

Interactive comment on “Screening of sustainable groundwater sources for integration into a regional drought-prone water supply system” by T. Y. Stigter et al.

Anonymous Referee #2

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General Comments The paper reports on screening on groundwater sources for integration in the public water supply system of Algrave, Portugal. The aim is to ascertain sustainability of groundwater withdrawals with respect to mean annual recharge under current and future change scenarios. The screening and selection is based on aquifer properties, well yields, and ground water quality data. The selected wells for one main aquifer system are then used to assess sustainability of groundwater use with a conceptual steady state groundwater model. This is a down to earth paper with motivation rooted in ensuring a sustainable public water supply. The topic’s urgency is ever more so for semi-arid/arid regions such as southern Portugal that faces both population pressure and possibility of a drier future. This manuscript brings forth, in a way, a protocol to

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inventorize available groundwater sources and to assess its supply capacity in order to manage growth in demand. This also makes readers aware of the data that is currently available in the study area. This manuscript is of great value to research in sustainable water policy design.

Detailed Comments (1) The authors have spent quite some space on discussing the inventory and screening of groundwater sources data set and have left comparatively little space on Section 4 onwards. The authors should expand this section further in comparison to previous sections. I found myself lost once in a while when they explain their conceptual groundwater model. The authors should therefore provide more detail on the concept of their model, via a couple of equations. Through this description they would also expose potential readers to parameters that they calibrate, i.e. transmissivity, storage coefficient (that also seems to have been adjusted later), etc., as well as other variables of the model that are of interest such as hydraulic head, recharge, and outflow. A descriptive figure of the model is also recommended. The authors should also expand on inverse modeling of transmissivity, in particular which years' data was used, and one or two lines on the method they employed to do so. (2) The authors do not discuss the limitations of the steady state assumption and its impact on the study itself, i.e. on perception of sustainability of groundwater sources in the region. The authors may want to discuss the results of their transient model scenario further in the light of sustainability over the long run. They only discuss it for a 2003-2006 run. (3) The authors should add a description of their transient groundwater model, briefly specifying how model updates the state variables over time, and how flow is routed, etc. This point may be dealt together with point (1) above by the authors. (4) It seems that the authors do not consider population growth in their future scenario. The authors assume that the same number of pumps would be in use 100 years down the line. It is, however, not difficult to conceive that municipalities might add additional wells with increasing population leading to increasing extraction rates over time. This will also bring forth the limitation of assuming steady state (see point (2) above) and its implications on future policy making. The authors should clearly state these, i.e.

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simplicity of their model (steady state assumption, etc) and of the scenarios (future change is too simple), as the limitation of this paper. (5) They should add a comment in the end that any policy recommendations derived from groundwater modeling results of this paper, i.e. based on Section 4 onwards, should be treated with caution due to simplified modeling assumptions.

Technical comments None.

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