



Seagrass mapping along the Italian coast for marine ecosystem restoration (MER)

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Finanziato
dall'Unione europea
NextGenerationEU



MINISTERO DELL'AMBIENTE
E DELLA SICUREZZA ENERGETICA





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<https://www.youtube.com/watch?v=LeBdd-jJT6U>

Marine Ecosystem Restoration (MER) Project



Objective

Restore and protect marine ecosystems, focusing on biodiversity conservation and sustainable resource use

Implementation

ISPRA (Italian Institute for Environmental Protection and Research)



Istituto di
Geologia Ambientale
e Geingegneria



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DI GEOFISICA E VULCANOLOGIA



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MILANO 1863



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Funding

PNRR (National Recovery and Resilience Plan) of Italy, part of EU's recovery plan

The activities are carried out within the framework of the **NextGenerationEU investment projects** -

- Mission 2: "Green Revolution and Ecological Transition,"
- Component 4: "Protection of Land and Water Resources,"
- Measure 3: "Safeguard air quality and biodiversity through the protection of green areas, soil, and marine areas."
- Investment 3.5 has been planned: "Restoration and Protection of Seabeds and Marine Habitats".



MER project target

Complete mapping of the entire coastline of Italy by July 2026

Ca. 7,600 km coastline length

Concept of Operation

Satellite EO

RGB, SDB, SSR, Seafloor Classification
Resolution: 2 m

EOMAP
a Fugro company

FUGRO
RAMMS

ALB

Bathy DTM, Topo DTM, Bathy Intensity, RGB-NIR
Resolution: 1 m

ALT

Orthophotos, DSM, DTM
Resolution: 10 cm

MBES

DEM, Backscatter
Resolution: 0.2 m – 0.5 m

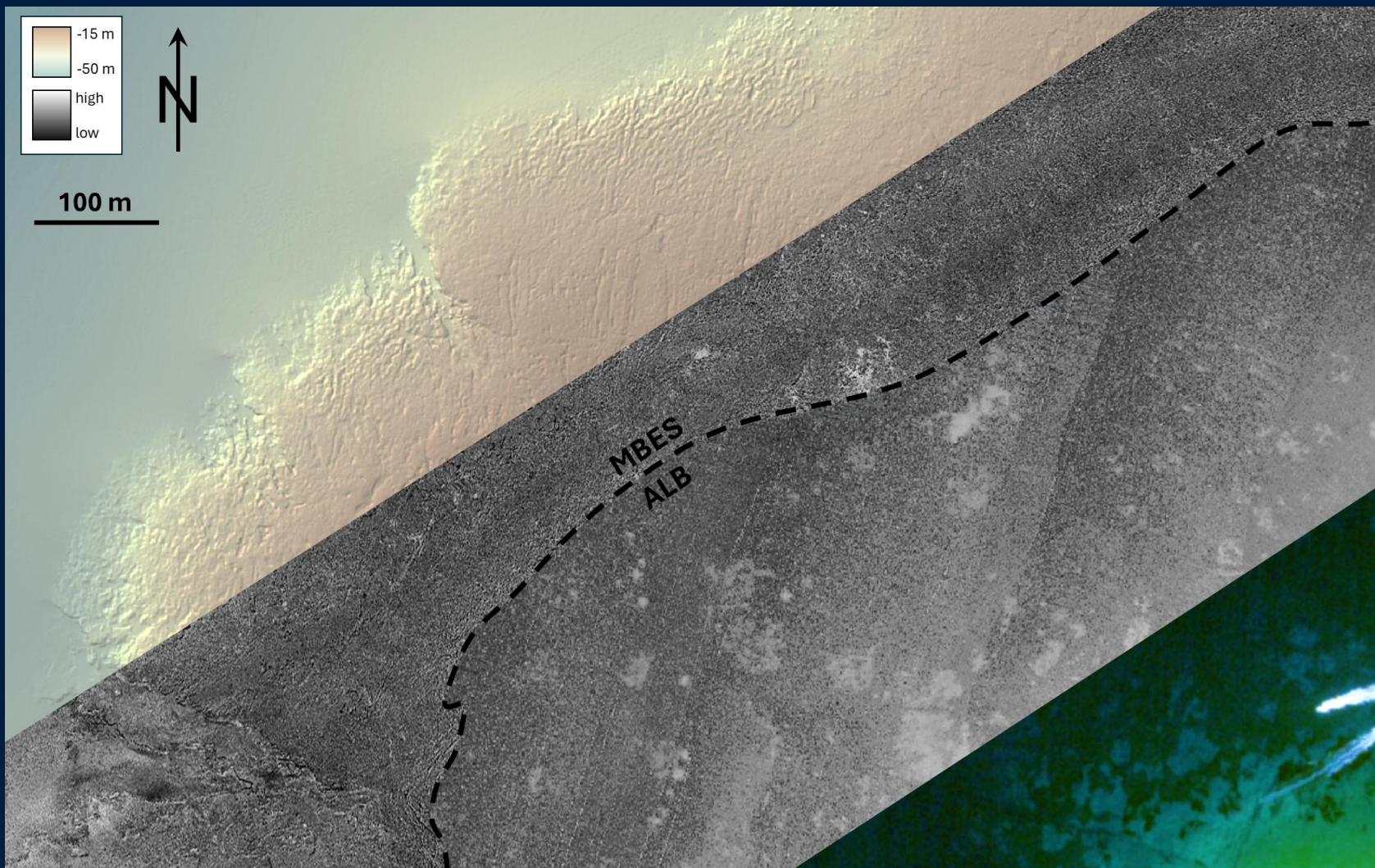
AUV

RGB Imagery, Orthophotos, Point Clouds, DEM
Resolution: sub-centimetre

 planblue

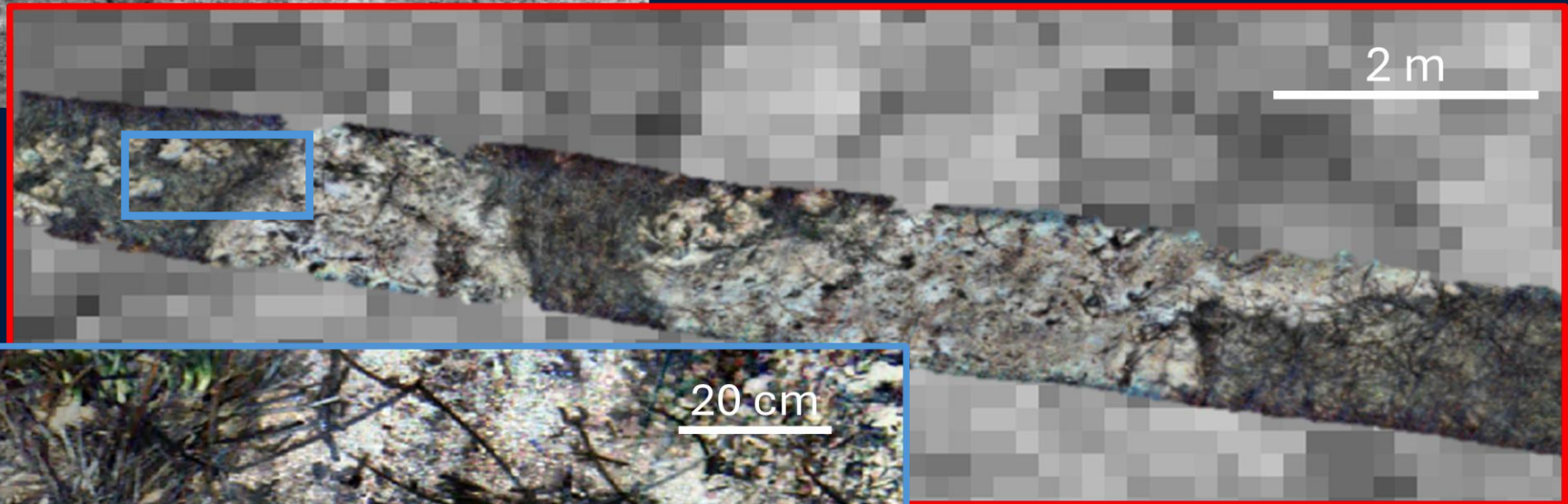
FUGRO

Area of seagrass coverage displayed by different data sets,
From bottom right to top left: Satellite imagery, Intensity (ALB & MBES), MBES bathymetry



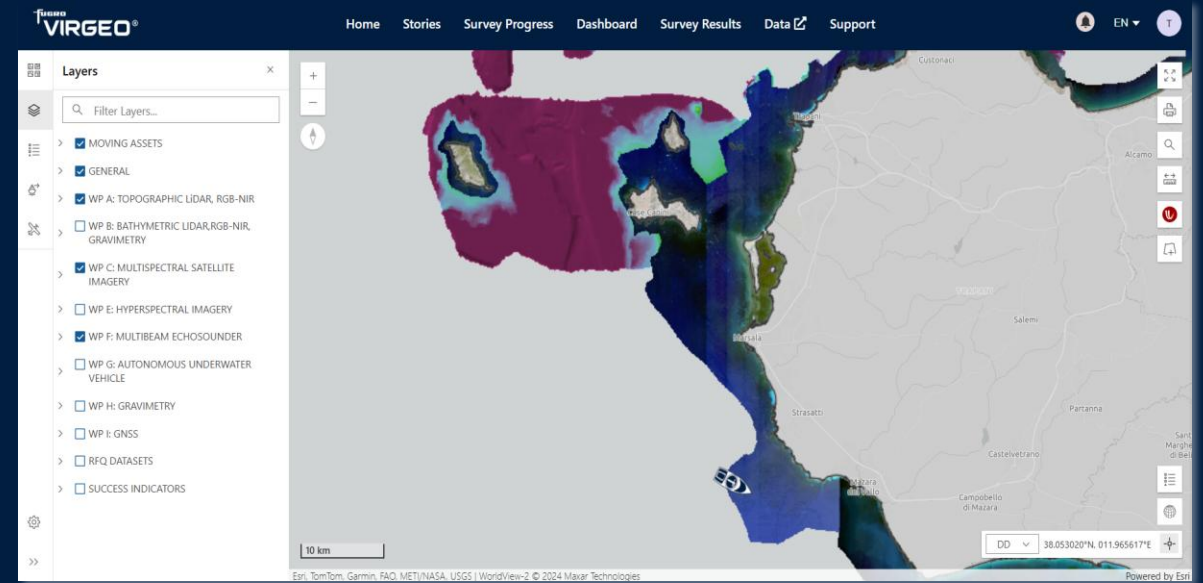


Different zoom levels of an area showing MBES backscatter data (20 cm) as background and AUV imagery in the foreground.

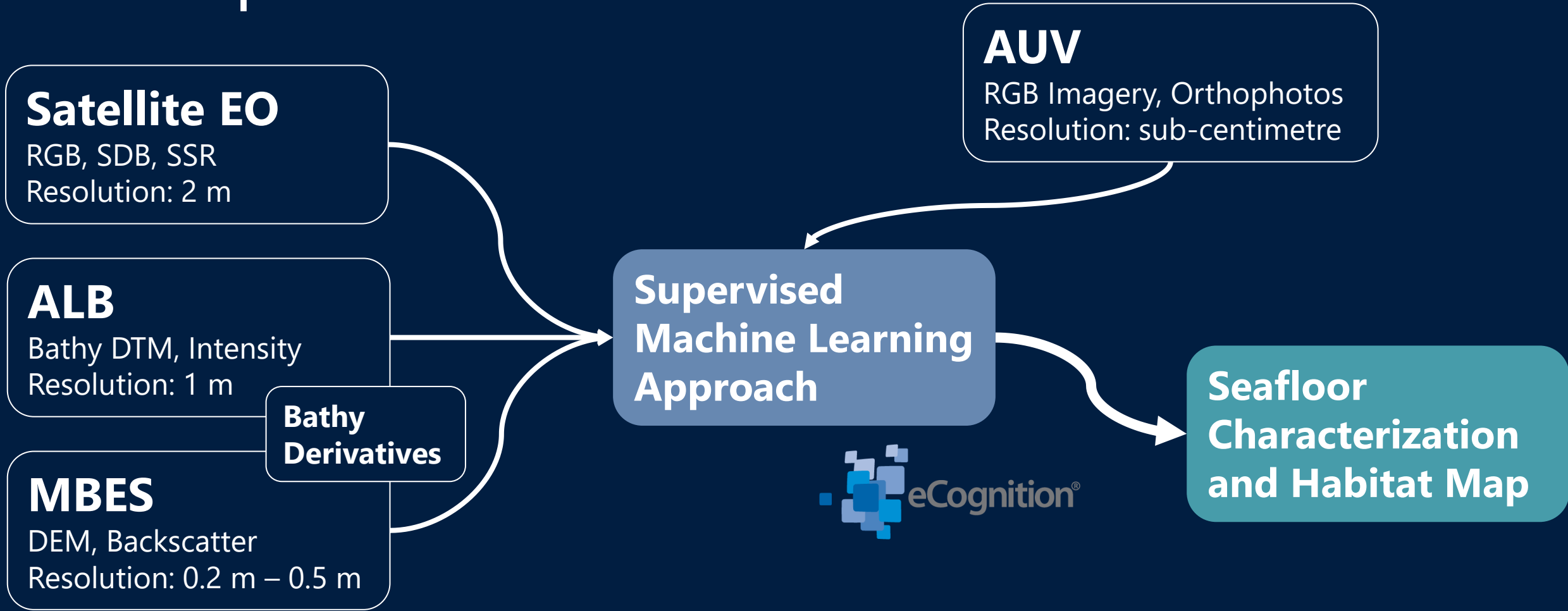


Navigating the Complexity of a Large-Scale Mapping Project

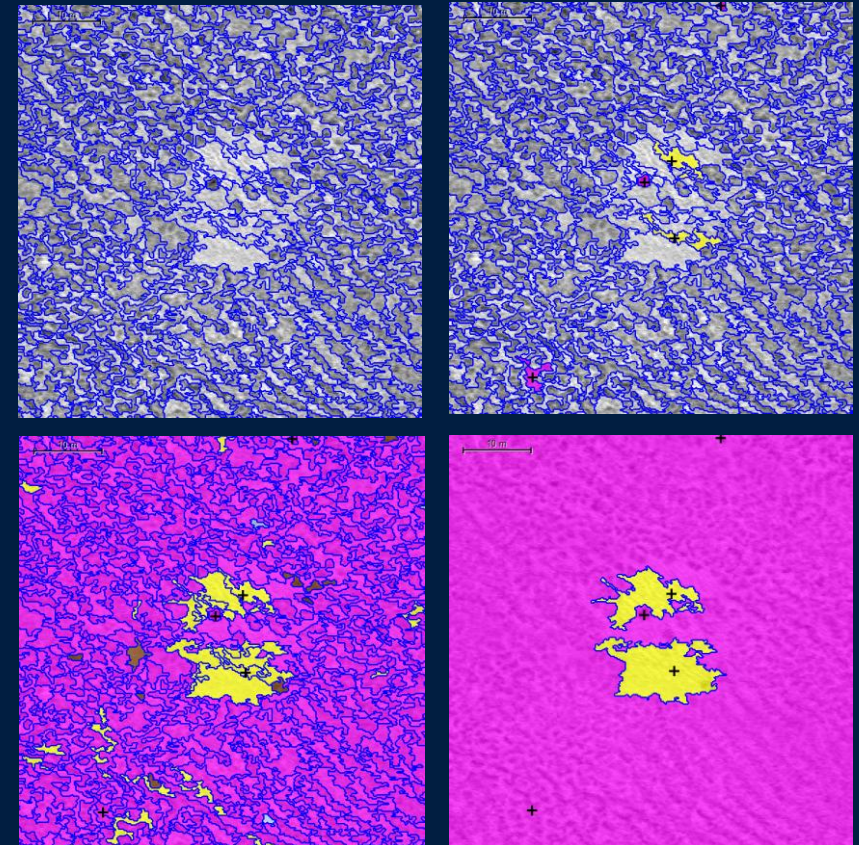
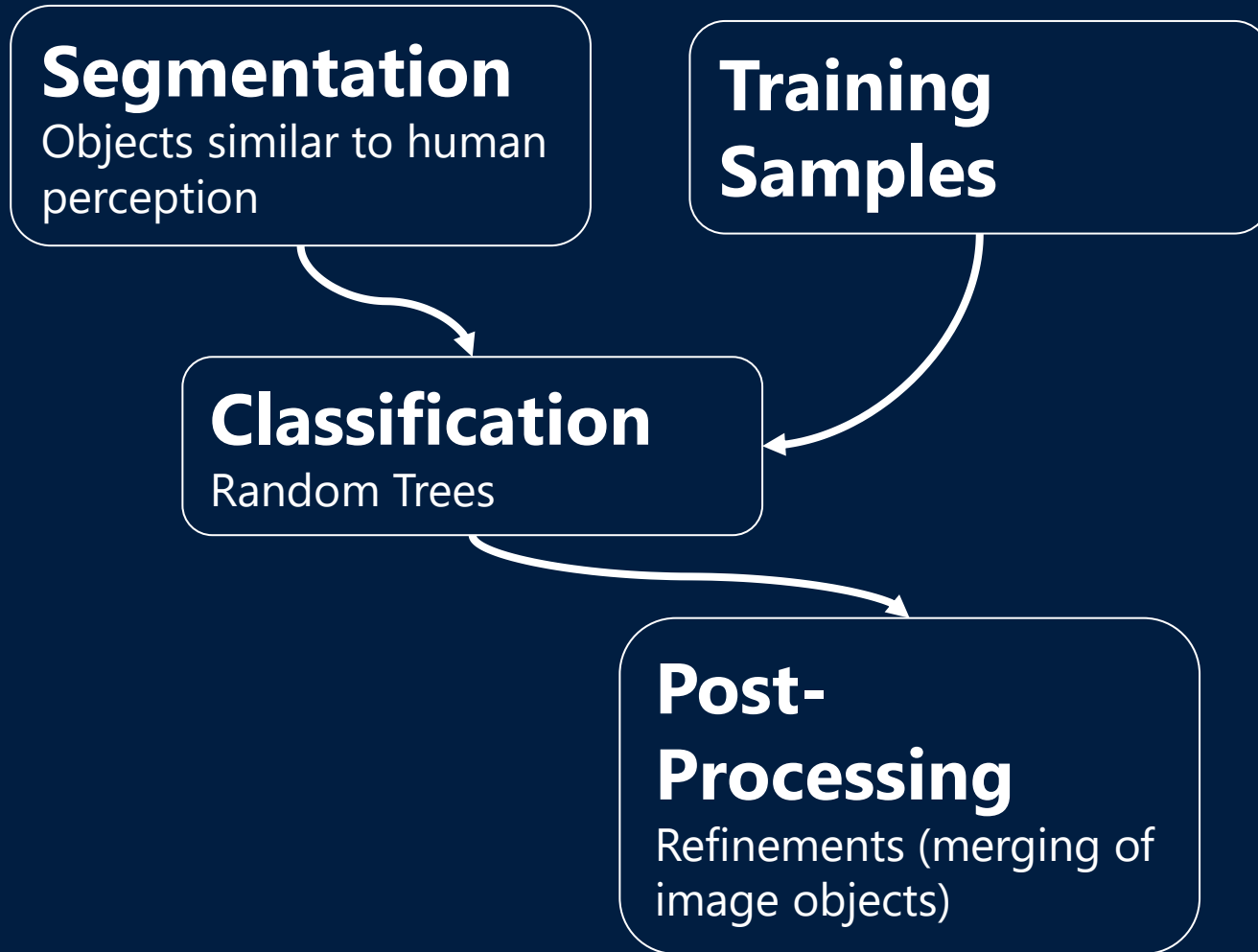
- Planning of data acquisition
 - Account for various factors such as:
 - Seafloor morphology
 - Environmental conditions
 - Operational constraints
- Monitoring project progress and data status
 - VirGeo®: cloud-hosted platform specifically designed to streamline data management.
- Automated seagrass classification



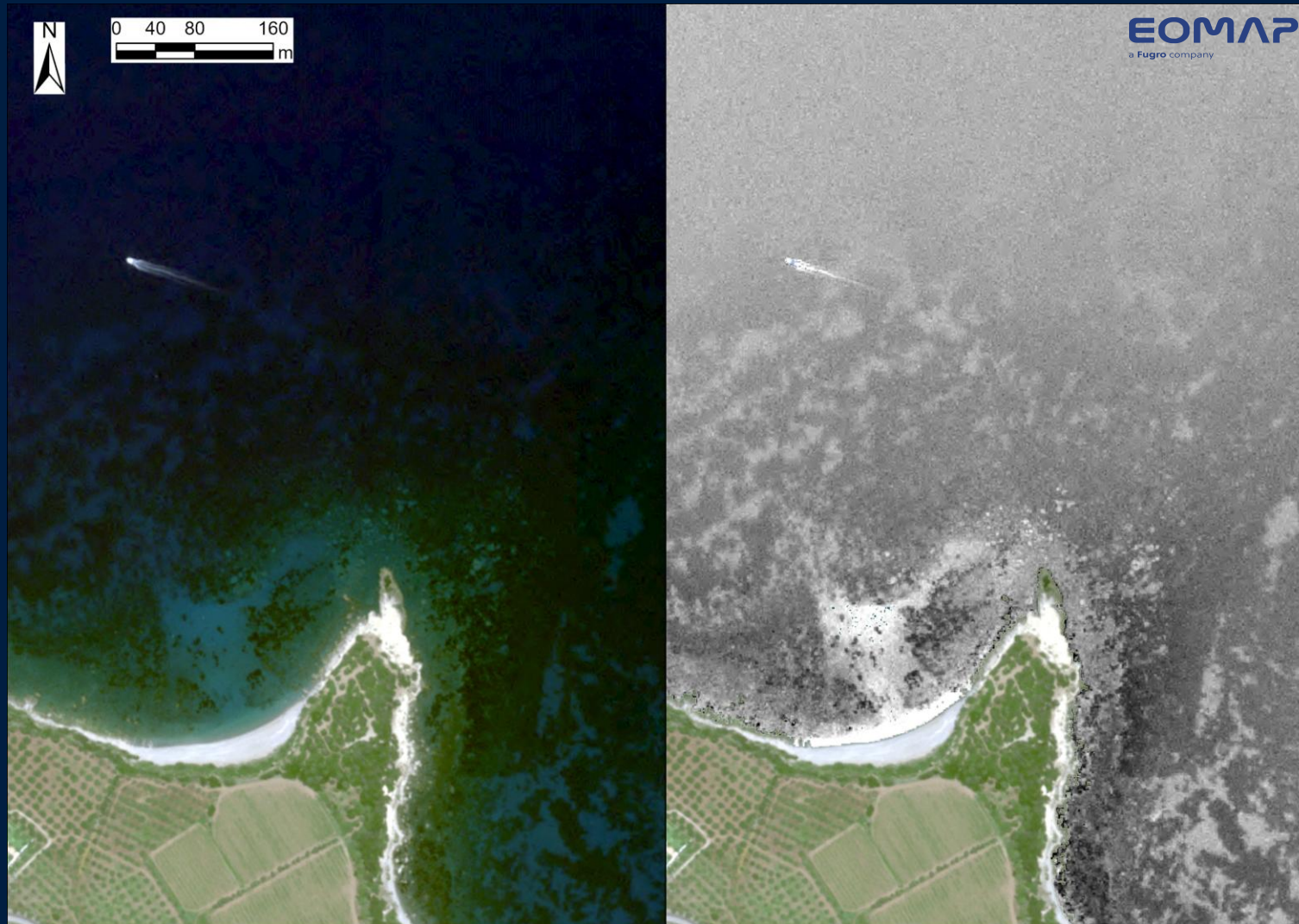
Concept of Classification



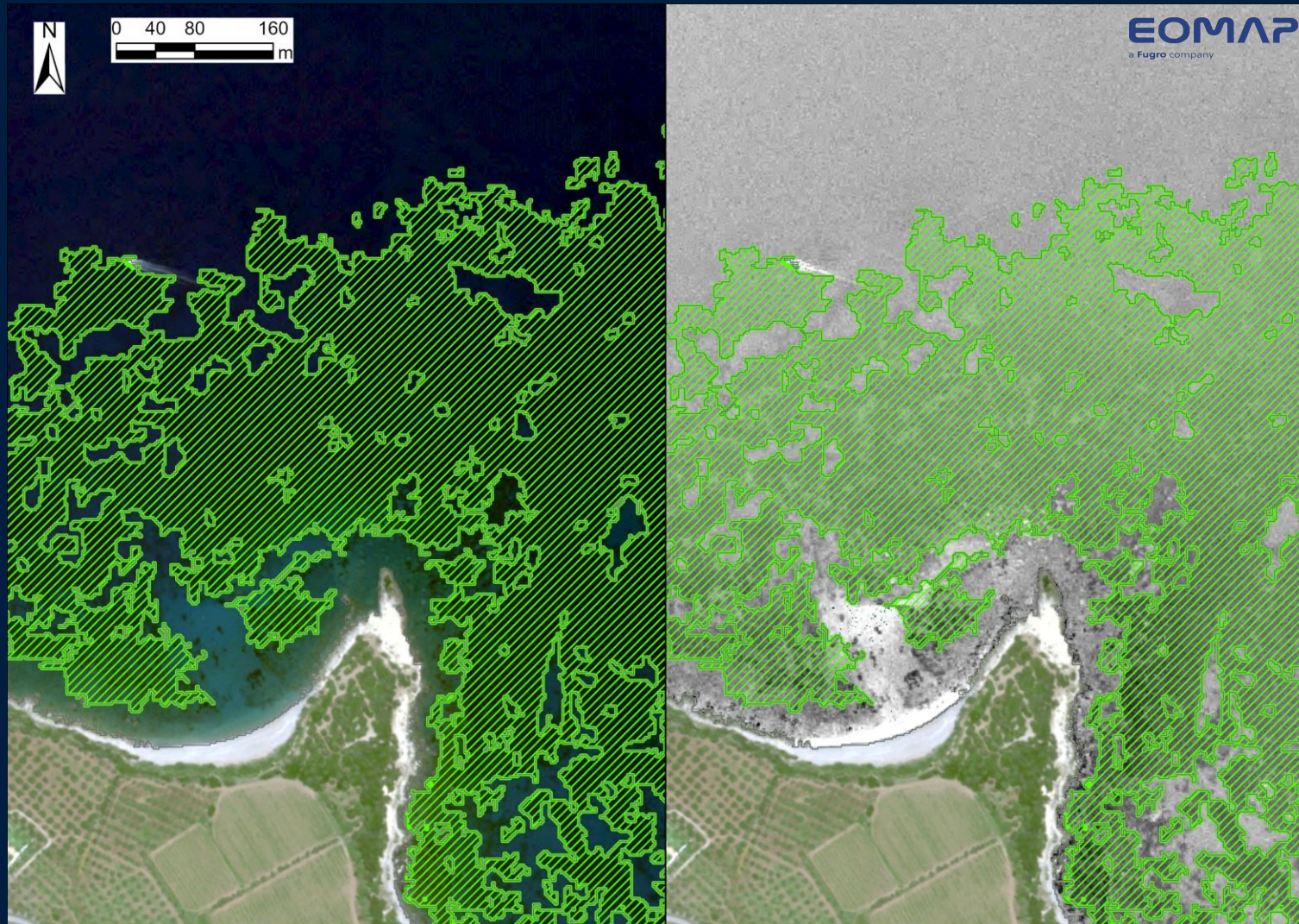
Supervised Machine Learning



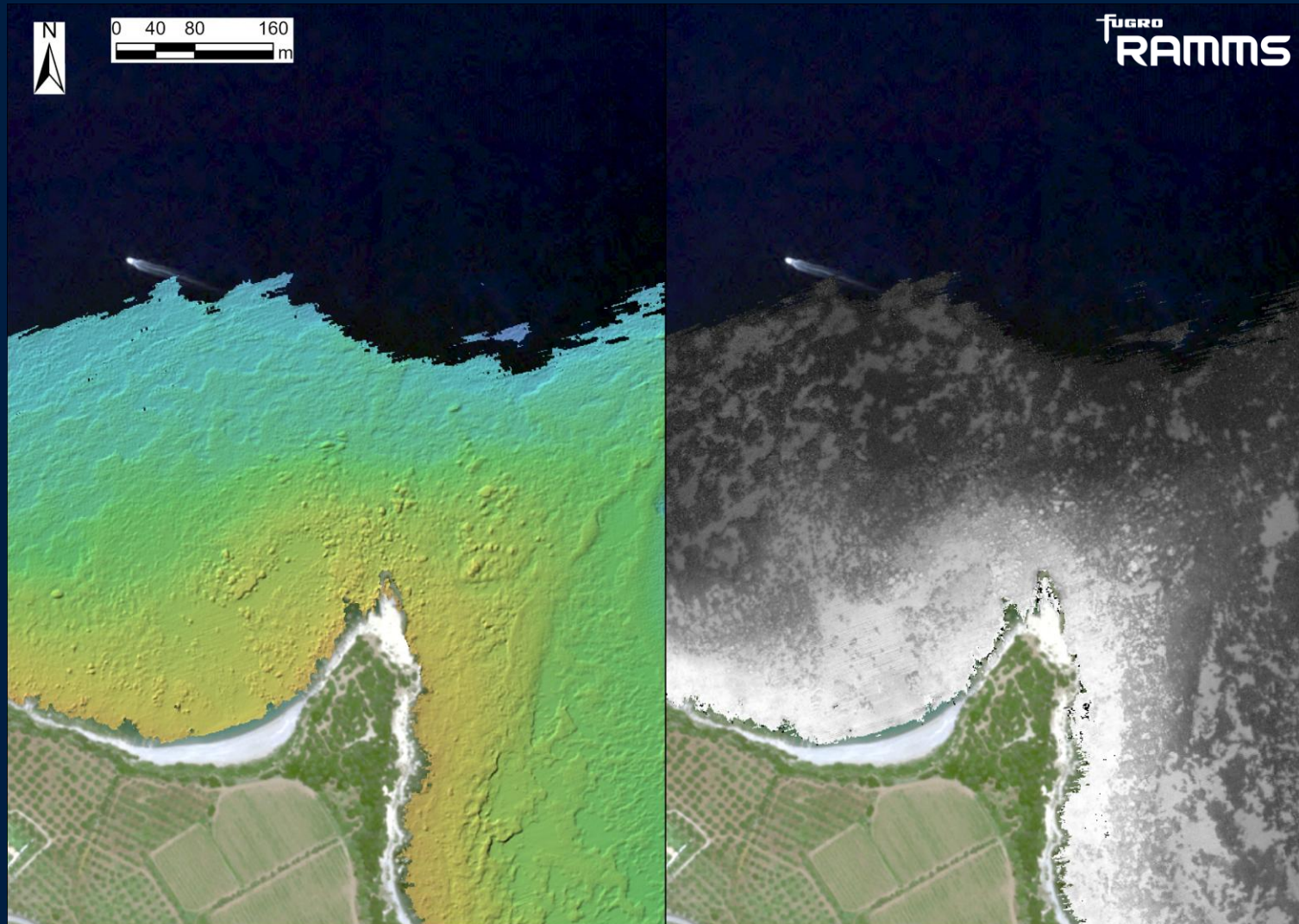
Results – Satellite



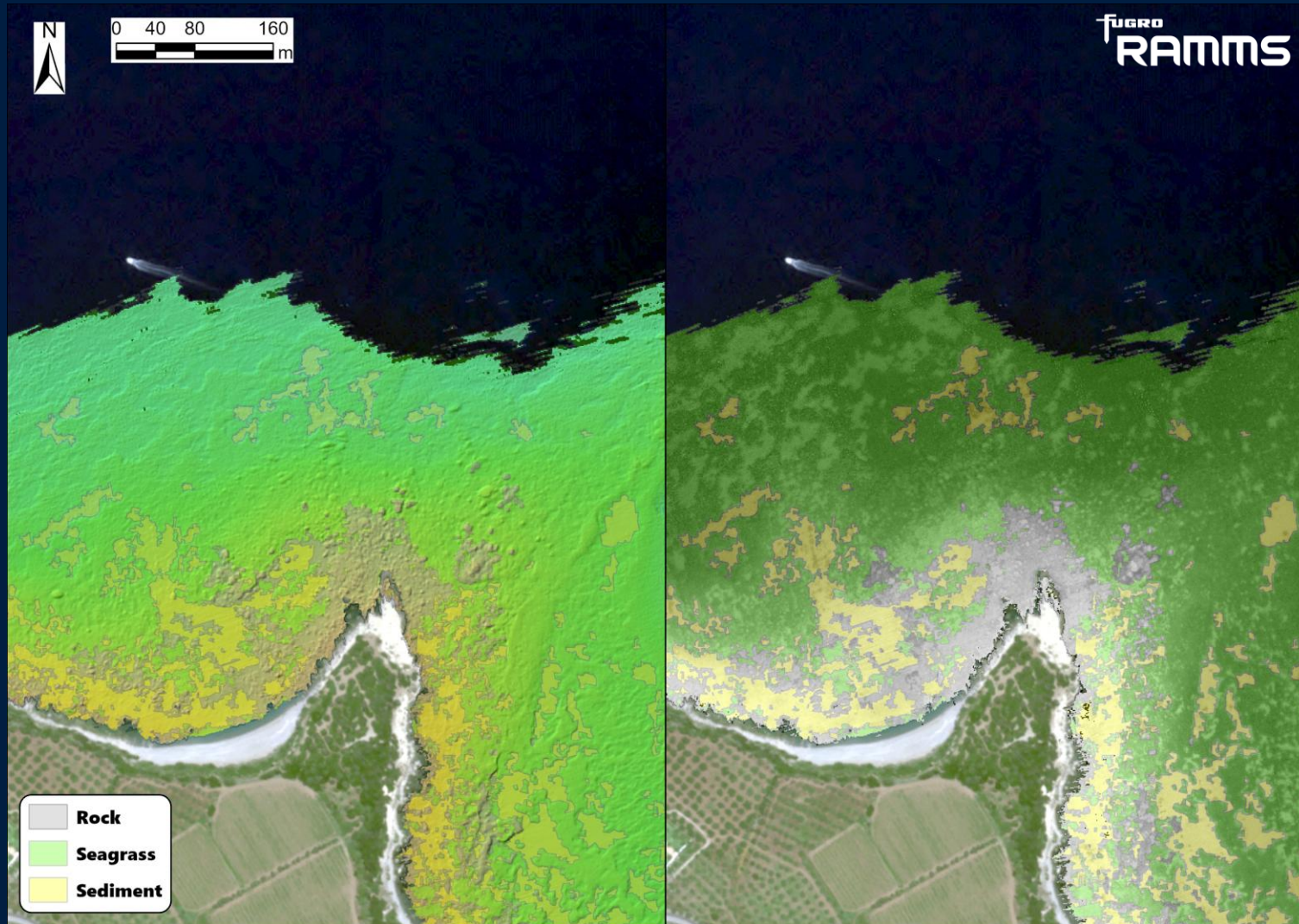
Results – Satellite



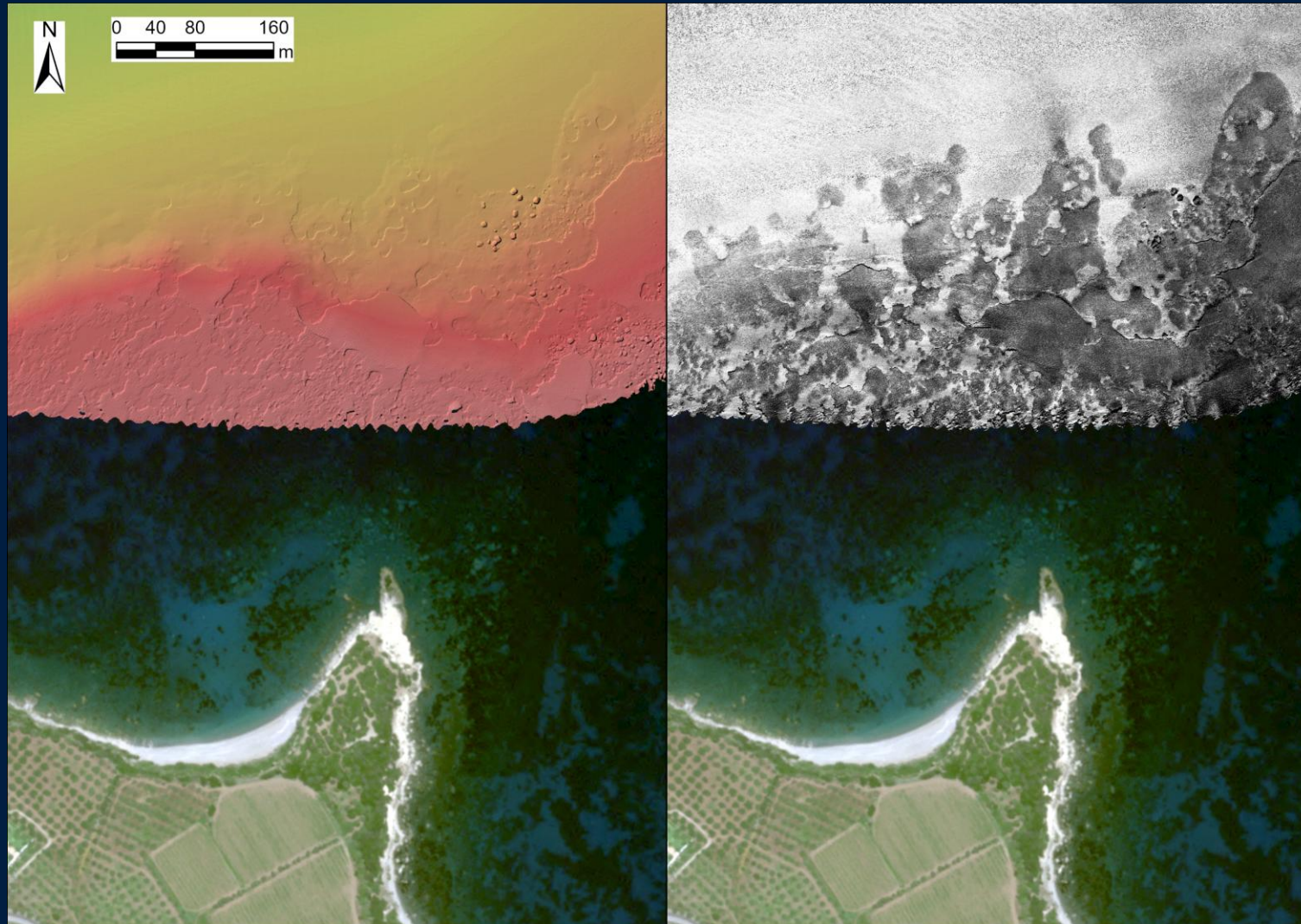
Results – ALB



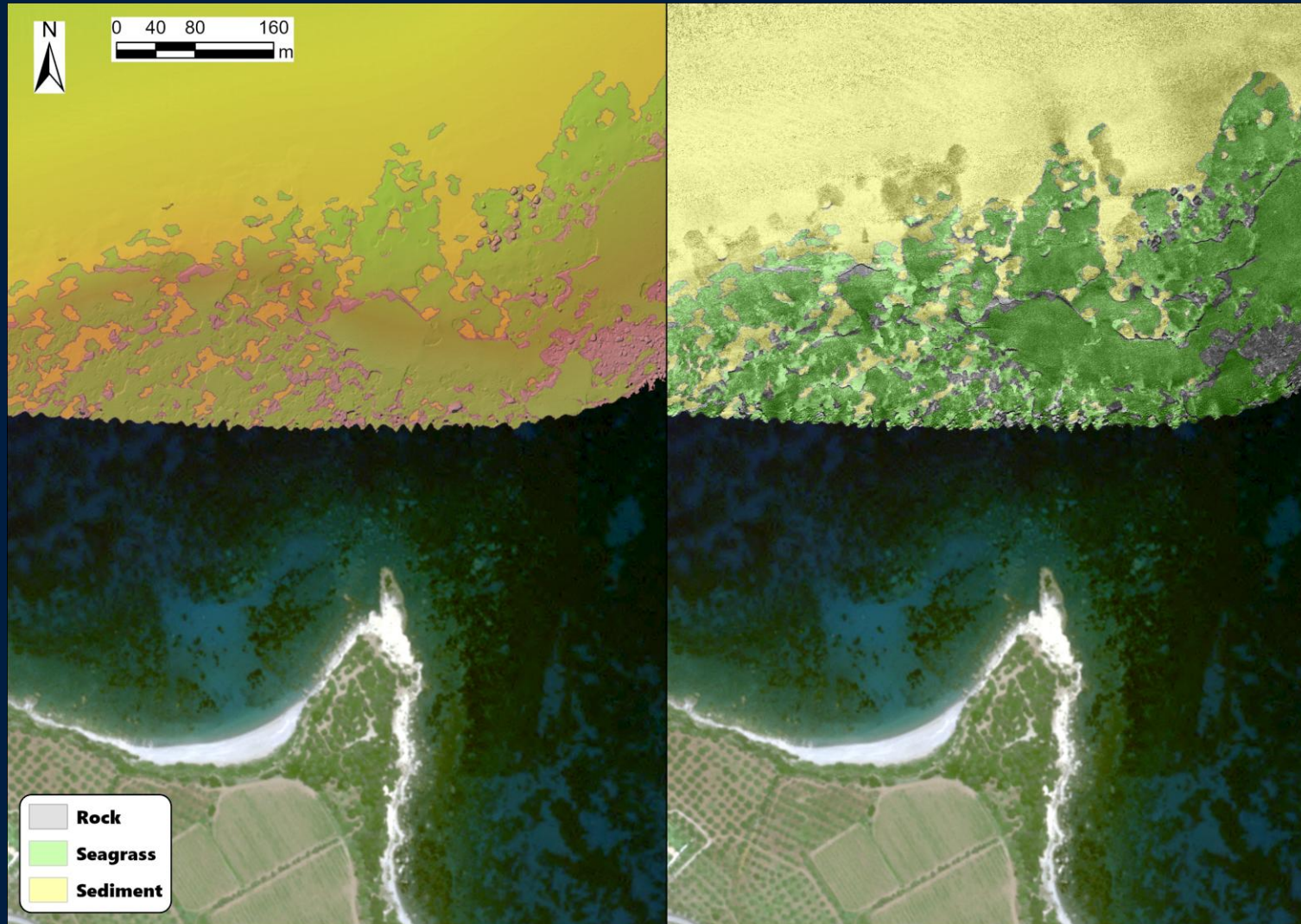
Results – ALB



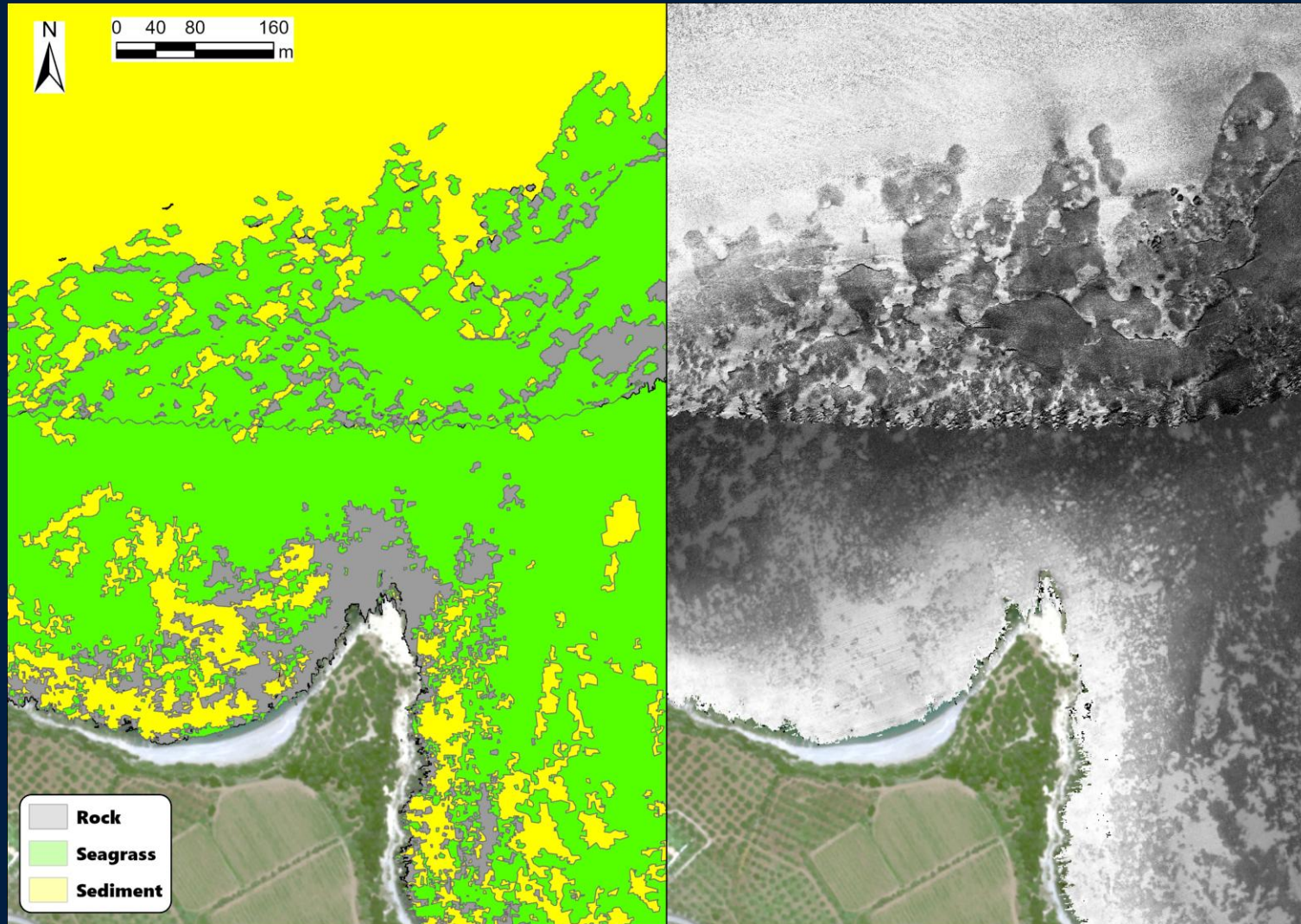
Results – MBES



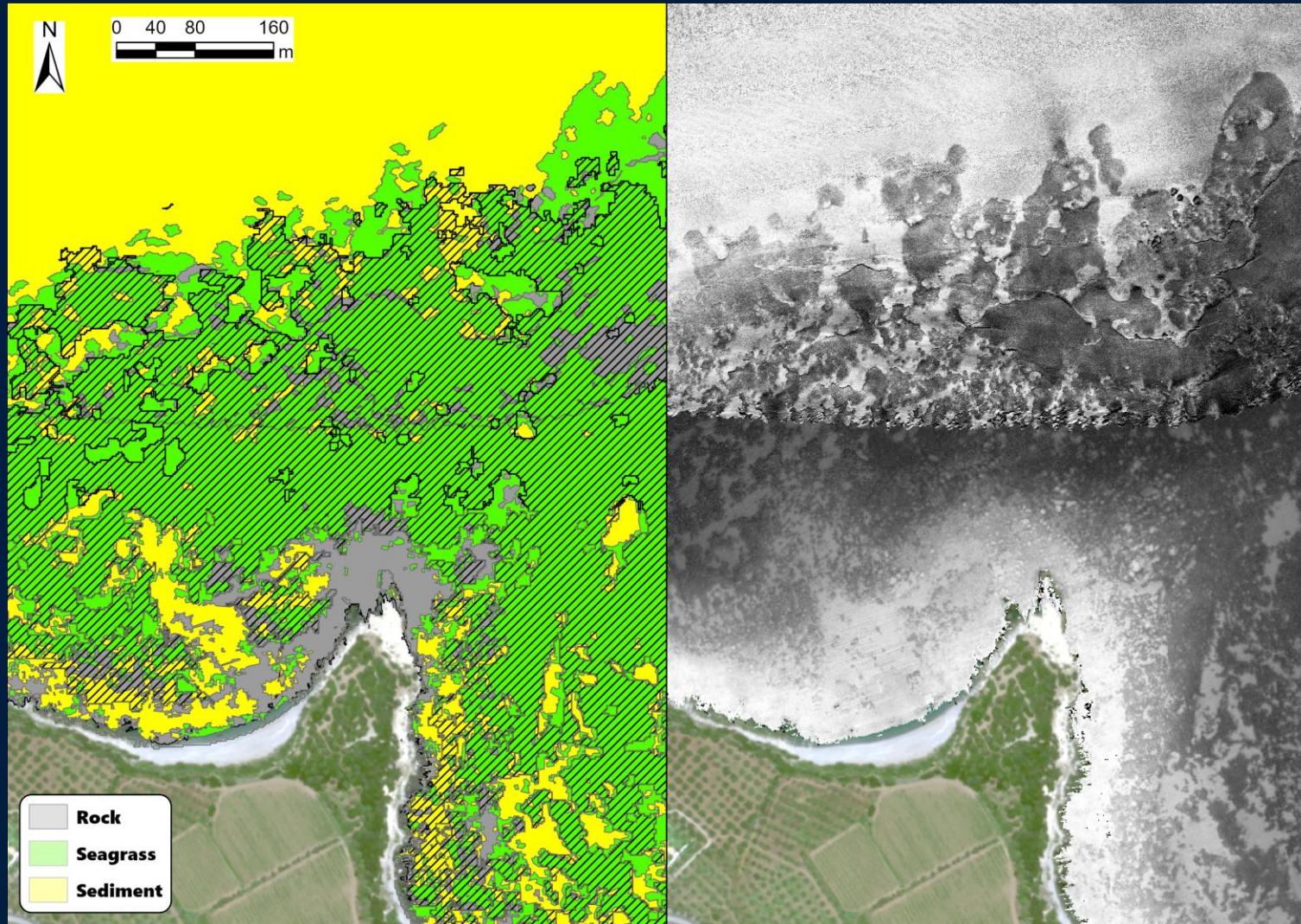
Results – MBES



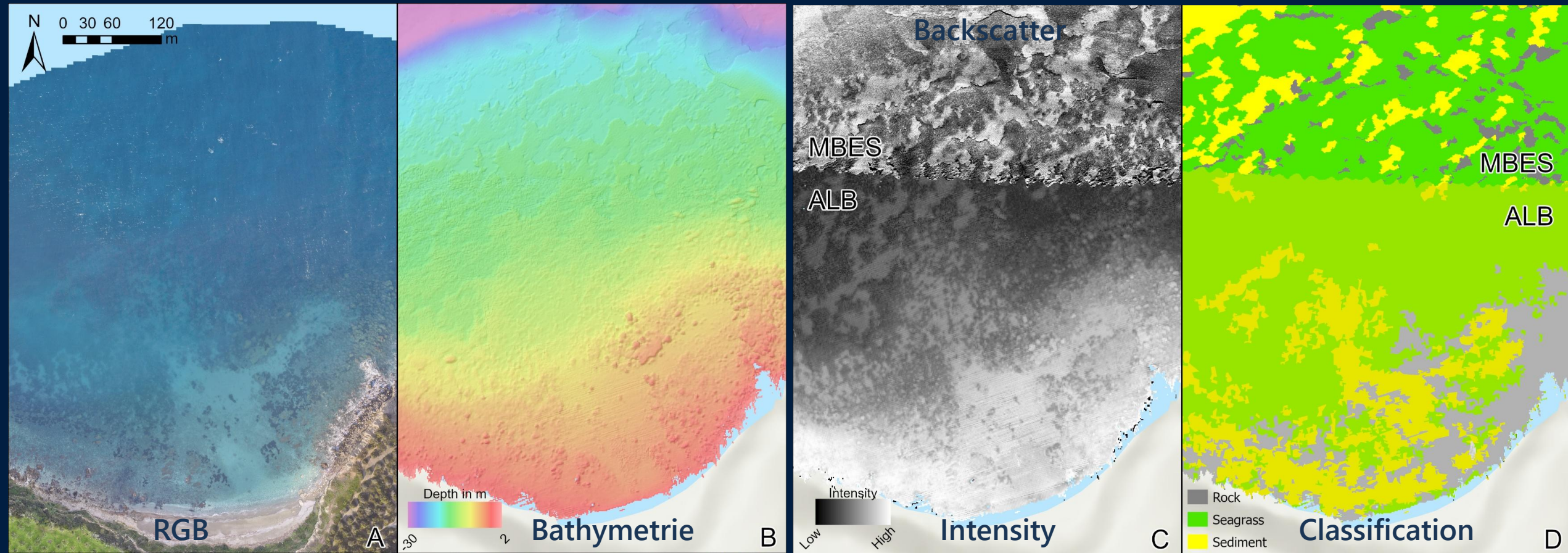
Results – MBES + ALB



Results – MBES + ALB + Satellite



Results – Close Up



You want to know more about the MER project?

Then listen to our podcast ...



... or check out our article in the upcoming "Journal of Applied Hydrography" HN 1320!
(https://dhyg.de/images/hn_ausgaben/HN132.pdf)

Large-scale seafloor mapping of the Italian coasts using multi-sensor surveying to characterise Posidonia oceanica and seafloor morphology in shallow waters

An article by SANTE FRANCESCO RENDE, ALESSANDRO BOSMAN, NUNZIANTE LANGELLOTTO, VIVIANA BELVISI, AGOSTINO TOMMASIELLO, MONICA MONTEFALCONE, ALBERTO GUARNIERI, GIORGIO DE DONNO, VALERIO BAIOCCHI, DANIELA CARRION, FILIPPO MUCCINI, RICCARDO BARZAGHI, TANJA DUFEK, PAULA GARCIA RODRIGUEZ, MARCO FILIPPONE, BENOIT CAJELOT, DHIRA ADHIWIJANA, FEDERICO BARTALI, HUGH PARKER, MICHELLE WAGNER, NICK RACKEBRANDT, LEONARDO TAMBORRINO, KNUT HARTMANN, CONSTANTIN SANDU, ANDREAS MÜLLER and GIORDANO GIORGI

The logo for FUGRO features a large, stylized white letter 'F' on the left. The vertical stem of the 'F' is a long, downward-pointing arrowhead. To the right of the 'F', the word 'FUGRO' is written in a bold, white, sans-serif font.

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Unlocking Insights
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