



Land Monitoring

How can EGMS help manage natural hazards?

RASTOOL-DoS Info Days

Lorenzo Solari, EEA-CLMS

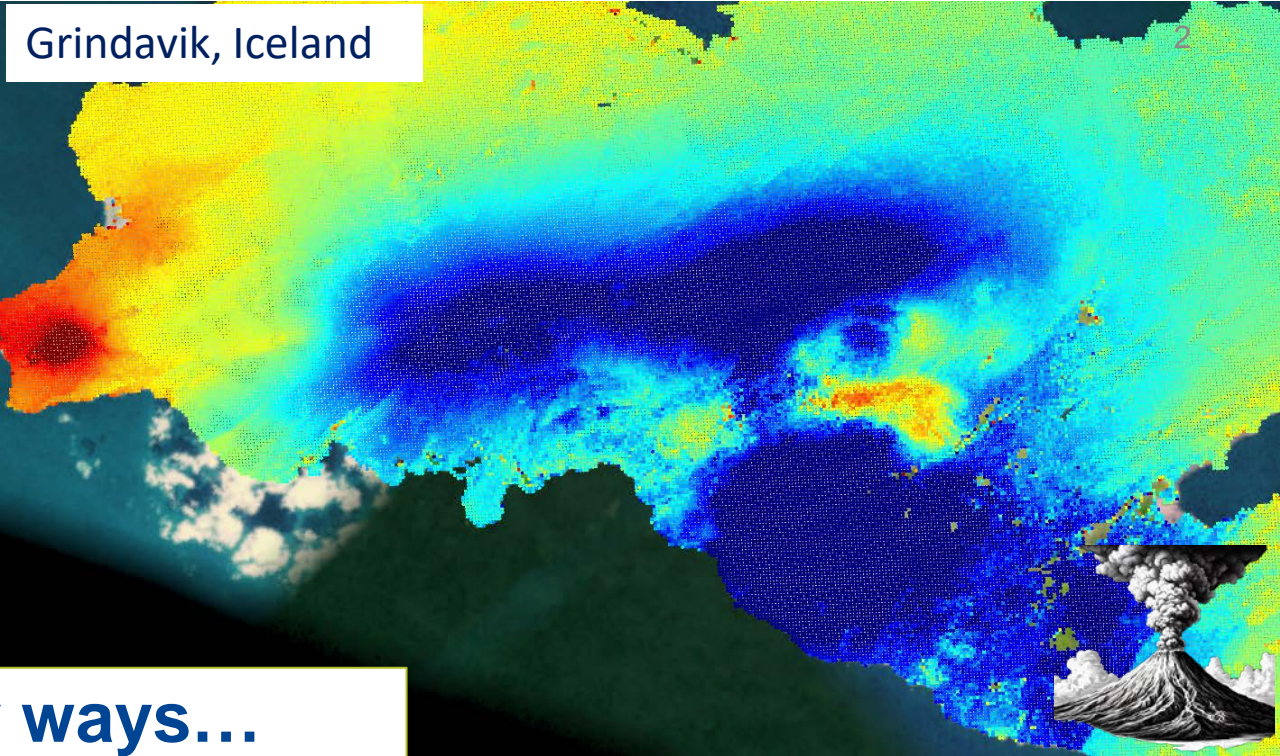
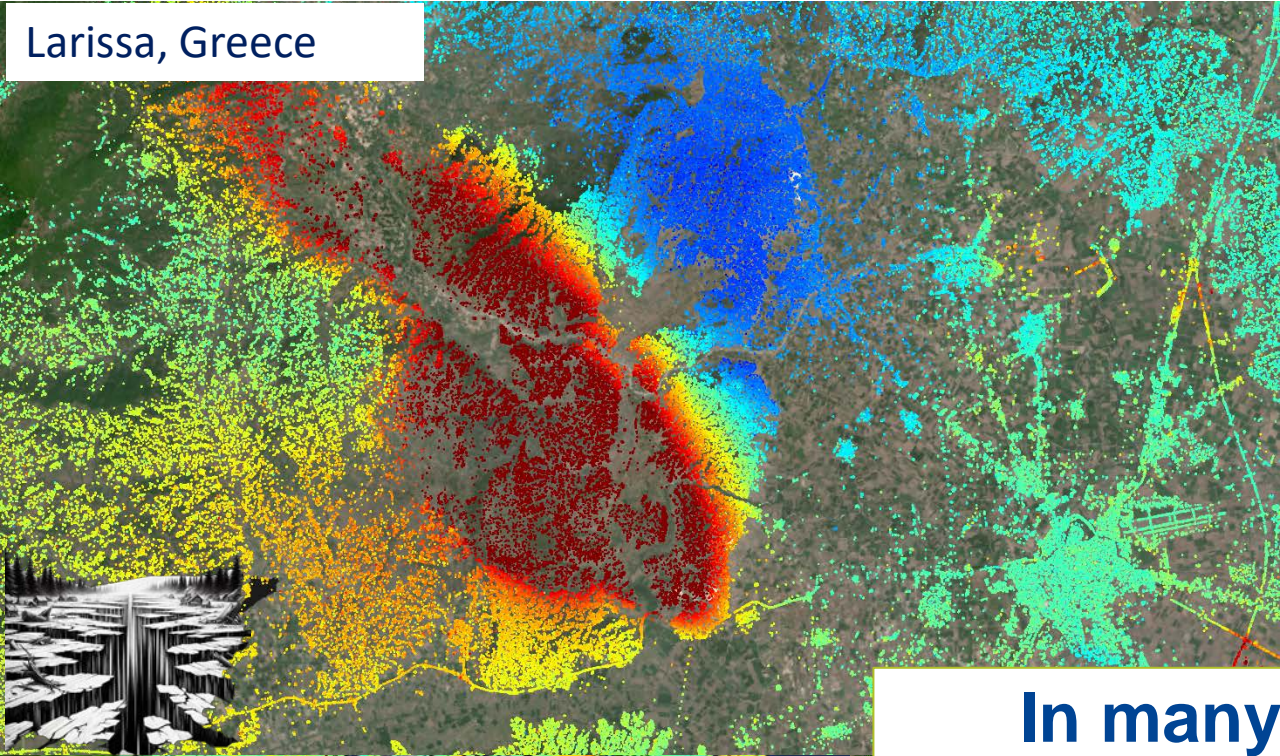
6 June 2025



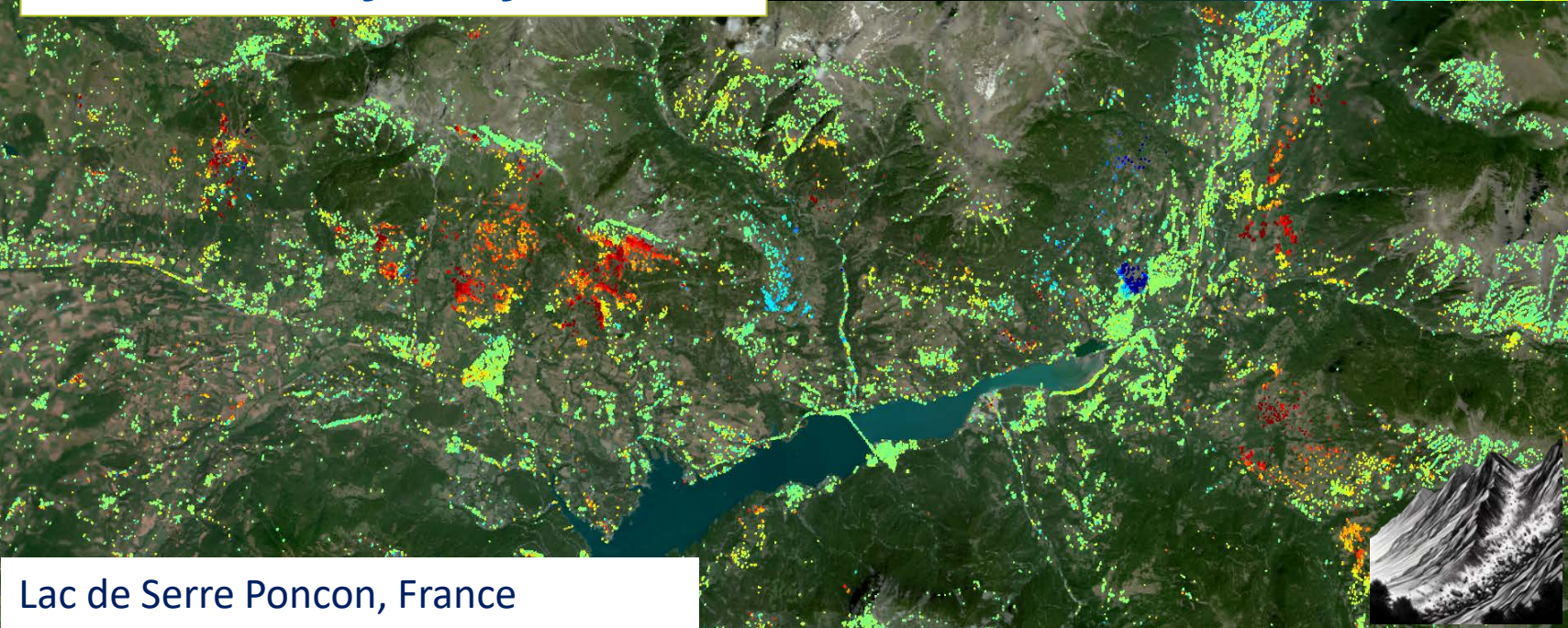
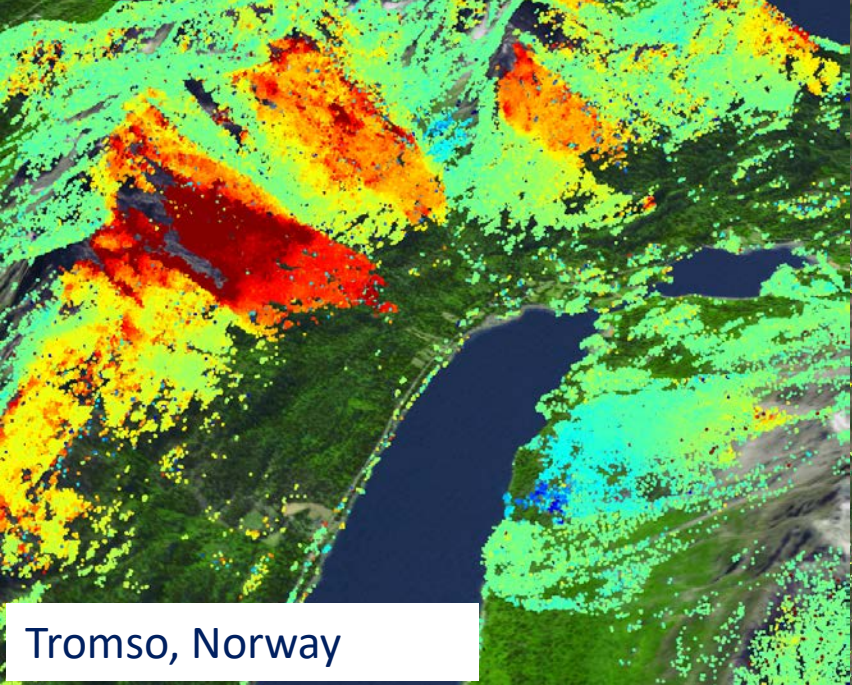
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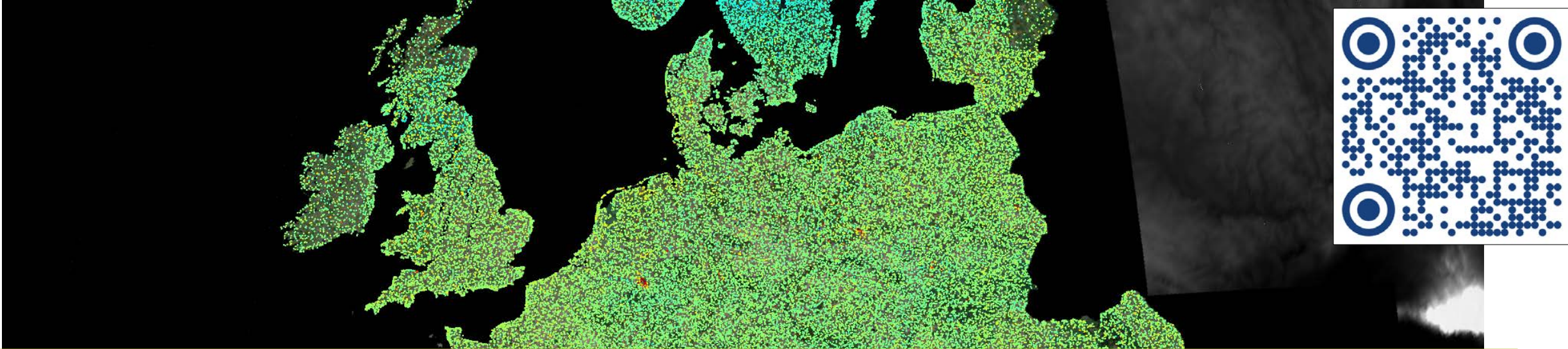
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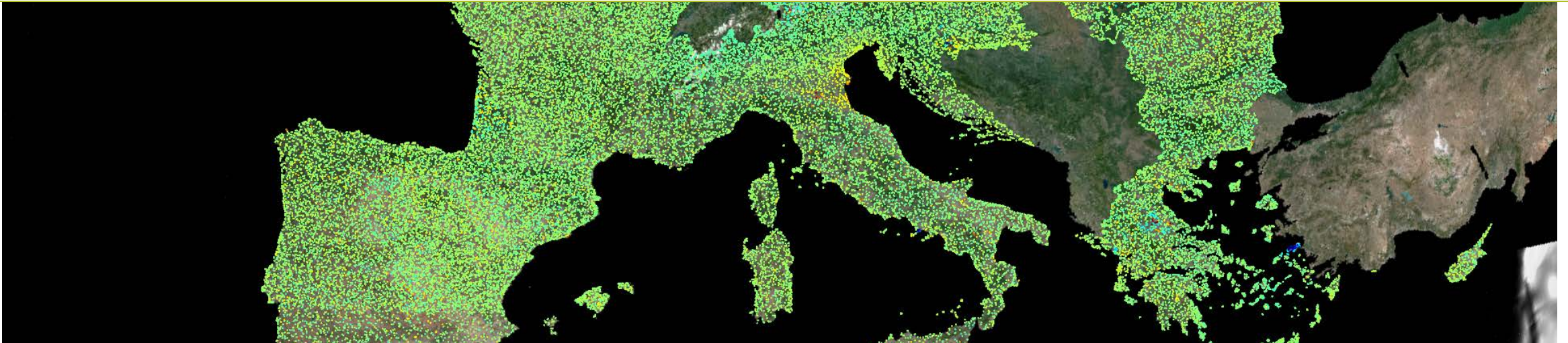
In many ways...



15 billions measurement points in action



... since it is a continent-wide map of ground motion



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<https://egms.land.copernicus.eu/>



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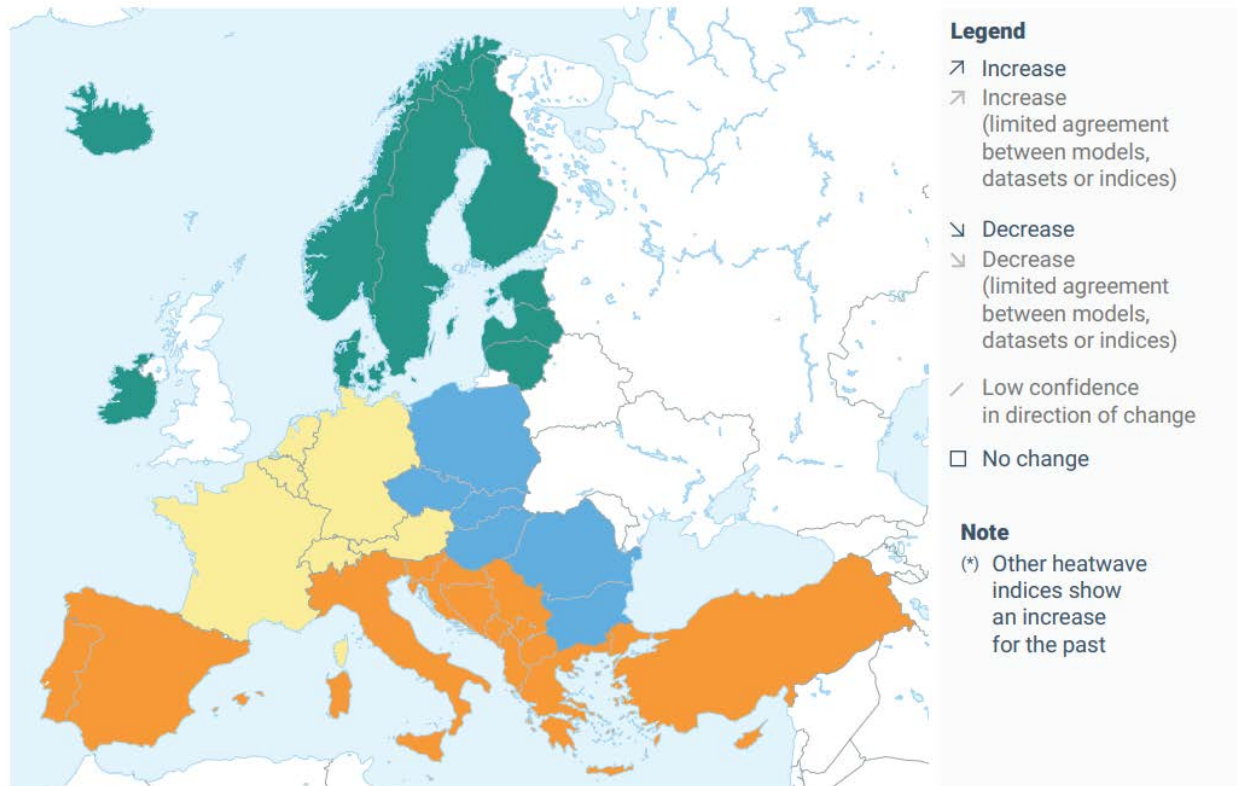
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Why is the CLMS providing these data?

Land regions	Northern Europe			Western Europe			Central-eastern Europe			Southern Europe			European regional seas		
	Past	Future		Past	Future		Past	Future		Past	Future			Past	Future
		Low	High		Low	High		Low	High		Low	High			
Mean temperature	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	Sea surface temperature	↗	↗
Heatwave days	☐(*)	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗			
Total precipitation	↗	↗	↗	↗	↗	↘	↗	↗	↗	↘	↘	↘	Sea level	↗	↗
Heavy precipitation	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗			
Drought	↗	↘	↘	↗	↗	↗	↗	↗	↗	↗	↗	↗			



And in general, the EGMS is driven by clear user requirements and by a well-defined user community!

EEA EUCRA report 2024:

<https://www.eea.europa.eu/publications/european-climate-risk-assessment>



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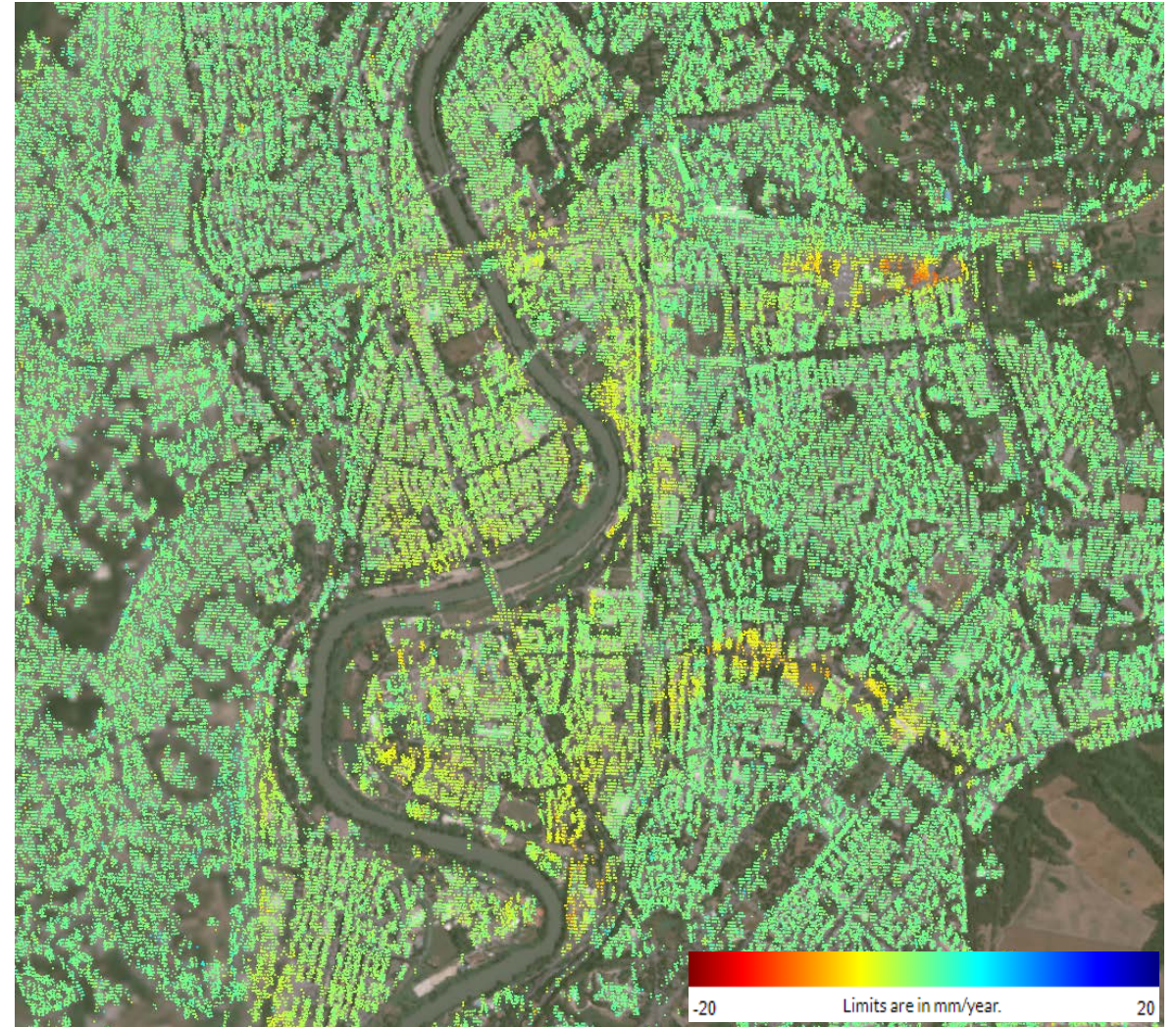
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What is EGMS?

- EGMS is an essential element of the CLMS portfolio.
- It is produced using data collected by the **Sentinel-1** radar satellite mission.
- The EGMS products provide a **high-density, continental-scale** map of ground motion.
- Each measurement point has a value of ground motion velocity and a time series



Rome city center, Italy



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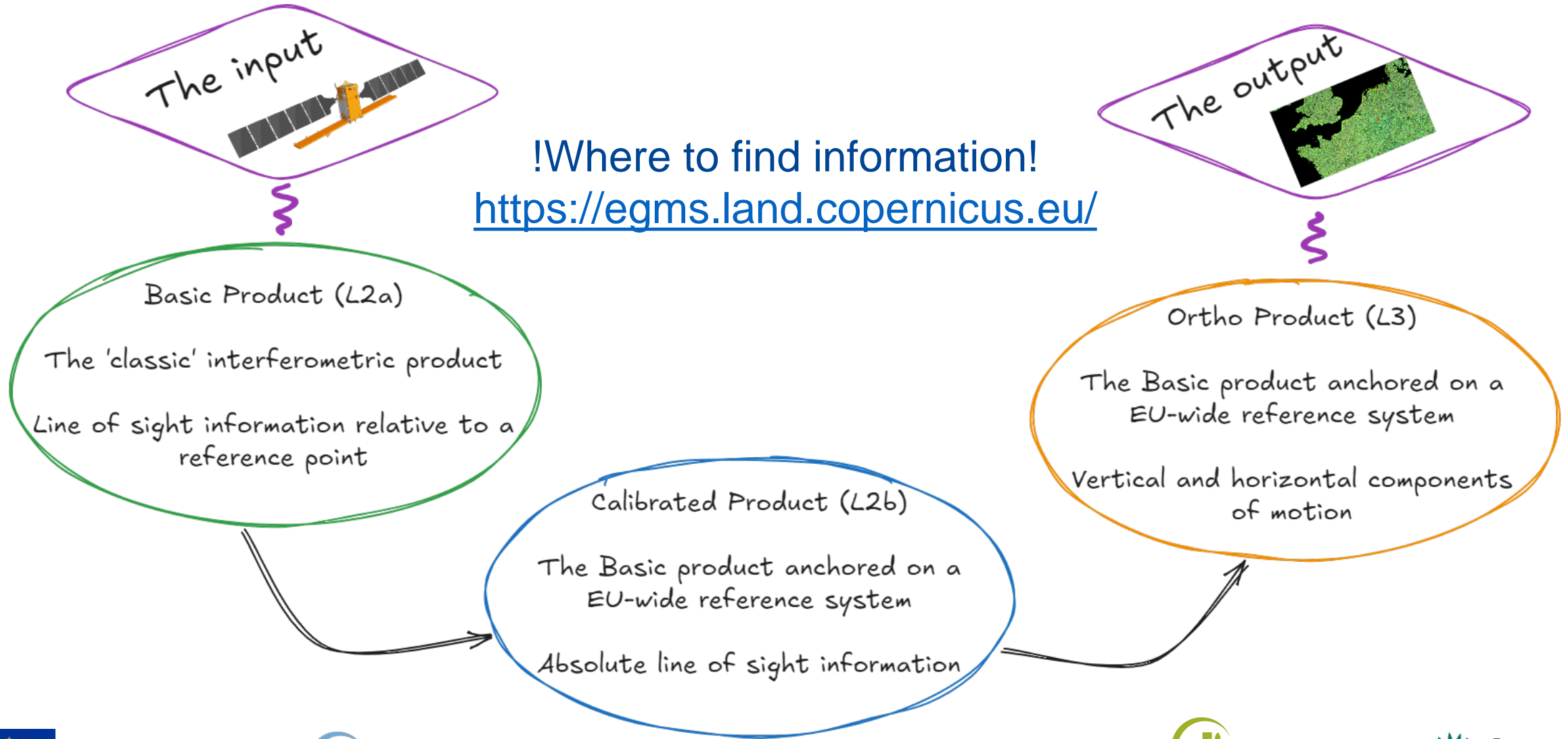
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The EGMS portfolio



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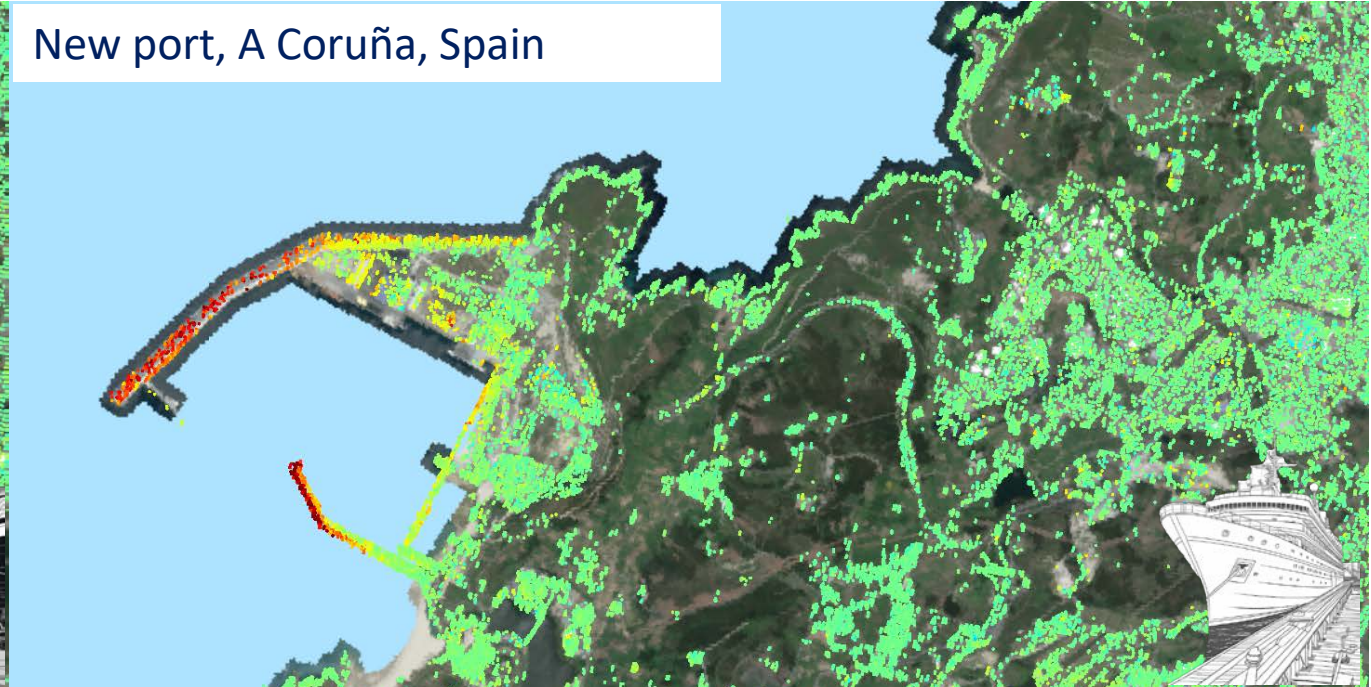
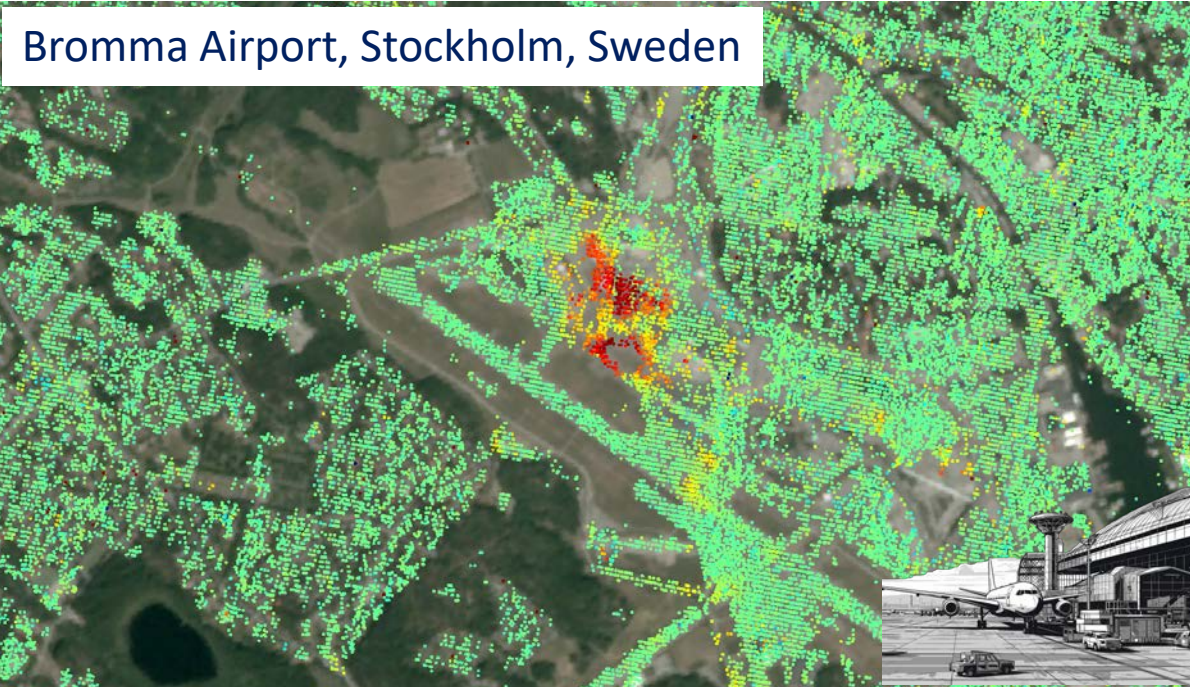


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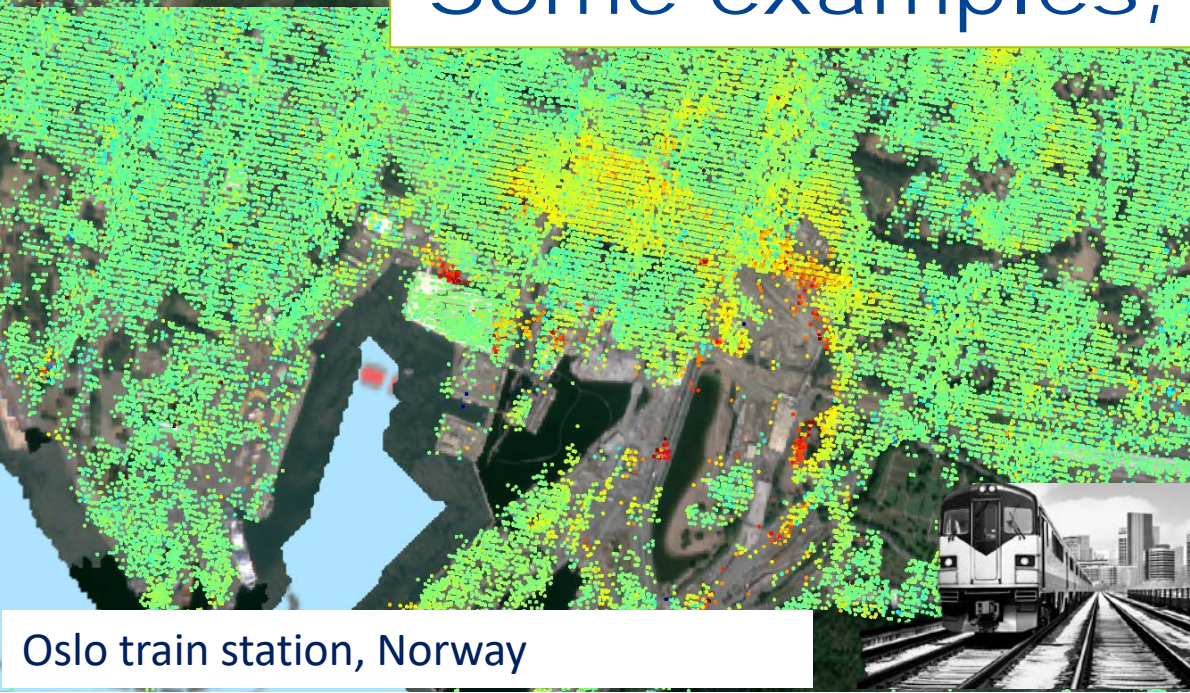
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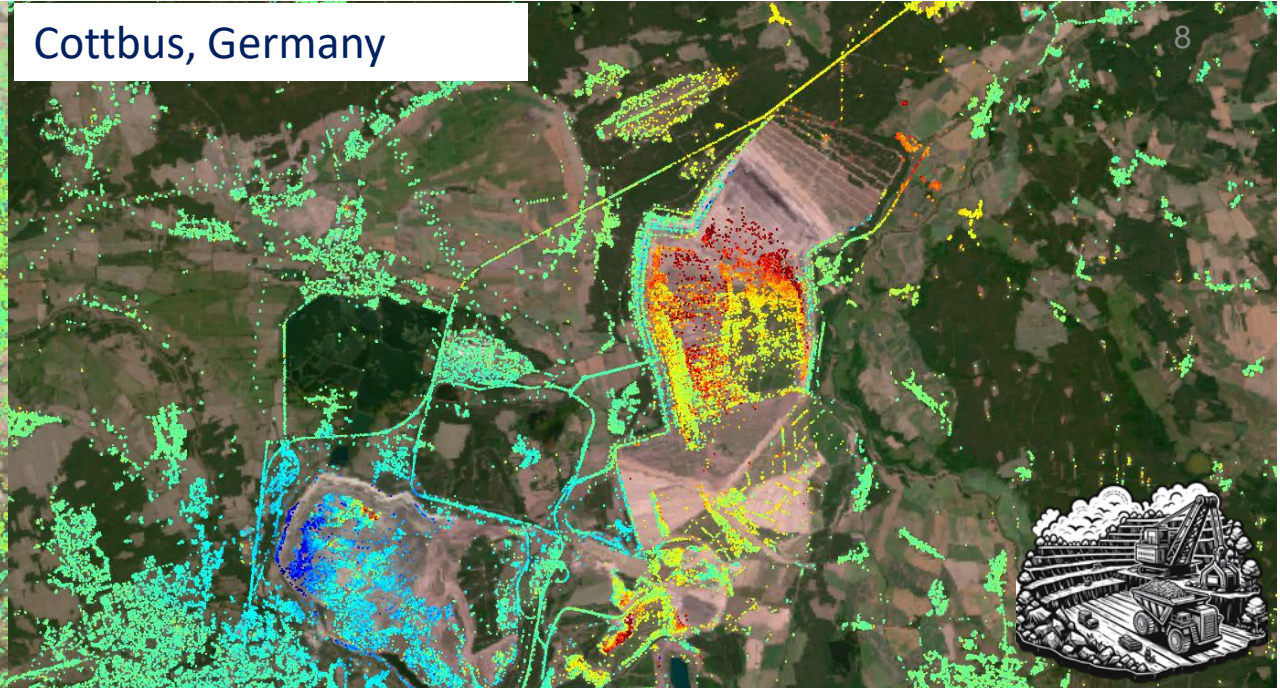
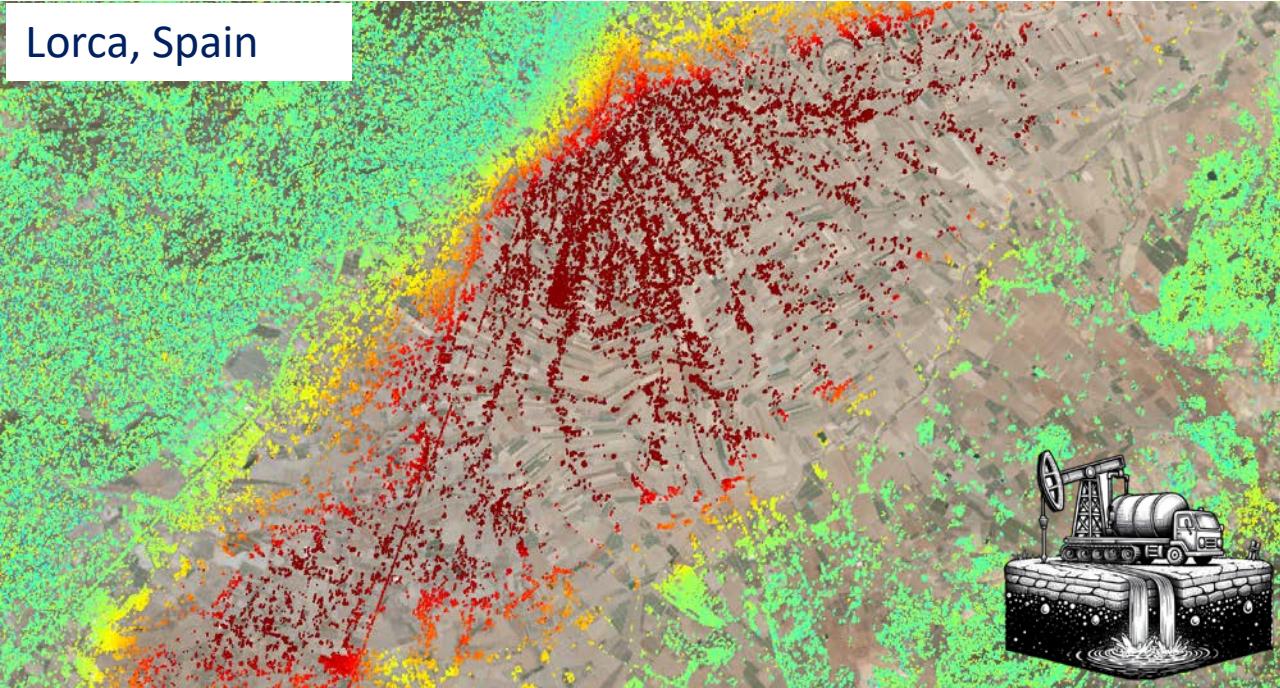


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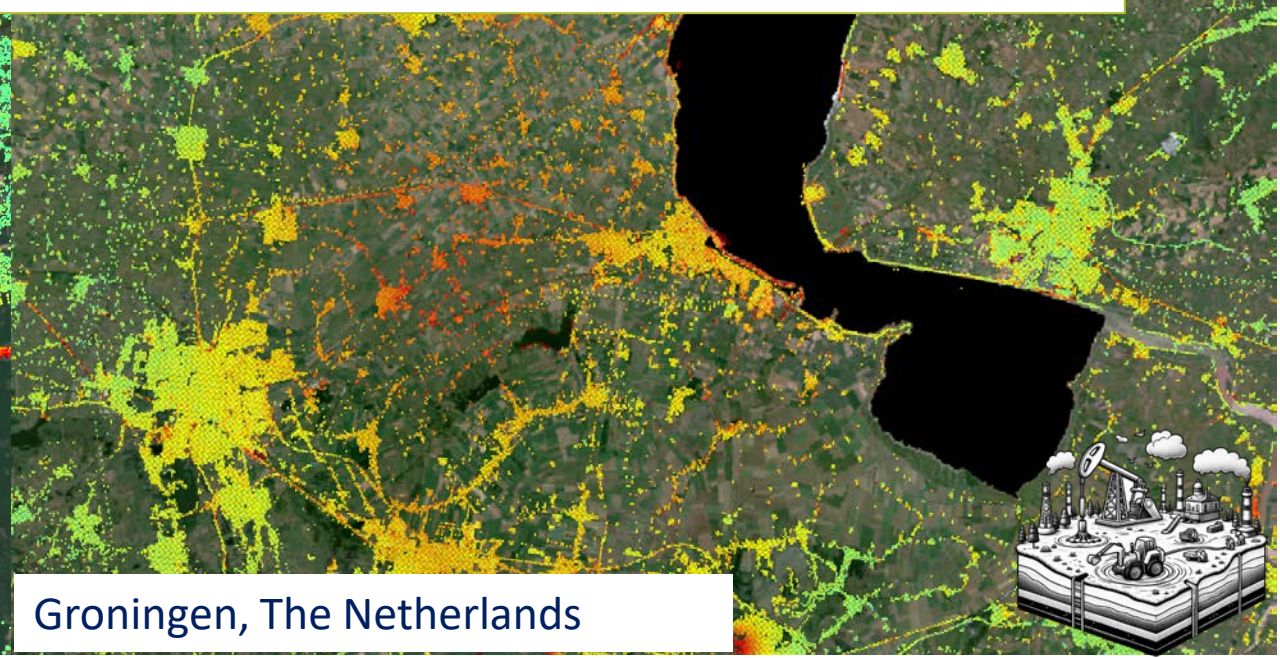
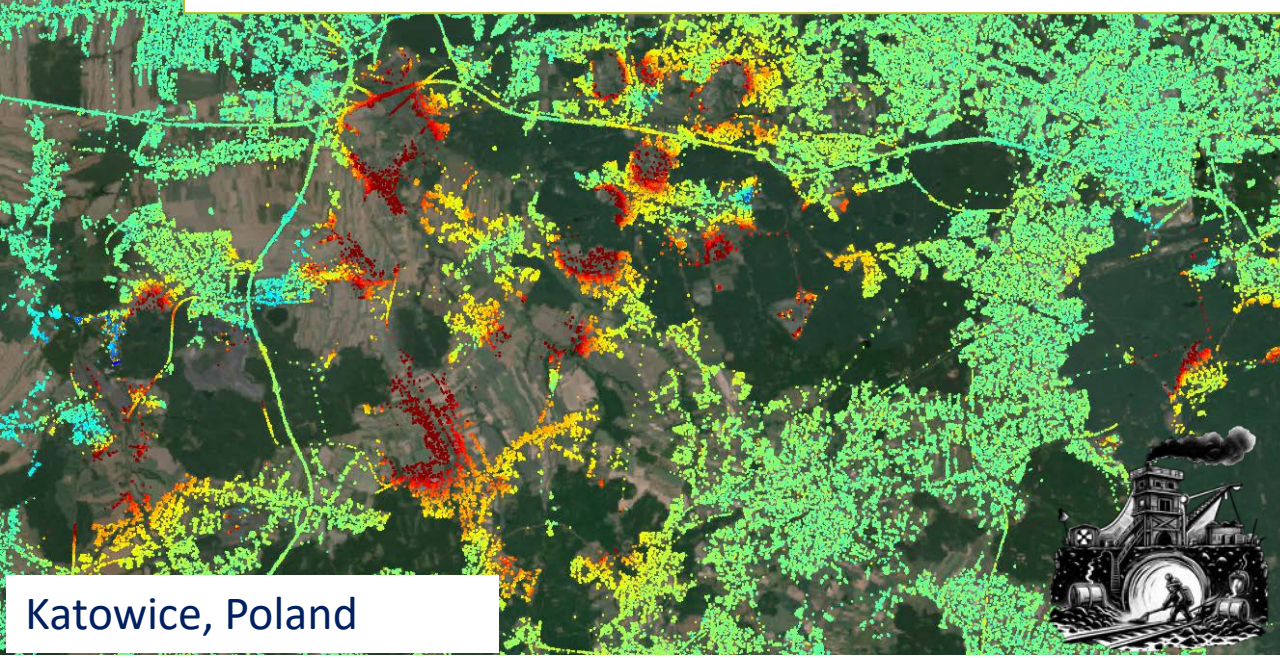


Some examples, from urban areas





Some examples, exploitation of natural resources



Use cases – Public entities

How the EGMS helps address the rising costs of sinking soils in Great Britain



2023 | United Kingdom | British Geological Survey

In Great Britain, the natural geological phenomenon of shrink-swell causes significant annual damage to buildings. The British Geological Survey (BGS), utilizing the European Ground Motion Service (EGMS) and Synthetic Aperture Radar Interferometry (InSAR) data from Sentinel-1, studies these ground movements. Climate predictions indicate a rise in properties affected by shrink-swell, increasing from 20% in 1990 to 57% by 2070, due to changes in rainfall and temperature. BGS's work, integrating EGMS data with environmental factors, aims to develop predictive models for future soil deformation, informed urban planning and climate change adaptation strategies in Britain.

Read more [here](#).



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Use cases – Industry

Unearthing Risks: European Ground Motion Service data fuels analysis of urban infrastructure



2023 | Italy, Spain | Detektia

The **European Ground Motion Service (EGMS)** provides valuable ground movement data across Europe, supporting risk assessment to urban infrastructure. Detektia employs this data in their eyeRADAR product, combining it with Interferometric Synthetic Aperture Radar (InSAR) technology and AI algorithms to detect infrastructure deformation. This provides early warnings of surface deformation at millimetre precision, enabling informed urban planning decisions. From assessing broad-scale impacts, such as the ground deformation caused by the Fereggiano Flood Diversion Tunnel in Genoa, to monitoring the structural health of individual buildings in San Sebastian, the EGMS facilitates effective risk management and future planning.

Read more [here](#).



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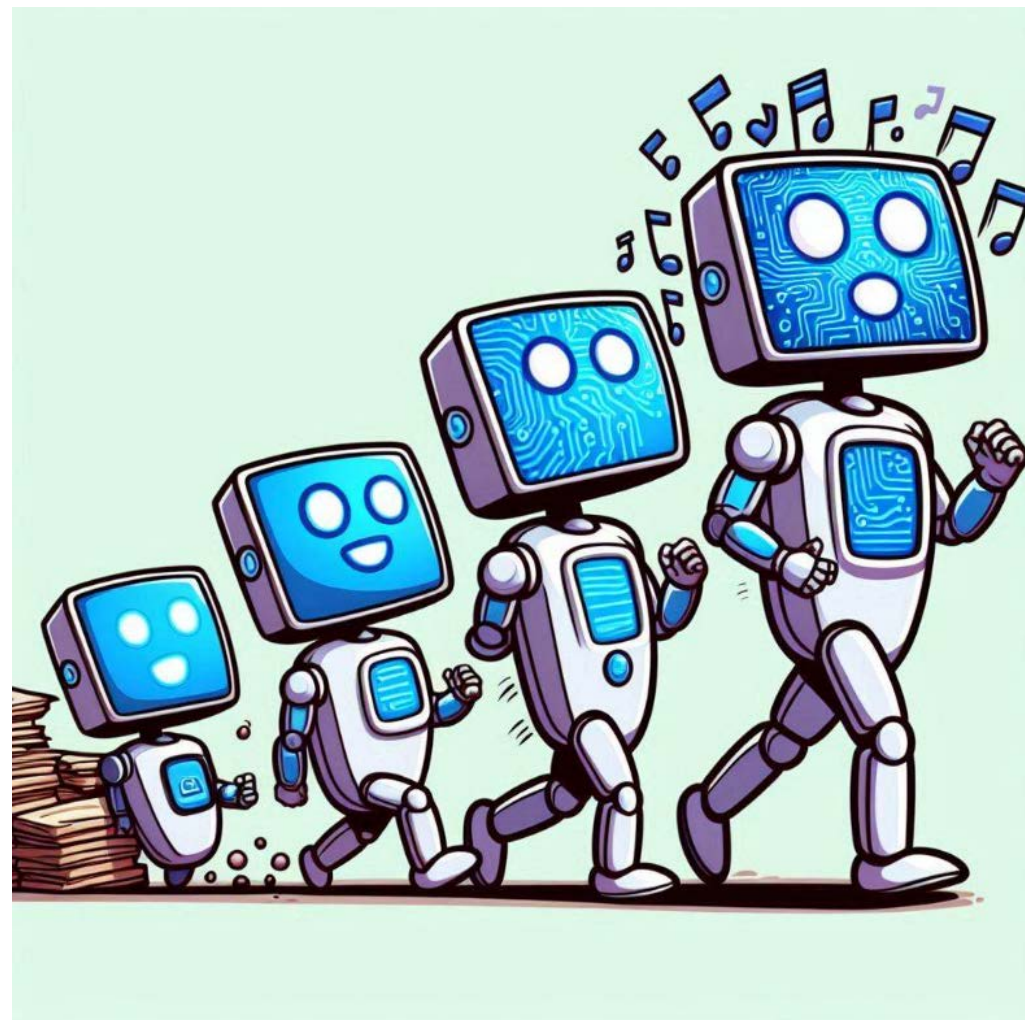


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Some EGMS news - Evolution of the delivery model

- REST-API
- Slight change to background image options
 - Add Urban Atlas + OSM
- On-the-fly removal of GNSS signal ('the toggle')
- Jupyter Notebooks
 - Ortho 'as you like'
 - LOS to v_slope
- Migration to Quarto markdown for documentation

(https://eea.github.io/CLMS_documents/src/guidelines/)





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Thank you!

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