Reinforcing the AI4EU Platform by Advancing
Earth Observation Intelligence, Innovation & Adoption

How can Copernicus data support a high value, low carbon, safe society?

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Equinor

Energy User Stories*

Where can energy installations can be built?

Where will there be energy demand?

How to improve renewable energy production efficiency?

*a user can be the EU, national govts, cities, companies or individuals

Safety

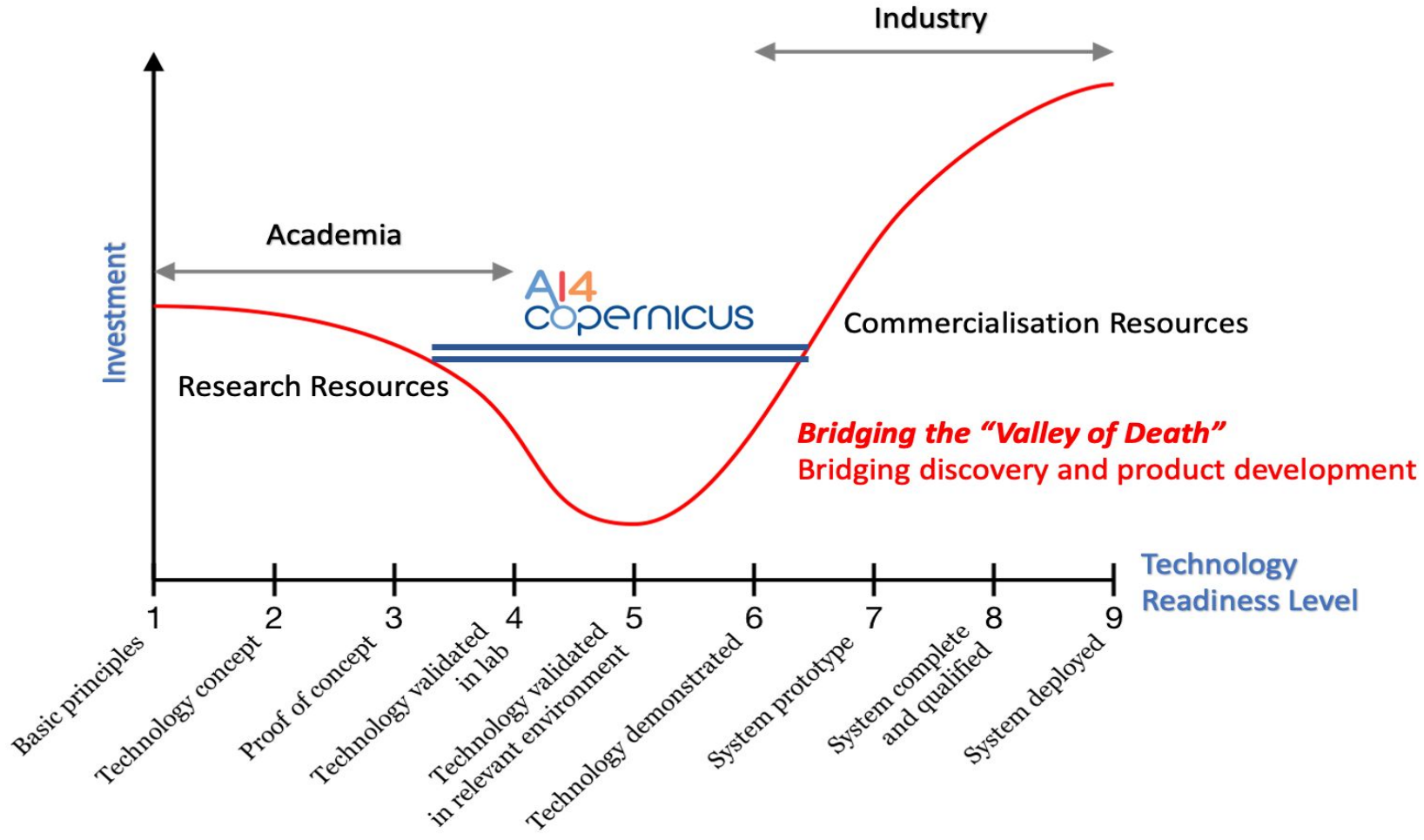
- A known situation is a safe situation

- Allows us to be pro-active rather than reactive
    - Satisfy authority and society expectations

- If we know and understand the situation
    - We make confident decisions to optimize operations

- Confident, safe and efficient operations
    - increase reputation
    - increase investor confidence

AI4Copernicus
Accelerating AI & EO Innovation

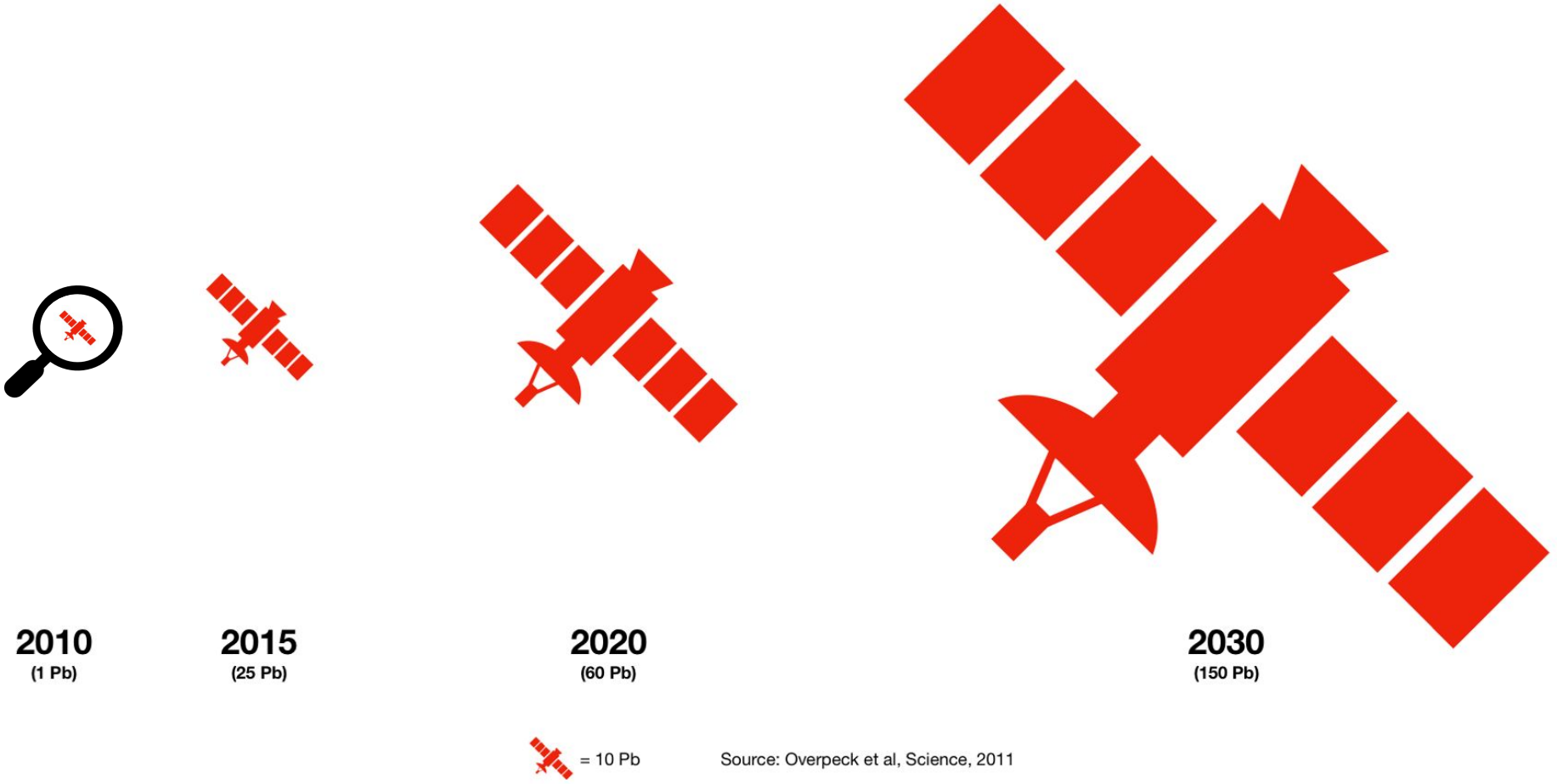


Data can have a purpose

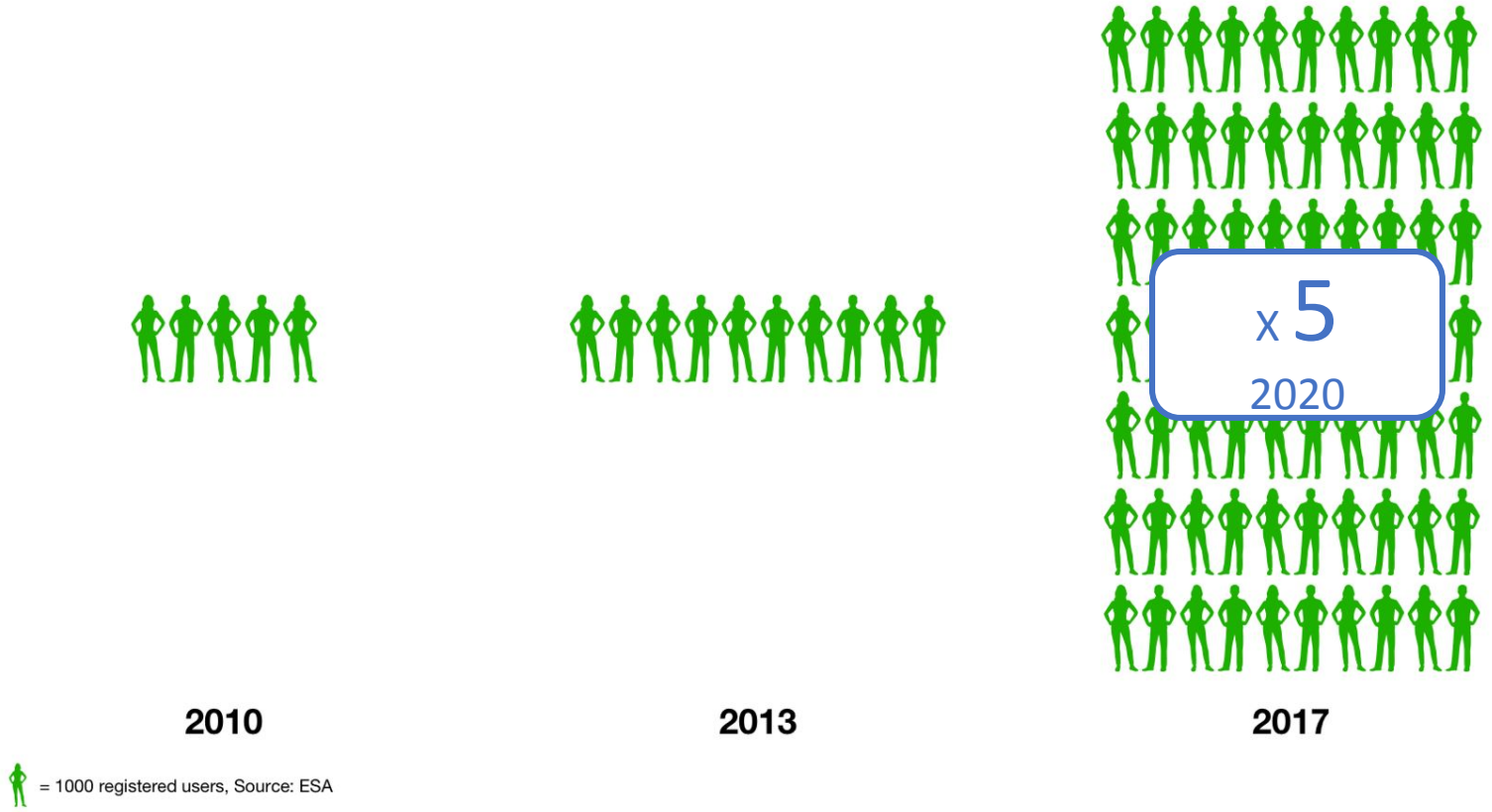
- Data can provide you with an extreme amount of answers…

…if you ask the right questions

Increasing amount of data



Increasing amount of users



Data, data everywhere…

Today's challenge is less about data collection
and more about making sense of the avalanche of data

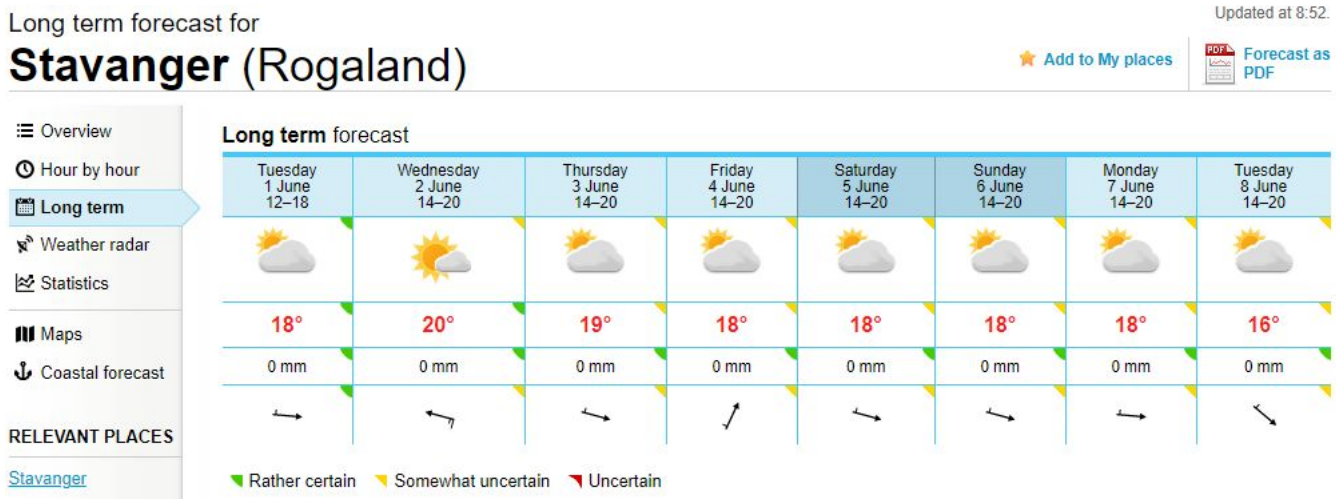
Solution:
Digitalization of the workflow
Integrate multiple observations into one summary

Take advantage of the increased number and higher frequency of observations

We want Information:

Decision makers should focus on the accuracy and quality of the information,

and not the source of the data



https://www.yr.no/place/Norway/Rogaland/Stavanger/Stavanger/long.html

Why? Let analysts analyse

- Tools being developed to allow analysts to analyse and not spend time re-formatting data or performing mundane tasks, especially if it involves **comparative** analysis.

- A doctor looking at a e.g. 1000 MRI scans can
  - only subjectively pick out the anomalies,
  - and with difficulty
  - e.g. was # 5 the same as # 756?

- A computer program can tell a doctor which 5 scans to focus on.

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What do we want to do?

Our goal is to produce high value energy with a low carbon footprint. Safely

But isn’t this also a description of the type of lifestyle we want?

A safe, high-value society with a low carbon footprint

Smart Cities

- We will live in smart cities
- By 2050 68% of the world's population will be in urban areas.

- Smart cities need energy.

  - But how much energy?

- Smart city inhabitants will want reliable low carbon energy mix to live in their smart city.

  - Where will it come from?

How do we find story?

Change the conversation

From
the traditional "customer-supplier" *table tennis* dialogue

"what do you want us to do (supplier) - what can you do (customer)"

to
a **brainstorming** collaboration

**"This is my challenge –
does this address your challenge"**

From knowing what's happening

NICFI Norway's International Climate and Forest Initiative

New satellite images to allow anyone, anywhere, to monitor tropical deforestation

23. September 2020

https://www.nicfi.no/current/new-satellite-images-to-allow-anyone-anywhere-to-monitor-tropical-deforestation/

to knowing what to do

Tree planting 'has mind-blowing potential' to tackle climate crisis

Research shows a trillion trees could be planted to capture huge amount of carbon dioxide

Editor's pick: best of 2019. We're bringing back some of our favorite stories of the past year. Support the Guardian's journalism in 2020

https://www.theguardian.com/environment/2019/jul/04/planting-billions-trees-best-tackle-climate-crisis-scientists-canopy-emissions

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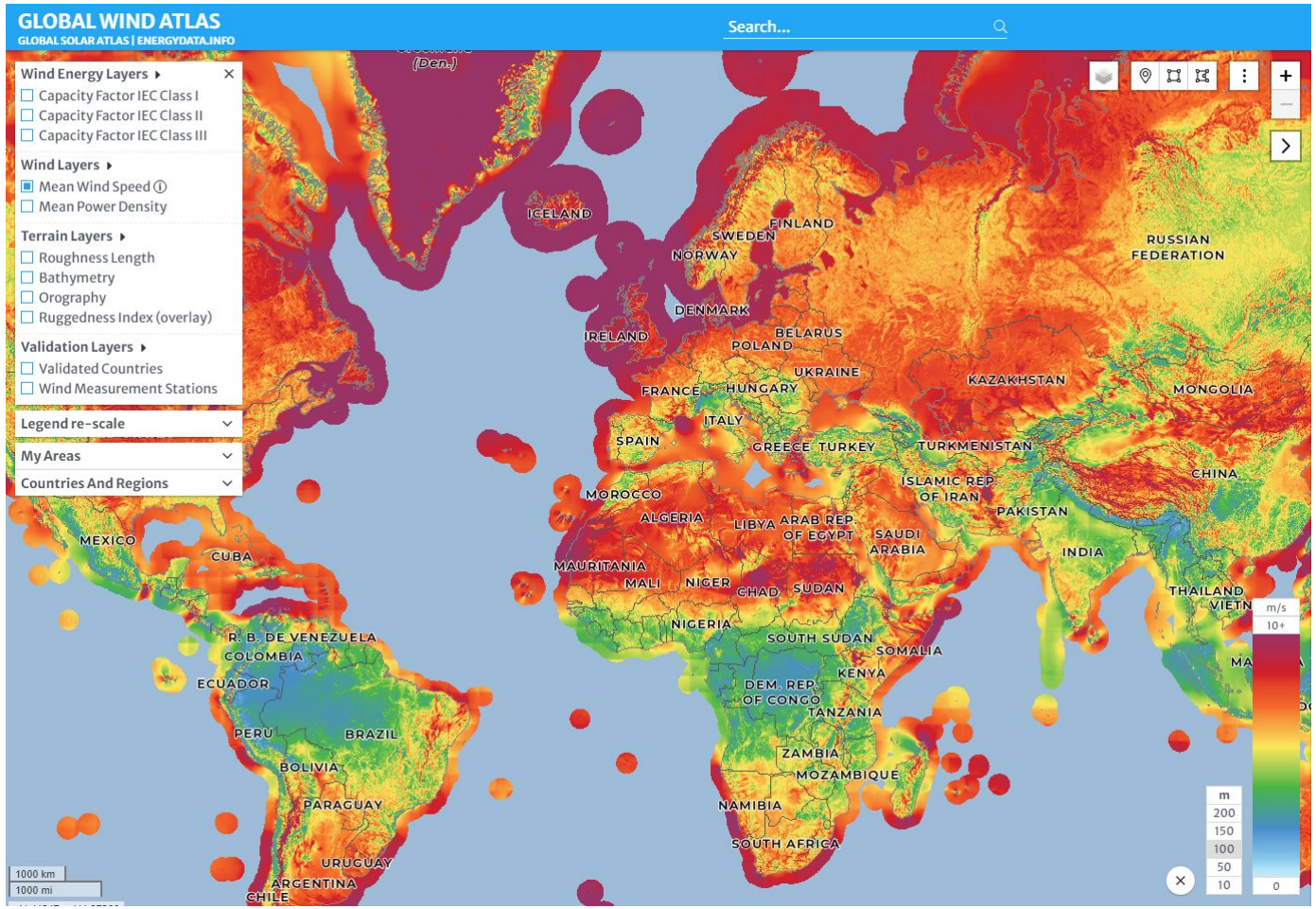
Wind farms


GLOBAL WIND ATLAS
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Capacity Factor IEC Class II
Capacity Factor IEC Class III
Wind Layers
Mean Wind Speed
Mean Power Density
Terrain Layers
Roughness Length
Bathymetry
Orography
Ruggedness Index (overlay)
Validation Layers
Validated Countries
Wind Measurement Stations
Legend re-scale
My Areas
Countries And Regions
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FINLAND
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NORWAY
RUSSIAN FEDERATION
DENMARK
IRELAND
BELARUS
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PERU
BRAZIL
ZAMBIA
BOLIVIA
MOZAMBIQUE
PARAGUAY
NAMIBIA
SOUTH AFRICA
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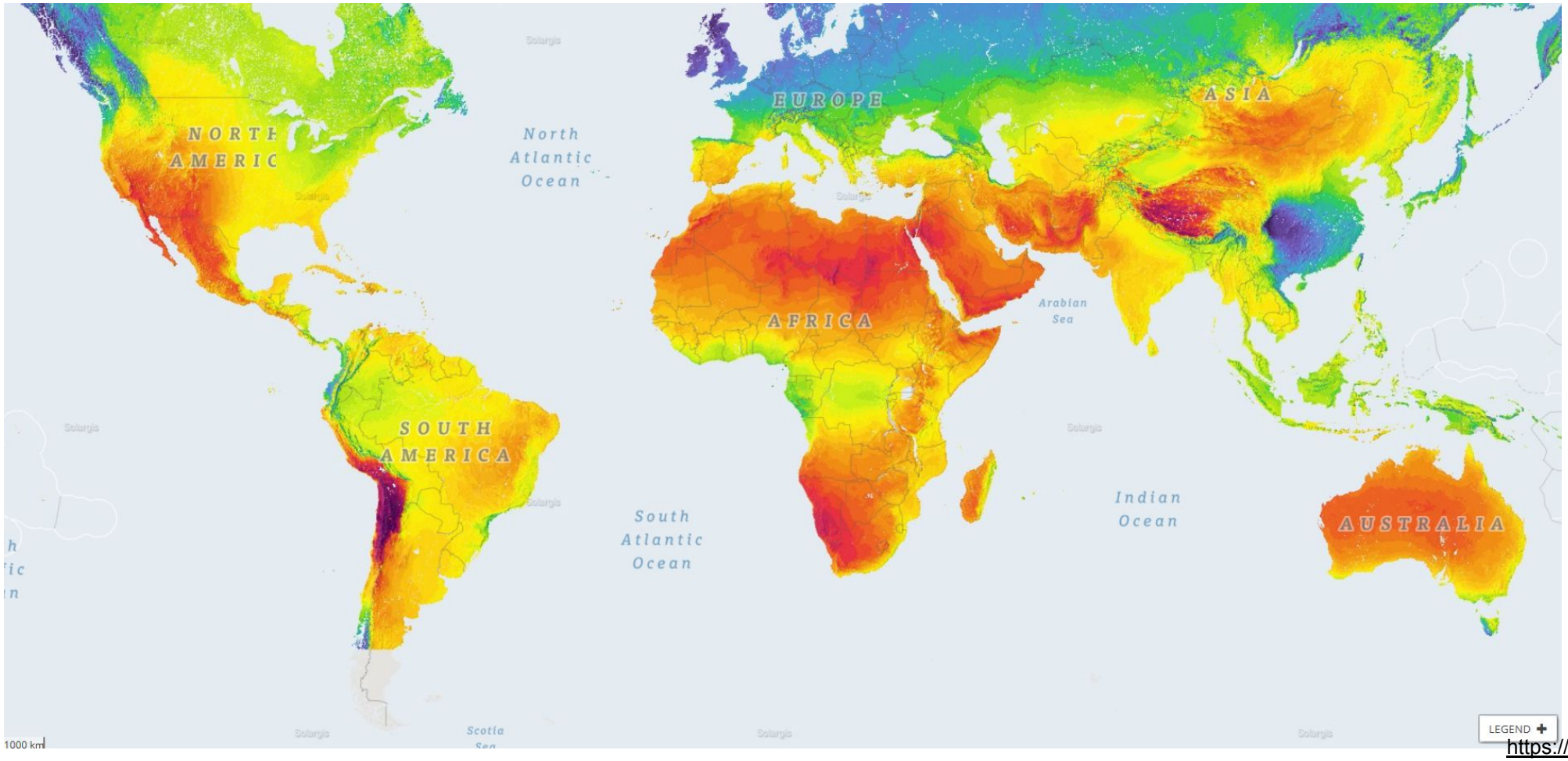
1000 km
1000 mi

From location of solar farms



https://globalsolaratlas.info/

To UV protection and more

https://ajuma.eu/?lang=en

The Alan Turing Institute

Solar nowcasting with machine vision

Enabling worldwide solar photovoltaic (PV) nowcasting via machine vision and open data

Introduction

Precisely how much solar energy is being pumped into the UK's electricity grid at any time is not well known, even by the National Grid. This project aims to fix that, using a combination of AI (machine vision), open data and short-term forecasting.

Solar nowcasting with machine vision | The Alan Turing Institute

RACE Dashboard

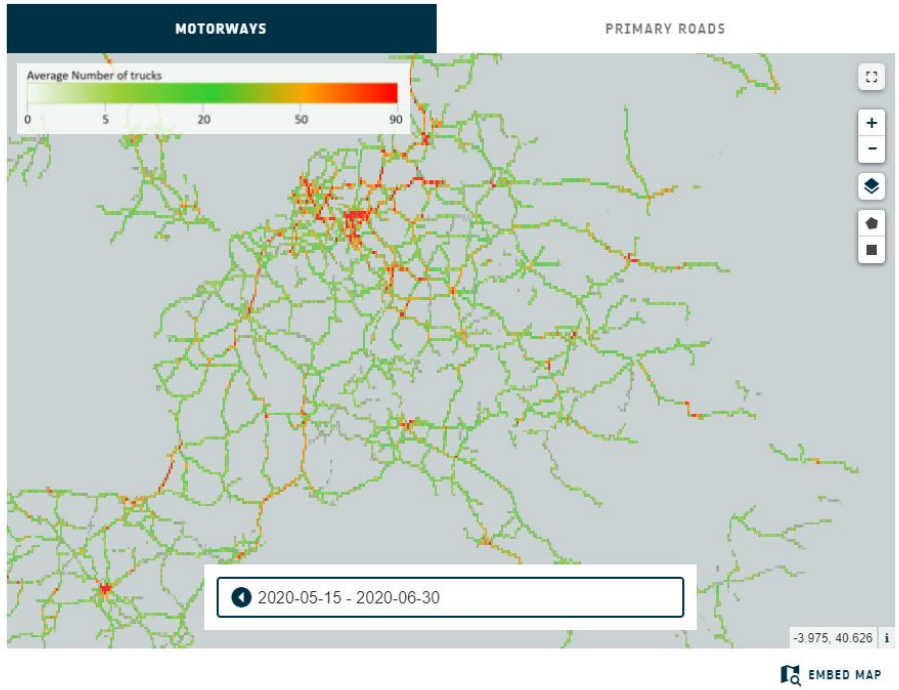
RAPID ACTION ON CORONAVIRUS AND EO

RAPID ACTION ON CORONAVIRUS AND EO WELCOME ABOUT

RACE Dashboard Challenges 2021

Europe, Number of Trucks (Beta)

Motorways



truck once but three times in the red-blue-green wavelengths. As the truck keeps traveling during this short time offset, it appears spectrally disassembled. This pattern may be used for detecting roaming trucks on roads. Although visual inspection cannot confirm that the objects are trucks, this is implied by the ratio between size of different vehicles and a Sentinel-2 pixel (see validation for details). However, a confusion with moving vehicles of similar size such as buses may occur. In order to generally reduce false detections the computation is constrained to road data from Open Street Maps (OSM). The blue dots in Fig. 1 are examples of identified trucks in these subsets.

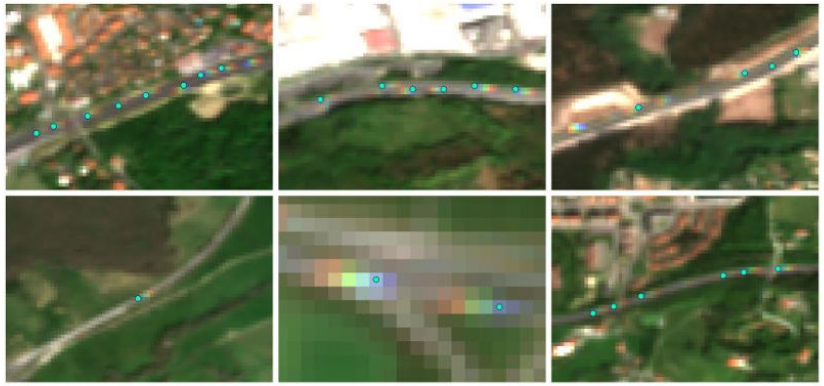


Fig. 1: Truck detection example in southern France

Detected trucks in 2020 are compared with the median value of the baseline years 2017, 2018 and 2019. In each period the number of detected trucks in an area is divided by the number of observations in order to make the figures comparable across the continent. The counts of each year are compared with the baseline value, which is the median of the three baseline years. The median is used in order to reduce arbitrary oscillations of the baseline. Truck counts higher or lower 5 % than the baseline are denoted as 'High' or 'Low' respectively.

- **Application 1:** As a user* I want to know where I can and cannot build low carbon and renewable energy infrastructure
  - *e.g. How many, and where, solar or wind farms can be built in Europe?*
- **Application 2:** As a user I want a better understanding of energy consumption and energy needs of a society
  - *e.g. How much energy does a settlement use?*
- **Application 3:** As a user I want to know where to carry out precision, pre-emptive, maintenance in my energy infrastructure
  - *e.g. Can I use satellite data to plan the cleaning of solar panels?*

* A user can be the EC, Country, County, company or individual

Thank You!

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Any Questions?

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