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COPERNICUS4REGIONS 2025

VENETO RAPID MAPPING (VRM)

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Infographic of the monitoring of interventions on the Veneto coast in the province of Rovigo | Copenicus Sentinel-2 data [16/06/2023 - 19/06/2023 - 09/07/2023 -10/09/2023]

The VRM – Veneto Rapid Mapping, a regional adaptation of the EMS service under the Copernicus program, leverages all available Earth Observation data, including Sentinel satellites and drone surveys, to enhance emergency response and land management. Supporting this system, the Veneto Region operates a fleet of approximately 30 drones, acquired and managed through the VEDRO (VEnezia DROni) project, equipped with a variety of sensors (RGB optical, thermal, multispectral, LiDAR).

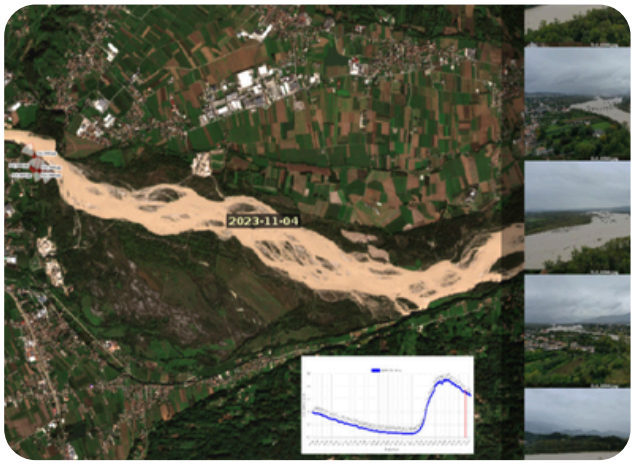
THE CHALLENGE

The VRM project faces significant challenges, particularly in integrating heterogeneous data from diverse sources, including Sentinel satellites, drone surveys, and GIS systems. These datasets must be processed, validated, and made operational rapidly, especially during emergencies. Another key challenge lies in adapting the European EMS model to the specific characteristics of the Veneto region, which is marked by diverse landscapes and vulnerabilities. This demands the development of customized methodologies that ensure both accuracy and timeliness. Equally important is the training of institutional operators and fostering collaboration among stakeholders to realize the VRM's potential fully. Moreover, expanding public access and awareness requires innovative strategies to promote data sharing and shared responsibility in land management.

THE SPACE SOLUTIONS

The VRM project leverages Sentinel satellite data from the Copernicus program to monitor the territory and support emergency management. Sentinel-2 provides multispectral images for indices such as NDVI (vegetation health), NDWI (water presence), and NBRI (post-fire analysis), while Sentinel-1, utilizing radar technology, detects flooded areas even under poor visibility conditions.

The open-source software QGIS, installed in all regional peripheral units, is used for data analysis and project sharing. Through the WMS connection, real-time access to satellite imagery is ensured. Primary studies are conducted at the central headquarters and shared in real-time with all stakeholders, providing coordinated and efficient territorial management.



Infographic of the flood emergency of November 2023 on the Piave river in the province of Treviso | The infographic focuses on a section of the Piave River between the municipalities of Vidor and Covolo, an area of particular interest due to its proximity to a site potentially suitable for the development of a flood storage basin. Understanding in detail what happens during flood events—especially in phases characterized by a sustained flood wave—allows for a clearer perception of the event's dynamics and its territorial impact. Copernicus Sentinel data [2023]

THEMATIC AREA

Civil Protection

REGION OF APPLICATION

Veneto Region

SENTINEL MISSION USED

S1, S2

COPERNICUS SERVICE USED

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THE BENEFITS AND THE BENEFICIARIES

The VRM project enhances emergency and land management by integrating satellite data and drone surveys. It enables fast and accurate monitoring, supports timely decision-making, and reduces risks for operators. Additionally, it fosters greater awareness of the opportunities offered by spatial data, promoting widespread use through a dedicated training program and an internal social sharing system within the Region. Real-time sharing via QGIS ensures better coordination among stakeholders.

Beneficiaries:
Key beneficiaries include regional institutions, such as Regional Civil Engineering and Forestry Services, local authorities, and, in the long term, citizens, who benefit from a safer and more sustainably managed territory.

Regional operators also gain advanced skills in spatial data usage through the training program to monitor air, marine, and urban green environments more effectively and at a lower cost than traditional systems. Real-time insights help authorities to act promptly in response to pollution events or environmental degradation, with benefits for public health, risk prevention, and resource efficiency.

The platform helps to improve air, water, and green monitoring through satellite data, enabling early detection of pollution, eutrophication, and vegetation degradation. This supports quicker responses to environmental issues, safeguarding natural resources, and improving urban resilience.

Copernicus Sentinel open data costs are lower than those of traditional ground-based systems, allowing for wider spatial coverage at lower operational expenses.

	TIER 1 SERVICE PROVIDER	TIER 2 PRIMARY USER	TIER 3 SECONDARY USER	TIER 4 END USER BENEFICIARIES
SERVICES AND BENEFITS	Sentinel 1 e 2, Planet Imagery, Uas Survey, historical archive of aerial images of the Veneto Region	Collaborative projects on a PostgreSQL/PostGIS platform integrated with the open-source QGIS software	Territory and emergency monitoring	Increased safety during emergencies and risk prediction
BENEFICIARIES	Cartographic Office at, Spatial Planning Directorate - Veneto Region (aerial images) Sentinel Hub platform, Planet (satellite data)	Land Protection and Safety Department, Veneto Region	Provincial and municipal civil protection system and municipalities	Citizens, society, territorial safety (Regional Level)

EU POLICY / DIRECTIVE

The Floods Directive

TYPE OF SERVICE PROVIDER

Public Service

TYPE OF FUNDING SOURCE

National or regional non space Programme

USAGE MATURITY LEVEL

5



A FUTURE WITH COPERNICUS

The VRM project envisions future developments in the use of Copernicus data, focusing on the creation of "information cubes" to integrate spatial and temporal data. This innovation will enable detailed temporal comparisons and provide tools to analyze territorial dynamics over time, as well as predict future developments. Information cubes will be a strategic resource for monitoring environmental changes, planning interventions, and improving sustainable land management, fostering decisions based on predictive analyses and long-term data



DID YOU KNOW?

Did you know that VRM shares information with 5 central facilities and 12 peripheral facilities in the regional network for a total of more than 150 users?

Acknowledgements

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