

# Summary and Analysis of the Paper: Detection and Monitoring of Maltese Shoreline Changes using Sentinel-2 Imagery

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## 1. Summary of the Paper

### 1.1 Motivation

The paper addresses the need for continuous and high-quality monitoring of the Maltese coastal zones due to their socio-economic significance. Traditional methods are limited in spatial and temporal resolution, prompting the use of remote sensing techniques with Sentinel-2 imagery to detect and monitor shoreline changes.

### 1.2 Contribution

This study introduces a method to extract and assess shoreline variations on Maltese sandy beaches using Sentinel-2 multispectral images. The approach employs the Normalized Difference Water Index (NDWI) for shoreline detection and validates the results with Digital Elevation Model (DEM) data from LIDAR systems.

### 1.3 Methodology

The methodology consists of four key steps: band extraction, NDWI computation, image thresholding, and shoreline extraction. The Quantum Geographic Information System (QGIS) platform is used for these processes, and the results are validated against DEM data.

### 1.4 Conclusion

The study successfully demonstrates the capability of using Sentinel-2 data for precise shoreline detection on Maltese beaches. The results show minimal shoreline displacement, with the most significant changes observed at Ramla Bay.

## **2. Critiques or Limitations**

### **2.1 First Critique/Limitation**

The study is limited to a short observation period (May to October 2019), which may not capture long-term shoreline changes and the impact of seasonal variations.

### **2.2 Second Critique/Limitation**

The reliance on NDWI and a global threshold method may not account for local variations in environmental conditions, potentially leading to inaccuracies in shoreline detection.

### **2.3 Third Critique/Limitation**

The study focuses on a small number of bays, which might not provide a comprehensive understanding of shoreline changes across all Maltese coastal zones.

## **3. Synthesis**

### **3.1 First Potential**

The methodology can be extended to a longer temporal study to assess the impact of seasonal and annual variations on shoreline morphology.

### **3.2 Second Potential**

Incorporating additional remote sensing data, such as high-resolution imagery from other satellites, could improve the accuracy and applicability of the model across different coastal environments.

## **4. Reference**

For more details, please refer to the full paper available at: [Detection and Monitoring of Maltese Shoreline Changes using Sentinel-2 Imagery](#).