Review of: "Cloud-based geospatial services for building capacity and safeguarding heritage in climatically marginal landscapes"

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Potential competing interests: No potential competing interests to declare.

Review of the manuscript '***Cloud-based geospatial services for building capacity and safeguarding heritage in climatically marginal landscapes***' by *Lim et al.* submitted to *Qeios*.

Focus of the paper: changing landscapes in the context of climate change crisis. Climate-environmental transition was evaluated with a case of two regions: Yukon-Kuskokwim Delta in Alaska, USA and Mauritania.

Abstract is well written and clearly describes the undertaken study.

Structure: The article is well organized with structured sections. The structure of the manuscript conforms to the journal standards and discipline norm and includes 4 Sections. Section 2 "Automatic Workflows for Remote Communities" is sub-divided into the minor subsections and paragraphs and well describes the workflow with examples of scripts. The numeration of the sections is correct and consecutive.

Logic: The clarity of the text logic and organization of the paper is sufficient. It demonstrates the consistent interpretation of the results with detailed explanations and comments. A comparison of the results with those in previous studies is presented.

Introduction The authors addressed the issues of world instabilities and described various examples – natural disasters, climate change, armed conflict, and others. They described the problem of the climatically marginal extremal places where temperatures and environmental conditions do not suite human comfort. They presented two study places and described their features: Alaska Native Yup'ik and Mauritania, located in the Sahel region of Africa. The Introduction presents a background, defines 2 study areas and research goals (using GEE for environmental assessment). The Introduction well describes the research. Introduction and background show the general context of the article. Literature is referenced and relevant.

Further, the authors introduced the advantages of the RS tools for environmental monitoring, described satellite images as data sources and provided examples. The problem of processing and interpreting RS data is then raised a question of the use of scripting tools for RS data processing such as GEE. The advantages of the cloud-based geospatial services of GEE are introduced and discussed with provided references on usage examples.

Study area: Yukon-Kuskokwim Delta in Alaska, USA and Mauritania. Among others, the authors mentioned such problems as desertification and sand dune encroachment in Sahel and landscape changes in American Arctic.

English language: fine.

Research questions and goal are identified: the authors assessed free cloud-based geospatial services of GEE for their applicability to build capacity for communities in the contrasting regions of Arctic and the Sahel.

Motivation is explained: to use the GEE to automate the spatial data visualization for the analysis of landscape change.

Methods and Results: The authors used five analytical remote sensing tools built in GEE to address specific and urgent environmental concerns in the regions, and presented and commented on the obtained results. Section 2. Automatic Workflows for Remote Communities well described the approach and undertaken methods with described GEE approach, its advantages and examples of scripts. The examples of the use of GEE include the processing of Sentinel-2 imagery with calculated VI (MNDWI, NDWI, NDVI etc.). Furthermore, the case of using multispectral UAV imagery is provided with presented examples of the processed images. Methods are well described.

I suggest to updated Figure 7 where the resolution is very low (the image is blurred).

Literature regarding the relevant topics is reviewed, formatted and appropriately referenced. Major sources include papers on the use of the RS data for environmental monitoring with diverse cases of applications.

Research gaps and weakness in former works are described; the existing gaps are identified. The contribution of this work filling this gap is explained.

Discussion The authors discussed the presented research outputs and in particular, mentioned the advantages of the tools written in a GEE cloud-based geospatial platform. They used these tools for the RS workflow to address a diverse range of environmental issues in the remotely located areas.

They compared the GEE with other tools for spatial data processing such as QGIS or Python's Rasterio, and GDAL, and then compared its functionalities with the ML and DL frameworks (Scikit and Tensorflow) and other technical tools. They mentioned restricted functionality and thus pointed at selected drawbacks of GEE. They provided a summary of the examples of natural and social disasters and methodological approaches to study these cases using RS data and diverse approaches (Table 2).

Conclusion The authors conclude that RS is a powerful tool for visualising and analysing threats and summarised the presented study where they applied the GEE for environmental monitoring.

Actuality, novelty and importance of the research is clear: the authors tested the GEE for environmental applications and demonstrated their study on 2 contrasting cases – Alaska and Mauritania.

Figures The authors presented 8 figures which are of acceptable quality (except for Figure 7), easy to read, relevant and suitable. Figures are labelled and described. They illustrate the results of the study.

Recommendation: I suggest to publish this paper based on the detailed report above.

With kind regards,

- Polina Lemenkova.

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