

***Interactive comment on “Impact of the European Russia drought in 2010 on the Caspian Sea level”***  
**by K. Arpe et al.**

**Anonymous Referee #2**

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The manuscript presents a case study on the Volga - Caspian Sea water budget subject to the heat wave 2011. The study deserves a possible publication as being interesting for a wider hydrological community. Results are partially novel, though presentation is sometimes vague (see my comments below on section 3.2, 3.3 and 3.5) making the conclusions too uncertain. My advise is to essentially revise the manuscript, complement it with later data and more detailed analysis. After this, the study may be recommended for publication.

The overall structure and the language are clear.

Title is catchy but does not fully correspond to the contents of the manuscript. Not more than 20% of the analysis is dedicated to the "russian drought 2011". The rest deals

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with information from previous years loosely connected to the question of anomalous dry events.

Abstract is unnecessary long and can be shortened without loss of essential information.

- Lines 14-21: 2+7+5+7=21, not 22cm. Presenting information in such a way is too confusing for an abstract, which should be understandable as a standalone text.

1. Introduction is too sketchy. No indepth review on state-of-the-art is presented, though the water budget of Caspian Sea is certainly not a new problem.

- Lines 19-20. The reasons and consequenses of inclusion/exclusion of Kara-Bogaz-Gol in the analysis should be explained.

- Lines 20-21. The sentence contradicts to the first sentence of the abstract.

- Lines 3-5 (p7783): Avoid using future tense for description of the work already done.

2. Data

- Lines 2-4. Sentence is unclear. Try to rephrase. ("Except" = "Excerpt"?)

3. Results - presentation is sometimes too sketchy or incomplete (Sections 3.2, 3.3, 3.5)

Section 3.1:

- Lines 27-29: Sentence is confusing. Where the 21% come from? Why is it "perhaps" 21%?

Section 3.2:

The section deals with estimation of the time lag between strong presipitation events over the Volga Basin and the increase of the Volga River discharge into Caspian Sea. The authors claim to present results on two different methods of the time lag estimation. The first method consisted, apparently, in a simple visual inspection of monthly

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averaged datasets and subjective choice of corresponding peaks in precipitation and discharge. Results are presented only verbally in Table 2 without any support for the results reliability. In the second paragraph, an attempt of applying the cross-correlation analysis to the precipitation/discharge data is described. No results of this analysis are presented. A necessity of low-pass filtering ("smoothing") of data is declared, but not explained. Two smoothing window sizes, 5 and 9 months, were used without a justification for these choices. In overall, the results presented in this subsection cannot be published in this form. Either the subsection should be rewritten by presenting a more thorough analysis, or omitted completely with subsequent changes in the analysis and conclusions.

### Section 3.3:

The results are too loosely presented. It is difficult to figure out the meaning of presented numbers and their connection to each other. The Authors try to provide the reader with a "feeling" on the uncertainty of the water budget components' estimation that is not a proper way of scientific analysis.

- Lines 1-5 and Table 3: How the numbers +39cm and -21cm in text relate to the CSL change values of +16 and -10 from Table 3?

### Section 3.4:

- Line 14: Reference to Fig. 3 appears, but Fig. 2 was not referred before. Revise figures' numbering.

### Section 3.5:

It is hard to judge, how novel are the results presented in this subsection. It is also unclear how this subject is related to the anomalous drought of 2010. If, as authors state, it is planned "to investigate this issue... in a separate study", the subsection has to be removed from the Results section of this manuscript.

## 4. Discussion

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The Section presents a nice overview on regulation measures on the River Volga and their effect on the discharge and, consequently, the Caspian water level. It is stated that the effect of the Drought 2010 on the Volga discharge is significantly delayed by these measures and is expected to last, at least, throughout 2011. This is indirectly supported by data in Fig. 3, where the level decrease continues down to the latest measurement of April 2011. The apparent conclusion for the reader is: Impact of the dry event cannot be fully estimated, unless data from later periods become available. That is, including data at least to the end of the hydrological year 2010-2011, and performing analysis based on the extended information would make the results much more valuable.

- Line 22: replace "was very low, i.e. 50-70% of the normal" with "was 50-70% of the normal".

### Table 1:

Abbreviation KBG should be explained in the text or in the figure subscript.

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