

## ***Interactive comment on “Effect of Water Surface Area on the Remotely Sensed Water Quality Parameters of Baysh Dam Lake, Saudi Arabia” by Mohamed Elhag et al.***

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Reviewer #1 Comments and Suggestions for Authors The manuscript entitled “Effect of Water Surface Area on the Remotely Sensed Water Quality Parameters of Baysh Dam Lake, Saudi Arabia” by Elhag et al. presents a study based on the hypothesis that changes in surface area can affect water quality in Baysh Dam Lake. To evaluate this hypothesis, authors have used remotely estimated water surface area, water quality indices, and several statistical data mining techniques such as PCA and NN. The results presented in the manuscript show an overall increase in water quality parameters (Chlorophyll, turbidity, and nitrogen concentration) with face area. Consequently,

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the conclusion confirmed these results by stating proportional relation between lake's water quality and surface area. In my opinion, the methodology and analysis presented to test the hypothesis are strong to reach to a solid conclusion. Therefore, I would recommend it for publication. General comments: 1. The hypothesis of change in water quality with surface area is only applicable if there is no inflow and no outflow to/from the lake. Hence, the change in water level is only due to either evaporation or precipitation. Please explain. The outflow of the lake operates only if the total volume of the dam lake water reaches more than at 80 BCM and is not common to have more than 80 BCM because the inflow is highly dependent on rainstorms not regular raining seasons. During the time frame of the current study (2 years, 2017-2018) there is no significant raining storms took place and mostly the water volume was slightly affected by evaporation process that we can neglect because it remained constant. the minimum surface area of the dam lake was 3.2 Km and the maximum was 4.8 km therefore the range of change (1.6 km) doesn't really support a potential inflow. Moreover, the findings of the current study remains valid as far as the minimum and the maximum water surface area were approximately endured the same. 2. Field data collection and validation are missing in the article. Please clarify. Data collection and data assessment were previously carried out and clearly cited in the current article. To avoid text redundancy data collection was omitted and the relevant reference was used as the follows: M Elhag, I Gitas, A Othman, J Bahrawi, P Gikas. 2019. Assessment of Water Quality Parameters Using Temporal Remote Sensing Spectral Reflectance in Arid Environments, Saudi Arabia. *Water*, 11(3):556-564. 3. Author relates surface area to each water quality index obtained by Sentinel-2 MSI. An average of all pixels (8 km<sup>2</sup> of lake area) was considered as a potential match up of remotely estimated lake water surface area. Result shows an obvious increase with increase in water inflow (or lake' water level/surface area). Is it possible to divide the lake into different regions (based on water input/outputs) before applying analysis? Unfortunately it can't be done. Some parts of the lake are strictly prohibited because of the current war. So if we divided the lakes into regions there will be no validation to the restricted part. 4. Basically, no

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green algae produce toxic gases, but cyanobacteria. Please check it. Acknowledged and corrected, its cyanobacteria Technical comments: Line 35 organic material not organic martial Acknowledged and corrected Line 37 organic material not organic martial Acknowledged and corrected Line 82 algae instead of Algae Acknowledged and corrected Line 82-83 "oxygen dissolving eutrophication process" Acknowledged and corrected Line 84 5 kilometers instead of 5 kilo meters Acknowledged and corrected

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