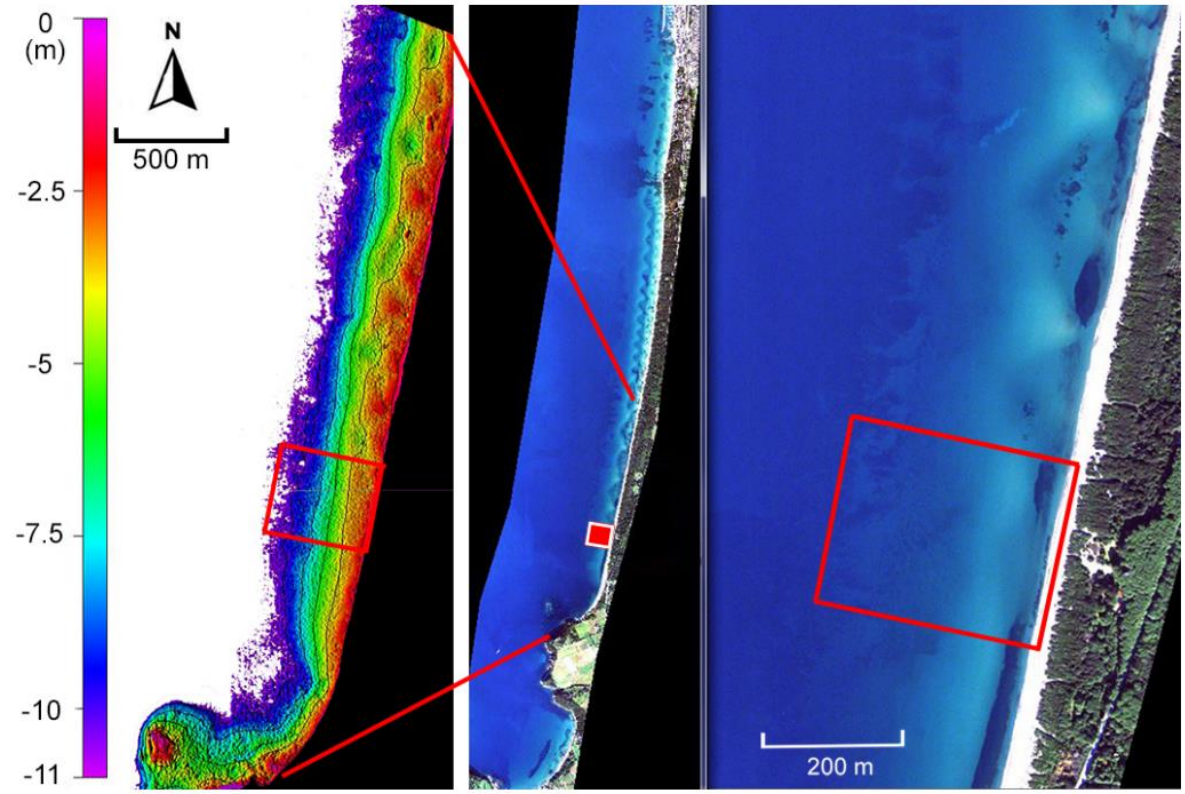
EO-FIN

Satellite-Derived Bathymetry for Port and Coastal Monitoring



Satellite-Derived Bathymetry (SDB) and the WorldView-2 (WV2) RGB image showing an area located on the coast on the Tyrrhenian Sea in the south of San Vincenzo town (LI) in Italy (Source: Rossi, L., Mammi, I. and Pelliccia, F., 2020. UAV-derived multispectral bathymetry. Remote Sensing, 12(23), p.3897.)

Product Category

☐ Land Use	☐ Natural Disaster	■ Coast Management	☐ Earth's Surface Motion
☐ Land Cover	☐ Climate Change	☐ Marine	

Financial Domain(s)

☐ **Investment management** ■ **Risk analysis** ☐ **Insurance management** ☐ **Green finance**

User requirements

UN12: Analysis of potential risks in specific regions.

Description

Shallow water zones are dynamic, so it is important to be monitored regularly. Satellite-derived bathymetry (SDB) is preferable due to the low cost and near real-time monitoring. Therefore, SDB can help assess the vulnerability of critical infrastructure like shipping lanes, ports, and canals to potential blockages or accidents. By having accurate and up-to-date information on water depths, authorities and stakeholders can identify areas that may be at risk of blockages or accidents and take preventive measures to avoid costly disruptions. For example, the blockage of the Suez Canal stands out as one of the most significant and compelling demonstrations of the importance of SDB in this context. In addition, such information can be used to adjust insurance plans and make informed decisions about the most cost-effective and safe shipping routes.

Spatial Coverage Target

Ports, canals, and coastal areas (with max depth 20m)

Data Throughput

Rapid tasking	■ High	☐ Low
Data availability	■ High	☐ Low

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Product specifications	
Main processing steps	Shallow water zones are dynamic, so it is important to be monitored regularly. Satellite-derived bathymetry (SDB) is preferable due to the low cost and near real-time monitoring. Therefore, SDB can help assess the vulnerability of critical infrastructure like shipping lanes, ports, and canals to potential blockages or accidents. By having accurate and up-to-date information on water depths, authorities and stakeholders can identify areas that may be at risk of blockages or accidents and take preventive measures to avoid costly disruptions. For example, the blockage of the Suez Canal stands out as one of the most significant and compelling demonstrations of the importance of SDB in this context. In addition, such information can be used to adjust insurance plans and make informed decisions about the most cost-effective and safe shipping routes.
Input data sources	Optical: Sentinel-2, VHR based on the availability like Pleiades 1A/1B & NEO, WorldView2&3, and SPOT6/7 Radar: N.A Supporting data: Ground truth water depth data like LIDAR, single or multi beam Echo-Sounder data.
Accessibility	Sentinel-1&2: freely and publicly available from ESA. Optical VHR imagery: commercially available on demand from EO service providers.
Spatial resolution	Sentinel-2: 10 m Optical VHR: ≤ 1 m
Frequency (Temporal resolution)	Sentinel-2: 6 days Optical VHR: Sub-daily to Daily
Latency	< 1 Day
Geographical scale coverage	Globally
Delivery/output formats	Data type: Raster File format: GeoTIFF
Accuracies	Thematic accuracy: 80-90% Spatial accuracy: 1.5-2 pixels of input data
Constraints and limitations	■ The lack of local in-situ data like LIDAR or Echo-Sounder data ■ Cloud presence ■ Limited to estimate water depth up to max 20m
User's level of knowledge and skills to extract information and perform further analysis on the EO products.	Skills: Ample Knowledge: Essential
Similar Products	Name of the Product: Planet Biomass Proxy (link) Spatial resolution: 2 m,10 m,15 m, and 30 m Frequency (Temporal resolution): Daily Latency: Few weeks Geographical scale coverage: Globally Delivery / output format: ASCII XYZQ files (Point clouds), GeoTIFF (Raster), KMZ overlays for Google Earth, PDF maps and contour lines (Shape files) Accuracies: 80-90% Accessibility: Commercially available from EOMAP