

Interactive comment on “Estimating the water needed to end or ameliorate the drought in the Carpathian region” by T. Antofie et al.

Anonymous Referee #1

Received and published: 22 May 2014

General comments:

This is an interesting study that presents the main characteristics of the precipitation needed to end or ameliorate droughts in the Carpathian region. It is a well written paper and deals with an important topic in the region which has a considerable incidence of droughts. The manuscript could be enhanced by addressing a few points suggested below.

The manuscript does not present a discussion section. A discussion section should be added even if it is together with the Results section.

For the identification of droughts the authors choose the Sc-PDSI. There are some studies, as indicated in the manuscript, which point to some weaknesses of the PDSI.

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For example, Vicente-Serrano et al. (2010) describe some limitations of the PDSI such as not allowing for the distinction of different types of droughts (meteorological, hydrological, agricultural) as it has a fixed time scale. Does the Sc-PDSI still have these limitations? How is it then used to quantify the impacts of the different types of droughts?

Specific comments:

P 1496, L8-10: What other indicators were computed? How do they compare with Sc-PDSI?

P 1496, L11-12: And the other indicators are not able to measure the intensity and severity of droughts?

P 1497 L7: There is not description of the region studied in the manuscript. A small description is needed to understand the characteristics of the area in the study. Moreover, the location of the region in the continent/globe is not mentioned (for example: located in Central and Eastern Europe). I would be nice to enhance Fig. 1 by locating the region in the continent and then zooming to the region. Furthermore, there is no mention to observed past droughts in the region. Do droughts occur often?

P 1497 L10: What is the temporal scale of the model? Please add.

P 1497 L14: Where is this precipitation coming from? Is it reanalysis data? or coming from satellite? or measured in the ground?

P 1497 L16: Same question for the temperature. Where is this temperature coming from?

P 1497 L24: What is HYPRES? This should be defined at a first mention.

P 1498 L3-6: Are runoff and recharge hydrological parameters or fluxes? Please rephrase/expand this paragraph. It is not clear what is computed and what is the input information to the model. Maybe a formula on the water balance with the terms

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considered in the model would help. Moreover, which are the Palmer constants and what is the meaning of the CAFEC precipitation? Which of the parameters described come from external datasets and from where? This should be clear in this section. The methods described may fit better in section 2.2.1.

P 1498 L7-12: What is the climate characteristic coefficient? Maybe this entire paragraph would fit better in section 2.2.2? Or are any of the things described here external datasets?

P 1498 15-17: This sentence is not clear, please rephrase. Originally it was computed on a monthly basis, and what is the temporal basis now?

P 1498/1499, Section 2.2.1: A brief description of the model in the methodology mentioning key parameters and fluxes would help to understand the methods used. The title of the section is "Sc-PDSI computation" and the computation methods are not described at all.

P 1499 L4: What is the sub index i in this section? Is it month?

P 1501, L9: Why was the gamma distribution used?

P 1502, L17-26: Was this compared with recorded droughts events in the region in the past years?

P 1503, L29 - P1504 L2: If the months mentioned here correspond to the points tagged in Fig.5 there are some that do not match. E.g: August 1990 for moderate droughts, and January 1990 for severe droughts.

P 1504, L28 - P1505 L3: Please rephrase this sentence to clarify. Should it say "...beginning of summer (May/June/July) and end of summer (July/August) respectively, ..."?

P1505 L4-5: Is this on average for the whole period? Indicate in the text.

P1505 L9: Add "in the next month" after "to end a drought".

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P1506 L13: Is it "May and June" or "April and May"?

P1506 L15: And also Oct/Nov/Dec for the north-eastern area.

P1506 L16: Corresponding with which months of the annual precipitation cycle?

P1506 L27: January and February?

P1508 L2-5: Were the results verified in some way with observed/recorded data?

P 1509, L7: What do you mean by "... until the layer is full"?

P 1509, L9: Are actual values of evaporation, recharge and runoff hydrological parameters or fluxes? How are the potential values estimated? A formula on the model water balance would help.

P 1525: Fig 8. Please make sure that the figure is clear and the text is readable in the final format. The font size seems very small (unreadable) but it might be to the format provided in HESSD.

Technical corrections:

P 1495, L20: Why 2010b? Is there a 2010a?

P 1495, L26: Why 2000a? There is not another reference to Wihlrite et al. in the 2000.

P 1495, L27: The reference on WMO, 2006 is missing. Also, the reference on ISDR, 2007 is missing.

P 1497, L1: 4 sections?

P 1498, L20: The reference on Weber and Nkemdirim, 1998 is missing.

P 1498, L21: Remove the b after Vicente-Serrano et al., 2010.

P 1499, L1: Remove the comma after "presented in"

P 1501, L8: Replace "precipitations" for "precipitation"

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P 1502, L17: Remove "the" previous to "Fig.4"

P 1503, L3 and L6: Change "SC-PDSI" to "Sc-PDSI" to uniformize.

P 1505, L29: The reference Busuioc, 2001 is missing.

P 1508, L24: Reference is not correct, change "Thornthwaite's method, 1948" for "Thornthwaite, 1948"

P 1511, L13: Shouldn't it say "dry/wet spells" instead of "drought/wet spells"?

P 1511, L23: Shouldn't it say "dry" instead of "drought"?

P 1512, L9: Is the reference on Allen et al., 1998 mentioned somewhere in the manuscript?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 1493, 2014.

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