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February 14, 2026

Editor-in-Chief
IEEE Geoscience and Remote Sensing Letters

Dear Editor-in-Chief,

I am submitting the manuscript entitled “NDBI Spectral Gap Predicts Refugee Camp Detectability from Sentinel-2: Environmental Limits at 10 m Resolution” for consideration as a Letter in IEEE Geoscience and Remote Sensing Letters.

Main contribution. This work demonstrates that the NDBI spectral gap—the difference in mean Normalized Difference Built-Up Index between camp and background—explains 83% of cross-country variation in refugee camp detectability at Sentinel-2’s 10 m resolution ($r = 0.912$, permutation $p = 0.005$, $n = 7$ countries, 101 camps, 1689 tiles). This transforms scattered qualitative observations in the literature into a quantitative, predictive framework.

Why this belongs in GRSL. The paper addresses a fundamental question in geoscience and remote sensing: under what environmental conditions is spectral detection of informal settlements physically possible? The result—that detectability is an environmental property rather than an algorithmic one—has direct implications for how the remote sensing community designs and evaluates settlement mapping pipelines. The concise, single-finding nature of the contribution is well suited to the Letters format.

Novelty. No prior work has (1) quantified the relationship between spectral contrast and detection performance across countries, (2) shown that CNN classifiers fail below chance at 10 m cross-country due to physics limitations, or (3) documented that structural texture features invert discriminative direction between arid and humid biomes.

This manuscript contains original, unpublished work and is not under consideration at any other publication. The author accepts the terms and conditions of submission to IEEE GRSL.

The submission consists of two files with identical content: the final two-column format and the single-column review format.

Sincerely,

Jose Miguel Robles Leyton