



FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

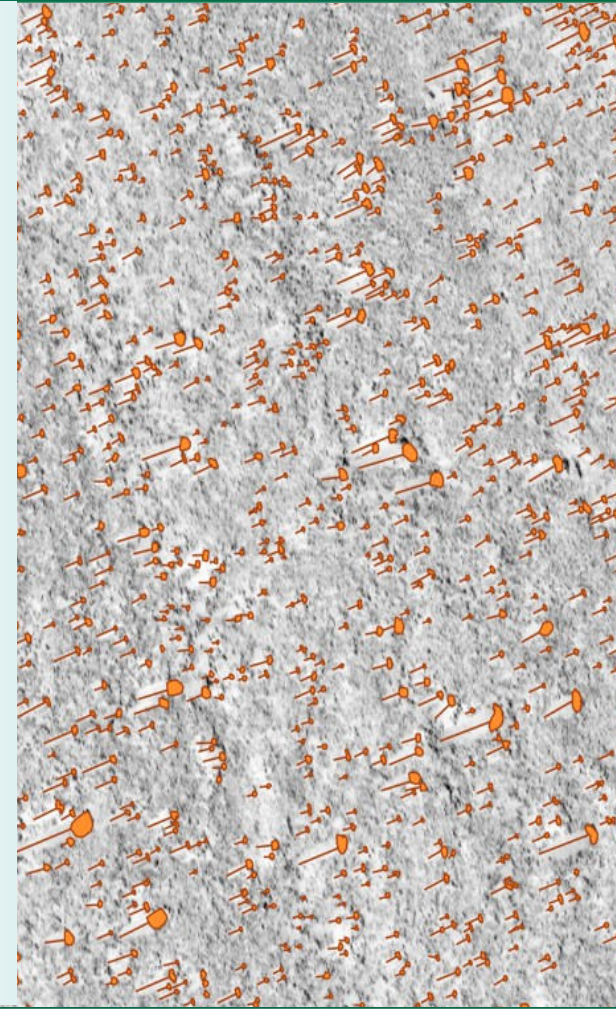
*Presented at the FIG Working Week 2024,
19-24 May 2024 in Accra, Ghana*

Automated Solutions in the Offshore Marine Geophysical Data Processing

Dino Dragun, CEO

Andrijana Horvat, R&D Lead

Srecko Kajic, Reporting Lead



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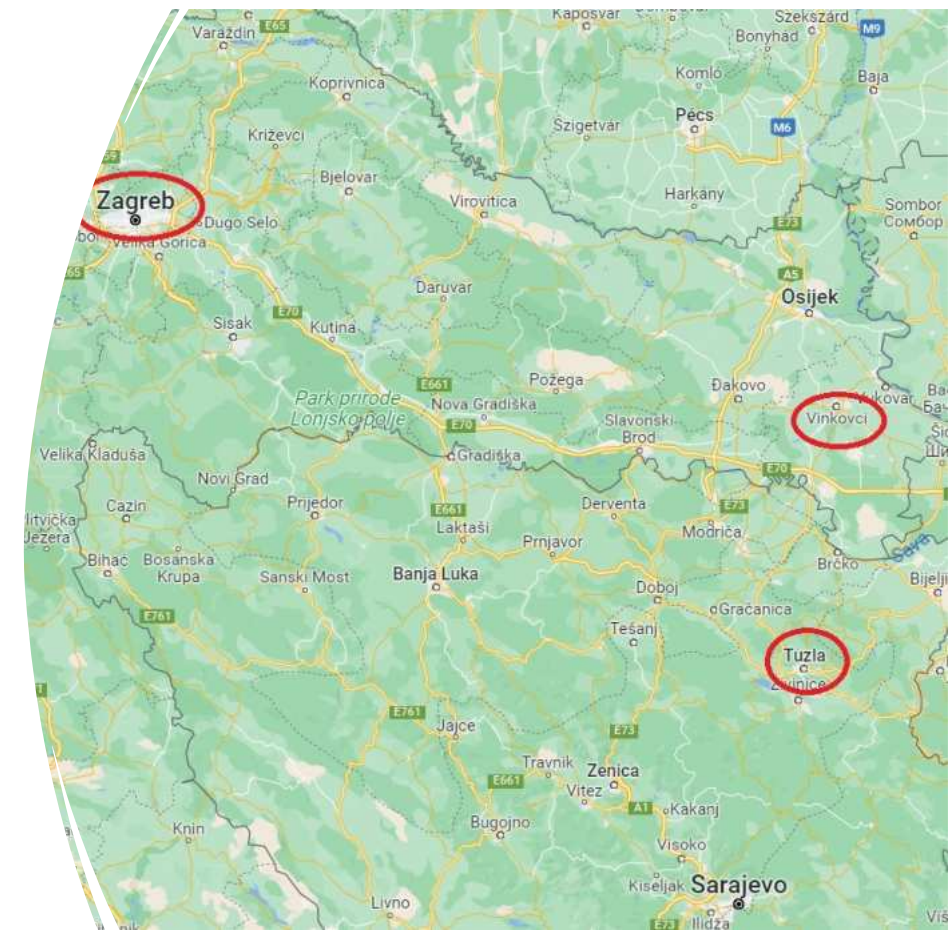
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Who is HidrociBALae?

- Marine geophysical data processing company
- Consulting services
- Founded in 2020
- Offices: Zagreb and Vinkovci (Croatia), Tuzla (Bosnia and Herzegovina)



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—
Hidrocibalae Team



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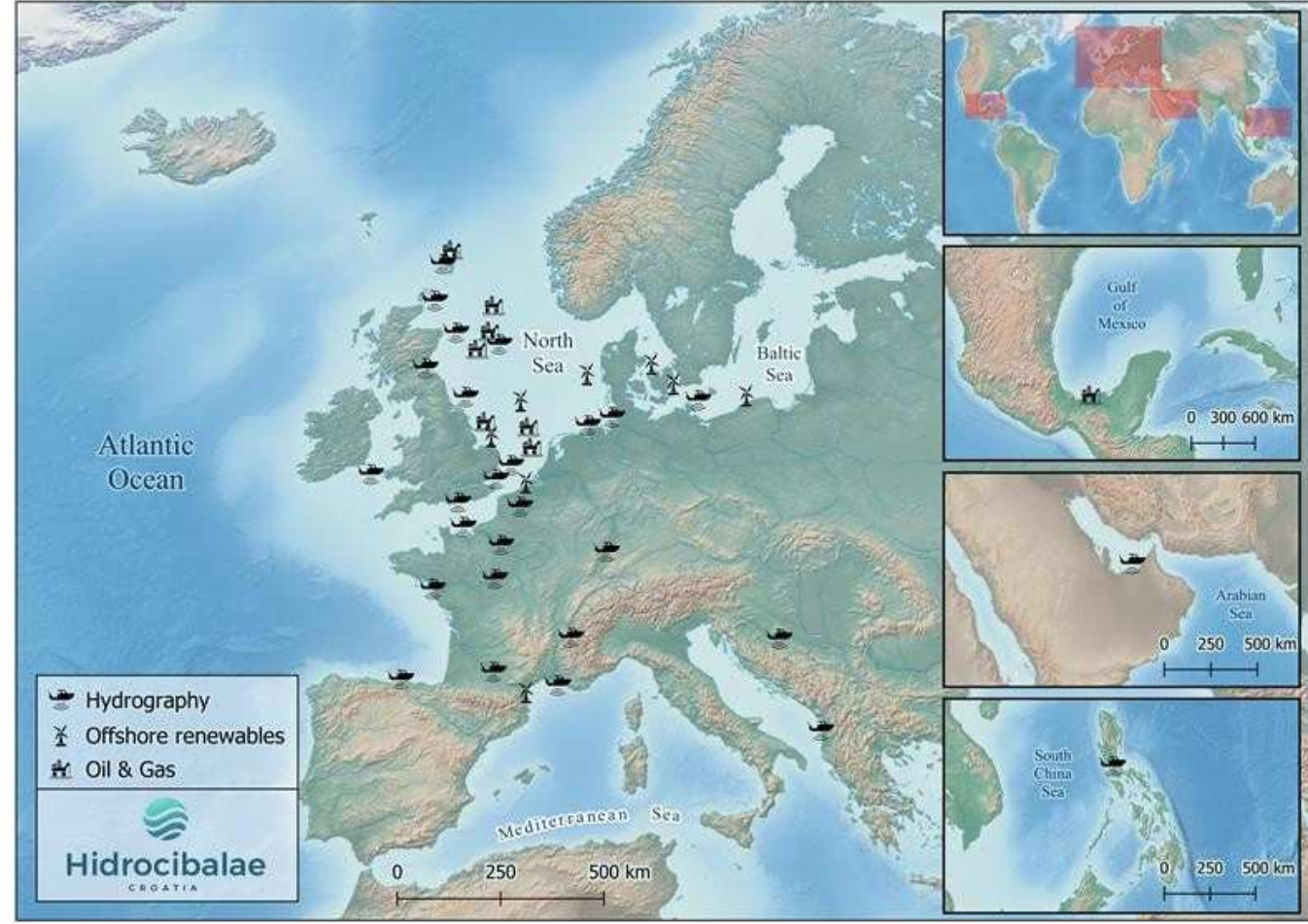


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Why we do?

Full service from tendering to delivery phase:

- Planning phase
- Construction/Execution phase
- Monitoring phase

Services:

- Geophysical data processing (SSS, MBES, SBP, MAG, UHRS)
- Reporting
- Charting
- Modern GIS solutions
- In-house automated data processing and smart data management solutions

Coming soon:

- EIVA pipeline detection



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- Advances in technology, an upturn in renewable energy sources and blue economy investments are causing rapidly increased industry demands, reflected in:
 - A growing number of projects.
 - Expanding project scopes and datasets size.
 - More specific client requirements.
 - Shortening of project deadlines.



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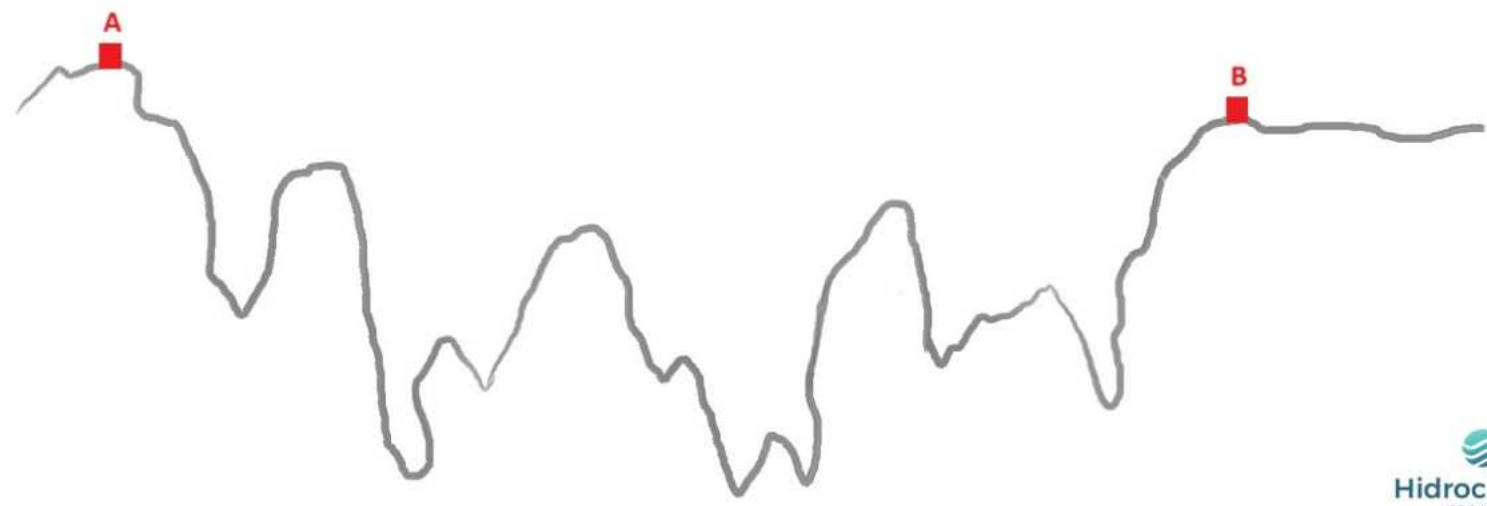


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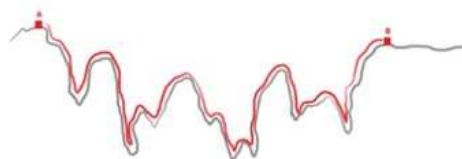
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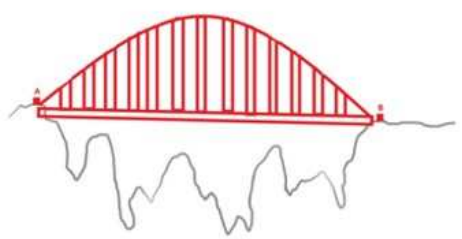
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Conventional Processing



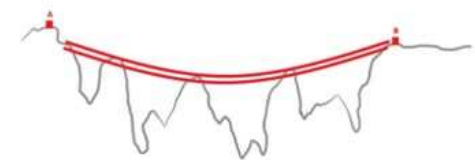
•Walking: 1 day

Automated Processing



•Construction: 30 days
•Driving Car: 2 minutes

Automated Processing



•Construction: 2 days
•Driving Car: 15 minutes



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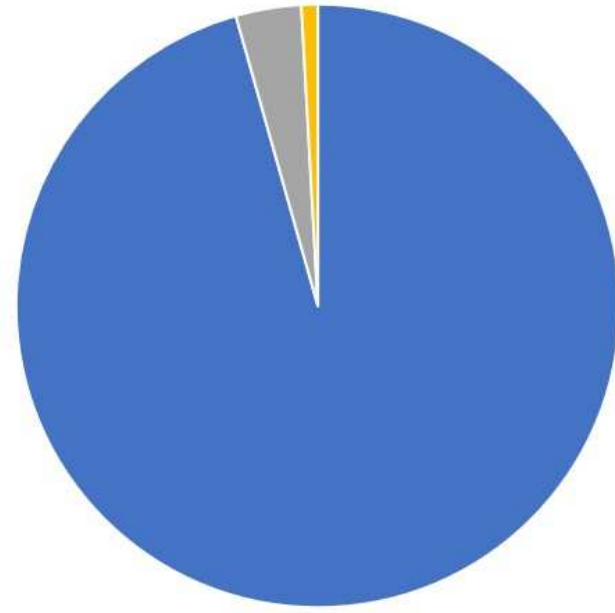


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Total Number of Automation Tools Developed in the last 12 months

- Developed in less than 2 working days: 109
- Developed in less than 10 working days: 4
- Developed in more than 5 months: 1





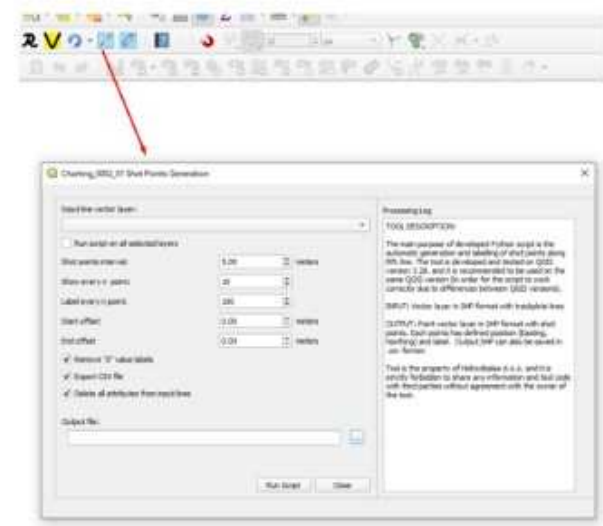
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Automation Tool Examples Developed in Less Than 2 Days



- **General:**
 - Auto-naming of lines in line plans
 - Capturing target images
 - Automatic cross-correlation of targets
- **MBES:**
 - Automatic creation of RGB slope maps from encoded .tif files.
- **SSS:**
 - Automated coverage calculation
 - Auto-naming of tiles based on coordinates
- **SBP:**
 - Tool for the automatic removal of bad timestamps and data lines
 - Tool for auto-removal and interpolation of duplicate SEG Y traces.
- **Charting:**
 - Tool for generating shot points
 - Tool for calculating the start and end KPs for panels.



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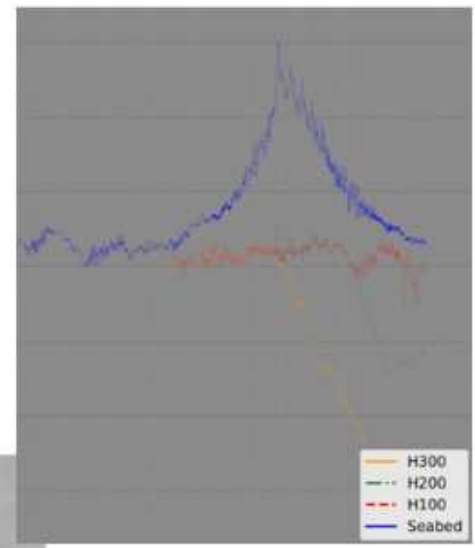
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Automation Tool Examples Developed in Less Than 10 Days

- Automatic detection and measurement of targets in MBES data
- SBP Geological Profile Generation Tools:
 - Tool for sampling multiple raster files at given line profile
 - Tool for trimming overlapping lines in geological profiles
 - Tool for removing spikes
 - Tool for plotting geological profiles for QC



Poly ID	Target ID	Block	BP	DCC	Easting	Northing	WaterDepth	Length	Width	Height
1	MBES_I2_01	B02	NULL	NULL	407137.2089526	5990734.115815	-3.78081630706...	1.848140796342...	1.148194882353...	0.548903942158...
2	MBES_I2_01	B02	NULL	NULL	407180.7171104	5990735.298183	-4.11220169067...	1.000374250934...	0.7382382473087	0.24848188238...
3	MBES_I2_02	B02	NULL	NULL	407162.5887383	5990734.842271	-3.72082355738...	1.349586779186...	1.13268782382	0.613421932547...



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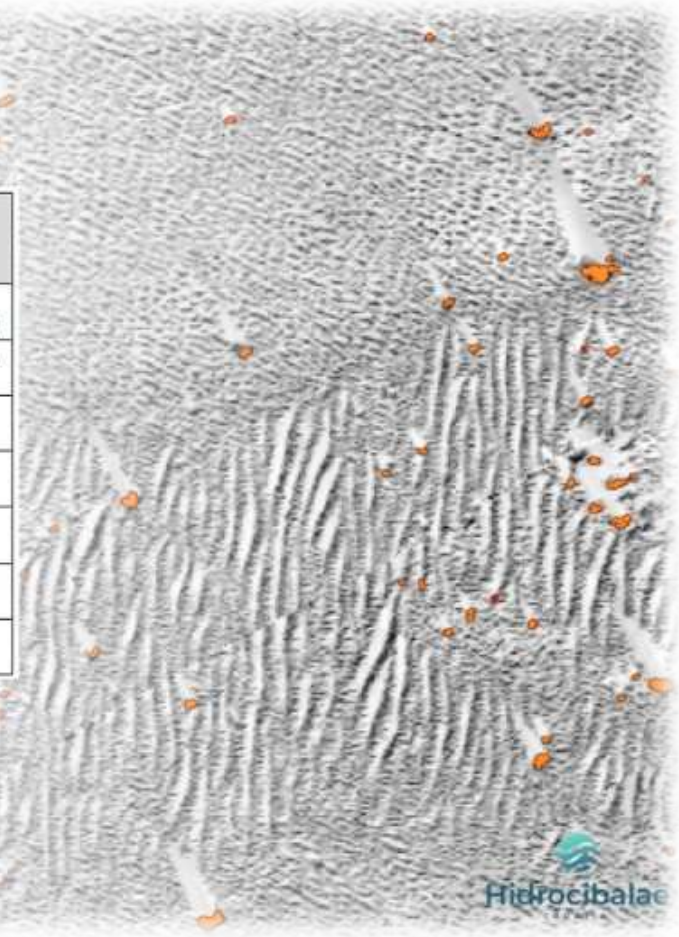
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Automatic Boulder Detection

	AUTOMATED BOULDER DETECTION ON SSS MOSAIC	AUTOMATED BOULDER DETECTION ON INDIVIDUAL SSS LINES
Required input data	SSS mosaic	SSS mosaic, SSS individual Geolimages, Trackplots (sensor height attribute required)
Detection output	Target list (point SHP) with boulder location, dimensions and description	Target list (point SHP) with boulder location, dimensions and description
Boulder dimensions	Length, Width	Length, Width, Height
Required TIF resolution	Does not affect the possibility of detection	Exports are required at specific resolutions that depend on requirements
SonarWiz Project	Not required	It is recommended to submit it for easier export of the necessary data
Minimum detection dimension	It depends on the survey parameters and the delivered TIF resolution	
Import of target list back to SonarWiz	No	Yes



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AL3_B54_0045-U_jsf-CH34

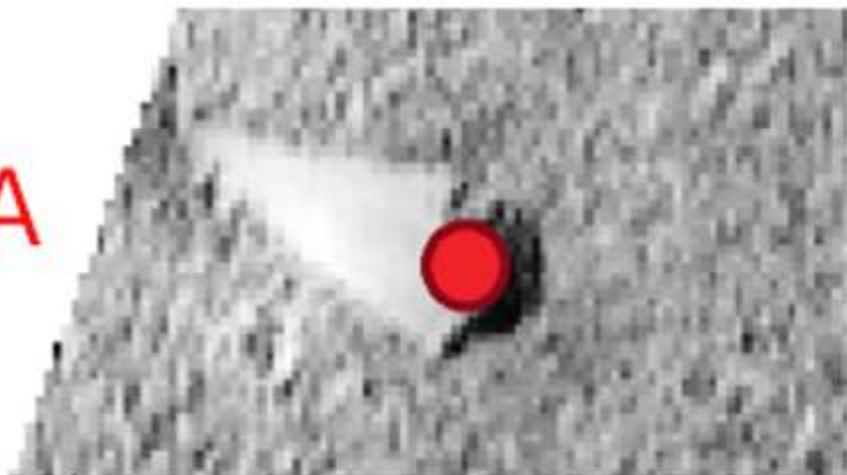
3_BAL3_B54_0045-U_jsf-CH34_ShadowLines.shp

3_BAL3_B54_0045-U_jsf-CH34_BoulderPolygons.shp

3_BAL3_B54_0045-U_jsf-CH34.shp

3_BAL3_B54_0045-U_jsf-CH34.tif

A



B

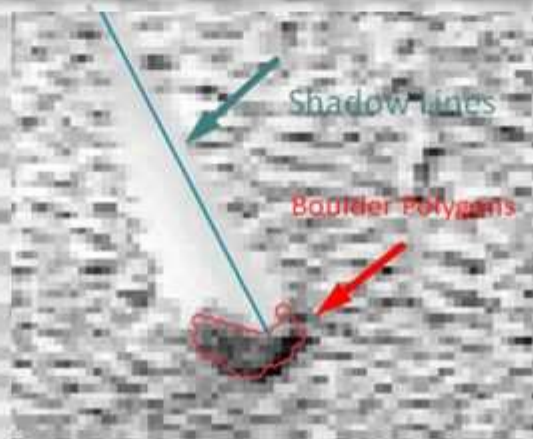
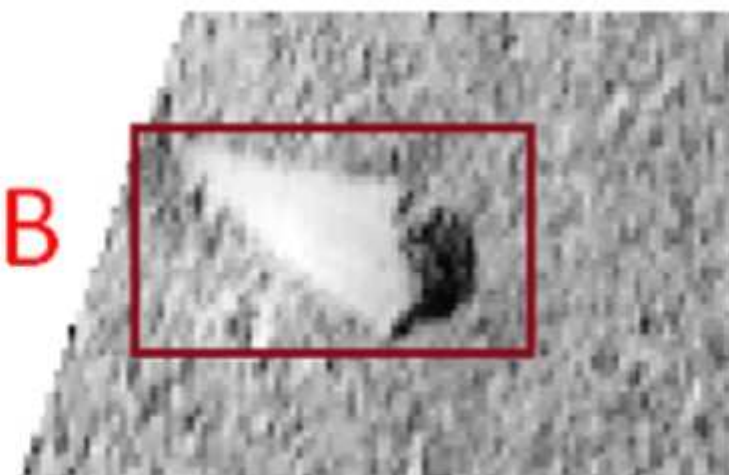




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1 REQUIRED INPUT DATA

- Mosaic Export
- Trackplots
- Geo Images of Each Line

2 INITIAL ANALYSIS OF SSS LINES

3 BOULDER PICKING ALGORITHM

4 DIMENSION CALCULATION

5 SCRIPT EXPORTS: EXCEL AND SHP TARGET LIST

Target ID	Target Name	Easting	Northing	Length	Width	Height	Description	Comment
001	SSS_001	400790.072	8071207.985	0.81	0.29	0.25	Boulder	Automatically Picked Target
002	SSS_002	400790.040	8071207.792	0.46	0.32	0.28	Boulder	Automatically Picked Target
003	SSS_003	400790.025	8071208.742	0.97	0.62	0.54	Boulder	Automatically Picked Target
004	SSS_004	400790.076	8071208.048	0.91	0.54	0.43	Boulder	Automatically Picked Target
005	SSS_005	400790.128	8071208.988	0.34	0.23	0.12	Boulder	Automatically Picked Target
006	SSS_006	400790.054	8071207.885	0.33	0.19	0.18	Boulder	Automatically Picked Target

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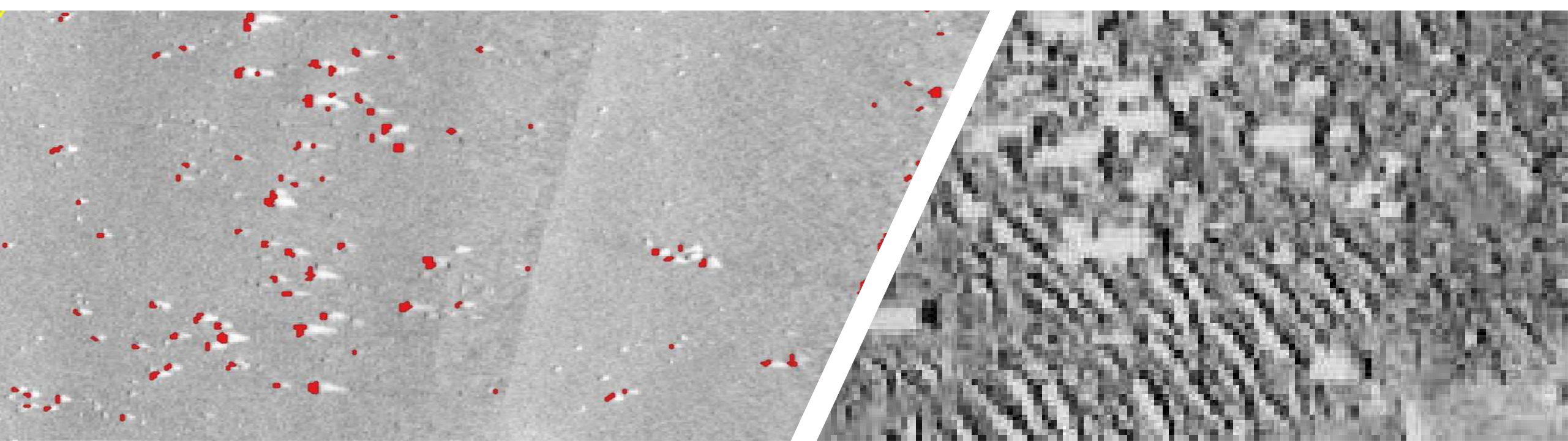
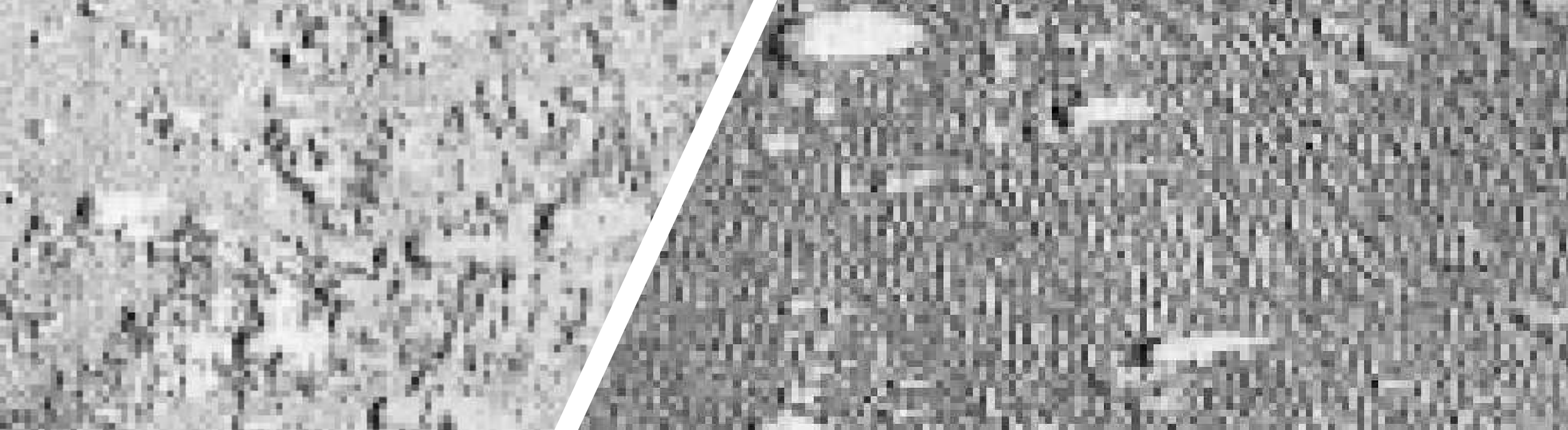


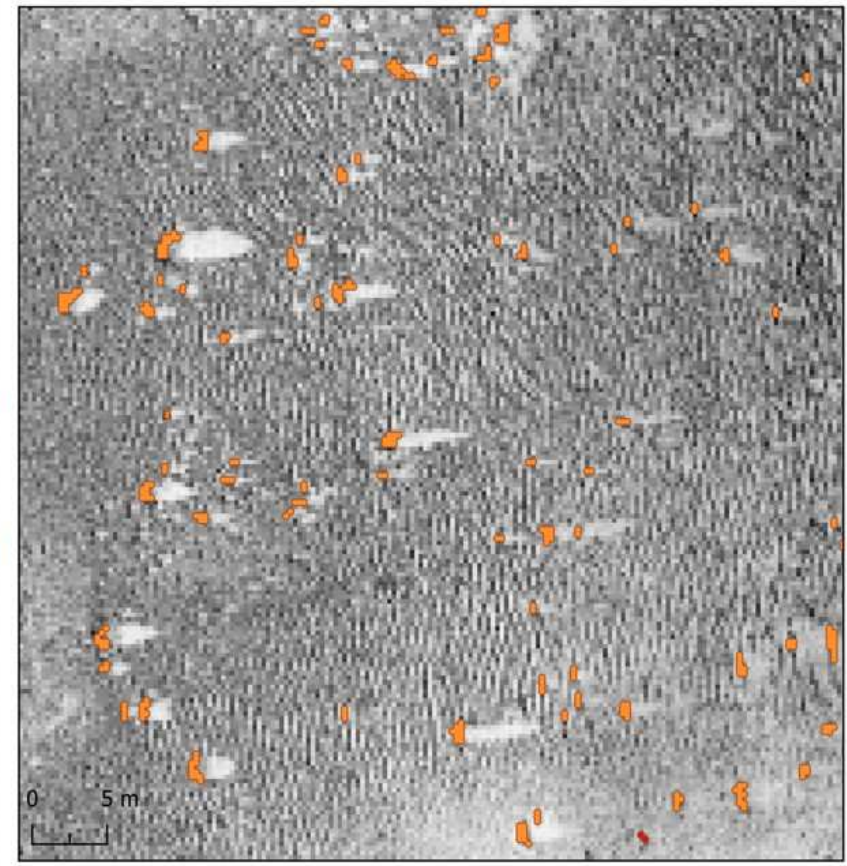
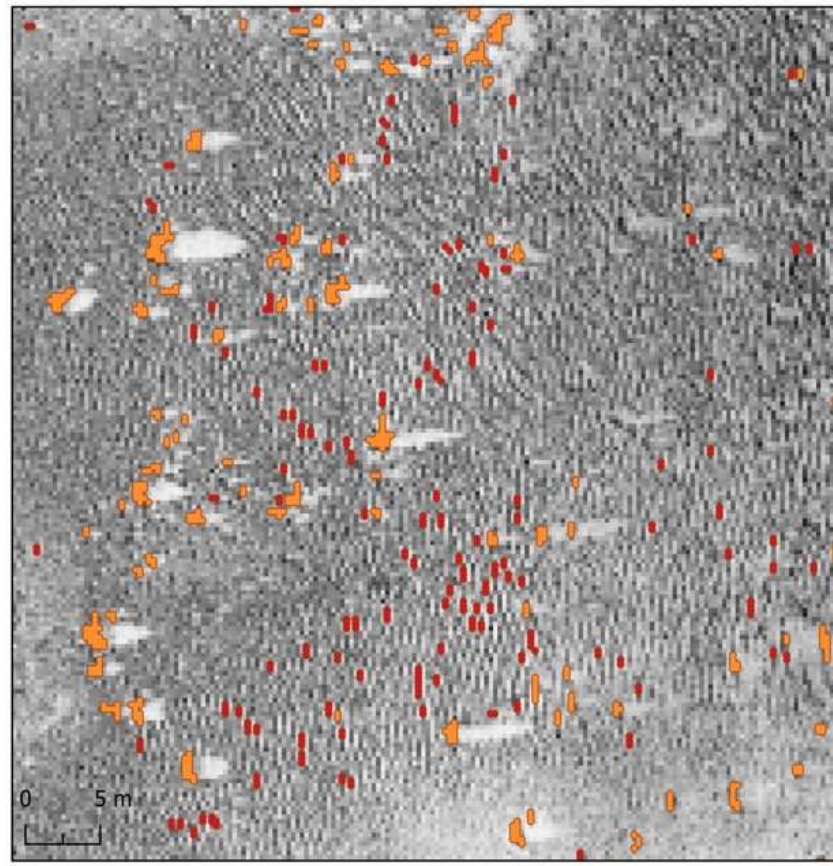


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Correct Boulder Detections False Positive Boulder Detections



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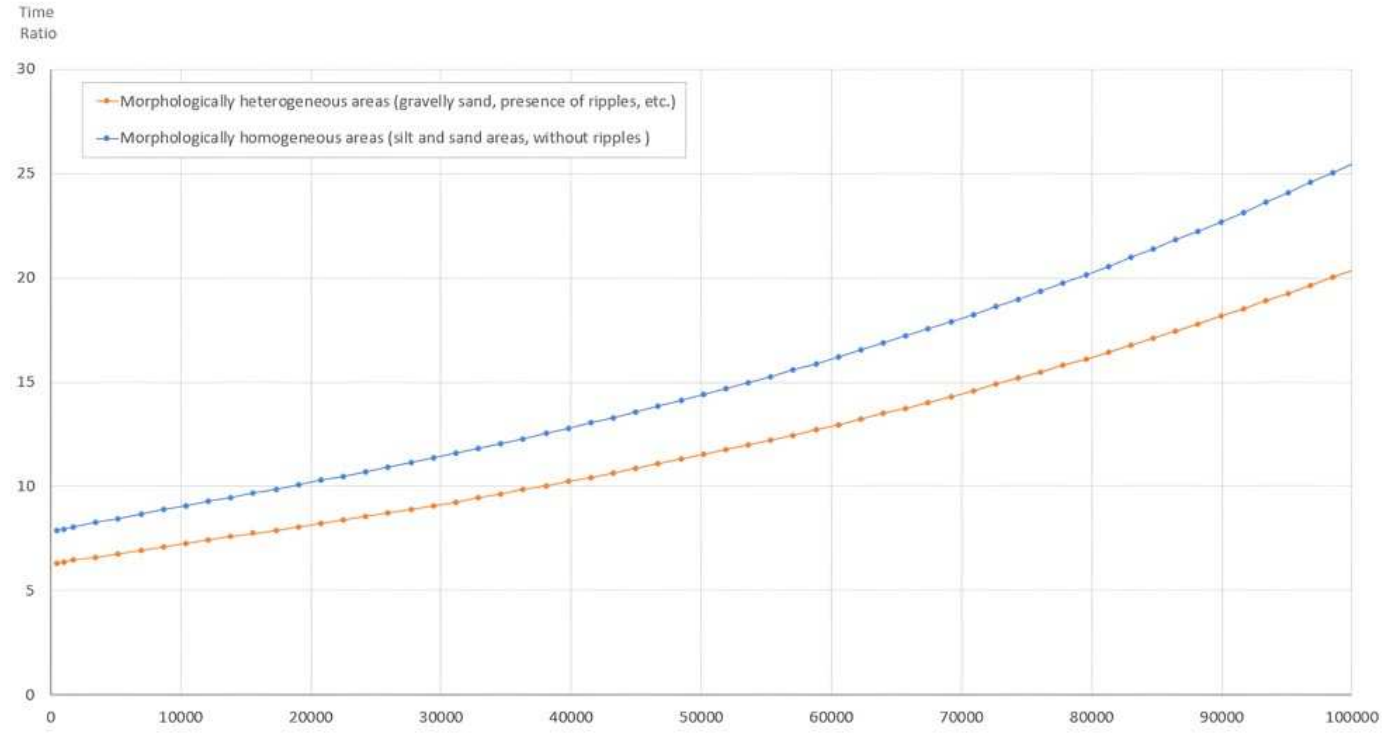


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Number of Boulders



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Thanks for your
attention



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C R O A T I A

All you need to Sea

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SUSTAINABLE DEVELOPMENT **GOALS**

International Federation of Surveyors supports the Sustainable Development Goals

Commission 4

Hydrography

Serving Society for the Benefit of People and Planet

