Qeios

Peer Review

Review of: "Cyanobacterial Biomass Estimation in Subtropical and Temperate Reservoirs by Sentinel-2"

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Comments for the authors

1. Literature review and objective framing

The most recent references cited are from 2023, but the manuscript was submitted in 2026. Updating the literature review to include studies from 2023–2025 on cyanobacteria detection and quantitative estimation using Sentinel-2 or similar sensors would place the contribution more precisely within the current state of the art.

The main objective is stated broadly as improving the direct estimation of cyanobacterial biovolume from Sentinel-2. Three points should be more explicit: (i) which response variable is being estimated (biovolume, cell density, or another proxy); (ii) what modeling approach is used (empirical models, spectral indices, machine learning, etc.); and (iii) what the baseline for comparison is (published models/indices, alternative sensors, or a simpler reference model).

To support the claim of "improving" the estimation, the gains should be presented quantitatively, with explicit changes in R^2, RMSE, MAE, or equivalent metrics relative to a clearly defined baseline. These numbers belong in the Results and should be revisited in the Conclusions.

2. Organization of methods and sampling description

The sentence "A total of 43 samples were collected on 19 different water bodies between 2016 and 2021 in different projects" describes the sampling design and belongs in the Materials and Methods section, not in the Introduction. The Introduction should remain focused on context and knowledge gaps. The Methods section would benefit from further detail on the criteria used to select the water bodies and sample points.

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A methodological flowchart summarizing the full workflow, from field sampling and laboratory analyses to Sentinel-2 preprocessing, pixel extraction, model calibration/validation, and spatial application, would help readers follow the design and support reproducibility.

3. Sentinel-2 processing and resampling

The manuscript states that "The images were resampled at 10 m with SNAP interpolation tools, because bands used have different spatial resolution," but does not name the interpolation method. The choice matters: nearest-neighbor preserves original radiometric values, which is generally preferable for spectral modeling, while bilinear and cubic methods smooth the image and alter reflectance values. A brief justification of the method selected, in light of the continuous nature of reflectance data and the modeling goal, should be added.

It should also be made explicit that resampling from 20 m to 10 m does not increase true spatial resolution; it only harmonizes the pixel grid of bands with different native resolutions so they can be combined in indices or multiband models. One or two references to previous Sentinel-2 water quality or cyanobacteria studies using the same resampling strategy would reinforce the methodological choice.

4. Pixel extraction strategy and consistency with resampling

The text does not specify how Sentinel-2 pixel values were linked to the in situ sampling points. This needs to be clarified: was a single pixel at the sampling coordinates extracted, or was a window around the point used (e.g., 3×3, 4×4, or 5×5 pixels)? If a window was used, the window size, summary statistic (mean, median), and software tool should be stated.

If only a single pixel was used, the value of resampling from 20 m to 10 m is not straightforward, because the resampled 10 m value is derived from the original 20 m pixel and does not independently improve representativeness. In that case, the rationale for resampling should be discussed in relation to the extraction strategy, or a small window around sampling points should be considered.

5. Additional preprocessing details and reproducibility

The Methods section should specify: the atmospheric correction procedure (software name and version, main parameters); the complete set of bands and/or indices used in the models (with central wavelengths and native spatial resolution); and the image selection criteria (maximum cloud cover, maximum acceptable time gap between field sampling and image acquisition, and exclusion criteria such as extreme turbidity or cloud shadows). The SNAP version and any plugins or scripts used should also be reported.

6. Figures, tables, and legends

Tables and abbreviations: All tables should be self-contained. Abbreviations and acronyms used in headers or entries (e.g., Chl-a, TSI, WQI) should be defined in the caption, with units where applicable.

Figure 1 (study area map): The map should include a north arrow, scale bar, coordinate reference system and projection (e.g., UTM, datum), and the data source. The legend should clearly distinguish water bodies, sampling sites, and any relevant classes (e.g., reservoir type, trophic level).

Figure 2 (caption and clarity): The caption should explicitly describe what each color, symbol, line, or panel represents, and how many samples correspond to each group or category. If regression fits are shown, main performance metrics (R^2, RMSE, n) should appear in the panels or in the caption. The figure should be interpretable without reference to the main text.

Methodological scheme: A new schematic summarizing the steps from field sampling to spatial model application (see point 2) would give readers a clear picture of the workflow and is suggested as an additional figure.

Declarations

Potential competing interests: No potential competing interests to declare.