

***Interactive comment on “Groundwater
ecohydrology: GIScience tools to forecast change
and sustainability of global ecosystems, studies
in Africa, Europe and North America” by
D. R. Steward et al.***

Anonymous Referee #2

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The paper presents a GIS framework for organizing data of different type, source and use, related to groundwater ecohydrology. It then shows three case studies in which numerical models are applied to such organized data, and it provides some insights about the results obtained. The paper lies within the context of 'Geographic Information Science', which develops computing tools for organizing and interpreting geophysical data. Since a systematic data-banking improves data availability and interoperability, these tools are useful in particular for interdisciplinary research fields such as ecohydrology.

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I appreciate the paper's goal about efficient data-banking and bridging different approaches to groundwater science; however, I question the ultimate objective of 'developing a comprehensive, systematic understanding of continental water dynamics' (lines 3-4). Collecting and organizing data does not mean to 'develop new understanding to address scientific challenges' (lines 123-124), which is a grand challenge and a much more difficult goal. The claim that an efficient data-banking can improve the knowledge and understanding of natural processes is questionable, if not unreasonable.

The paper does not have fair and realistic objectives and it does no place them in the wide and diverse context of Ecohydrology. No general model is proposed for an improved understanding of ecohydrological processes, but only a framework for data organization, yet useful, efficient and science-based. Case studies are presented to show some applications of the framework and the corresponding 'conceptual models', while numerical results are provided by softwares taken from the literature. Some confusion may thus arise about the 'conceptual models': these are, in fact, data structures built according to the knowledge of each specific case study. 'Conceptual models' are thus not tools for general quantitative descriptions of processes, but collections of data which are depicted in Figures 4-6-8.

In conclusion, the paper does not state the real (more limited) advances proposed. Data have been collected from available sources (lines 196-203), the theory describing soil water balance and groundwater flow (lines 146-167) is well known, numerical codes used for processing data (lines 196-203) are found in literature. ... In my opinion, there is little novelty and a wealth of details and comments about the case studies. If the paper is going to be accepted, -the real advance (data organization) needs to be stated clearly from the beginning, -misleading sentences about the paper ultimate objective should be avoided, -the title could be rephrased in order to better address the topic, -and the whole work should be much shorter and use less citations (to be reduced to the essentials).

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