

Interactive comment on “How to identify groundwater-caused thermal anomalies in lakes based on multi-temporal satellite data in semi-arid regions” by U. Mallast et al.

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Received and published: 4 April 2014

Due to the second review that we received after we have replied to the comments of Reviewer1, some pursued changes affect the previous changes. To maintain certain clarity we would therefore add this reply enabling Reviewer1 to follow our changes in a straightforward manner.

Within this context, the specific comment section highlights relevant changes that were commented differently in our first reply. The technical comments list changes that mostly address shortening and/or restructuring of sections, the removal of Fig. 3 and

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the shift of Tab. 2 and 3 and Fig. 8 into the supplementary material.

Specific comments

Reviewer comment

The first paragraph of the Introduction introduces the problem of sustainable management of water resources, but the paper does not provide results that are directly or straightforwardly applied to this ultimate goal. In fact the notion of sustainable water management is treated by a large number of papers, which are neglected by the authors in their introductory section. Therefore, I suggest to start directly from the scientific problem of the determination of groundwater discharge in surface water bodies.

Answer

In the revised version of the manuscript we changed the introduction to large extents starting directly, as suggested, with the scientific problem instead of introducing it with sustainable water management practices.

Technical comments (P=page, L=line)

Abstract completely changed with emphasis on a concise but informing structure

1. Introduction

P4902L23-P4903L11. Mostly removed, or reworked in terms of a straightforward description and introduction to the topic

P4904L03-P4905L25. Mostly removed, or reworked in terms of a straightforward description and introduction to the topic

P4905L26ff. Objectives rewritten in a simple and straightforward manner

3. Data and Pre-Processing

P4907L22-P4909L20. Largely reworded and partly shortened, changed the resulting term from “ $T(^{\circ}\text{C})^2$ ” to “ $\text{SST}(^{\circ}\text{C})$ ” in Eq. 3

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4. How to separate [. . .]

P4910L9 Changed heading from “How to separate groundwater from surface-runoff” to “Groundwater-surface water influx separation”

P4910L10-L19 Shortened and reduced to relevant introduction of that section, removed Fig. 3 as the additional benefit was too low compared to a short description of the results in the text

P4910L20 Sub-heading deleted

P4910L21-P4913L22 Almost completely rewritten and restructured to maintain a straightforward concept – theory is shortened and leads directly to the “methodical preprocessing” section that is also restructured to fit in sequence to Fig. 4 (Flowchart), all previously included methodical subsections are grouped and logically rewritten, Eq. 6 was too general and was rewritten

P4913L22 Changed heading from “Surface-runoff influence inference through IF” to “Evaluation of surface runoff influence”

P4917L10 added the following bullet point: “iii) For the present study 7 SST images are excluded that statistically exhibit a surface runoff influence.

5. How to amplify [. . .]

P4913L22 Changed heading from “How to amplify groundwater signals” to “Multi-temporal SST approach amplifying groundwater caused thermal anomalies”

P4917L12-P4919L25 Largely reworded and shortened, specifically for the description of travel time of submarine spring water, moved Fig. 8 and parts of the explanation to supplemental material; introduced subsection for clarity reasons

6. Discussion

P4922L1 Changed heading from “Discussion” to “Transferability and Uncertainty”, as

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the discussion was already included in the two result sections (1. Groundwater-Surface water separation and 2. Multi-temporal SST approach) before. However, this sequence unnecessarily doubled certain contents and was partly misleading as the actual content coped with the general transferability and improvements of certain aspects (Pre-processing, IF, Application in other environments).

P4922L2-P4927L29 We maintained the structure but removed any doubling to previous sections and focused strictly on uncertainty and transferability aspects. We also included a section that addresses the broader application in other areas.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 4901, 2013.

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