Hydrology and
Earth System
Sciences

Open Access

Discussions

**Interactive
Comment**

Interactive comment on "Estimating drought risk across Europe from reported drought impacts, hazard indicators and vulnerability factors" *by* V. Blauhut et al.

Anonymous Referee #1

Received and published: 20 January 2016

General Comments:

This manuscript is a very interesting study that explores the feasibility of using drought hazard indicators and vulnerability factors as predictors of the annual drought impact occurrence and translates this information into drought risk maps at European scale. The authors propose the use of a "hybrid" methodology mixing hazard and vulnerability factors to define the likelihood of losses. One of the main constraint in building such a relations is the absence of reliable long-term dataset of drought impacts. In this study the authors use a new dataset of drought impacts to quantify the relationship between the drought severity and its impacts for several sectors.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

For instance, I see that one of the main source of uncertainties in the impact database are the different reliability of impact reports (scientific publications, governmental reports, media, etc.). Also, there exists spatial differences on report sources and a trend exists in most of the reports. I know that this is a problem not easy to solve and is clear that the EDII is one of the most complete database of drought impacts for Europe. However, a brief assessment on the main uncertainties would be beneficial to understand the reliability of main results.

Overall, the objective is clear, the paper is well written and follows an adequate methodology. This research is relevant to scientific questions within the scope of HESS. I am suggesting some changes before this manuscript would be suitable for publication.

Particular comments

Regarding the indicators and factors used, while you state which indicators you selected, I don't fully understand how you did the regional and temporal aggregation of indicators. A brief quantitative assessment in this respect would be beneficial.

Please briefly describe the drought indicator aggregation procedure for severity calculation.

Baselines used to compute each indicator are not clearly stated. It was used a common one or depends on the data availability? Baselines for CDI and SPI - SPEI are the same? What baseline was used to compute the SPI?

Impact Categories are mostly referred with the full name and sometimes using an acronym. I would suggest to use the full name to improve the readability in the discussion.

Page 12519 lines 16-17: It's not clear what the authors mean with multiple hazard predictor? What hazards?

Objectives are stated in the paragraph starting at line 17 of page 12519 and somehow repeated in the last paragraph of page 12520. To avoid recurrences, I would

recommend to condense these two paragraphs in one, preferably at the end of the introduction.

Page 12522 Lines 25-29: "Drought impact reports stem from various sources and are assigned with a certain level of reliability, decreasing by its enumeration-rank: academic work, governmental reports and documents, reports, media and webpages and other sources." How this reliability was accounted for? Different weights were assumed for each rank?

Page 12523 Section 2.2: Different levels of severity are shown as representatives of drought severity. However there is little explain on how drought severity was defined, how it was aggregated in time and space, etc. As far as I understood there is one annual value that defines drought, usually there are single months as stated in Figure 3. These months are related to some drought characteristic, like the peak of the drought, or are just the values of SPEI regionally aggregated? Were other metrics like total area, absolute minimum, etc. tested? A better description on this key issues would be beneficial to the understanding on how the functions were built.

Page 12523 line 16: "indictors" should read as "indicators"

Page 12523 lines 22-25: In this form this affirmation is not completely true. Neither in this work (you stated in page 12524 that a transformation using Gamma distribution was used) nor in McKee 1993, was the SPI computed as the difference from the mean divided by the SD. This is true for normally distributed variables, but usually this is not the case for precipitation.

Page 12524, line 11: EOBS-9 was used for a specific reason? Several updates since this version were made to this dataset that now integrates more data and with better quality of information. Do you think that using a different or updated dataset results could change largely?

Page 12526 Section 2.3: I'm not sure if Table 2 is completely necessary. I found a bit

confusing that at the beginning 16 vulnerability factors are presented but then in Table 3, 69 factors were selected. Also the header of the Table 2 is not clear, do exposure should be after the line as it is a component? Are drought characteristics the definition of exposure? If you decide to keep Table 2 factors in Table 3 should be associated to any category in Table 2.

Page 12527 lines 5-18: It's not clear how vulnerability factors with different time steps were used? There are different maps of vulnerability or the last available data was used?

Section 3: Is there any other function that could be suitable for fitting drought LIO?

Page 12529 lines 10-14: Is unclear how SPEI data was included in the model. I guess that monthly data for each aggregation period was used. Please be more specific.

Page 12532 line 3-6: did the authors checked D(fapar) for the growing season instead of the annual average? This could improve the suitability of the fapar as a predictor.

Page 12532 lines 9-11: SPEI performs better because it has more data availability than the CDI or because it better represent the conditions?

Page 12537 lines 24-26: "For an application like this one, this can be interpreted in two ways: prior standardisation, composition and weighting appears unnecessary or a composite of factors may well replace the many individual ones." This sentence seems a bit contradictory in the present form, please consider rephrasing.

Page 12539 lines 2-7: "Hence, the most relevant SPEI may differ in month selected. This corresponds to different aggregation times, e.g. detected by Lei et al. (2011) for Northern China and Potopováa et al. (2015) for Czech Republic for 5 maize. Furthermore, some combinations of selected hazard indicators may have been affected by the criterion of variable independence employed." This two sentences are not completely clear to me. Please consider rephrasing them.

Figure 1. Please review the caption of this figure. It could be shortened as: "Number

of annual NUTS-combo scale impacts reported and archived in the European Drought Impact report Inventory (EDII) by European macro region (left panel) and by NUTS-combo region (right panel)."

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 12515, 2015.