Response to the comments

Date:Nov. 9, 2014To:C. P. Kumar "cpkumar@yahoo.com"From:Samy Khalaf "samykhalaf2005@yahoo.com"Subject:Response on comments for MS No.: hess-11, C4537–C4538, 2014
"Optimal well locations using Genetic Algorithm
for Tushki Project, Western Desert, Egypt "

I appreciate the insightful comments and suggestions, which greatly will improve this manuscript. Kindly, in the following is the response to these comments.

- <u>Comment (1)</u>: The language of the paper needs to be improved with correct grammar and proper formulation of sentences.
- <u>*Reply: OK, English language was reviewed.*</u>
- <u>Comment (2)</u>: Drainage network may be included in the study area map.
- <u>Reply</u>: There is no in Tushki project drainage system (Drainage network) because the irrigation system used in this area is drip (trickle) irrigation.
- <u>Comment (3)</u>: Please review the following statement on line number 25 on page 8 "general groundwater flow is from SW to NE direction (also similar statement on line 20 on page 10)" however from Figure 4, the groundwater flow direction appears to be SE to NW ???
- <u>Reply</u>: The <u>general groundwater</u> flow Characteristics to the Nubian sand stone aquifer in western desert in from SW - NE while figure 4 chosen the <u>local groundwater</u> flow direction which reflect the recharge from river Nile to adjacent aquifer i.e. SE-NW.
- <u>Comment (4)</u>: Please correct the following statement on line numbers 26-28 on page 8 "The groundwater flow rate was estimated as 0.044 m/day (near Nasser Lake) and decreased to 0.044 m/day towards northwestern parts" (both figures are mentioned as 0.044 ???).

<u>Reply</u>: <u>OK</u>, was verified from reference (EL-Sabri) and was corrected statement as follows: "The groundwater flow rate was estimated as 0.054 m/day near Lake Nasser and decreases to 0.044 m/day towards southwestern and middle parts of the area". <u>Comment (5)</u>: Variable head boundary is not visible in Figure 5 on page 35.



<u>*Reply: OK,*</u> the cells color in the model is different on the legend, the below figure illustrate the variable head

<u>Comment (6)</u>: "El-Sabry" (2010) in the Reference list has been mentioned as "El-Sabri" in the text on pages 8, 16, 34). Please correct the name.

<u>Reply</u>: <u>OK.</u> The correct Reference name is El-Sabri.

<u>Comment (7)</u>: Few study area features (lake location/drainage) may be included in Figure 10 on page 41.



Fig.10: Optimal location of wells (2nd scenario)

<u>Comment (8)</u>: The following references are missing from the reference list –

Holland (1975) - mentioned on line number 7 on page 3 Karahan and Ayvaz (2005) - mentioned on line number 13 on page 4 Ayvaz and Karahan (2008) - mentioned on line number 14 on page 4 WRRI (2002) - mentioned on line number 11 on page 9 DRC (2012) - mentioned on line number 11 on page 10 and line number 10 on page 11

<u>Reply</u>: <u>OK.</u>,

This references are inserted for the reference list

1- Holland (1975)

Holland J.H. Adaptation in Natural and Artificial Systems. Cambridge, MA: MIT Press.Second edition (First edition, 1975).

- 2- Karahan and Ayvaz (2005) Karahan H, Ayvaz MT "Groundwater parameter estimation by optimization and dual reciprocity finite differences method". J Porous Media 8(2):211–223, 2005
- 3- Ayvaz and Karahan (2008)

Ayvaz MT, Karahan H, "Simultaneous parameter identification of a heterogeneous aquifer system using artificial neural networks". Hydrogeology Journal 16: 817–827, 2008.

4- WRRI (2002)

Water Resources Research Institute (WRRI) "Well logging of observation wells in Tushki project", unpublished internal report, submitted, MWRI – Water Resources Research Institute, 70 p., 2002.

5- DRC (2012)

Desert Research Center (DRC) "Evaluation of Hydraulic Parameters of Nubia Sandstone Aquifer", unpublished internal report, submitted, MARA – 65 p., 2012.

With kind regards,

Authors