



**Air quality is a key factor impacting population's health. The World Health Organization in 2021 issued new, stricter, guidelines for the world to follow. The European Commission will translate these into stricter limit values for the EU and environmental or health authorities will be required to update their methods for monitoring air quality.**

Currently, the Greek statistical office (ELSTAT) officially publishes an air quality account with information received from the Ministry of Environment, in full compliance with the Air Quality Directive. The information is only provided for bulk reporting zones (meaning the two major cities of Athens and Thessaloniki plus north and south Greece) while several cities with populations of over 50,000 having no air quality system whatsoever.

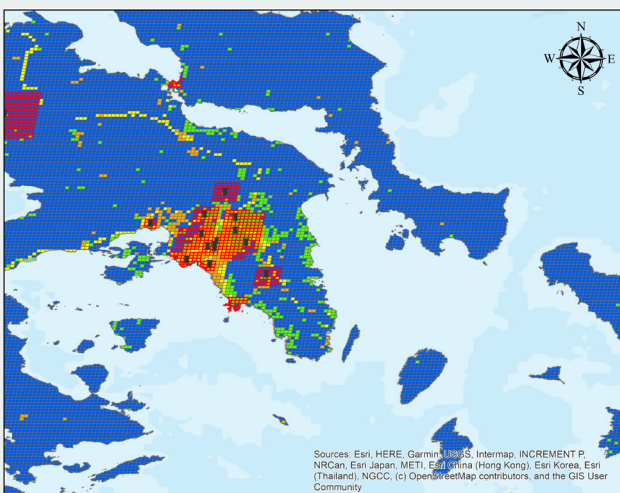
This case study has shown how Earth Observation data from a variety of sources (in situ low-cost and reference networks, modelling, remote sensing) can be fused to provide enhanced monitoring of air quality at local and regional level with respect to temporal and spatial disaggregation. Data used include measurements from the Sentinel-5P mission, regional reanalysis data from the Copernicus Atmosphere Monitoring Service, in situ sensors through the PANACEA research infrastructure as well as the, currently used, regulatory network of reference instruments handled by the Ministry.

The project has provided ELSTAT with a web-based GIS dashboard showing the concentrations of key pollutants ( $PM_{2.5}$ ,  $PM_{10}$ ,  $NO_2$ ,  $O_3$ ) on a monthly basis at the Municipality level, which can easily be aggregated to other time scales or area of interest depending on the user needs. The use case is considered experimental but demonstrates the way for operationalization in the new era launched by the World Health Organization.

FOR MORE DETAILS VISIT

<https://eo4smartstats.com/>

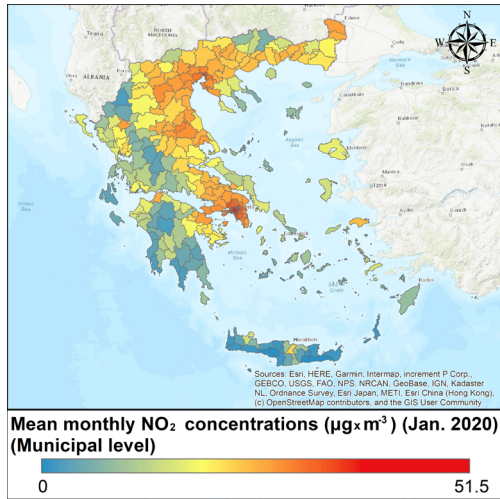
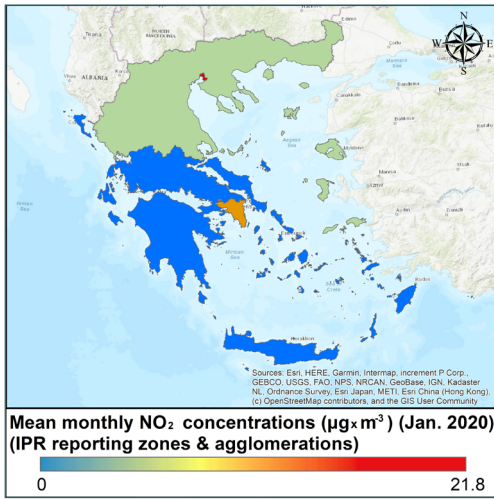
● *Characterization of grid cells through Corine and Open Street Map.*



**Re-gridding (1x1 km<sup>2</sup>) of land use (CORINE) and road network (OSM) data according to the air quality monitoring site classification**

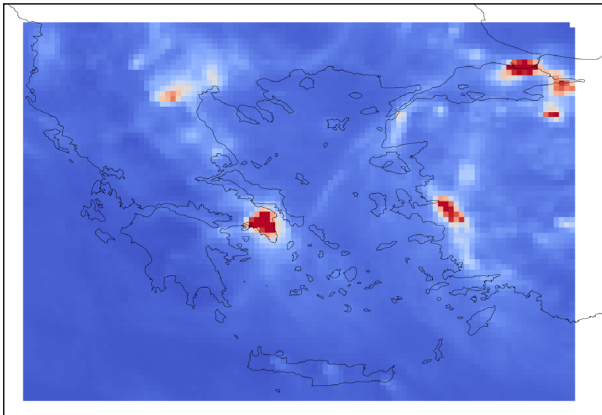
- Monitoring sites
- Buffer zones
- Traffic
- Suburban Background
- Urban Background
- Rural Background

Sources: Esri, HERE, Garmin, Swisstopo, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

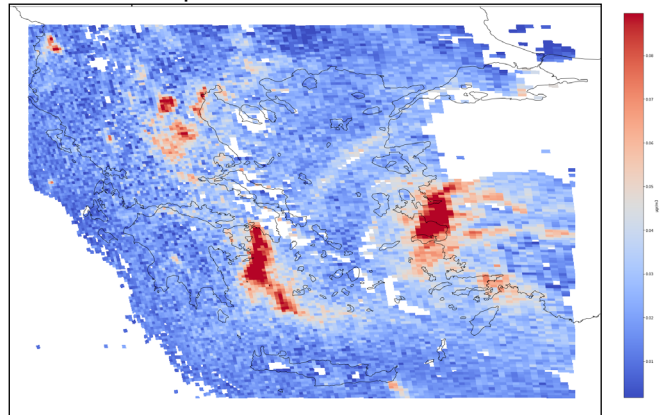


Mean monthly NO<sub>2</sub> concentrations for the IPR reporting zones (left) and at LAU level (right) derived from nudged CAMS values

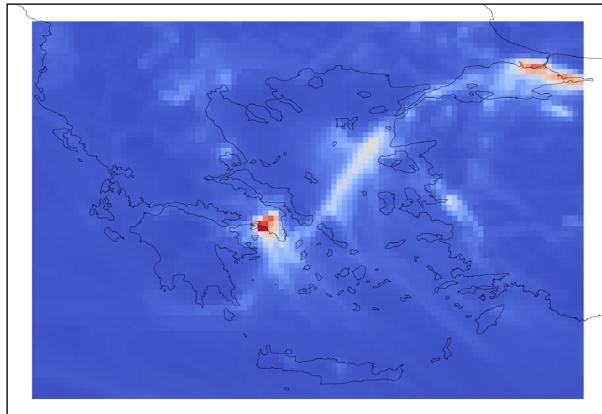
CAMS NO<sub>2</sub> Column - 20200123



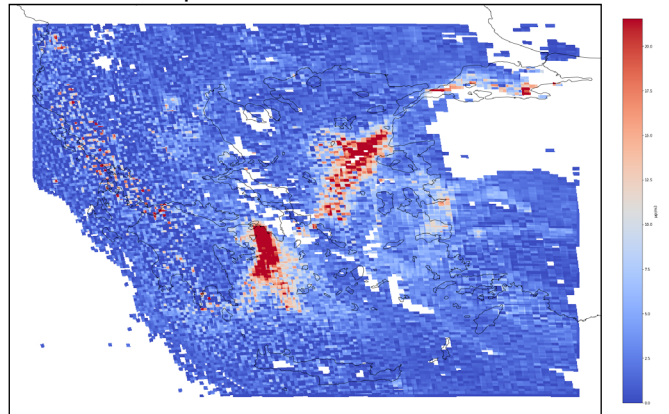
Tropomi NO<sub>2</sub> Column - 20200123



CAMS NO<sub>2</sub> Surface - 20200123



Tropomi NO<sub>2</sub> Surface - 20200123



Inference of surface NO<sub>2</sub> concentrations starting from satellite columnar information via utilization of the vertical information of a chemical transfer model (CAMS). Left column depicts the columnar and surface information from CAMS and the right column