

The following are my comments as a Referee on the following Research Article:

Journal: HESS

Title: **The problems of overexploitation of aquifers in semi-arid areas. The Murcia Region and the Segura Basin (South-east Spain) case**

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### **General comments**

I find this article of little scientific significance

The article manuscript does not represent a substantial contribution to scientific progress within the scope of Hydrology and Earth System Sciences. It does not present any substantial new concepts, ideas or methods. If anything, it presents very site-specific information on a case of overexploitation of a local aquifer (or group of aquifers) in Spain

### **Specific comments**

In chapter **2.1** the author presents a very brief semantic review of the word “overexploitation”, neglecting at the end to state which meaning of the term he is adopting in the chapter **3 Effects of aquifer overexploitation** of his article. Yet, the caption of chapter **3 Effects of aquifer overexploitation** notwithstanding, the discussion of the chapter is entirely on a rather nebulous term “**intensive exploitation**”. While “**intensive exploitation**” can be either sustainable or unsustainable (hence its ambiguity), I believe that the term “aquifer overexploitation” is unambiguously synonymous with “unsustainable production of ground-water”.

Further, the author presents a list of direct and indirect **Negative impacts of overexploitation**. The distinction between the two categories (direct and indirect) is not clear and confusing. For example, the author lists among the direct impact of overexploitation “Change in the physical and chemical characteristics of the groundwater; hand in hand with the overexploitation, the groundwater abstracted sometimes becomes thermal and their chemical facies change, for example, going from bicarbonate to sulphate facies, or vice verse[sic!]” and then lists again, this time among the indirect impacts “Alteration of the physical properties of the aquifer water.”

The discussion presented in chapter **4.3 Chemical quality and thermalism** is woefully insufficient. The author is citing temporal changes in the aquifer chemical facies from “mixed sodium chloride-bicarbonate” or “sodium-calcium bicarbonate-chloride” in 1972 to “a sodium-chloride facies” in 1986 without presenting a single chemical analysis of all the major anions and cations in a tabular or graphic fashion. This is a major deficiency in the article.

Elsewhere, he lists among the indirect impacts “Creation of depression cones that mobilize pollutants from remote areas”, while cones of depression are clearly, always a direct result of ground-water production.

Strangely, the author also claims that “Sea level rise in the Mediterranean.” is also an indirect result of aquifer overexploitation. I know of no mechanism that would explain how aquifer overexploitation may cause such dramatic effect.

The author should keep in mind that not every reader of his article will be familiar with all the geographic locations and litho-stratigraphic units of his study area, and should always refer to the figures/maps where these locations or units are identified.

Last, but not least, the article needs a thorough editing, particularly with regard to the appropriate use of English language. The most flagrant examples of misuse of terms occur in chapter 5 **Proposal of internal actions to alleviate the hydric deficit of the Segura Basin**. The term hydric is an adjective defined as relating to, characterized by, or requiring considerable moisture. Therefore, “hydric deficit” does not mean “scarcity of water” or “insufficient quantities of water”. Later in the same chapter the author is citing the need for “hydric education”, which doesn’t make any sense at all.

Similarly, the caption of the chapter 4.2 **Analysis of the excision[sic!] of the Ascoy-Sopalmo aquifer** doesn’t make any sense either.

Elsewhere in the same chapter the author is referring to “surface river waters”, which is verbal overkill, as “river waters” are always understood as a component of “surface waters”.

Earlier, in the chapter 4.1 **General characteristics of the Ascoy-Sopalmo aquifer before division[sic!]** the author states that the aquifer “belongs to the municipalities of Jumilla and Cieza”, conveying an unintended connotation of legal property (while the author, obviously intended to say that the aquifer is located under the area of the municipalities of...)

In summary, the article is poorly written (4), with little scientific significance (4) and fair scientific quality (3).