



SHORELINE CHANGE ANALYSIS ON INACCESSIBLE COASTAL AREAS OF THE MUNICIPALITY OF SARANGANI, PROVINCE OF DAVAO OCCIDENTAL, PHILIPPINES



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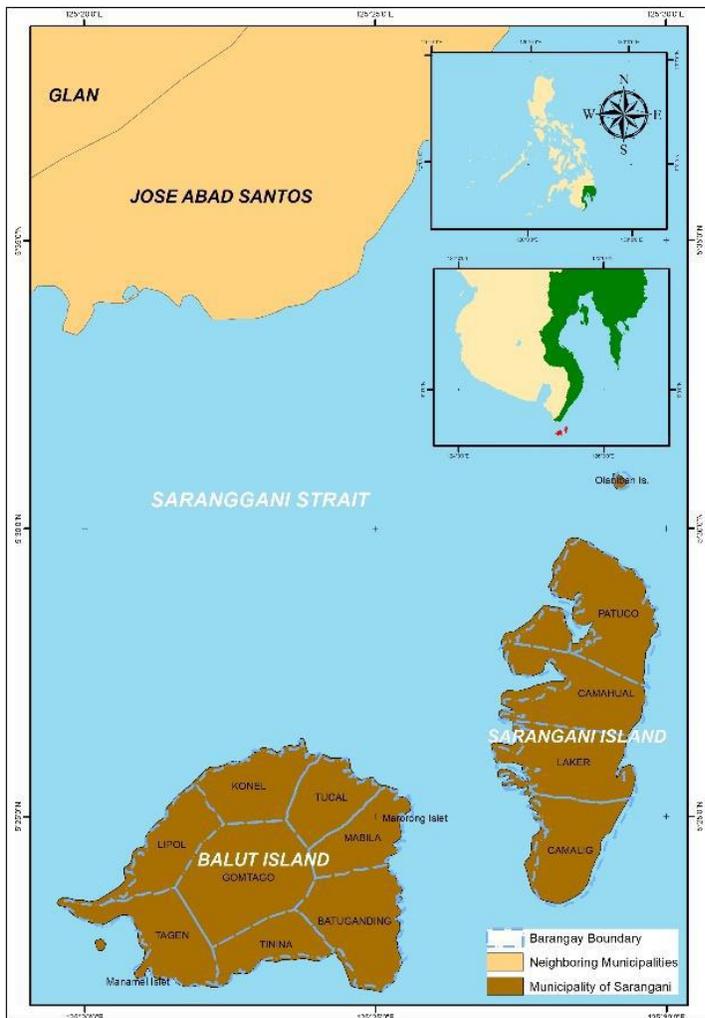




INTRODUCTION

- Shoreline changes are best distinguished, measured, and validated by doing actual field surveys on the affected area.
- One of the most effective method in detecting shoreline changes widely used by coastal engineers and geoscientists is through the use of GPS tracking devices wherein someone walks through the desired shoreline which has been proven effective on accessible beach areas.
- It is still a big challenge to survey inaccessible areas such as estuaries and mangrove areas, bluffs and rocky shores, reclaimed and built-up areas; most of the shorelines in the Philippines are having this kind of coastal environment.
- The main objective of this study is to delineate historical and recent shorelines to supplement our data on the computation for shoreline shift to identify eroded and accreted areas.

STUDY AREA



- It is approximately located within geographic coordinates of $5^{\circ}20'$ to $5^{\circ}32'$ latitude and $125^{\circ}19'$ to $125^{\circ}32'$ longitude.
- It is bounded to the north by the Sarangani Strait, to the east by the Philippine Sea, to the south by the Moluccas Sea along the Indonesian border, and to the west by the Celebes Sea.

GEOLOGY AND GEOMORPHOLOGY



- Balut is a volcanic island generally underlain by pyroclastic flows and volcanoclastic materials of basaltic to andesitic composition which rose along the Celebes-Moluccas Sea area.
- On the other hand, Saranggani Island and Olanivan Islet resembles a pop-up structure composed of uplifted marine deposits mostly limestones thrust over older deposits during trench formation.
- Balut Island is generally characterized as having a rugged topography especially along west towards the center with minimal gently sloping volcanic footslopes towards east.
- Meanwhile, Saranggani Island is characterized by a rolling hills karst topography incised by fault-controlled creeks generally draining northeast.

METHODOLOGY



PRE-PROCESSING

- Image enhancements
- Shoreline extraction
- Line corrections
- Shorelines Geodatabase

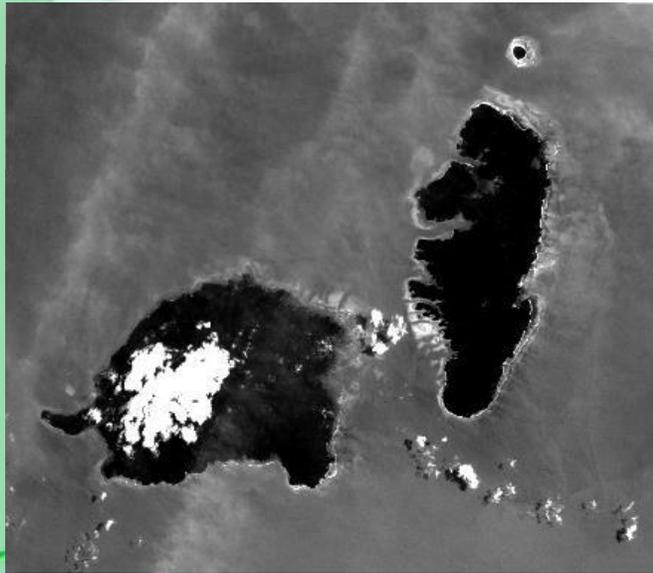
PROCESSING

- Shoreline Change Computation using DSAS

RESULTS

- Net shoreline movement
- Rate of Accretion/Erosion (m/yr)

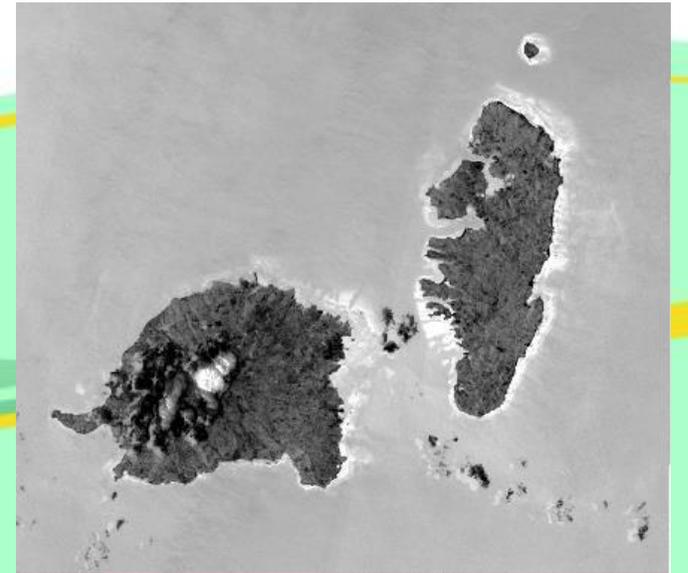
BAND RATIONING



BAND 1



BAND 7



BAND 1/7

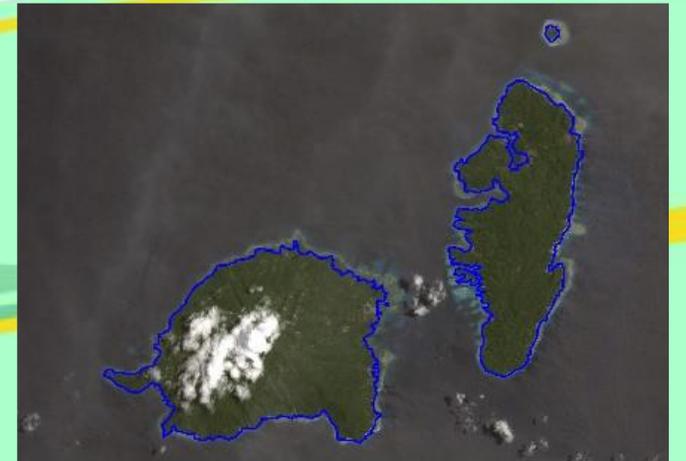
PAN-SHARPENING



30m x 30m resolution



15m x 15m resolution

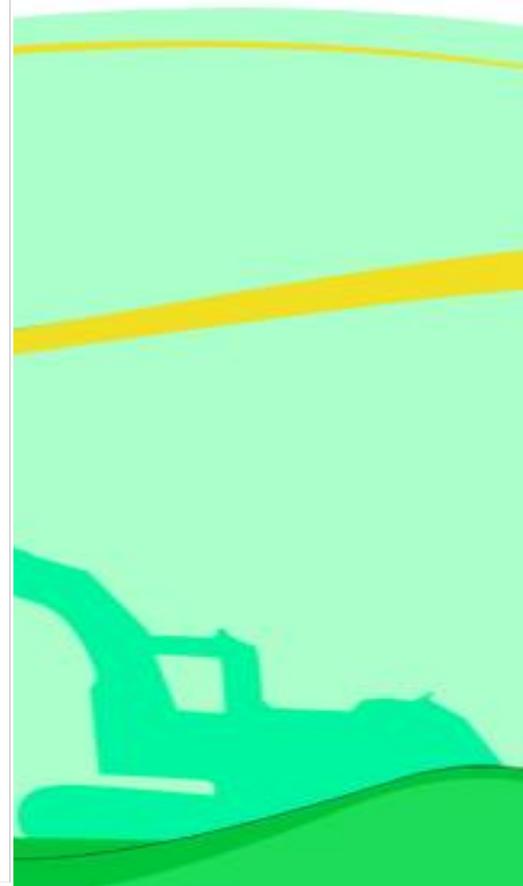
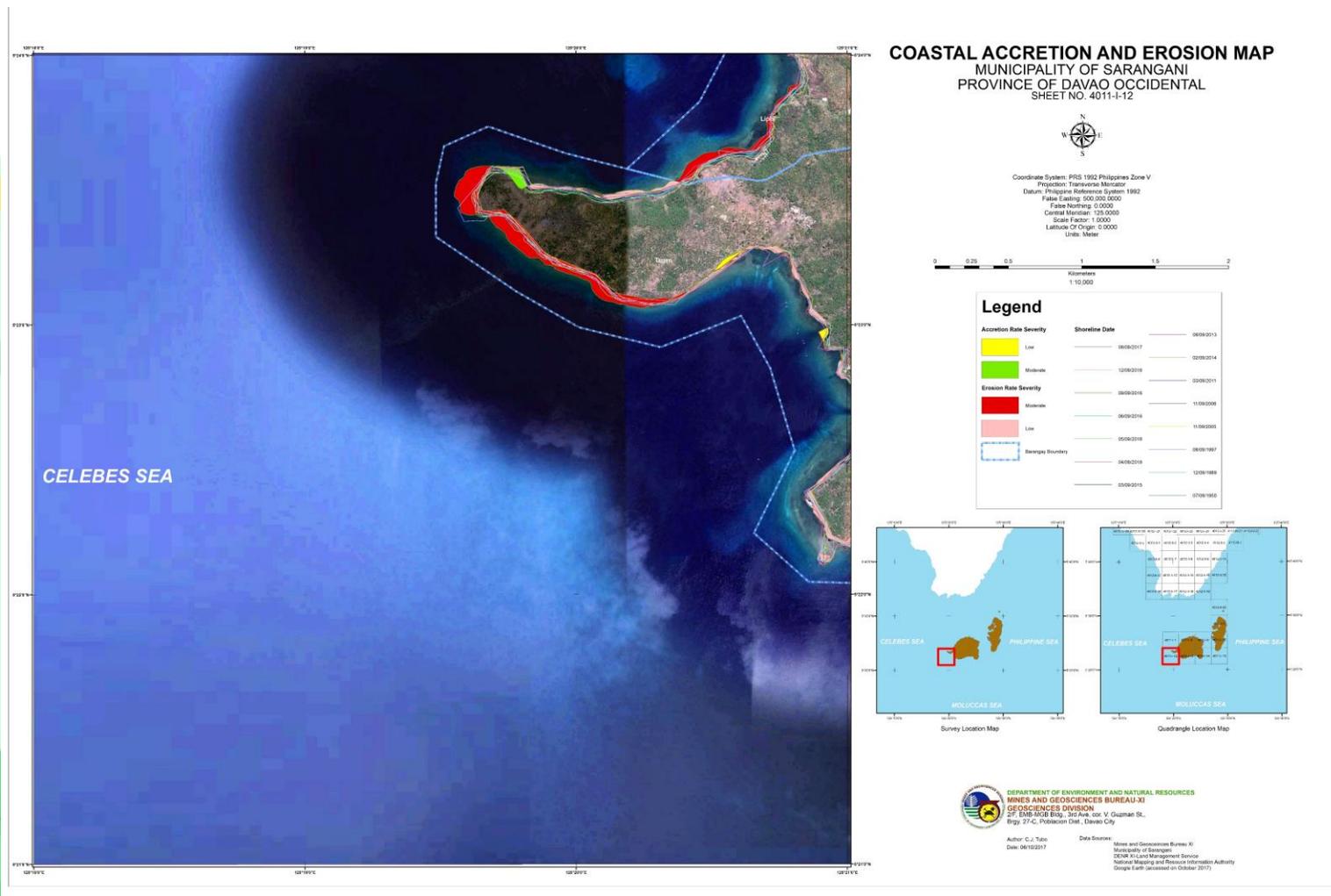


Computations Using Digital Shoreline Analysis System (DSAS)



- Using the stored data on the manageable geodatabase, the Net Shoreline Movement (NSM) in meters is computed by comparing the distance between the oldest and the latest shoreline available on a certain area through an equal interval of transect lines.
- The End Point Rate (EPR) in meters/year is also calculated by dividing distance of shoreline movement by the time elapsed between the oldest and the most recent shoreline (Thieler, E.R., Himmelstoss, E.A., Zichichi, J.L., and Ergul, 2017).
- The degree of hazards is then classified as low, moderate, and high according to the standard set by the Marine Geological Survey Division (MGSD) of the Mines and Geosciences Bureau (MGB) on Coastal Geohazards Mapping and Assessment.

RESULTS



CONCLUSION



- The result of this study shows that remotely-sensed data which in this case LANDSAT images are reliable in semi-automated extraction of historical shorelines for the shoreline change analysis of inaccessible areas such as the Municipality of Sarangani.
- It is also an effective method for small-scale mapping, and rapid coastal geohazard assessment and monitoring since data are freely available twice a month.
- Errors might be encountered due to image quality (e.g. cloud cover, image resolution, processing, polygon/line simplification, etc.) constraint.
- The method employed is an effective tool to supplement the data gathered from the field survey.



END OF PRESENTATION

