

# Application services based on hyperspectral data



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Bari



Athens



Roma



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“Simplifying the complexity of space”

# Agenda

- Application services based on hyperspectral data
- Cooperation with Research Entities
- Big Data and continuous monitoring services
- From data to information: geoanalytics

# Monitoring of illegal dumping

For the identification of illegal dumping it is possible to exploit the spectral contrast between the landfill and the adjacent areas. Through the use of special classification techniques it is possible to identify illegal dumpings between different elements of the area of interest.

The presence of free water (or of strong humidity) allows a virtually absolute recognition thanks to the high infrared absorption by water and at the same time the very low absorption of ultraviolet radiation.

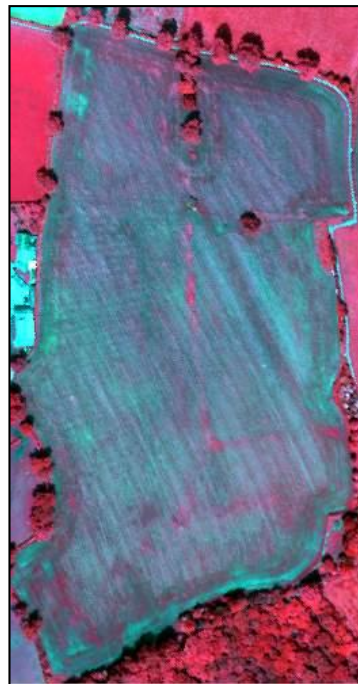
Two analysis criteria:

- the evaluation of direct physical quantities (direct methods), for example by exploiting the geometric and spectral resolution
- the evaluation of physical quantities related to direct ones (indirect methods), such as vegetation indices and their trends, the thermal inertia, etc.

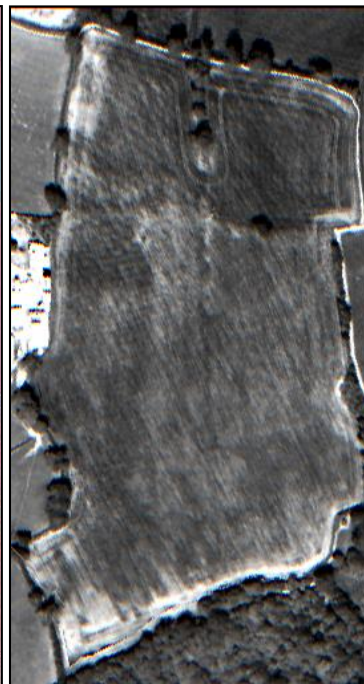
# Mapping of illegal dumping



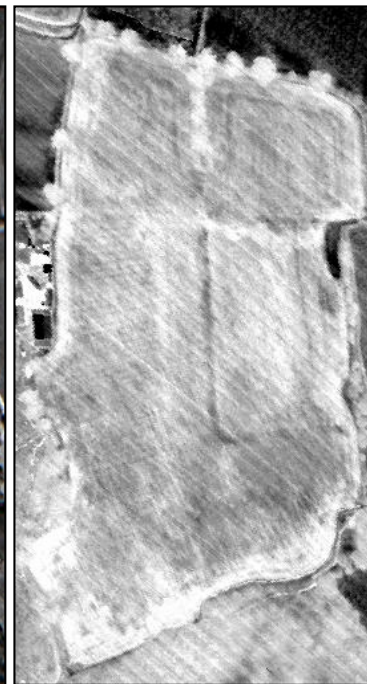
Natural colors  
composition



False Color  
composition  
NIR:R:G



TIR - Day



TIR - Night

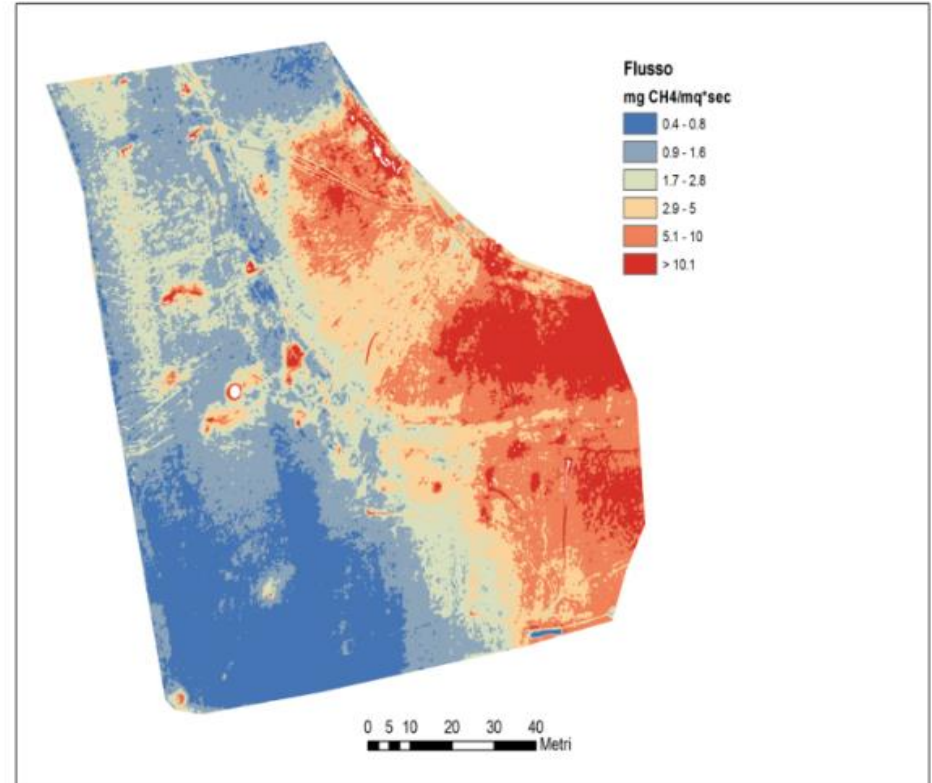
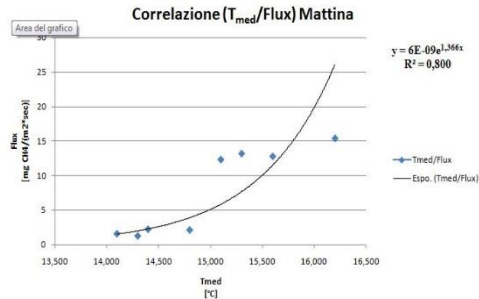
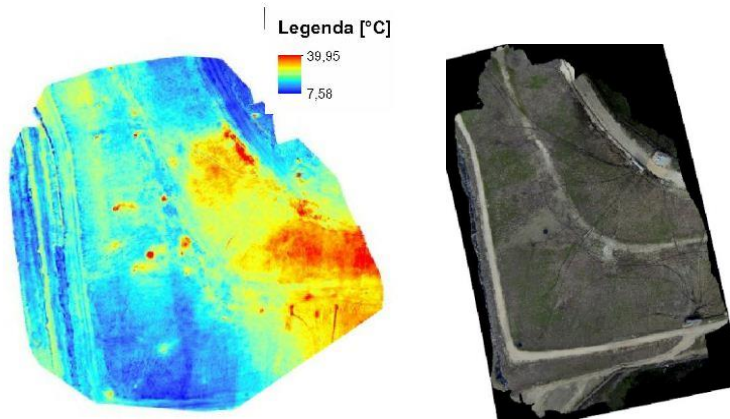
# Monitoring of landfills - Biogas

In sites used for landfill of solid waste, the digestion of the organic substances, due to anaerobic bacteria, it is accompanied by heat and biogas production.

The biogas, consisting of a mixture of methane (60%), carbon dioxide (40%) and hydrogen sulfide (0.5%), filter through the deposited materials, accompanied by a considerable amount of water vapor, by dragging (by convection) heat digestion towards the surface.

To pass into the atmosphere, the gas mixture and the water vapor produces a detectable thermal footprint. This temperature increase can be recognized as an anomaly in the territory.

# Monitoring of landfills - Biogas



# Identification of soils contaminated by hydrocarbons

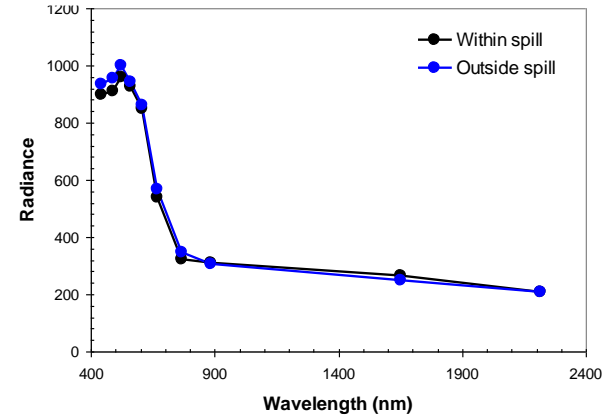
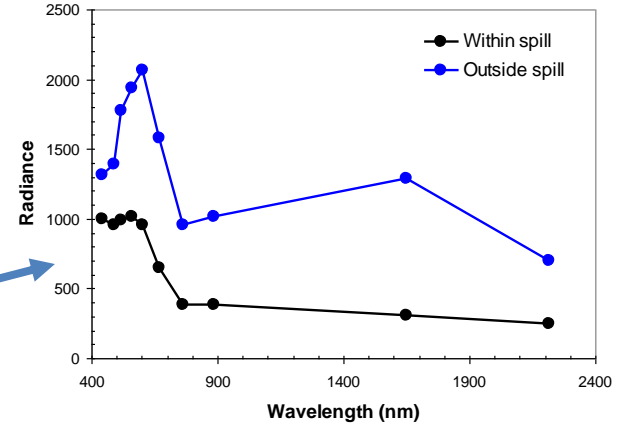
- The spectral signature of the soil is strongly influenced by the presence of hydrocarbons and derivatives
- Hyperspectral sensors can be used to identify contaminated areas
- Albedo anomaly detection





# Identification of marine areas contaminated by hydrocarbons

Based on the differences between the spectral signatures



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# Cloud based infrastructures for data processing

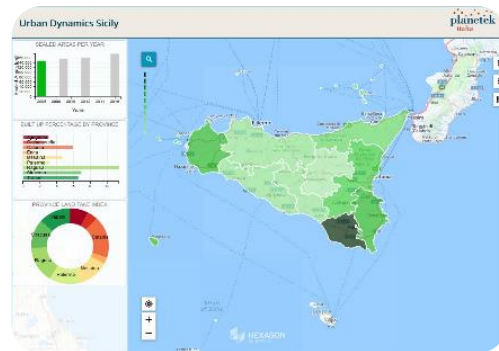
Satellite Data



Automatic Selection & Download  
Automatic Processing



Geoanalytics as a Service



# Rheticus<sup>®</sup> : geoinformation service for monitoring



Monitoring the evolution of our Earth

HOME SERVICES CONTACTS 

## Services

### Displacement



Detecting and reporting earth's surface movements, aimed at monitoring landslides, subsidence, and the stability of infrastructures, as buildings, roads and railways.

### Marine



Monitoring coastal seawaters quality, supporting local governments, environmental reporting requirements, aquaculture and desalination plants.

### Wildfires



A geoinformation service designed to support burnt areas detection and monitoring, through burned area perimeter, mapping and detection of illegal land use changes over time.

### Urban Dynamics

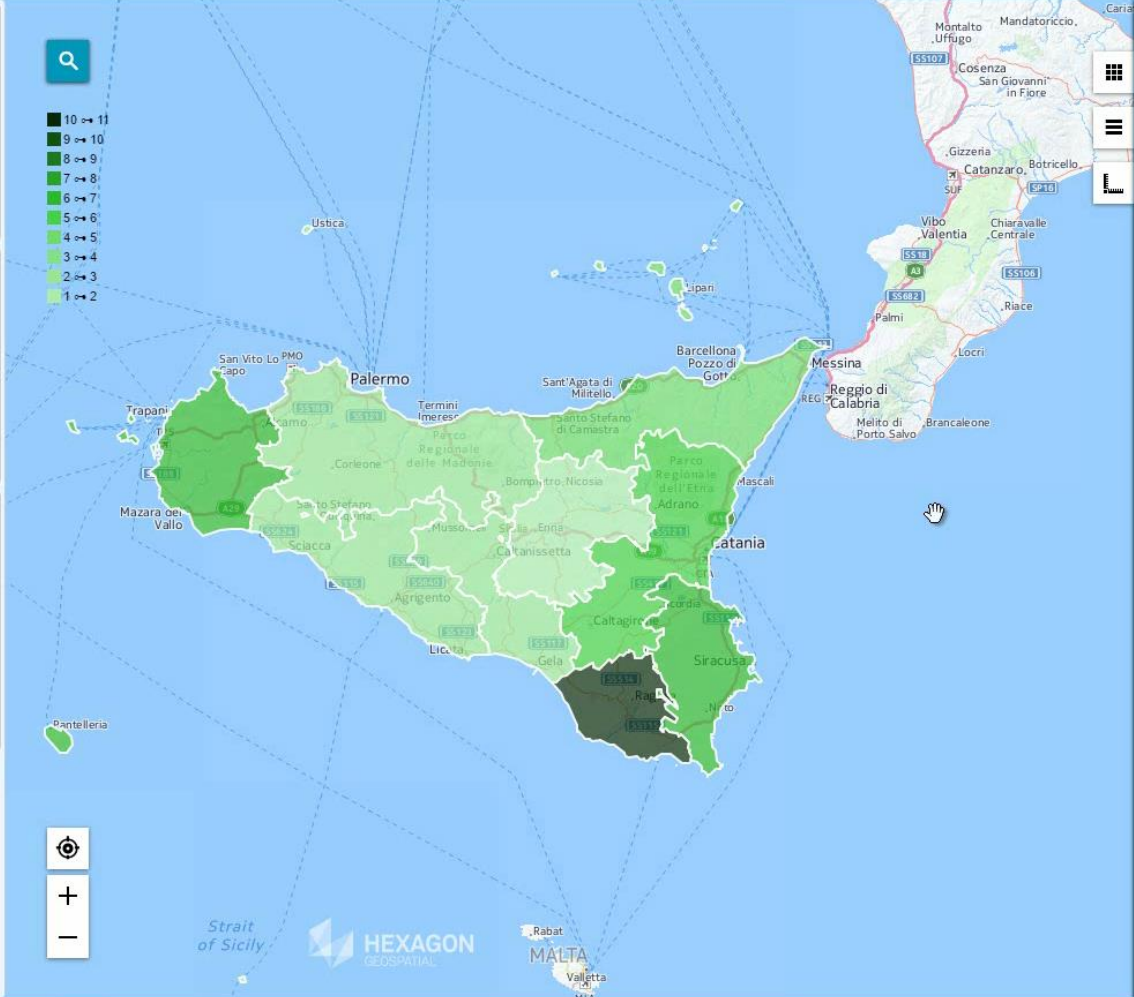
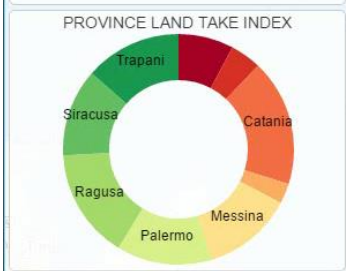
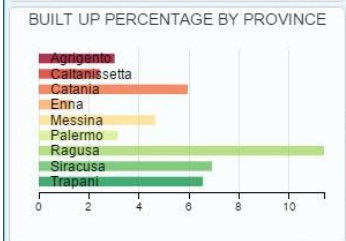
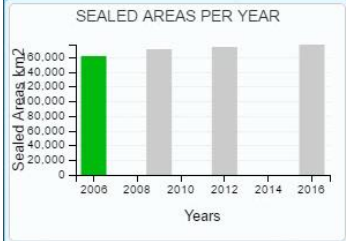


Monitoring and reporting land use changes, soil loss and infrastructures development, to support decision makers in territorial planning and infrastructures building.

[www.rheticus.eu](http://www.rheticus.eu)

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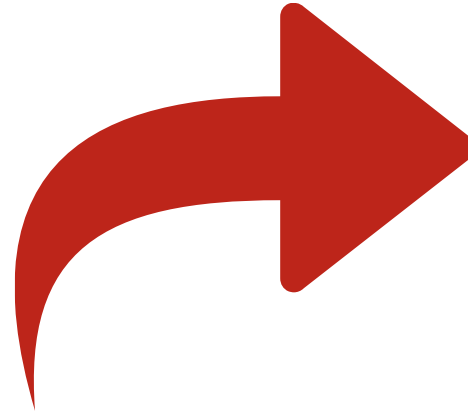
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Smart M.Apps



# Thanks.



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