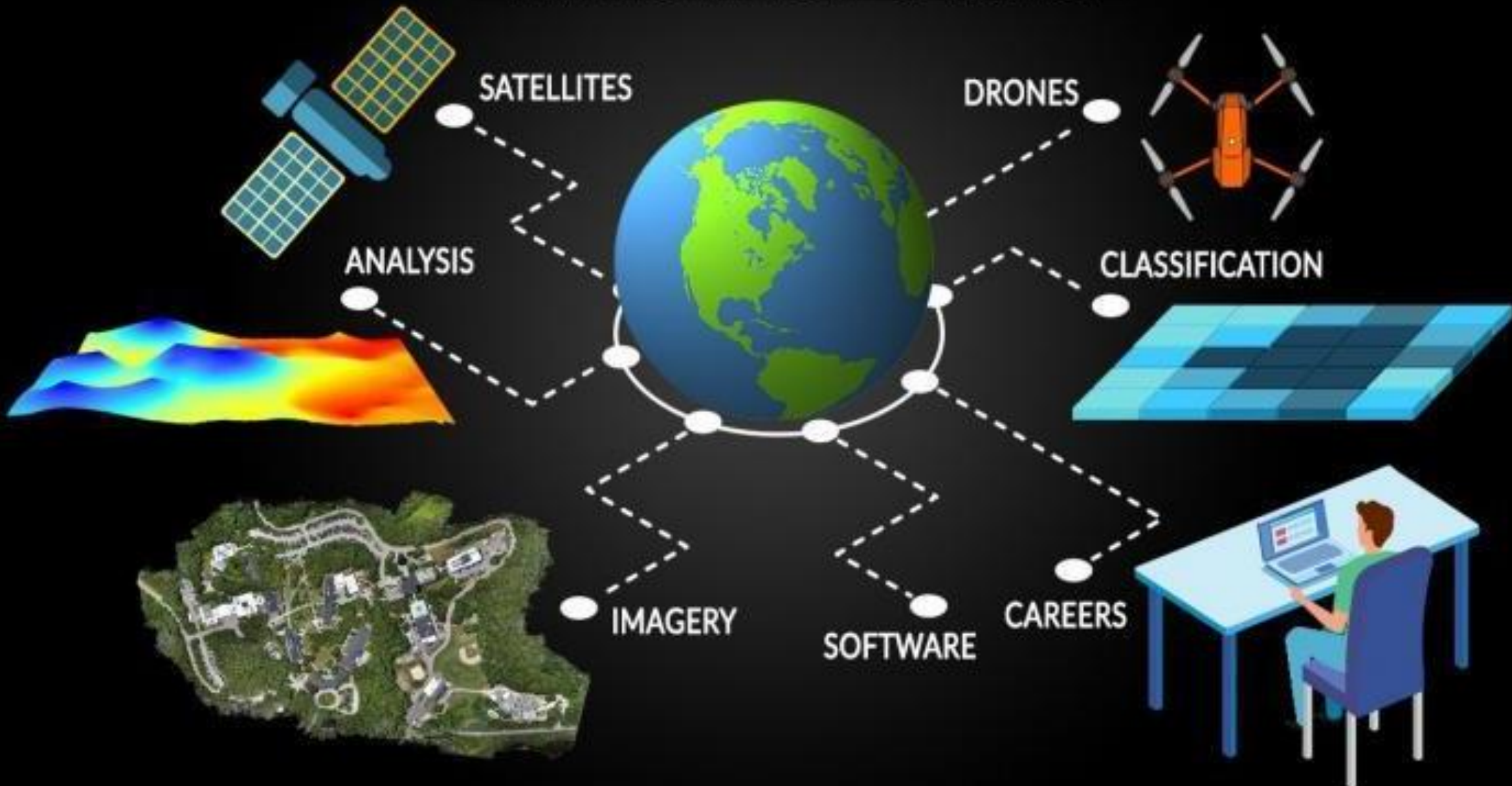


# Setting the Stage:

# Using Remote Sensing for Monitoring and Impact Evaluation

# What is Remote Sensing?



# Copernicus Sentinels: Operational monitoring



PROGRAMME OF THE  
EUROPEAN UNION



**300 TB**  
satellite data  
distributed per day



**full, free & open**  
data policy

**sentinel-1**

→ **RADAR VISION**

**sentinel-2**

→ **COLOUR VISION**

**sentinel-3**

→ **A BIGGER PICTURE**

**sentinel-4**

→ **EUROPEAN AIR MONITORING**

**sentinel-5p | sentinel-5**

→ **GLOBAL AIR MONITORING**

**sentinel-6**

→ **SURFING THE SEAS**

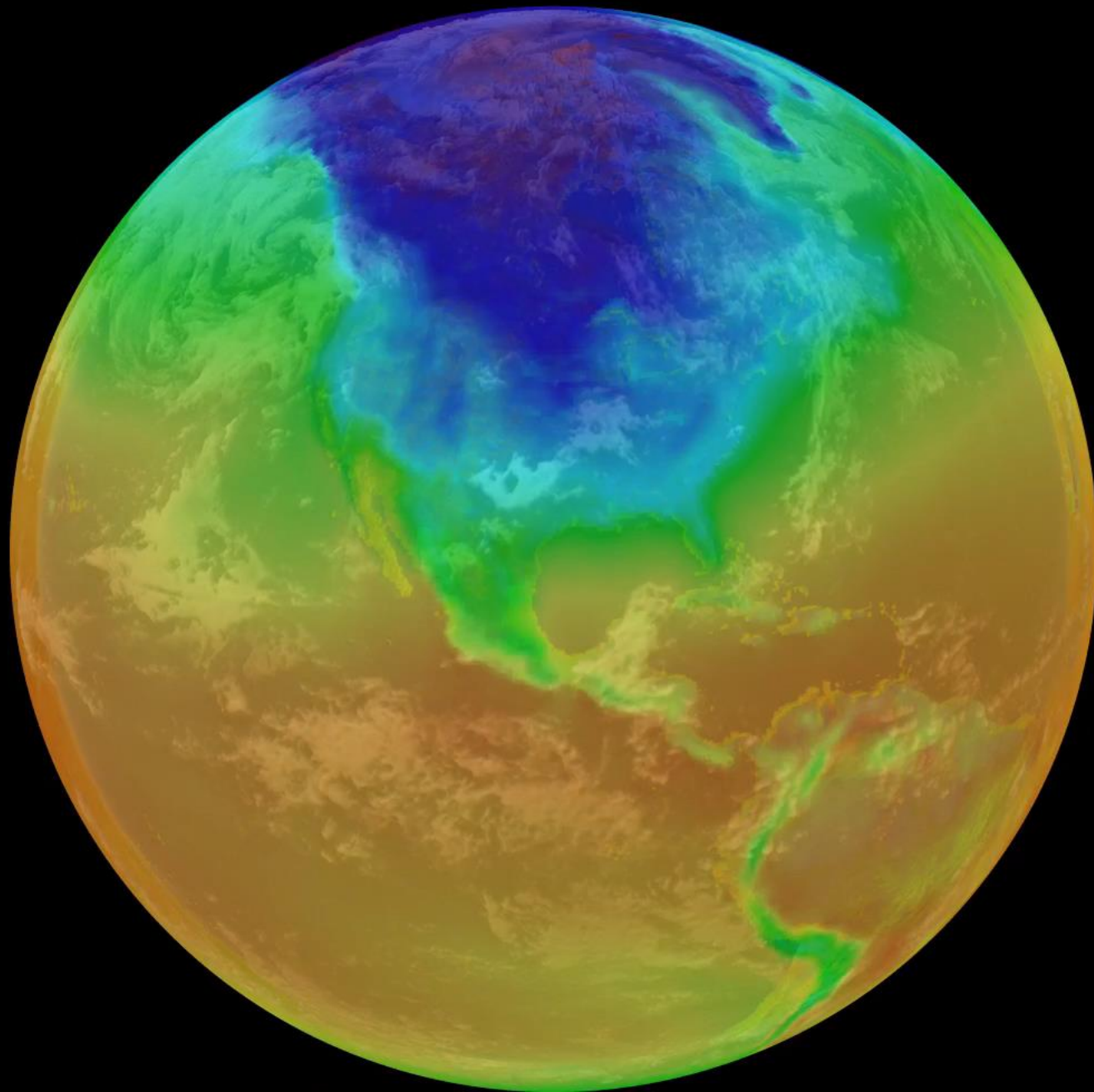




**All** global  
landmass  
is observed  
every **5** days  
at **10**<sub>m</sub>  
resolution



0 days 00 hours 00 minutes  
Sentinel-2 constellation:  
summer solstice



# Value of Earth Observation data



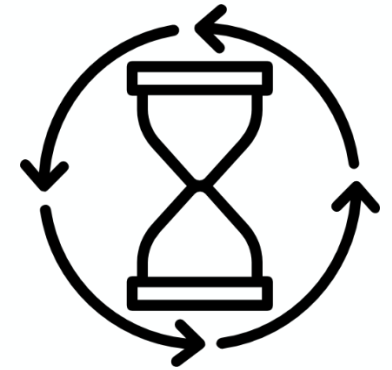
**Affordability**



**Coverage**



**Frequency**



**Anonymity**



**Objectivity**



**Continuity**





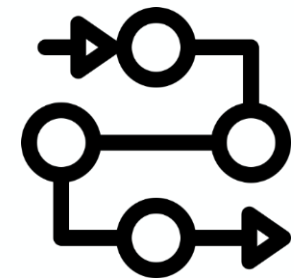
**Limited thematic scope**

**In-situ data for calibration/training**



**Necessity of complementary skills**

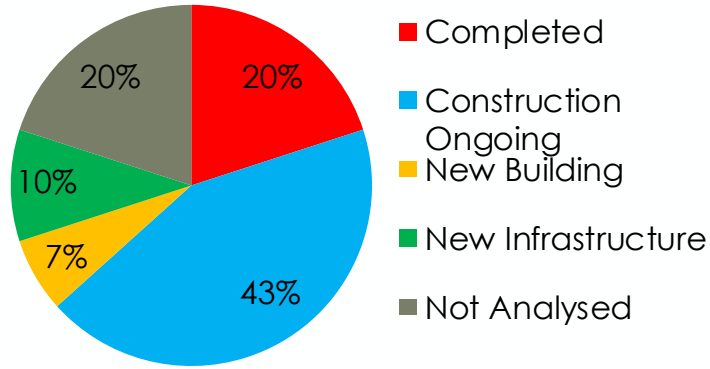
**Un-adapted internal processes**



# Monitoring: Infrastructure construction in Pakistan

AOI04 - INFRA 05 SENSORE 19/09/2022

Analyzed infrastructures: identified classes



AOI04 - INFRA 09 SENSORE 19/09/2022



AOI04 - INFRA 10 SENSORE 19/09/2022





# Monitoring: Decision Support System in Pakistan



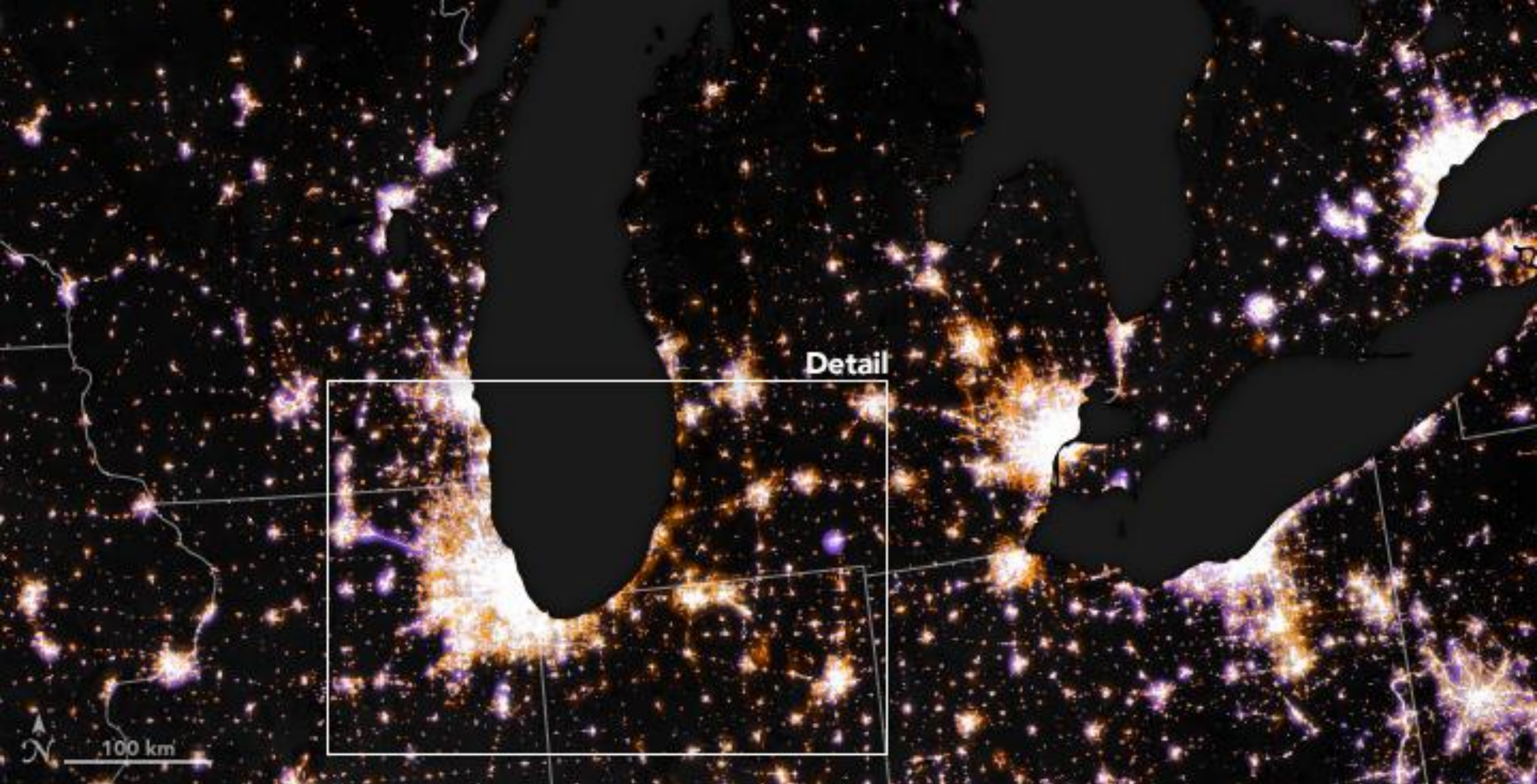


**Increase number / quality of measured outcomes**

**Extend temporal or geographical coverage**



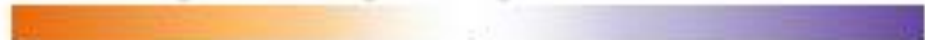
**Increase analysis statistical power**



Detail

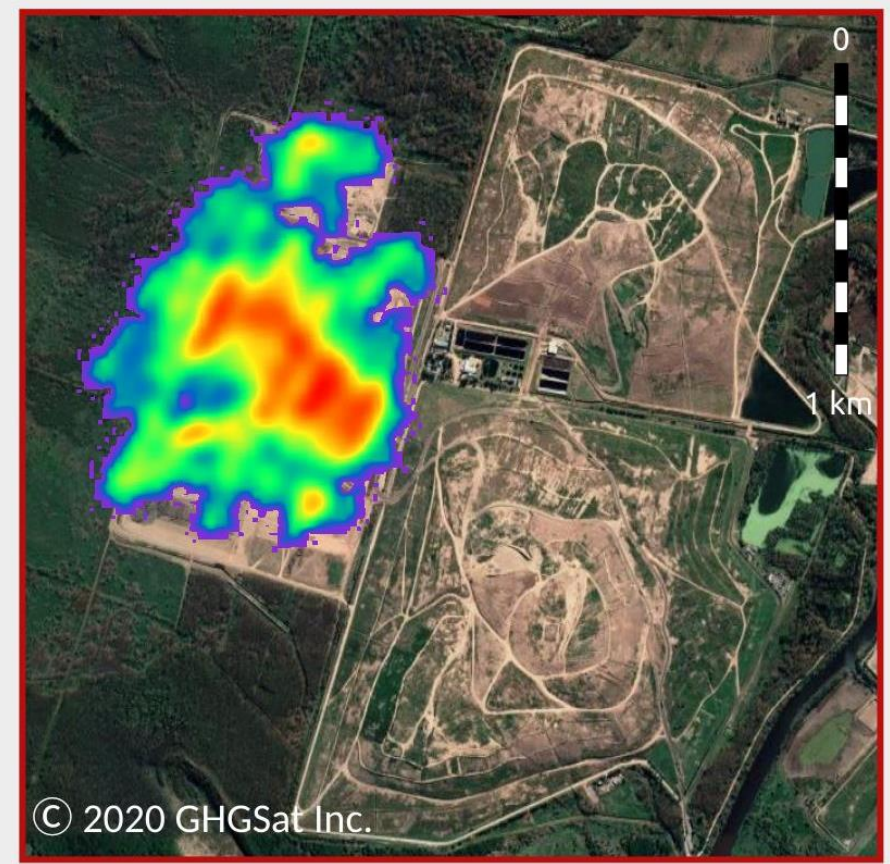
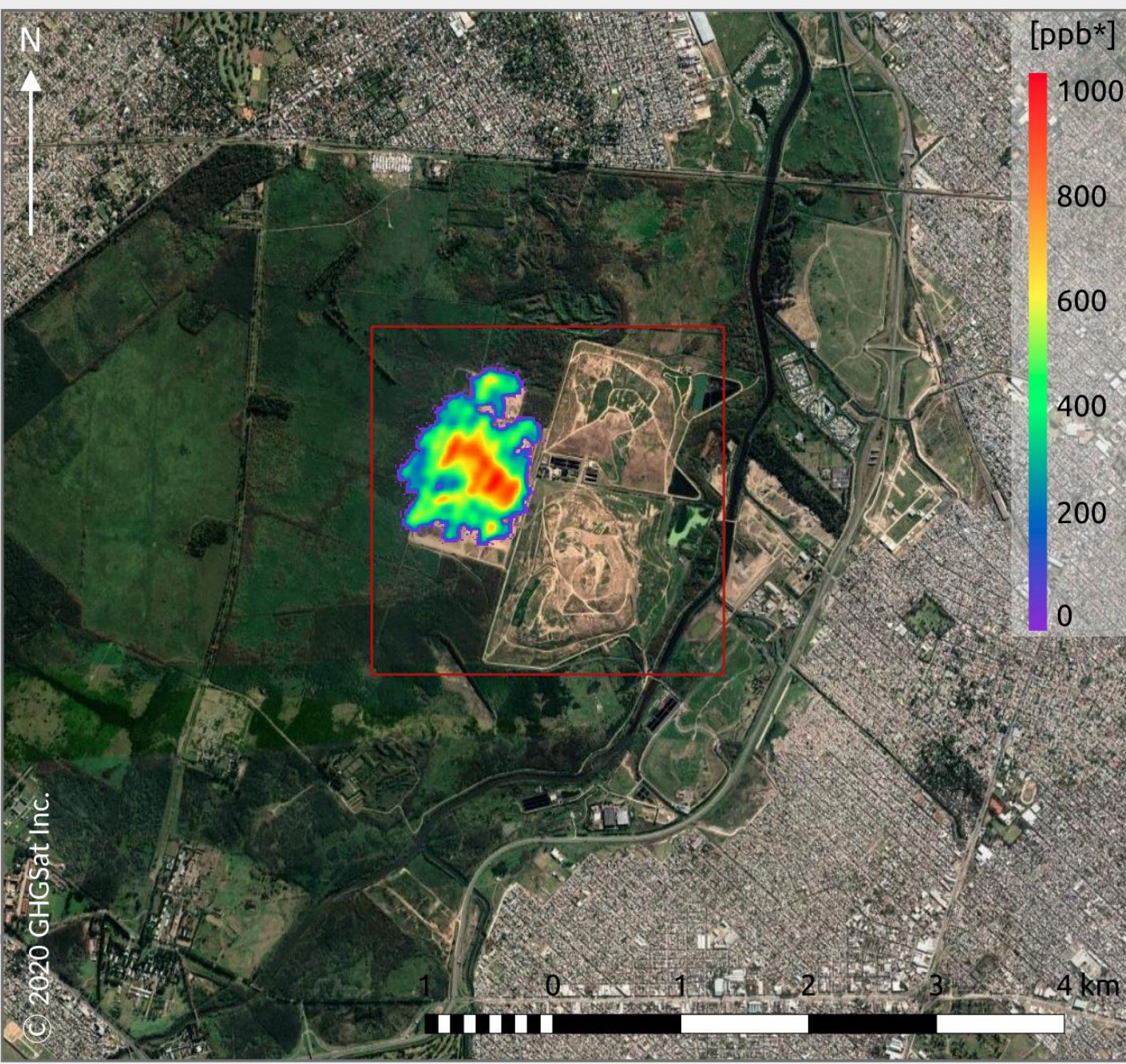
N  
100 km

Change in Night Lights (2012–2016)



# NDVI - Vegetation Index

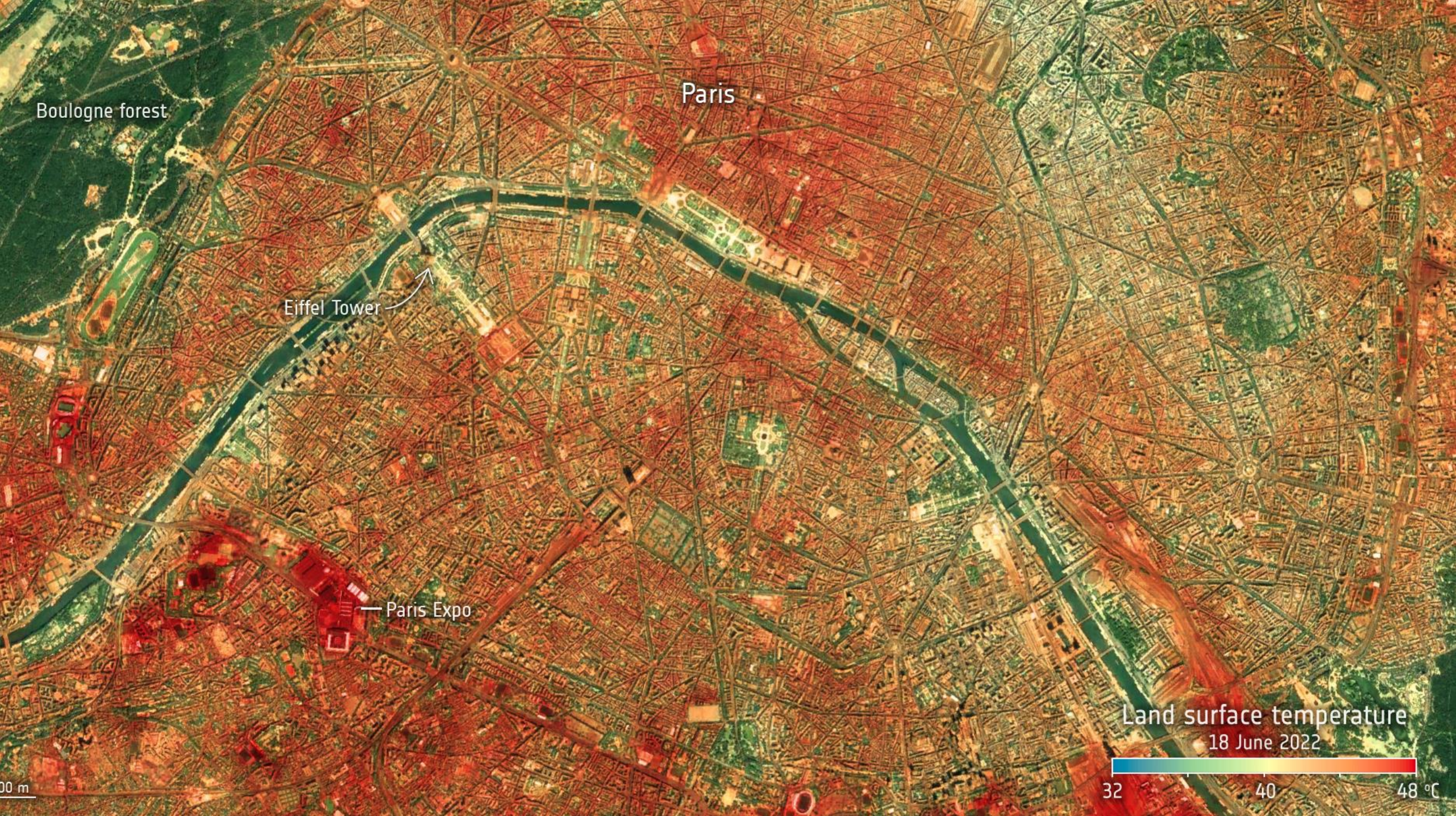




Product:  
CH<sub>4</sub> column-averaged concentration  
in excess of local background level

Timestamp:  
2020-02-15 13:03:17 UTC

Background:  
© 2020 Google Map Data



Boulogne forest

Paris

Eiffel Tower

Paris Expo

Land surface temperature  
18 June 2022



00 m



**biomass**



PROGRAMME OF THE  
EUROPEAN UNION



co-funded with



**CHIME**  
Copernicus Hyperspectral  
Imaging Mission  
for the Environment



- soil properties
- crop health
- raw materials
- biodiversity
- water quality

**ROSE-L**

L-band Radar  
Observing System



- geohazards
- polar ice
- forest management
- food security
- maritime surveillance



**CIMR**

Copernicus Imaging  
Microwave Radiometer



- sea-ice concentration
- sea-surface temperature
- polar maritime security
- global ocean and cryosphere
- soil moisture and vegetation



**CRISTAL**

Copernicus Polar Ice  
and Snow Topography  
Altimeter



- coastal and inland waters
- polar oceanography
- ice sheets and glaciers
- snow
- sea-ice thickness



**LSTM**

Land Surface  
Temperature Monitoring



- sustainable agriculture
- water resources management
- drought
- urban heat islands



**CO2M**

Copernicus  
Anthropogenic Carbon  
Dioxide Monitoring



- carbon dioxide and  
methane from human activity

**Combatting  
Climate Change**

**Food Security and  
Water Management**

**Monitoring Land  
and Natural Resources**

**Safeguarding  
the Arctic**

**Copernicus Sentinel  
Expansion Missions**





# Use of Remote Sensing for Impact Evaluation



**Mascha Rauschenbach**  
(DEval)



**Anupam Anand**  
(GEF)



**Ingrid Dallman**  
(AFD)



**Melvin Wong**  
(KfW)



**Alexander Stepanov**  
(EBRD)