Review of: "New Method to Identify Potential Illegal Water Use Location by Using Remote Sensing and Neural Networks in Laguna de Aculeo, Chile"

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Potential competing interests: No potential competing interests to declare.

Kudos to the authors.

However, I make the following suggestions towards improving the paper:

1. Based on my observations on page 3/18, please recast the title to become:

Yolov3 Machine Learning Model For Illegal Water Intrusion With Sentinel-2 Multispectral Remote Sensing Data In Laguna De Aculeo, Chile

1. Write a paragraph explaining the YOLOv3 machine learning algorithm and place it before the objective of this paper.
2. No explanation of how the Yolov3 Machine Learning Model was applied under the methodology section. Authors should explain what was done in relation to machine learning as a new approach, as captured in the initial title. They should do so with supporting citation(s) to justify the application. Otherwise, nothing is **new Method to Identify…** as implied by the authors in the title. Because remote sensing of vegetation indices isn't a novel algorithm.
3. Under the Materials and Methods subsection, note the yellow highlights below:

i. The enchanting Laguna de Aculeo, nestled in the Estero Angostura between Estero Paine (II) and the Río Maipo Sub-Basin, lies within the confines of Paine city, in the Maipo Province of Santiago's Metropolitan Region, Chile. Positioned at 33º 50' 30'' S latitude and 70º 54' 24'' W longitude **(cite a reference here)**, and perched at an altitude of 350 meters above sea level, this once idyllic summer retreat is now facing a dire reality of vanishing waters **(insert a citation)**. The lake, which previously spanned 11.5 square kilometers, boasted an average depth of 3.4 meters, peaking at 7 meters, and held a substantial water volume of $53.6 \cdot 10^6$ cubic meters **(insert citations to justify this claim)**. It received an annual average precipitation of 611 millimeters **(Citation?)**. The climate, characterized as Mediterranean, is predominantly influenced by the shallow groundwater that replenishes the lake. The catchment area covered a vast expanse of 264 square kilometers, with a hydraulic conductivity of 15 cubic meters per day. Historical data spanning 27 years, from 1970 to 1997, indicates an annual evaporation rate of roughly 1200 millimeters **(Citations needed to confirm those mentioned stats)**.

1. Under Data Collection subsection:

i. NDVI is a prevalent index for assessing vegetation health, contrasting near-infrared (NIR) with red light (RED). Higher NDVI values denote healthier plants. The formula **(according to whom? Please, cite the authority here!)** is: NDVI = (NIR-RED) / (NIR+RED) or NDVI = (B8-B4) / (B8+B4), with a value range from -1 to +1. NDVI is crucial for tracking vegetation and ecosystem changes, correlating positively with regular irrigation and grassland proliferation.

ii. EVI, an enhanced version of NDVI, corrects NDVI's inaccuracies to better represent vegetation. EVI ranges from -1 to +1, with 0.2 to 0.8 indicating healthy vegetation. The EVI formula is: EVI = 2.5·(NIR-RED) / NIR + 6·RED - 7.5·BLUE + 1 or EVI = 2.5·(B8-B4) / B8 + 6·B4 - 7.5·B2 + 1 **(according to whom? Please, cite the authority here!**) is

iii. GNDVI's formula is: GNVI = (NIR – GREEN) / (NIR+GREEN) or GNVI = (B8-B3) / (B8-B3), and it ranges from -1 to +1. **(according to whom? Please, cite the authority here!)**is.

iv. SAVI incorporates a soil-brightness correction to reduce soil's impact on NDVI, beneficial in low-vegetation areas. SAVI's equation is: SAVI = (NIR-RED) / (NIR+RED+L) · (1+L) or SAVI = (B8-B4) / (B8+B4+L) · (1+L), where L is typically 0.5 or 0.48. **(according to whom? Please, cite the authority here!)**is.

v. NDMI utilizes NIR and SWIR to analyze soil moisture, with higher values in wetter soils. The NDMI formula is: NDMI = (NIR-SWIR1) / (NIR+SWIR1) or NDMI = (B8-B11) / (B8+B11). **(according to whom? Please, cite the authority here!)** is.

vi. MSI, an index sensitive to leaf water content, indicates water stress with higher values. MSI's range is 0 to over 3, with 0.4 to 2 typical for green vegetation. The MSI equation is: MSI = MIR / NIR or MSI = B11 / B8. **(According to whom? Please, cite the authority here!)** is.

vii. BSI measures bare soil reflectance, with higher values showing more bare soil, useful for detecting soil issues. BSI's formula is BSI = NIR / (NIR + Red) or BSI = (B11 / (B11 + B4). **(according to whom? Please, cite the authority here!)** is.

2. Unsupervised Classification **(why this approach? Back up your reason with cited literature)**
3. Please, report results on the **Yolov3 Machine Learning Model** as applied in your study.