Geophysical Research Abstracts
Vol. 18, EGU2016-16794, 2016
EGU General Assembly 2016

The European 2015 drought from a hydrological perspective

Gregor Laaha (1), Tobias Gauster (1), Claire Delus (2), Jean-Philippe Vidal (3), and the UNESCO FRIEND-Water low flow and drought group Team

(1) University of Natural Resources and Life Sciences Vienna (BOKU), Institute of Applied Statistics and Computing, Vienna, Austria (gregor.laaha@boku.ac.at), (2) Université de Lorraine, Département de Géographie, Laboratoire LOTERR, Nancy, France (claire.delus@univ-lorraine.fr), (3) Irstea, Hydrology-Hydraulics Research Unit (UR HHLY), Villeurbanne, France (jean-philippe.vidal@irstea.fr)

The year 2015 was hot and dry in many European countries. A timely assessment of its hydrological impacts constitutes a difficult task, because stream flow records are often not available within 2-3 years after recording. Moreover, monitoring is performed on a national or even provincial basis. There are still major barriers of data access, especially for eastern European countries. Wherever data are available, their compatibility poses a major challenge.
In two companion papers we summarize a collaborative initiative of members of UNESCO's FRIEND-Water program to perform a timely Pan-European assessment of the 2015 drought. In this second part we analyse the hydrological perspective based on streamflow observations. We first describe the data access strategy and the assessment method. We than present the results consisting of a range of low flow indices calculated for about 800 gauges across Europe. We compare the characteristics of the 2015 drought with the average, long-term conditions, and with the specific conditions of the 2003 drought, which is often used as a worst-case benchmark to gauge future drought events. Overall, the hydrological 2015 drought is characterised by a much smaller spatial extend than the 2003 drought. Extreme streamflows are observed mainly in a band North of the Alps spanning from E-France to Poland. In terms of flow magnitude, Czech, E-Germany and N-Austria were most affected. In this region the low flows often had return periods of 100 years and more, indicating that the event was much more severe than the 2003 event. In terms of deficit volumes, the centre of the event was more oriented towards S-Germany. Based on a detailed assessment of the spatio-temporal characteristics at various scales, we are able to explain the different behaviour in these regions by diverging wetness preconditions in the catchments. This suggest that the sole knowledge of atmospheric indices is not sufficient to characterise hydrological drought events. We claim that assessment of impacts on water resources requires hydrological data and additional efforts of Pan-European dimension need to be undertaken to make hydrological assessments more operational in the future.