



Trends in low flows and droughts in small undisturbed rivers across Europe

K. Stahl (1), H. Hisdal (1,2), L.M. Tallaksen (1), H.A.J. van Lanen (3), J. Hannaford (4), E. Sauquet (5), S. Demuth (6)

(1) Department of Geosciences, University of Oslo, Norway, (2) Norwegian Water Resources and Energy Directorate, Oslo, Norway, (3) Centre for Water and Climate, Wageningen University, The Netherlands, (4) Centre for Ecology and Hydrology, Wallingford, UK, (5) Cemagref, Hydrology-Hydraulics Research Unit, Lyon, France, (6) UNESCO, Paris, France (kerstin.stahl@geo.uio.no)

In the recent past, several notably hot and dry summers have had major societal impacts in Europe, which has focused interest on the detection and attribution of temporal trends and spatial patterns in the occurrence and severity of low flows and hydrological droughts. Several recent studies have investigated such trends at a local or national level and results vary considerably, which to some extent is due to the use of different time periods and methods. In a collaborative effort initiated by UNESCO through the FRIEND research programme, streamflow data are brought together from small undisturbed catchments in Scandinavia, the UK, Germany, the Czech Republic, Slovakia, France, and Spain to investigate regional patterns of trends in streamflow drought across Europe. The UNESCO-IHP FRIEND European Water Archive Archive has been updated to the year 2005 to include the recent severe droughts and was supplemented by national data for this study. The results will provide opportunity to be compared (i) to an earlier study that was based on data of an earlier version of the archive for the periods of 1930-1990 and 1962-1990 and (ii) to several recent trend studies on large rivers, which are potentially more prone to direct human influences on low flows. Preliminary results of trend analyses are presented for a range of low flow and drought indices, including seasonal minimum flows, drought duration, and drought deficit below different thresholds, based on the Mann-Kendall test and a randomization test for determination of field significance.