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Unlock the future



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Wildfires : Reduce the destruction risk of 5 million buildings using AI applied to satellite imagery

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Simon Lamy



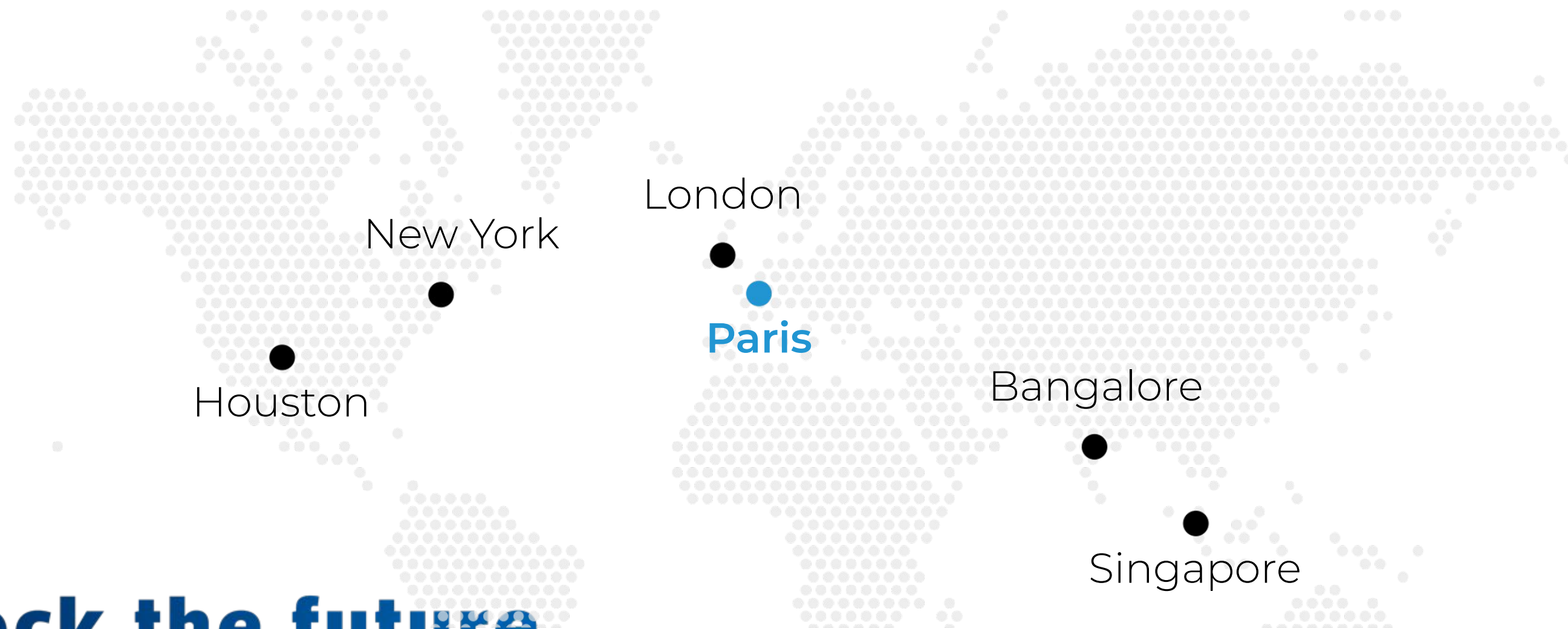
**Unlock
the future**



Kayrros in numbers

 Founded in 2016  6 Offices  150 Employees  20+ PhDs & 100+ MSc  90+ Clients

 Key industries: Finance, Energy & Government  EUR 72 Million VC funded



Unlock the future

Vision and mission

Vision: Satellite and AI will transform global climate governance

Our mission is to provide decision makers with the information they need to:



Reduce Greenhouse
Gases Emissions



Protect People,
Nature & Assets



Manage the
Energy Transition

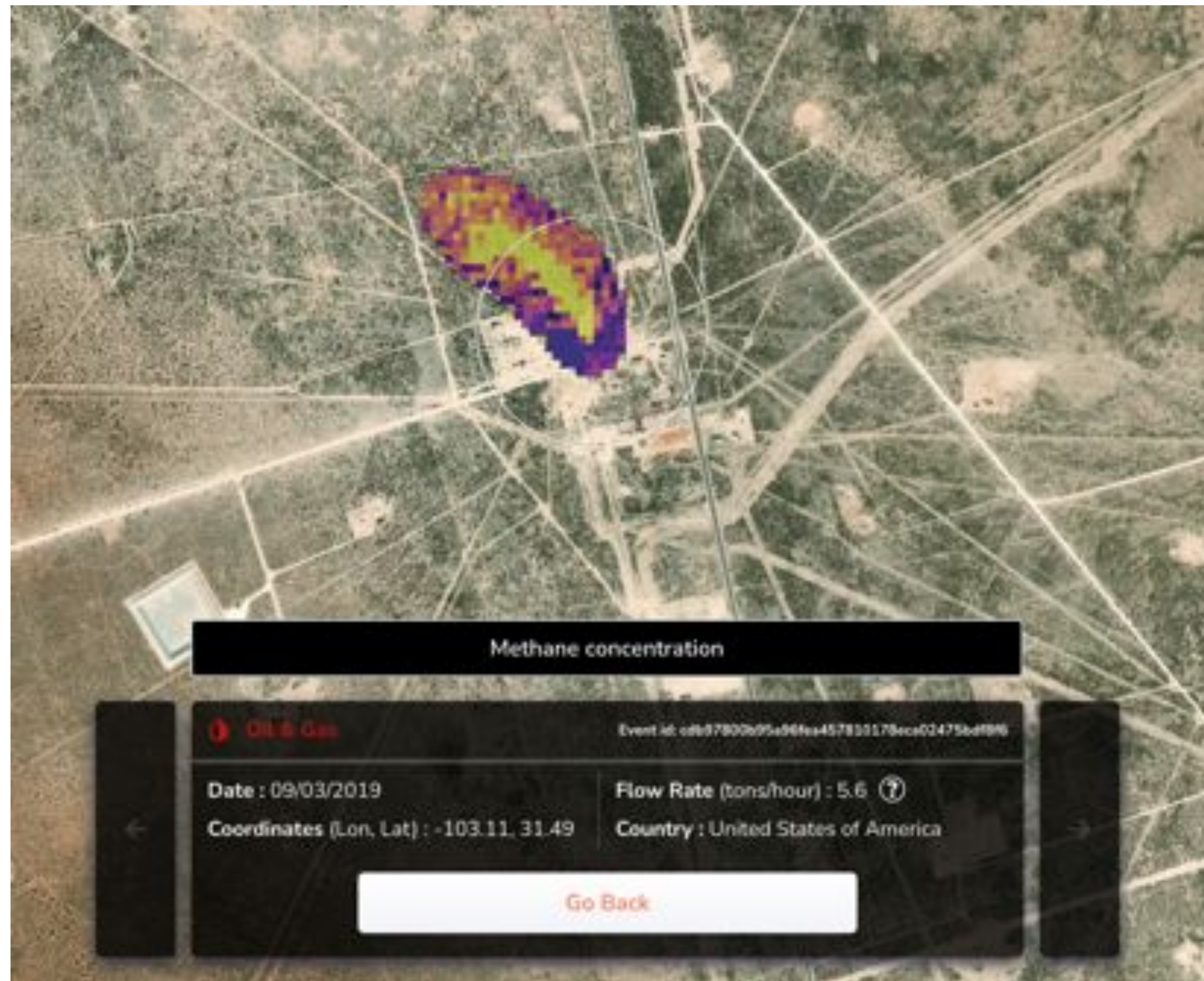
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Example of what we do : Methane Watch, the first tool to detect and attribute large methane emissions at a global scale



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Actionable data



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Bloomberg



Exxon Broke Rules With Late Reporting of Permian Methane Leak
It's the biggest US operator to publicly acknowledge a misstep in reporting its emissions since high-resolution satellite imagery of methane concentrations has become more widely available.



ESG
The Cheap, Powerful Climate Fix Energy Companies Are Ignoring
Preventing routine methane releases would be the single most meaningful measure countries could take to cut emissions from oil and gas, IEA says in annual report.

The Guardian

Revealed: 1,000 super-emitting methane leaks risk triggering climate tipping points

Wildfire risk monitoring : a case for AI and geospatial large-scale application



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Wildfire risk monitoring : a case for AI and geospatial large-scale application

5 millions

buildings in high risk of wildfire areas

- 20 %

respect their legal obligation to properly manage their vegetation

90%

building totally destroyed in case of wildfire if the vegetation around is not cleared

300 MEUR

average cost of wildfire for the French economy

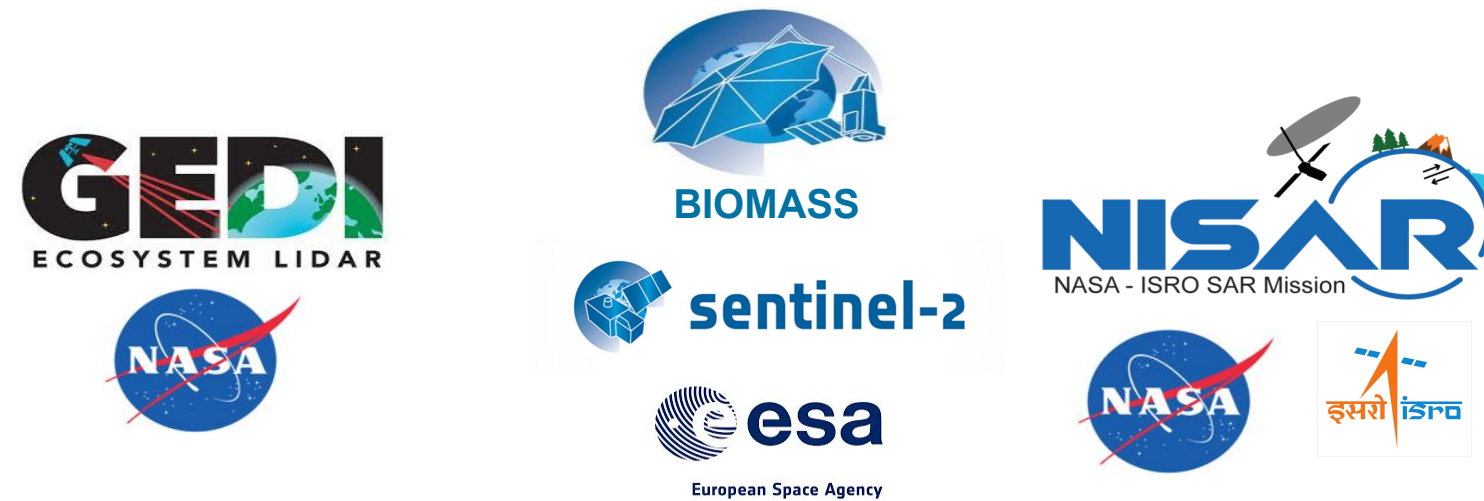
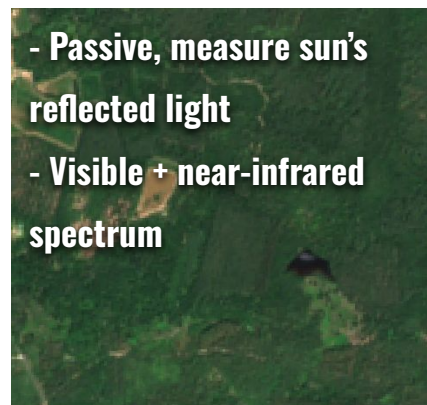
A better monitoring require people and time to visit building one by one ...

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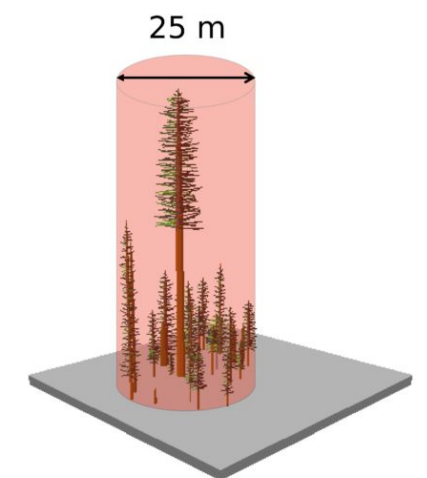
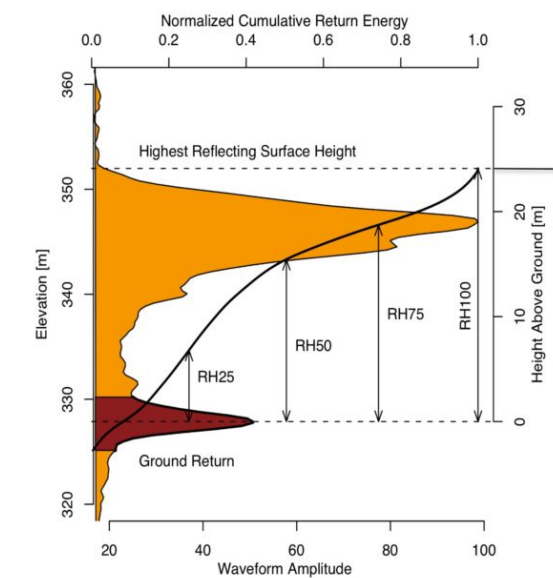
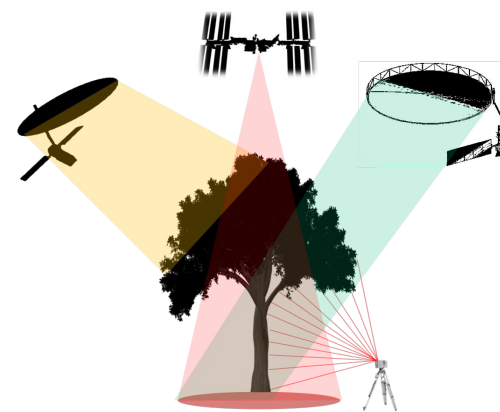
More and more satellites data available ...

Disponibility of high resolution optical, radar and lidar satellites constellation with global coverage and high frequency

Optical sensors



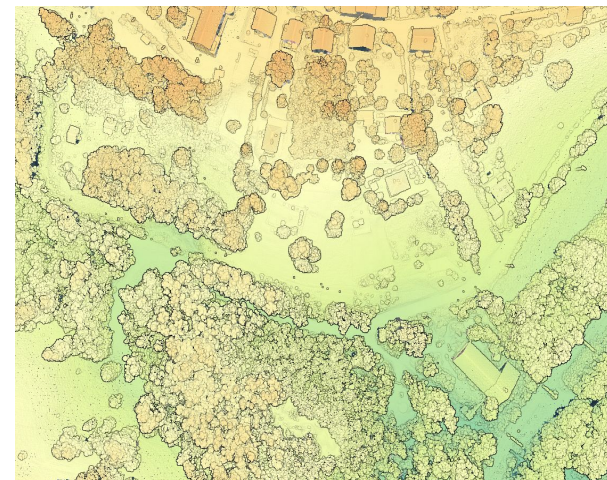
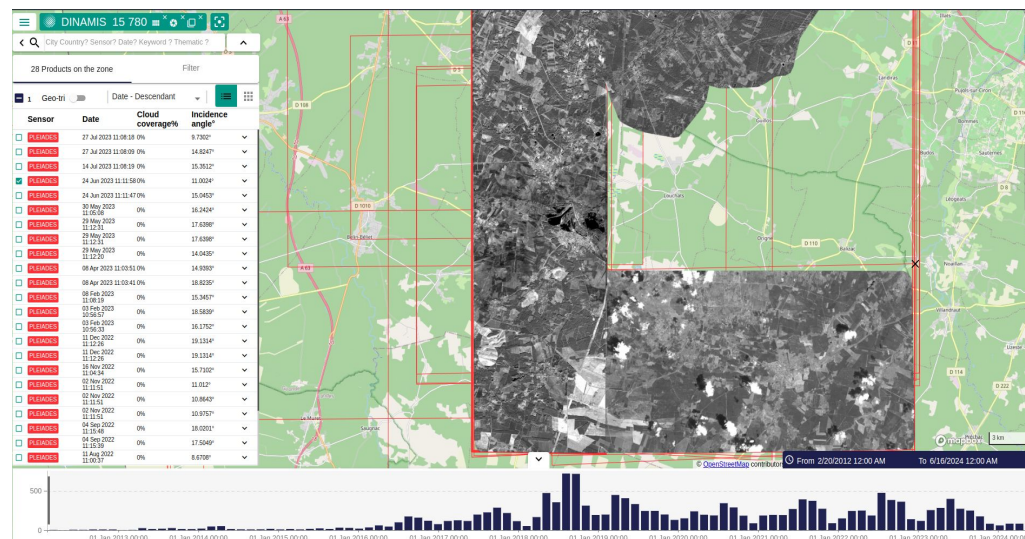
SAR (Synthetic Aperture Radars)



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... and public data

An open data ecosystem in France helps train and calibrate Kayrros models.

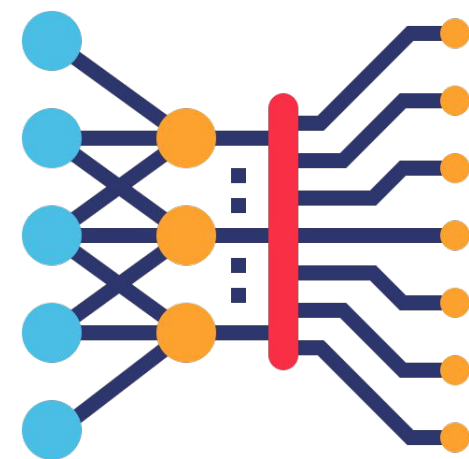
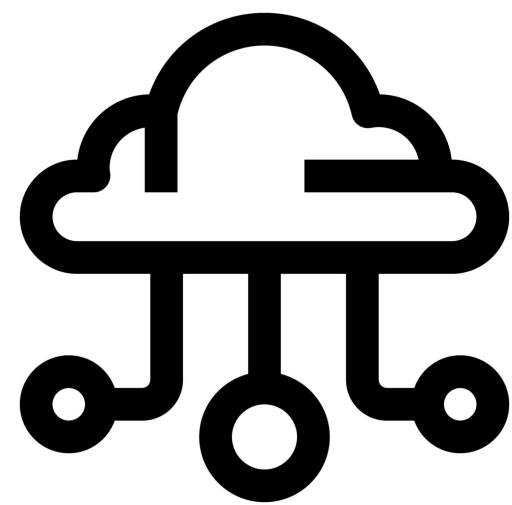


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AI and Cloud computing allow data fusion at large scale

Recent advancements in AI and distributed cloud processing enable the ingestion and processing of large amount of data and produce measurement of the Earth at regional and global scale.

Kayrros developed Phlogeo a large scale satellite data processing software able to ingest and process 1Tb of data per hour.

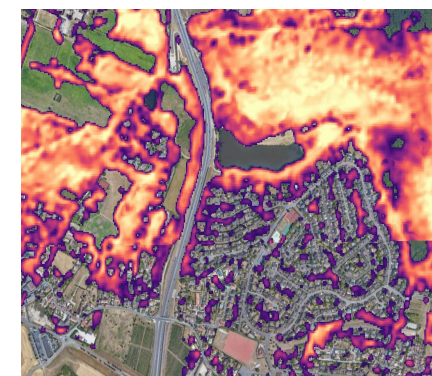
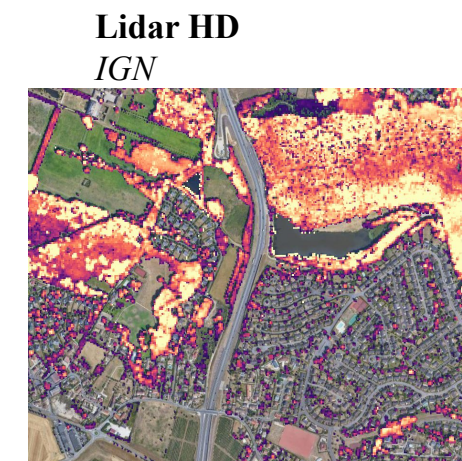
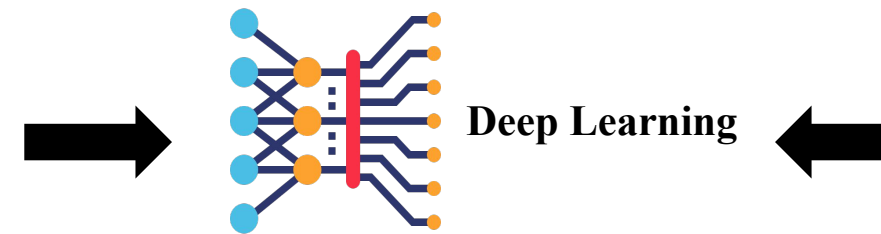
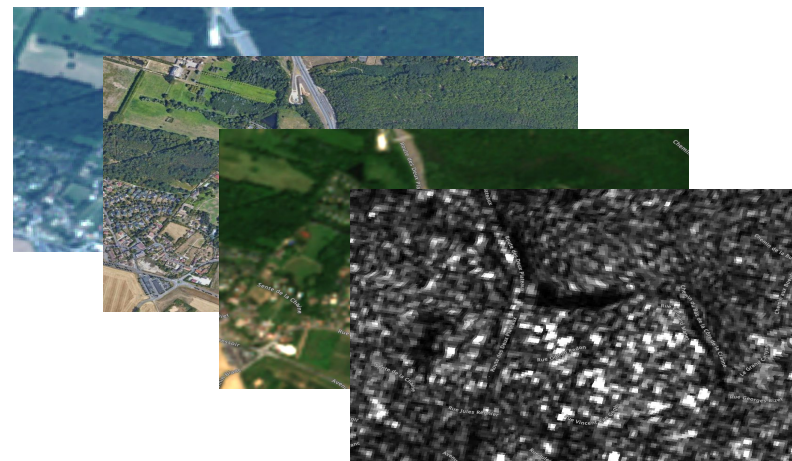


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Kayrros wildfire risk monitoring solution

Combine the power of mid-res open-source data (coverage, frequency, historical) and high-res data (baseline and calibration)

(SAR) Sentinel-1
(Optical) Sentinel-2 10m, Spot 1.5 m, BD Ortho 20 cm



Canopy Height and Cover:

- 4 times a year at **10 m**
- once a year at **2 m**
- every 3 years **< 1 m**



Risk Score with several revisit over the year calibrated with public authorities

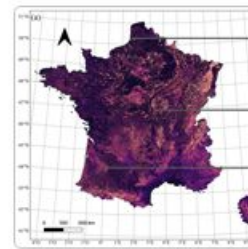


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Kayrros wildfire risk monitoring solution

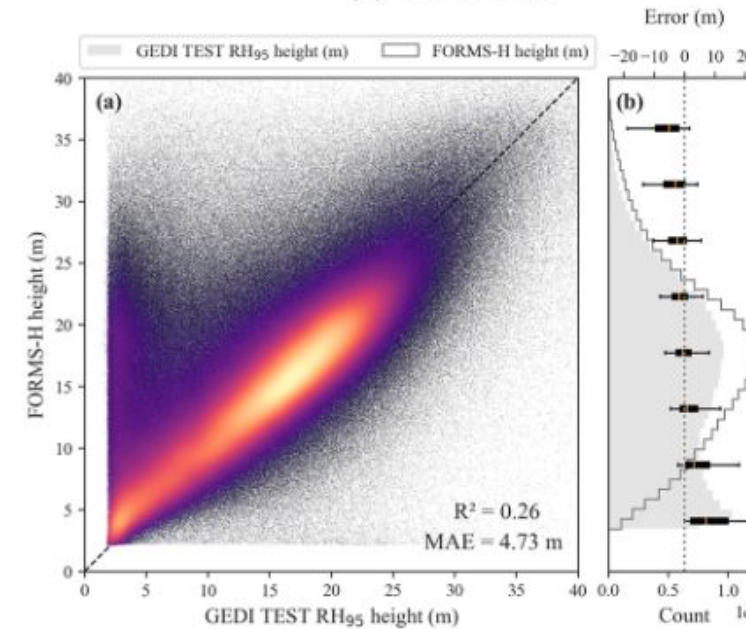
Methodologies developed and validated with our academic partners and published in scientific papers

FORMS: Forest Multiple Source height, wood volume, and biomass maps in France at 10 to 30 m resolution based on Sentinel-1, Sentinel-2, and Global Ecosystem Dynamics Investigation (GEDI) data with a deep learning approach

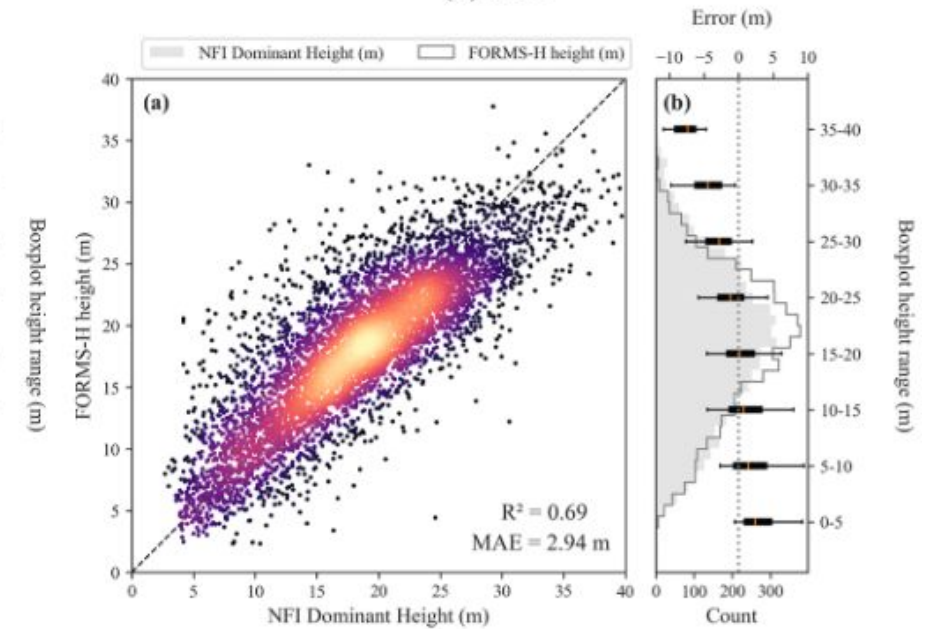


Martin Schwartz ^a, Philippe Ciais, Aurélien De Truchis, Jérôme Chave, Catherine Ottlé, Cedric Vega, Jean-Pierre Wigneron, Manuel Nicolas, Sami Jouaber, Siyu Liu, Martin Brandt, and Ibrahim Fayad

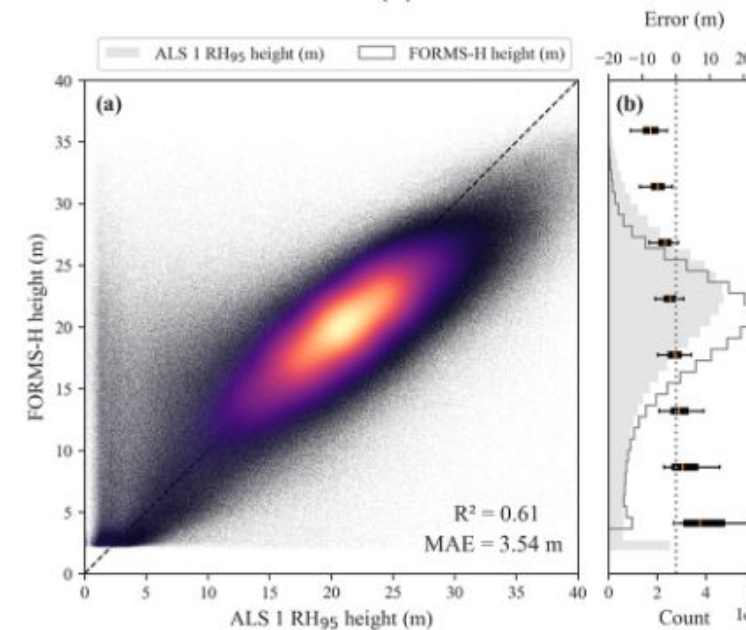
(1) GEDI Test



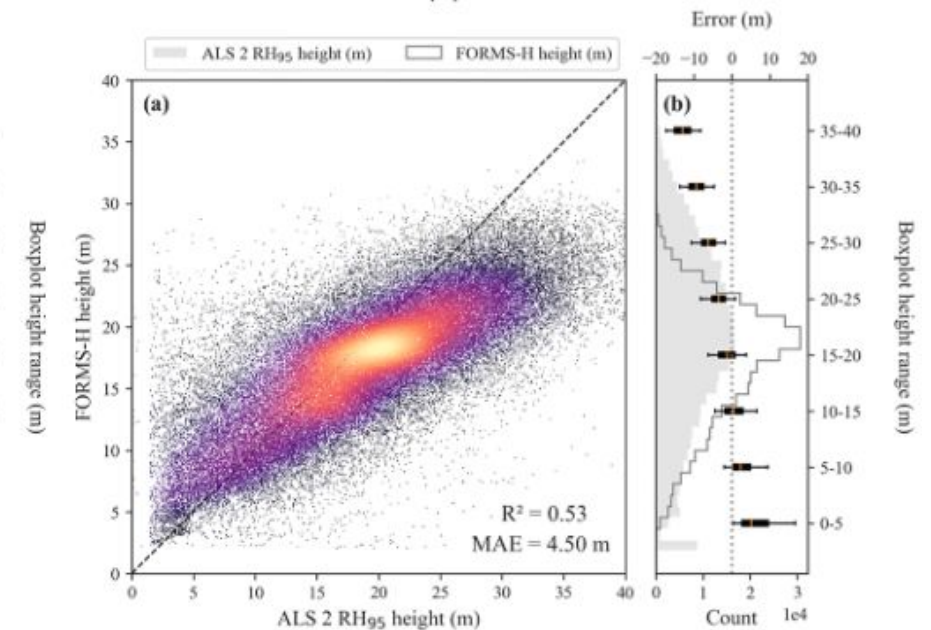
(2) NFI



(3) ALS 1



(4) ALS 2



High-resolution canopy height map in the Landes forest (France) based on GEDI, Sentinel-1, and Sentinel-2 data with a deep learning approach

Martin Schwartz ^a, Philippe Ciais ^a, Catherine Ottlé ^a, Aurelien De Truchis ^b, Cedric Vega ^c, Ibrahim Fayad ^d, Martin Brandt ^e, Rasmus Fensholt ^e, Nicolas Baghdadi ^d, François Morneau ^f, David Morin ^g, Dominique Guyon ^h, Sylvia Dayau ^h, Jean-Pierre Wigneron ^h

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Millions buildings under monitoring 3x per year



- Vegetation assessment 50m around the building
- Vegetation > 4m : 90% accuracy
- +2000 ground truths and high resolution comparison

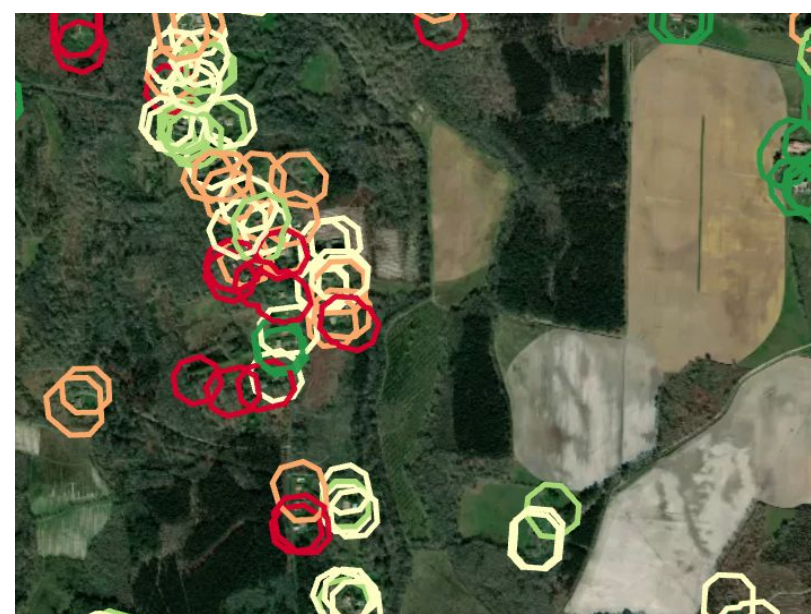
Unlock the future

Millions buildings under monitoring 3x per year

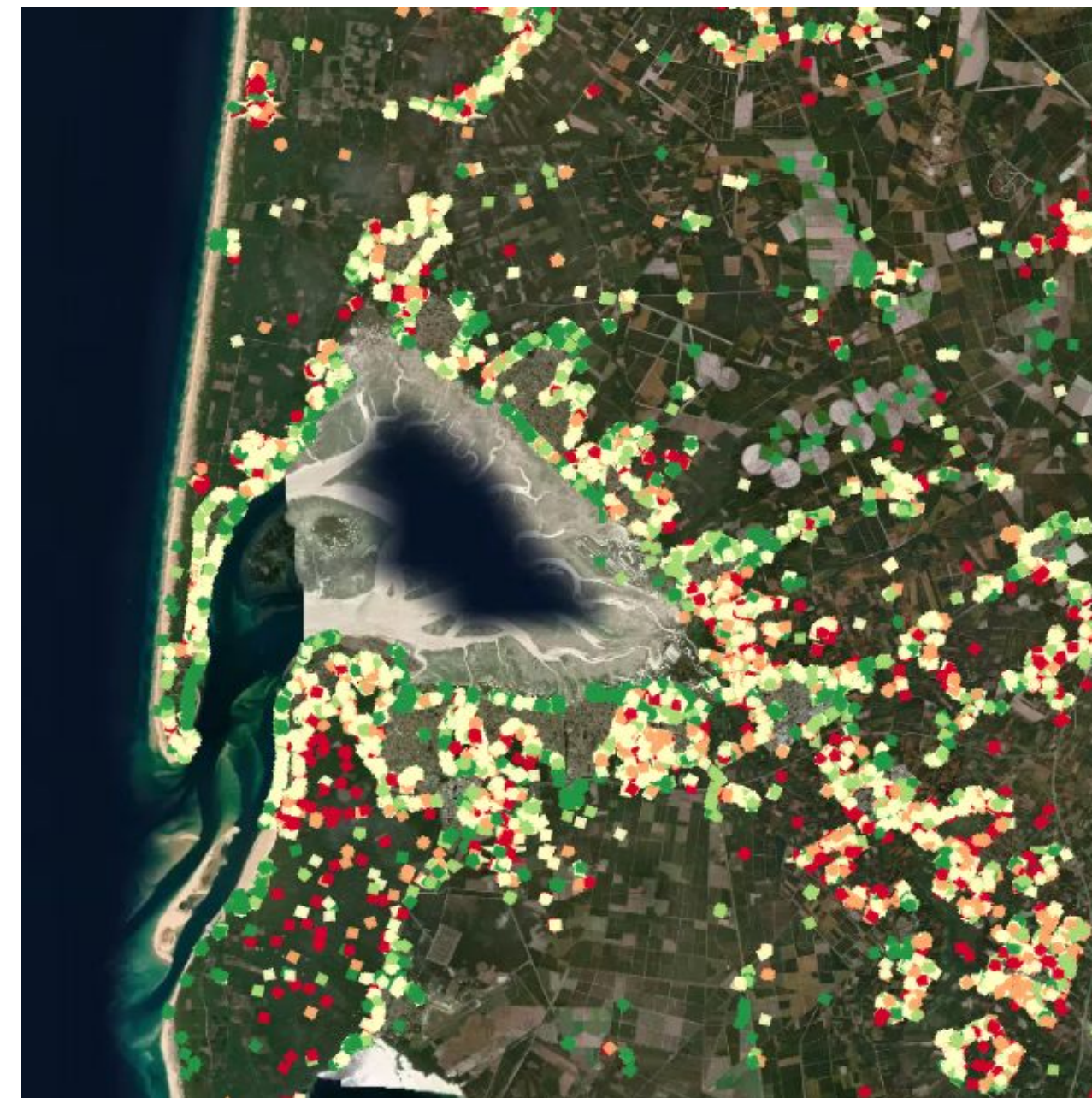
Building level



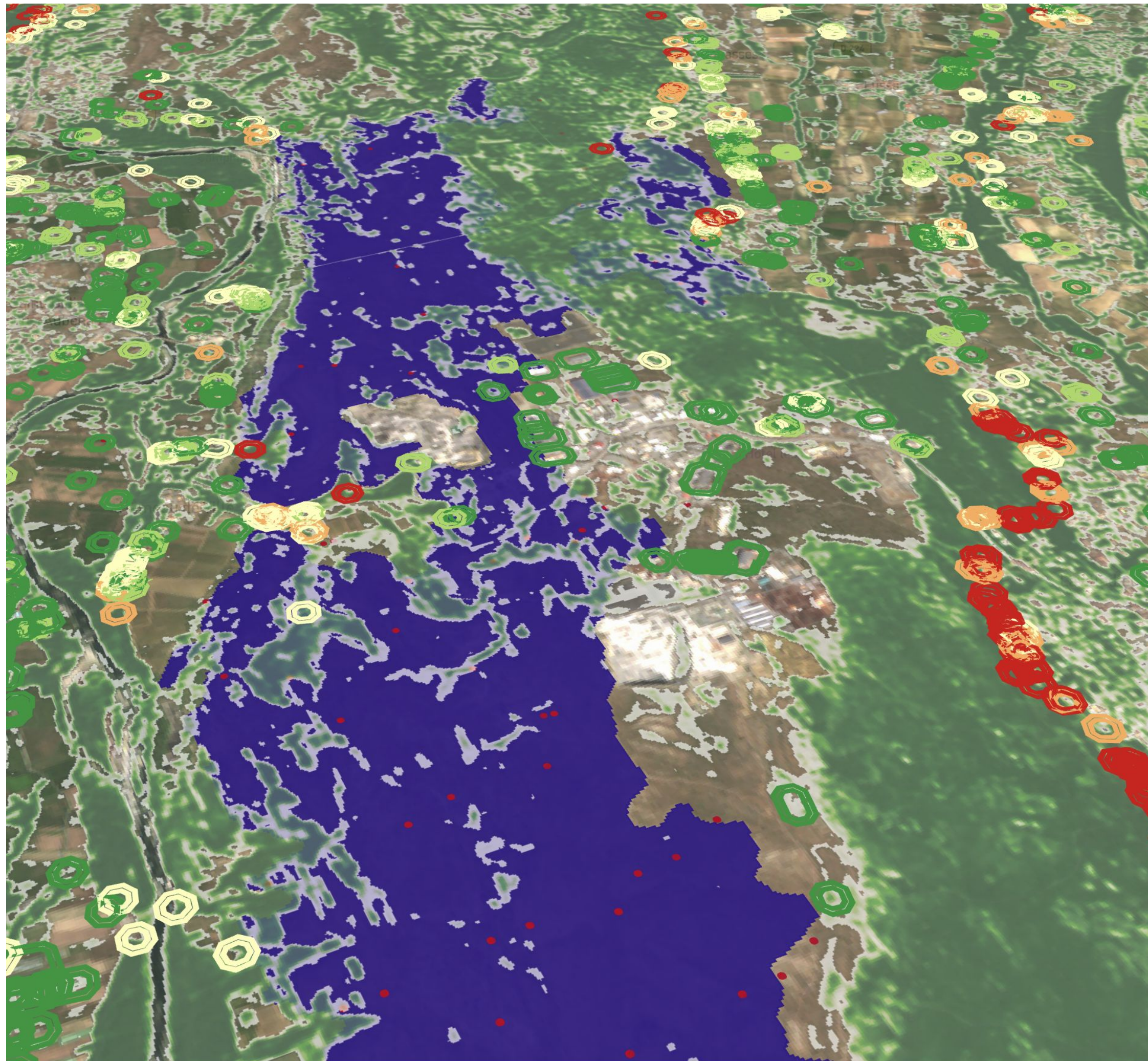
Local level



Regional level



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End use case : aggregation of different layers and datasets to support firefighters before and after wildfires

blue : previous fire
red dots : heat points
green : biomass density

circles : buildings and “defendability” score



A case for AI and geospatial large-scale application

Without AI

- the risk of less than 20% of buildings is well known
- total coverage once a year would require more than 130 FTE

With AI

- 100% coverage, several times a year
- need to visit only the 10-20% most critical buildings
- savings : more resources (time, people, money) available for awareness and field work

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Rising number of potential users

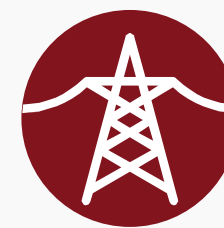
Fire fighters



Insurance



Network infrastructures



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Thank you !

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