



Survey & Challenges

- **Coverage** : 2152 m x 1837 m, using 7 survey lines with 20% overlap.
- **Field Challenges** :
 - Calibration: No formal system calibration was performed.
 - SVP Limit : Rope was 50m for a 118m depth, requiring software extrapolation.
 - Navigation: Vessel drifted off planned lines in some areas, introducing noise. A shallow region was also left uncovered, creating a surface gap.

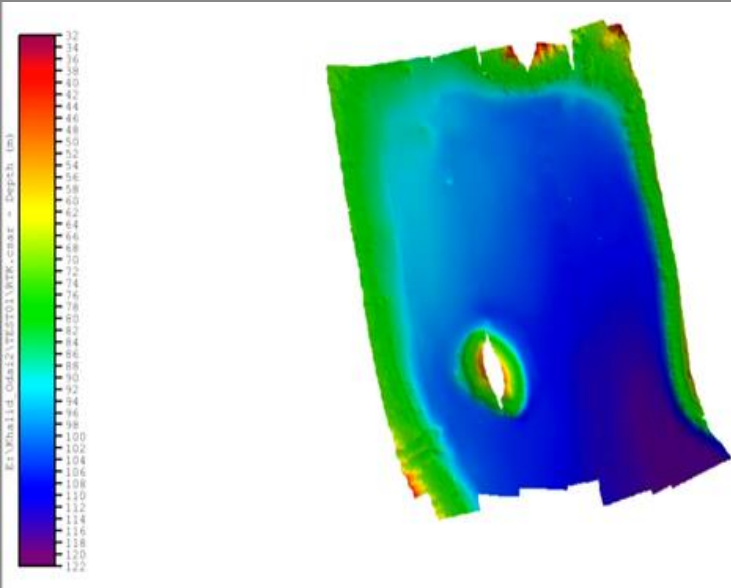
Data Processing

Software Used :
Applanix POSpac and CARIS HIPS & SIPS.

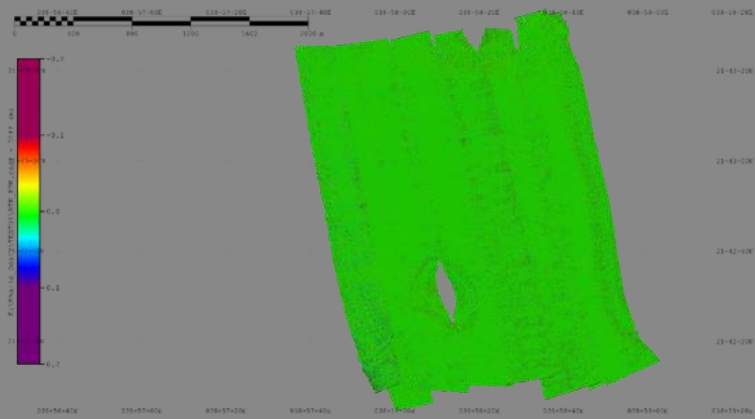
RTK Processing : MBES data directly georeferenced using real-time base corrections.

PPK Processing: Raw data logged and processed in POSpac to generate an SBET (Smoothed Best Estimate of Trajectory), then applied to the bathymetry.

Analysis : A surface-to-surface difference tool compared the final RTK and PPK gridded surfaces.



Final Results & Conclusion



Difference Statistics:

Mean Difference: -0.0 m.

Standard Deviation: 0.0 m.

Extreme differences (7.2 m, -5.3 m) were strictly localized outliers on steep slopes.

Conclusion

The near-zero mean and standard deviation confirm that real-time RTK completely matches the post-processed PPK method.
Recommendation: RTK is highly reliable and time-efficient for hydrographic surveying in Bayada, though keeping PPK as a background backup is best practice.

THANKS

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Comparing RTK and PPK Accuracy in Hydrographic Surveys



Objectives & Area

Location: Bayada region, Jeddah, Red Sea.

Goal: Compare RTK vs. PPK bathymetric accuracy using a Multibeam Echosounder (MBES).

Methodology

- A single field survey feeding two parallel positioning workflows (RTK & PPK).
- Processed and compared side-by-side using CARIS HIPS & SIPS.

Key Contribution

Prove that PPK is a highly reliable alternative that ensures continuous data acquisition without compromising accuracy

Survey Standards

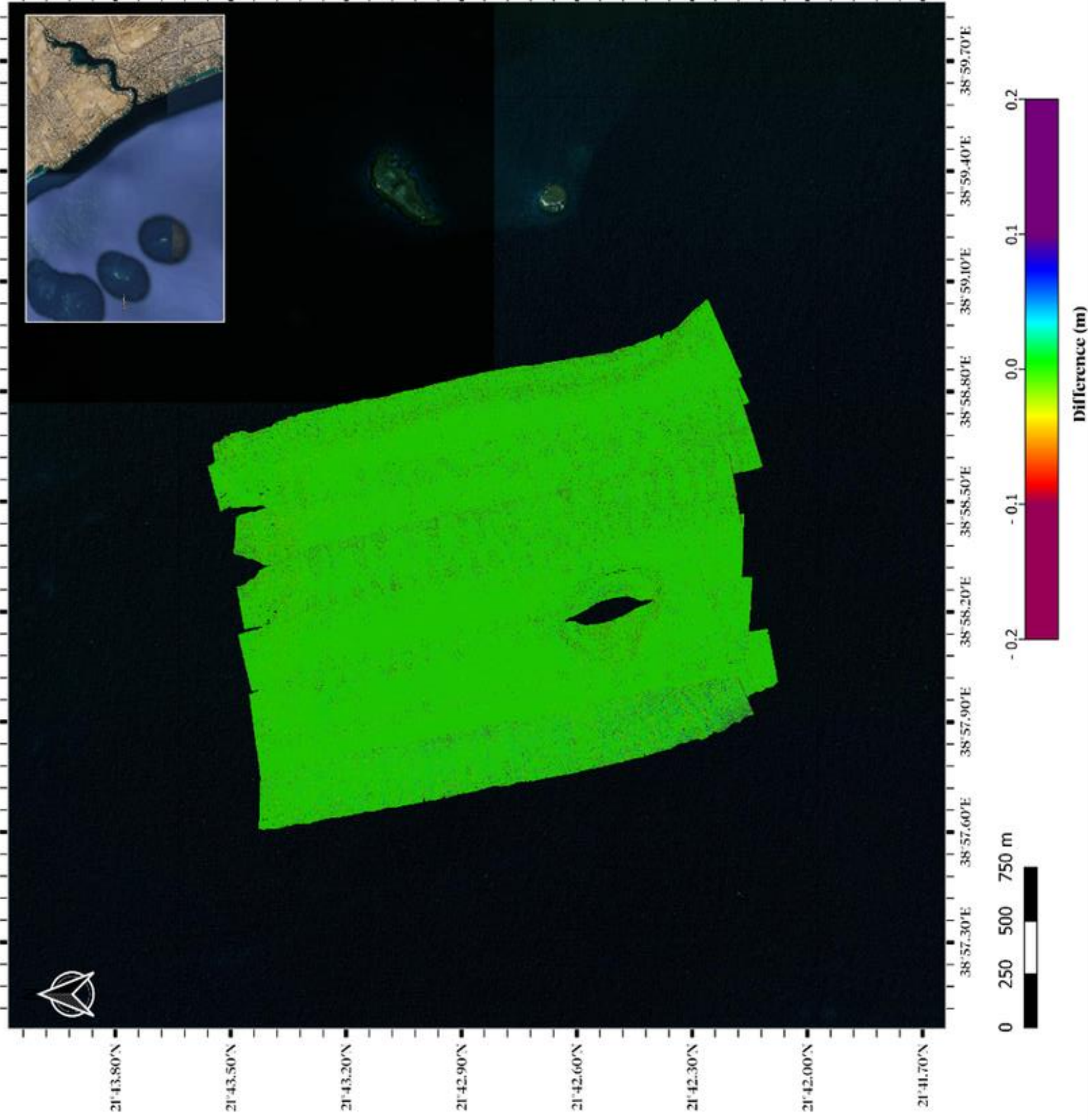
Evaluated according to the IHO S-44 minimum standards for hydrographic surveys.

Field Equipment

- 1- Vessel: KAU Hydrography
- 2- Sonar: Kongsberg EM712 MBES.
- 3- Motion Sensor: Applanix POS MV Ocean Master.
- 4- GNSS Bases: SinoGNSS N3 (RTK) and Trimble SPS 855 (PPK).
- 5- Profiler: Sound Velocity Profiler (SVP)



خريطة الفروقات السطحية لمنطقة بياضة - البحر الأحمر Surface Difference Map of Bayada - Red Sea



KING ABDULAZIZ UNIVERSITY

Faculty of Maritime Studies
Department of Hydrographic Surveying

PROJECT DESCRIPTION

Scale : 1:20000

Comparing RTK and PPK Accuracy in Hydrographic Surveys

Location : Bayada , Jeddah

Survey Vessel : KAU Hydrography 1

Instrument: Kongsberg EM712 MBES

Difference Statistics :

Mean Difference = -0.0 m
Std Deviation = 0.0 m
Max Difference = 7.2 m
Min Difference = -5.3 m

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