FIG WORKING WEEK 2019

22–26 April, Hanoi, Vietnam

"Geospatial Information for a Smarter Life and Environmental Resilience"

An Aid in Determining the Territorial Sea Baseline for Marine Cadastre using Satellite-Derived Bathymetry

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An Aid in Determining the Territorial Sea Baseline for Marine Cadastre using Satellite-Derived Bathymetry

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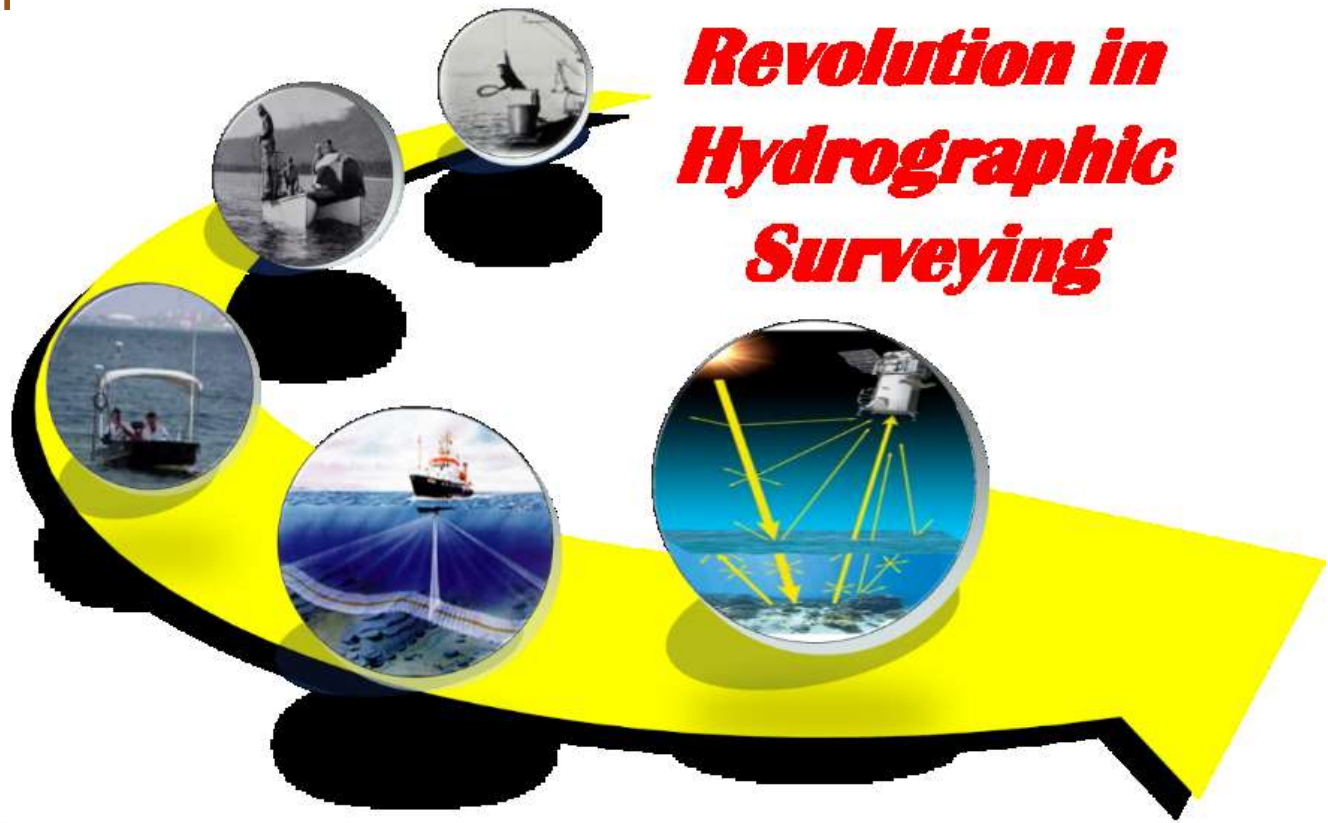
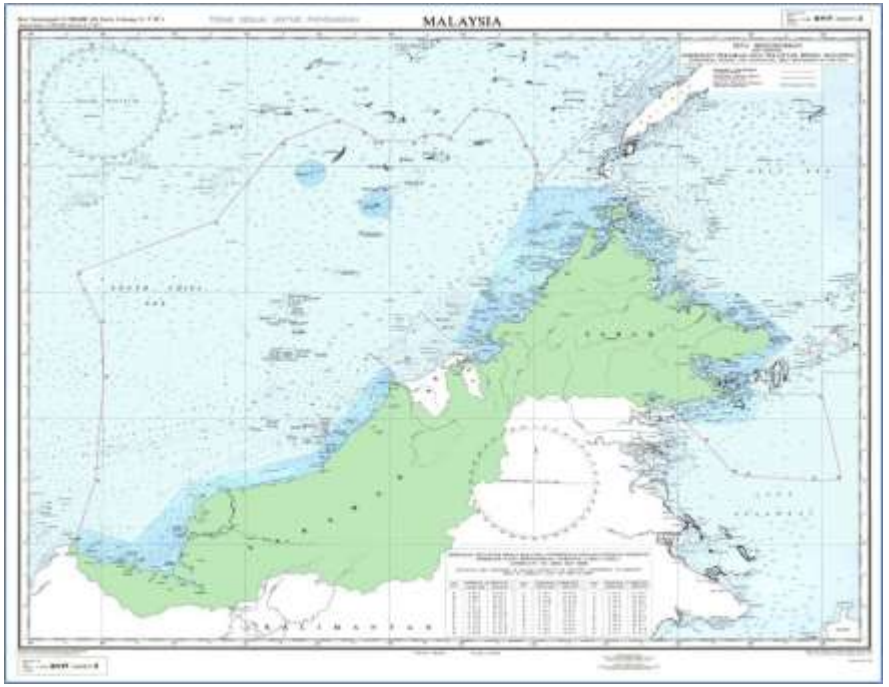
Alhaji HUSSAINI and Auwal Garba ABUBAKAR, Nigeria

INTRODUCTION



Malaysia's Sovereignty and Jurisdiction

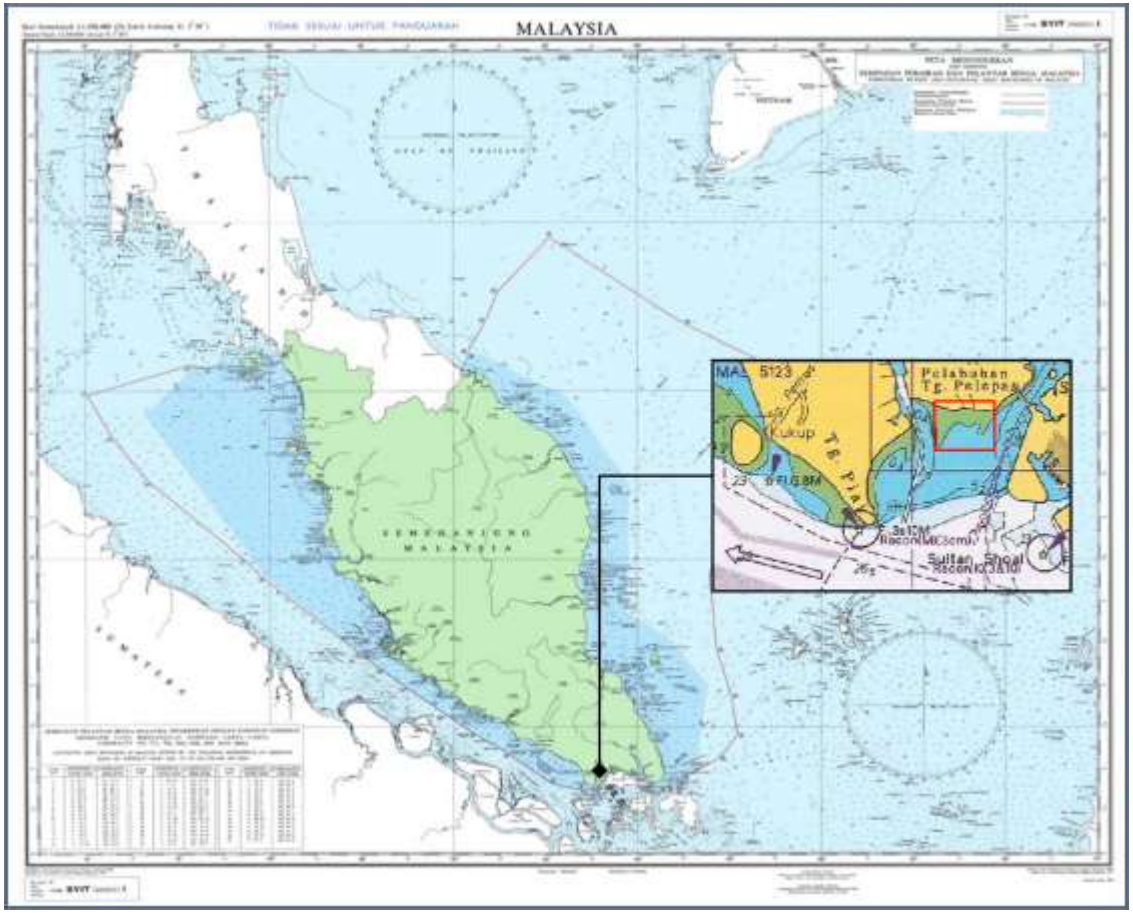


Rapid Development in Coastal Zone
- Marine Cadastre Initiative

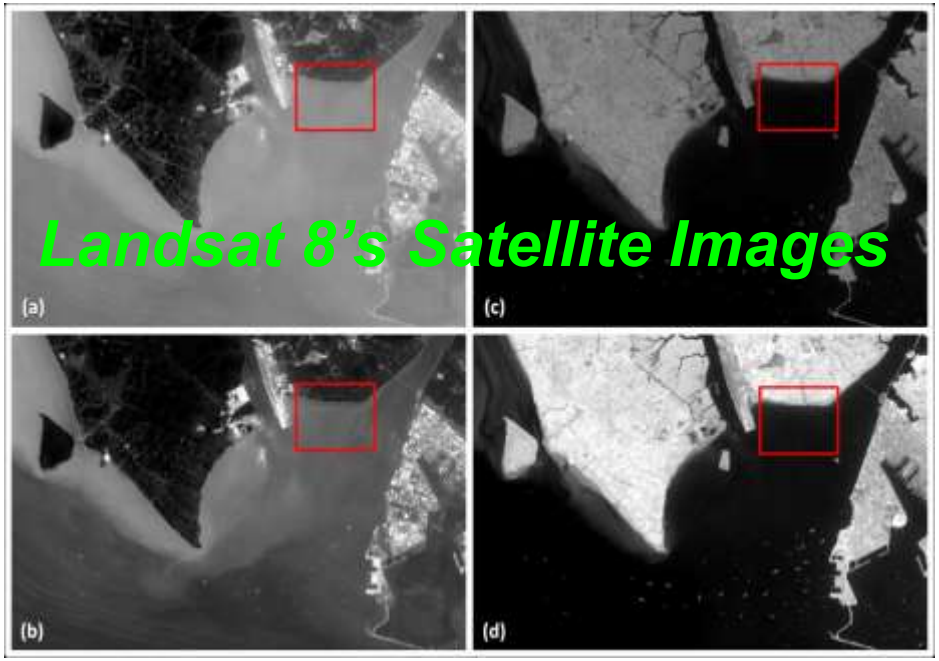

The Golden Palm Tree Resort & Spa is one of several hotels planned for Sepang's coast

Study Area

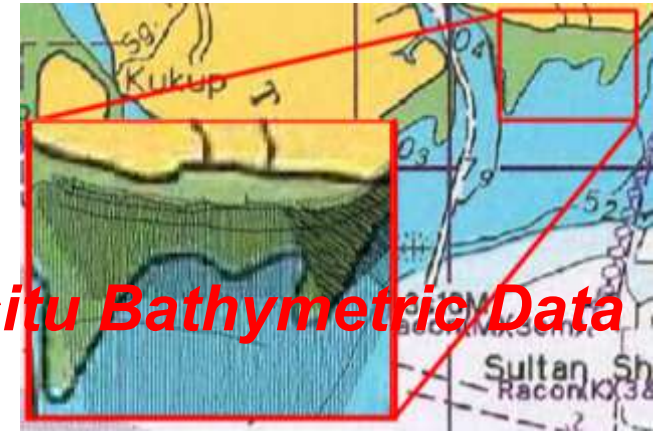
- Southwest of Johor State, Malaysia



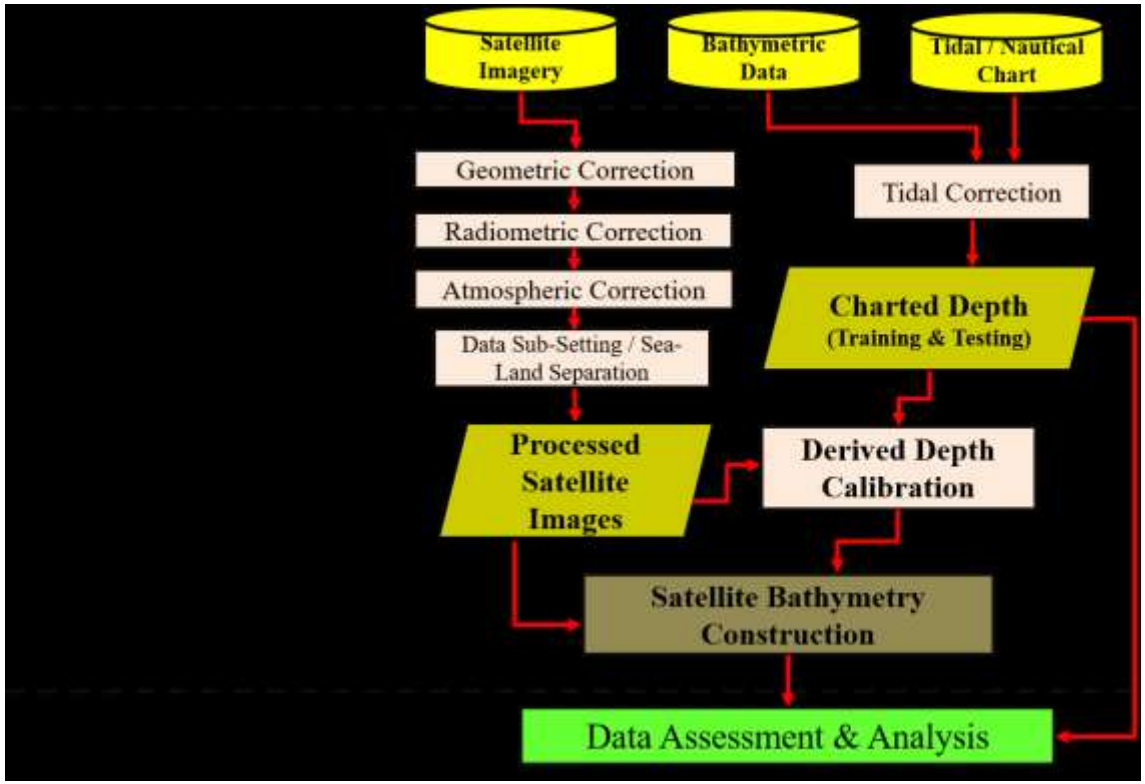
Data & Materials



Landsat-8 multispectral satellite images of Tanjung Kupang, Strait of Johor area. Image (a) Blue (Band 2); (b) Green (Band 3); (c) Red (Band 4); and (d) NIR (Band 5)



General Process Flow



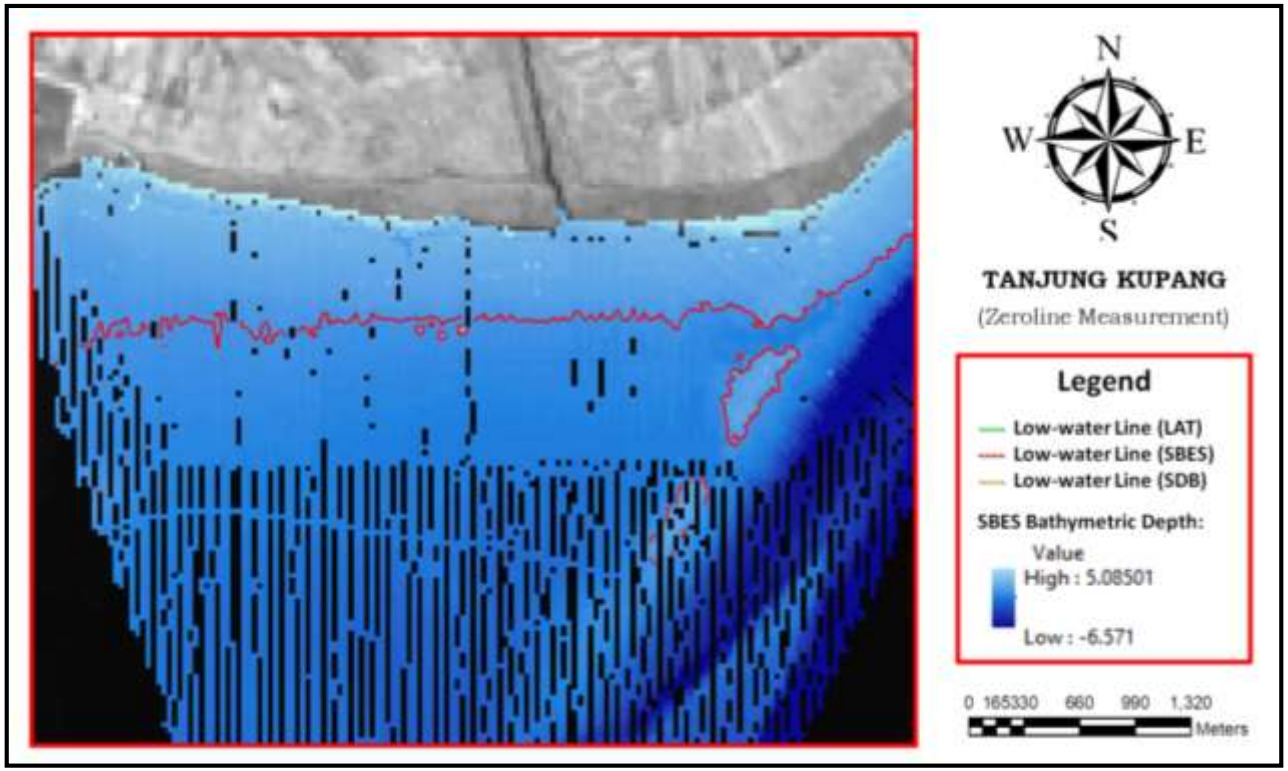
GENERATION OF LOW-WATER LINE

- This study makes an attempt to determine the seabed topography over the shallow and turbid coastal region via empirical approach purposed by:
  - Dierssen et al. (2003)

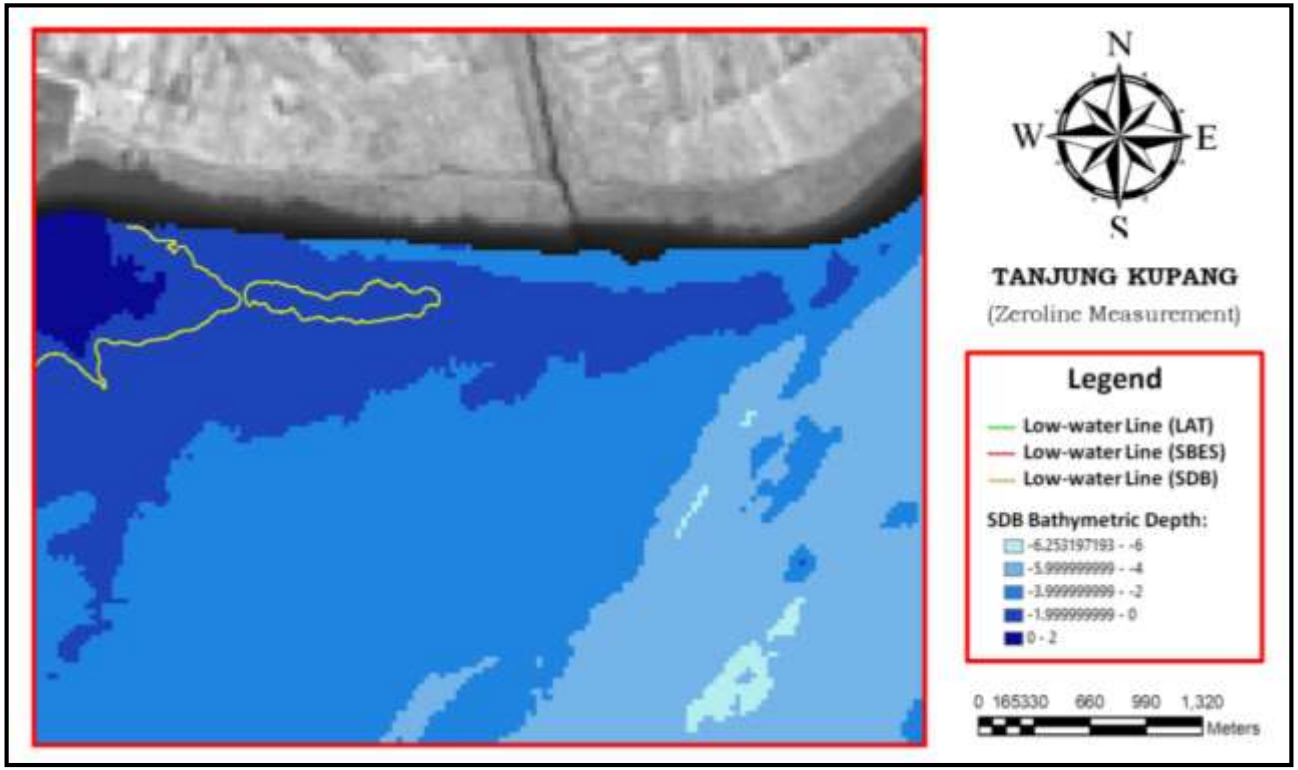
$$Z = m_0 * \ln\left[\frac{nR_w(\lambda_i)}{nR_w(\lambda_j)}\right] + m_1$$

- This model applies the fundamental Principle of Beer-Lambert Law, intensity of light decreases exponentially between a pair of water-penetrating wavelengths with depth. Theoretically, the linear inversion approach is able to empirically deriving the relationship between a pair of water-penetrating wavelengths.

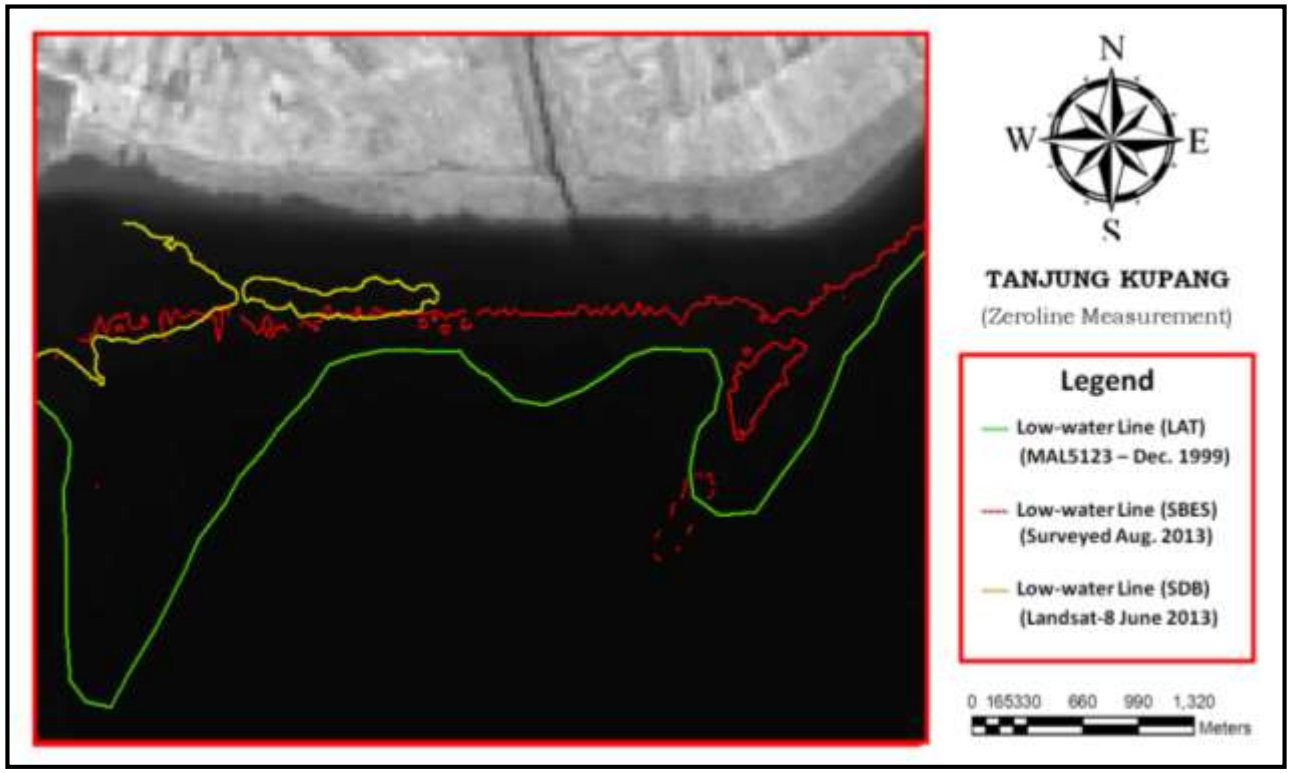
RESULT & ANALYSIS



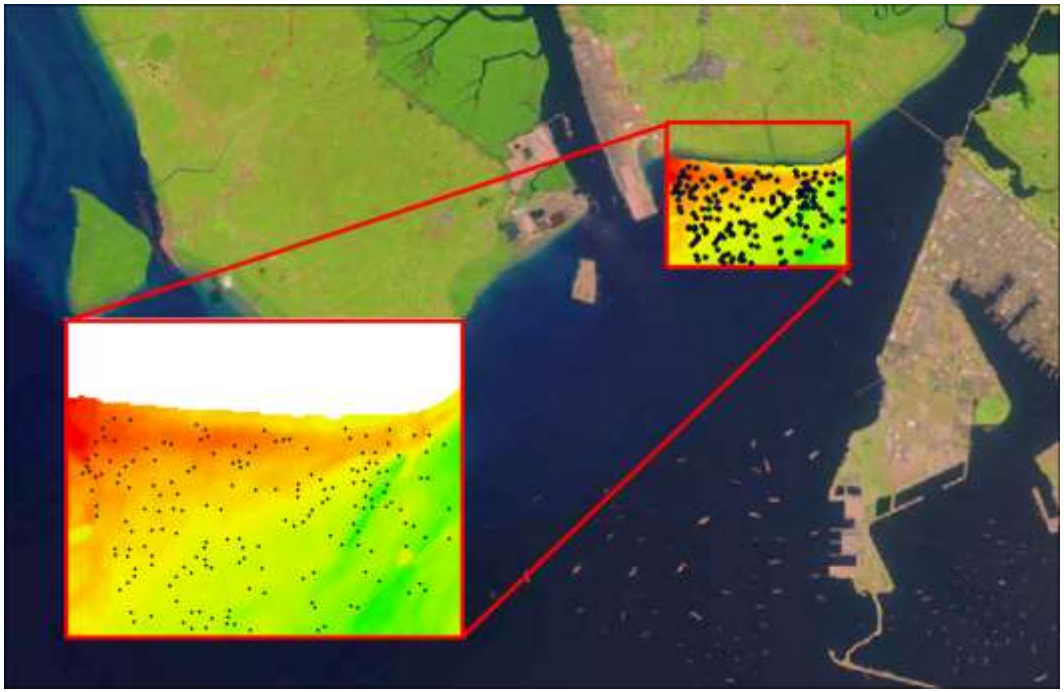
RESULT & ANALYSIS



RESULT & ANALYSIS



Data Accessment

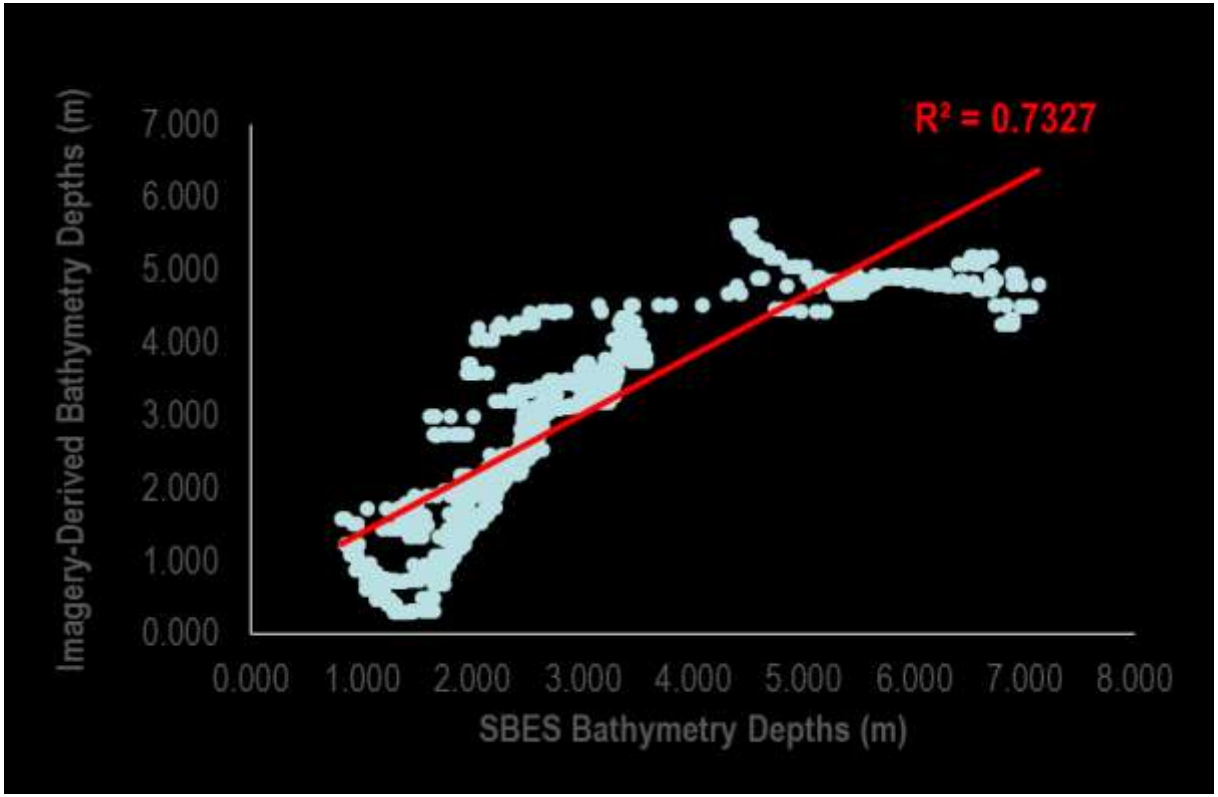


1,367 selected SBES bathymetric data for depth validations.

Data Accessment

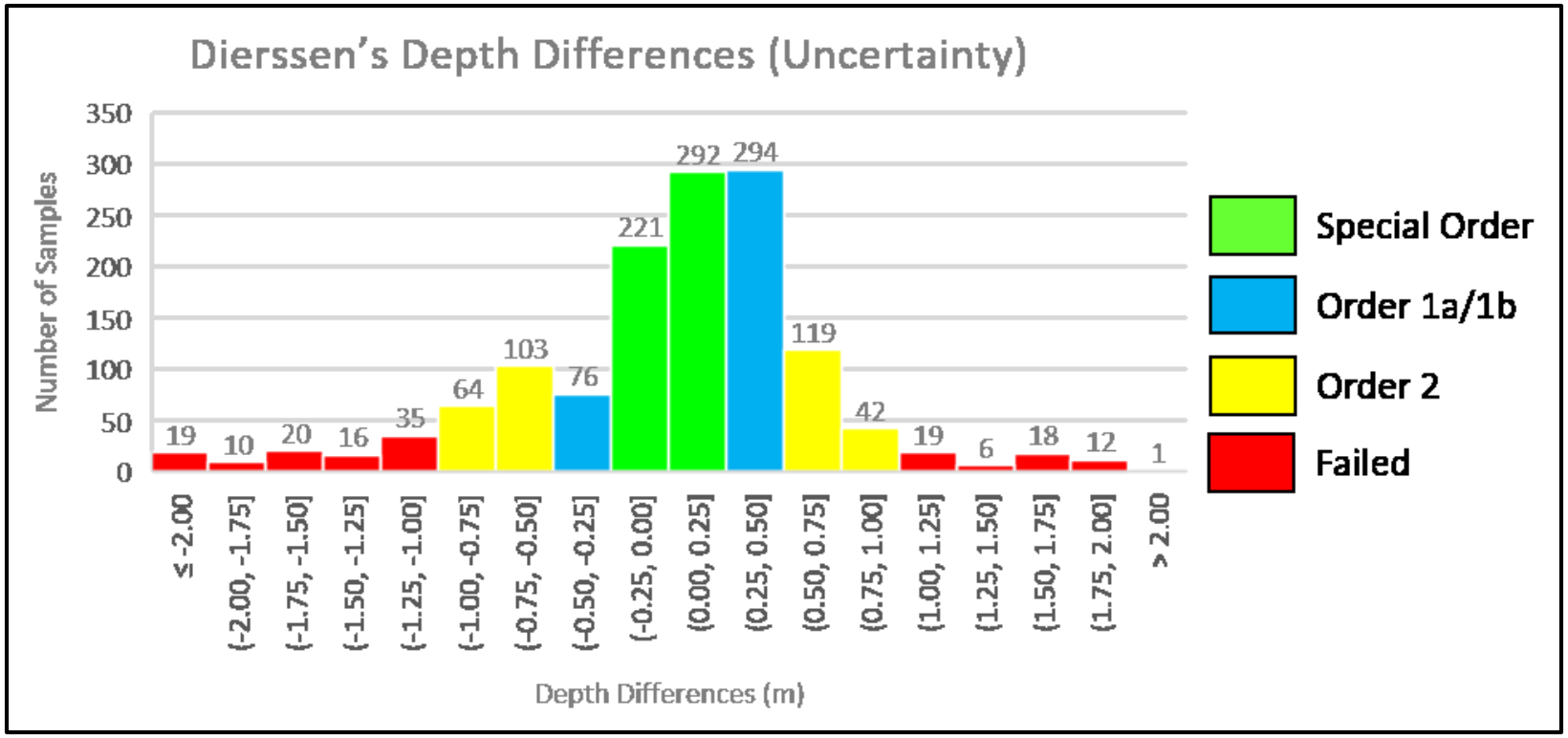
Statistical results based on Dierssen *et al.*'s SDB model

Dierssen et al.'s SDB Model	
Correlation of Determination (r^2)	0.7324
Correlation Coefficient (r)	0.85



Accuracy Assessment: Coefficient of Determination (R^2) from Dierssen *et al.*'s Model

Data Accessment



CONCLUSION

- This study examines usability of imagery-derived bathymetry approach to extract bathymetric information and eventually determine the low-water line in the southwest of Johor state in Malaysia.
- In general, this study has enlightened that the imagery-derived bathymetry's empirical approach is possible to provide realistic seabed terrain profiles and three-dimensional quantitative information on shoreline position.
- Satellite bathymetric mapping is an innovative solution to supplement the traditional vessel-based survey techniques. It can be consider as an alternative tool in determining the low-water line at the ultra-shallow water areas, which are often inaccessible for vessel-based acoustic sounding approach.

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