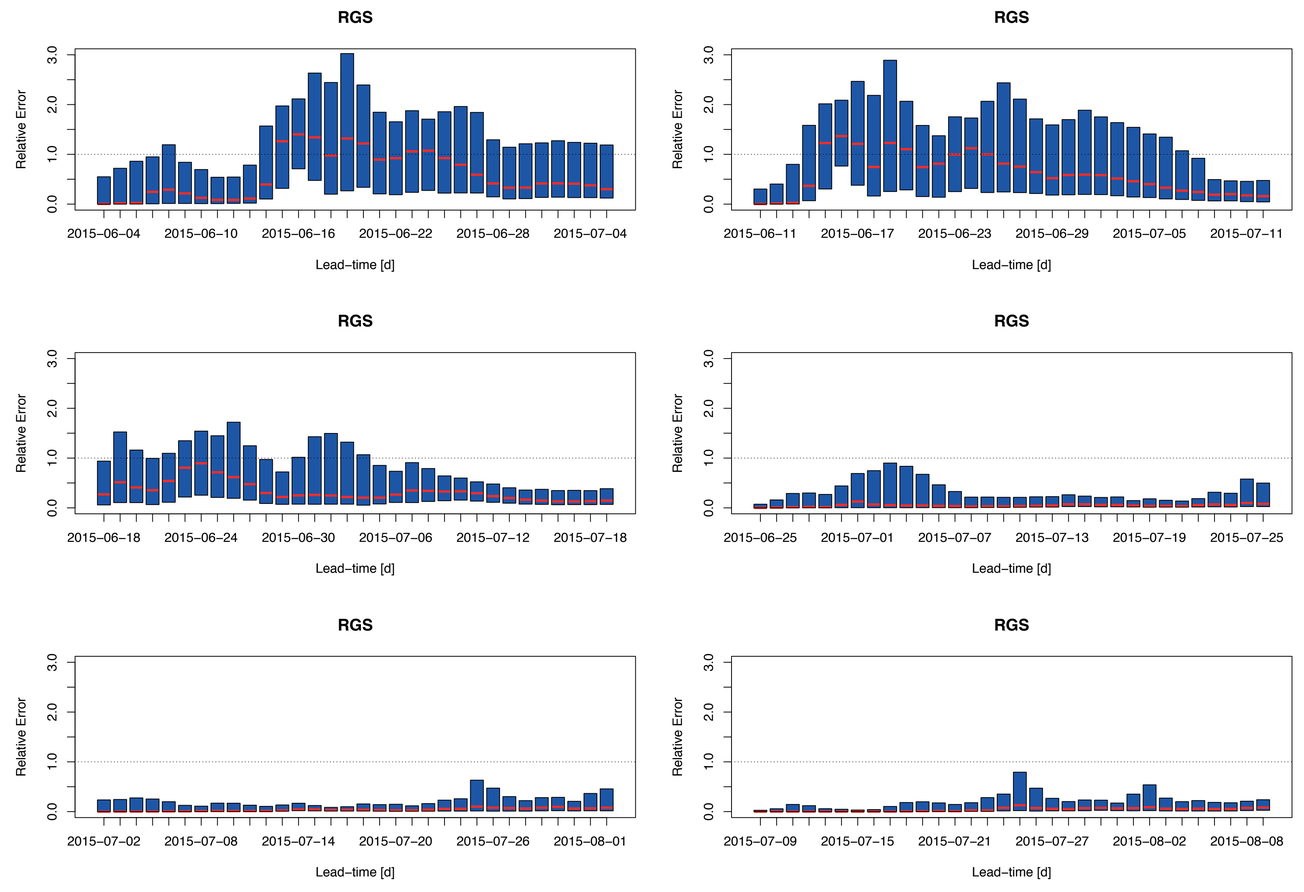


Figure 5: Geometric Mean Relative Absolute Error (GMRAE) will be applied to test accuracy of the Ensemble mean in comparison to the climatology. The later the 30-day ECMWF-forecasts begin, the smaller the error for the runoff (RGS)

Conclusions

The drought.ch platform presents an example of an integrated customer-oriented product that has developed in a participative, yet science-driven process over the duration of three years. It illustrates a succesful way to create added value by integrating and tailoring available hydro-meteorological information from different sources to a specific purpuse, such as drought management.

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