

REVIEW of the PAPER hess-2014-431by Fabre et al.

1) GENERAL COMMENTS:

SCIENTIFIC SIGNIFICANCE (GOOD [2])

The paper is focus on the assessment of the balance between demand and availability at river basin scale. I consider the paper of potential interest to the HESS readership.

Prior publication

As far as I'm aware, this work has not been published elsewhere.

SCIENTIFIC QUALITY (FAIR [3])

Although I found the paper of interest, I did have a concern about the presented material, which will require further explanation by the authors. The main concerns are related with:

- In the proposed basing scale analysis there is not any reference about groundwater resources and the influence that their management (groundwater stresses) could have on stream flows (stream depletion due to pumpings). I think that the hypothesis assumed by the authors to approach groundwater and stream-aquifer interaction within their simulation should be clearly pointed in the paper (in the method and in the limitations described in the discussion). A paragraph about the different stream-aquifer interaction approaches existing in the literature should also be included within the introduction.

In some cases too simple stream-aquifer interaction approaches (that not consider spatial distribution of the stresses [pumping far or near to the stream-aquifer hydraulic connection], geometry or aquifer heterogeneity] produce important errors. Could it explain the difference observed in some sub-basin? At the usual timescale in which river basin management models work, surface water flow can be represented by simple mass balance in a flow network. However, the simulation of groundwater flow and surface-groundwater interactions within a conjunctive use management model usually requires more complex modeling approaches [Gorelick, 1983]. Due to their computational cost, there are few examples in which classical finite difference or finite element distributed models are employed to integrate groundwater and stream aquifer approaches within management models (Theodossiu, 2004; Matsukawa, 1992), and they are simple systems (eg. Pulido-Velazquez et al., 2007, 2008). Assuming linear behavior other approaches with important computational advantages could be employed, as the influence functions ([Fredericks et al., 1998; Belaine et al., 1999; Theodossiou, 2004; etc.]) or the eigenvalue technique solution for confined (Pulido-Velazquez et al., 2007b, 2011b, 2012) and

unconfined (Pulido-Velazquez et al., 2006, 2007a) aquifers.

References:

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PRESENTATION QUALITY (GOOD [2])

The paper is well written and organized, although some cite in the text are missing in the “References” section (the author needs to carefully check them again), and there are some minor typos (eg. Pulido-Velasquez instead of Pulido-Velazquez should be corrected within the text and the reference list). The figures and tables are quite clear and easy to follow.

SOME DETAILED COMMENTS and TECHNICAL CORRECTIONS

My concerns and suggestions are presented below by section.

1) Introduction

A paragraph about the different stream-aquifer interaction approaches existing in the literature should also be included within the introduction.

3) Method

The hypothesis assumed by the authors to approach groundwater and stream-aquifer interaction within their simulation should be clearly pointed in the paper (in the method and in the limitations described in the discussion).

5) Discussion and conclusions. 5.2) limitations

The limitations of the modeling approach with respect to the assumptions applied to simulate groundwater and stream-aquifer interaction should be clearly stated.

Line 654. Cite in the text missed in the “References” section (see Grouillet et al., submitted).