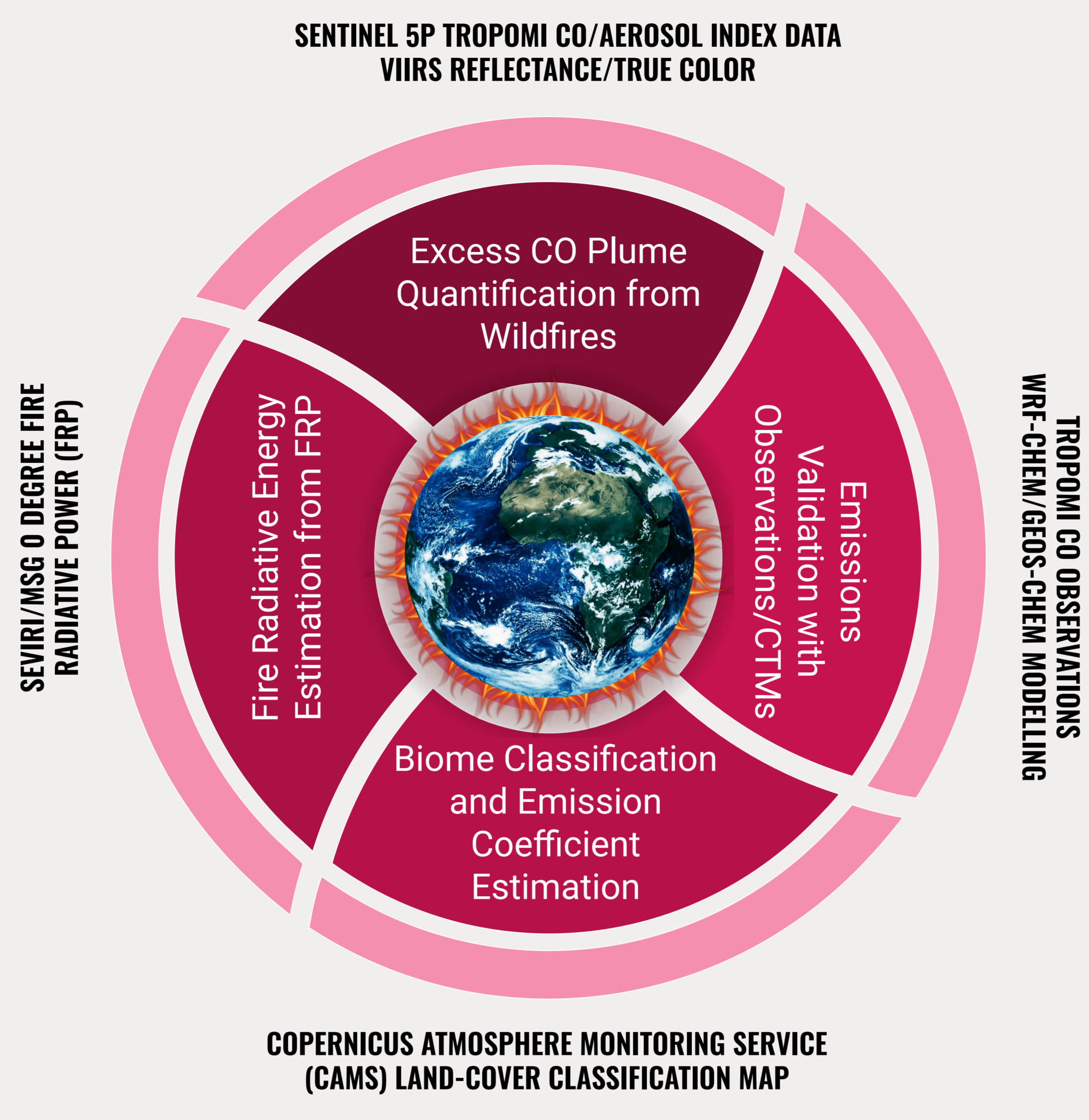


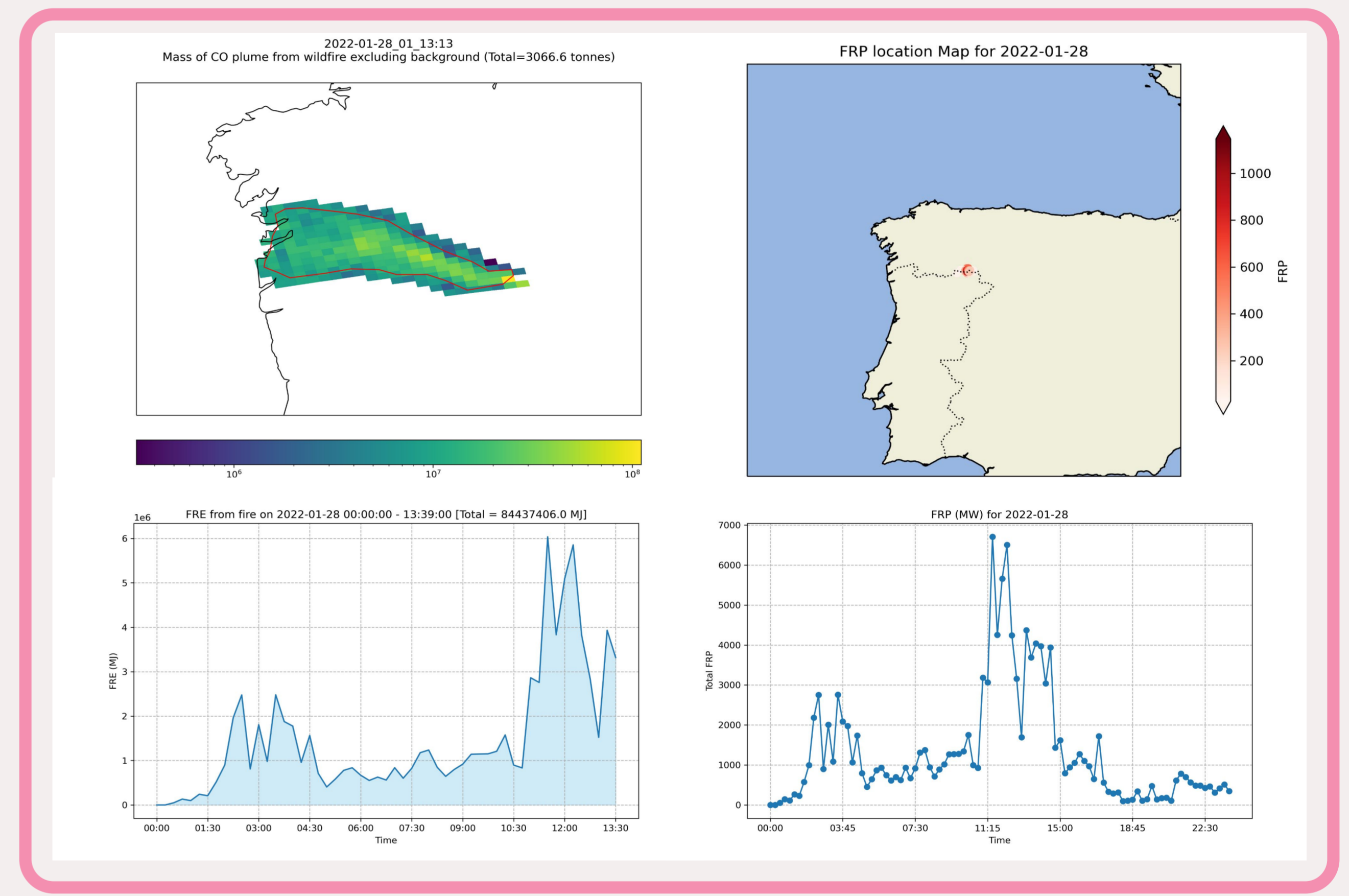
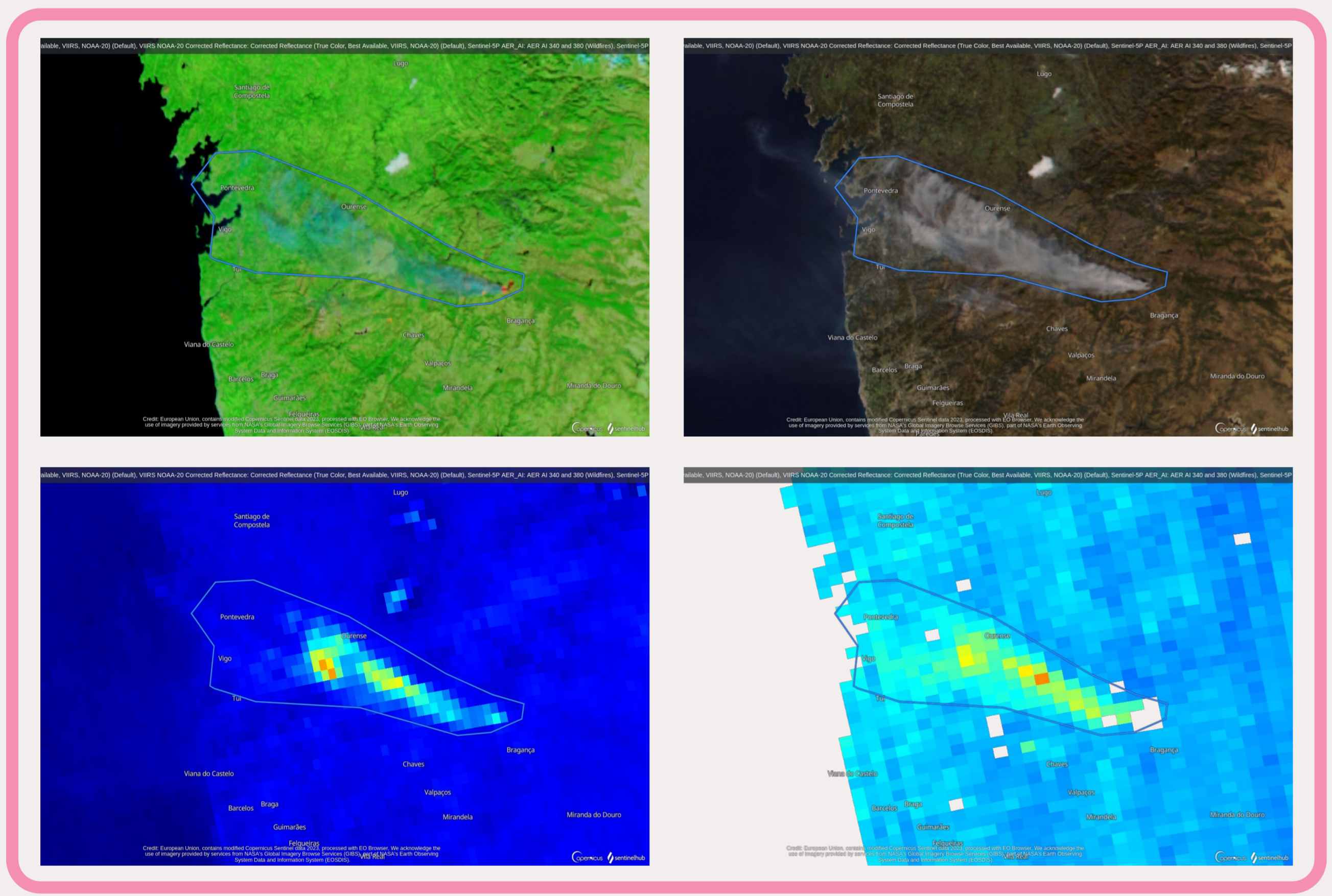
## Introduction

- In the face of growing threat of wildfires in many parts of Europe, FIREURISK project brings together experts to develop a science-based strategy for wildfire risk management in Europe.
- The exploitation of Earth Observation (EO) satellites is part of this strategy.
- Satellite-derived information on fire and smoke is a potential tool that can improve the management and response to fire events across Europe.
- KCL is a partner in the FIREURISK project. We are leveraging on EO data and using top-down method to estimate the wildfire emissions in real-time.



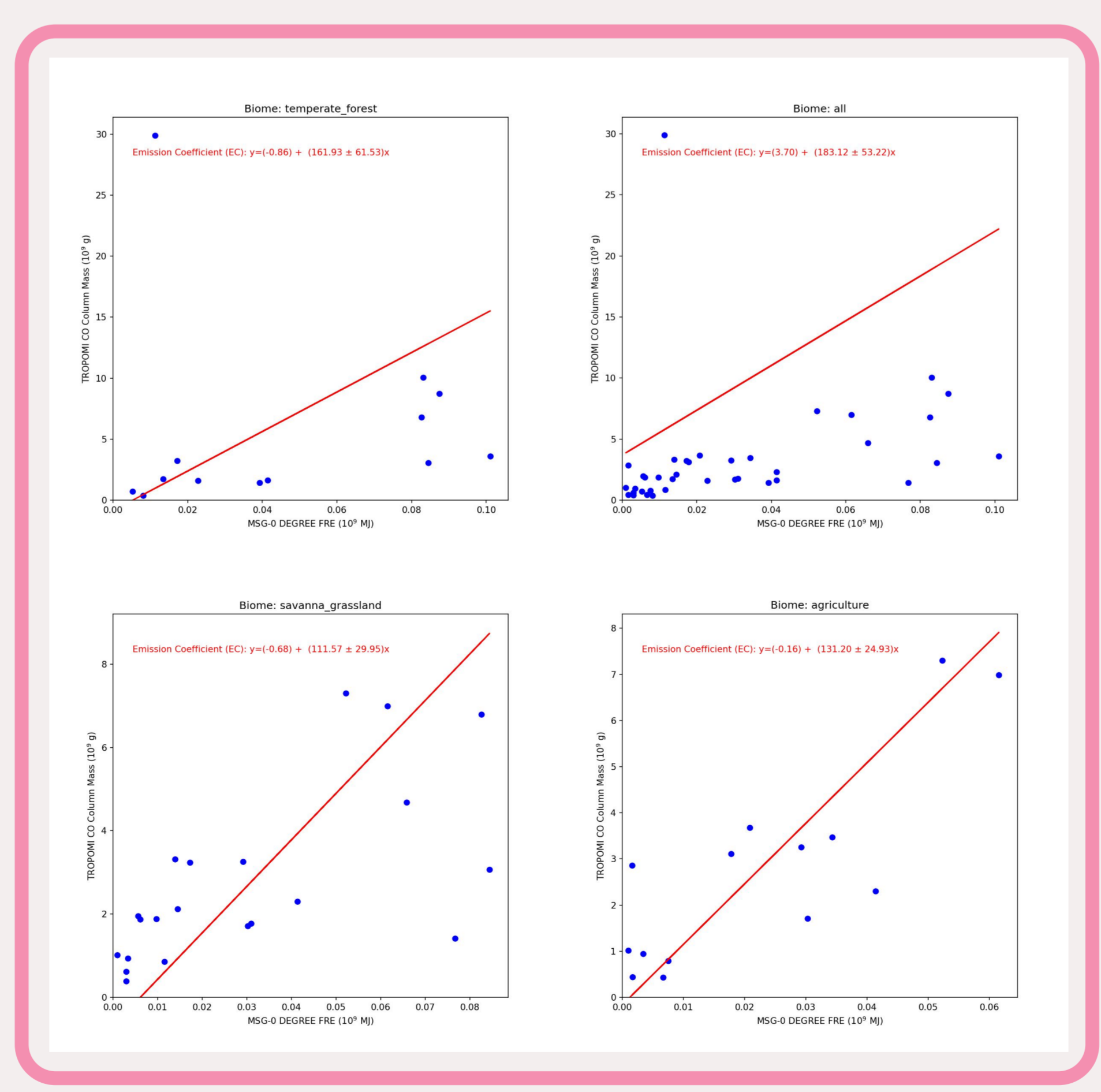
## Methodology

- We identify periods of frequent wildfire in the EU territory
- Using S5P TROPOMI CO data, we extract the mass of CO from fire, excluding CO from other sources.
- Using the Fire Radiative Power (FRP) data from geostationary satellite (SEVIRI-MSG 0 degree), we estimate the Fire Radiative Energy (FRE) for each fire occurrence (between start of fire up to the time of TROPOMI overpass).
- Since CO has relatively high atmospheric lifetime (assuming negligible CO diffusion), the total FRE through each fire life cycle is relatively proportional to the total mass of CO generated from the burning of biomass.



## Methodology

- CAMS land-cover map is used to classify each fire and a coefficient of emission (Ce) in g/MJ is estimated for each biome.
- Fire emission inventory will be made using FRP data. This inventory will be validated by comparing it with GFED and GFAS. Also, their mixing ratios from model estimations will be compared with observations.
- The amount of CO will be estimated from the Ce values and FRP data from satellites.
- Emissions of other atmospheric gases (such as methane, ethane, propane) will be estimated by interpolating the emission factors (Ef) of these gases including CO from literature and Ce for CO to generate their corresponding Ce.



## Further Steps

- Similar to CO, smoke/aerosol analysis will also be carried out to estimate particulate matter (PM) using AOD data.
- Thus, we will estimate in real time the potential of active fires in generating different atmospheric constituents/aerosols and use this information to support air quality warnings and exposure mitigation planning in the EU territory.
- The emissions product generated will be available through the EUMETSAT LSA SAF operational service.

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