

## ***Interactive comment on “The use of GIS and remote sensing for the assessment of waterlogging in the dryland irrigated catchments of Farafra Oasis in Egypt” by M. El Bastawesy and R. Ramadan Ali***

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I would like to thank the editors and the reviewers for their considerate reviews and the valuable comments which will improve the quality of this manuscript; I will follow up these comments and amend my manuscript thoroughly in order to be awarded the chance to submit a revised manuscript. My response to the raised points of concern and comments is given below: Reviewer 1: Comment 1- Page 10540, line 1-4: “The paper has largely dealt with derivation of the drainage networks using a DEM.. The

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paper has not adequately dealt with water logging and salinisation. The monitoring aspect which is included in the aim of the paper has not been addressed.

Response: I agree with the reviewer that the paper is mainly focusing on the delineation of drainage networks and catchment boundaries for closed drainage basin in the Sahara, in order to explain their relation to the distribution and extent of water logging. Indeed the water logging in this particular area of the Sahara may not well obvious in the presented figures. Therefore, I have obtained more recent satellite images for the Farafra Oasis as well as other similar areas in order to demonstrate the relevance and aim of this research.

Comment 2: how did the author identify the water logging? Response: it was identified by the visual interpretation of moderate and high resolution satellite images and these areas were visited for field work. Again more illustrating figures will replace the non-clear ones in the manuscript. Comment 3: how were the areas affected by salinisation were identified? Besides the 2 photographs included in the paper, Fig 7 & 8, the results presented do not cover waterlogging and salinisation Response: I agree with the reviewer that the definition of salinisation was not clear in the manuscript. This is the difficult task to be determined from satellite images as reflectance of different types of salts concentration in the soil will be interfere with the reflectance with plants and crops. Additionally, the salinity is usually associated with water logging, therefore, it was grouped with water logging hazard throughout the paper. Ideally it should be measured with relevant equipment in the field, but these facilities are not available and thus the amended manuscript will focus on water logging but with the general implication on soil salinisation. Comment 4: throughout the manuscript the word “fluvial” should not be included Reponse: I agree and it will be omitted. Comment 5: The authors sometimes use the word “waterlogging” and at other times write this as “water logging”. They should decide on the correct word or phrase to use. The authors use both SI and non SI units when referring to sizes of areas on page 10538. Hectares and acres are used within the same paper. They should not use non-SI units, such as

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“acres” but should use “hectares”. Response: I will be consistent in the writing style and using the measurement units. Comment 6: The authors should get the assistance of a good English writer to improve their paper.

Response: I appreciate the effort which has been done by the reviewers to fix some language problems within the paper, so thanks very much indeed for their great help. However, I will pass the revised manuscript to a colleague of mine in Reading University, UK.

Comment 7: There are several incomplete sentences in the manuscript, or improper use of verbs. Page 10536, line 6, change “ These new cultivations” to “ This new cultivation”. Page 10536, line 12, change “new cultivations have been” to “new cultivation has” Page 10537, line 4, change “dryland” to “drylands”. Page 10537, line 9, replace “agricultural” by “cultivation” Page 10537, line 16, delete “Notwithstanding”. Page 10537, line 18-19, what do you mean by “the disturbance of these areas hydrological balabnce”? Page 10538, line 14, replace “seepage for” by “seepage from”. Page 10538, line 21.

Response: I will amend these particular changes.

Comment 8: what is the meaning of “converted from basin to perennial”?

Response: I mean year-around irrigation rather than cultivating the soil during the summer season which has Nile flood covering the fields being grouped into sets of neighboring basins.

Comment 9: Page 10539, line 1, replace “collected” by “collect”. Page 10539. Line 3, replace “significance” by “significant”. Page 10539, line 6, correct the spelling of salinisation. Page 10539, line 8, replace “expansion in” by “expansion of”. Page 10539, line 9, delete “developed”. Page 10539, line 10 replace “time-effective” by “timely”. Page 10539, line 15, delete “essentially”. Page 10539, line 22, replace “integrated catchment hydrological processes” by “integrated catchment management.

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Response: I agree and will amend these particular changes in the revised manuscript.

Comment 10: Page 10540, line 7-8, Remote sensing and GIS cannot mitigate water logging. These are techniques for collecting and analysing spatial data. How can a technique mitigate against water logging?

Response: The result of this study can be used to mitigate against water logging.

Comment 11: Page 10540, line 14, the sentence starting “Where natural discharges” is incomplete. Page 10543, line 18, the sentence starting “Where the Nubian Sandstone” is incomplete. Page 10544, line 21, the sentence starting “However, selecting” is unclear.

Response: the missing words will be added and the unclear sentence will be re-written.

Comment 12: Page 10545, line 17, what is the meaning of “catchments are relaxed”?

Response: it means that the catchments are of not fixed surface area because they are integrated by overflow and the hydrological processes in one catchment are being affected from outside the physical catchment boundary.

Comment 13: Page 10546, line 7, the author use the phrase “the control of geomorphology and landforms on dynamics”. Geomorphology is the study of landforms or processes that form the landforms and the resulting landforms. Therefore the authors should not use geomorphology and landforms in the same phrase.

Response: I agree and this specific comment will be considered in the revised manuscript.

Comment 14: Page 10549, line 1-4, what is the relevance of discussing transboundary catchments?

Response: This will be deleted from the discussion section.