S2-P3: EO-based pollution-health risks profiling in the urban environment

Population exposure to urban air pollution – The Athens pilot

Eleni Athanasopoulou (NOA)

A Webinar on the 'Health Surveillance Air Quality-HSAQ' Pilot
1 April 2022, 10:00-11:00 (CET)

Lead Partner: National Observatory of Athens (Evangelos Gerasopoulos)

Partners: German Aerospace Center (DLR), Finnish Meteorological Institute (FMI), Consiglio Nazionale delle Ricerche (CNR), International Institute for Applied Systems Analysis (IIASA), DRAXIS Environmental S.A.

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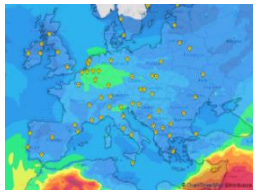
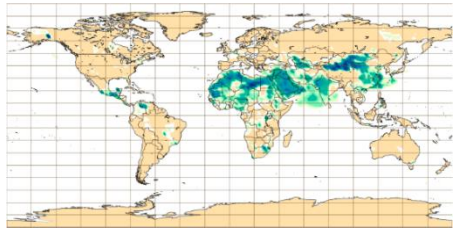
Existing EO Infrastructure

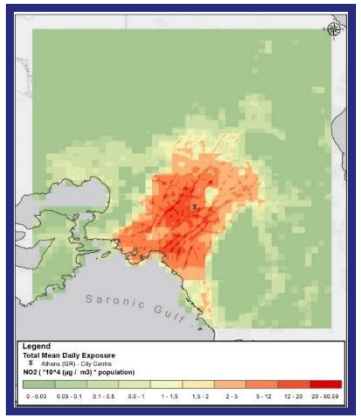
Satellite: Global

Modeling: Global/Regional





Modeling: City-level



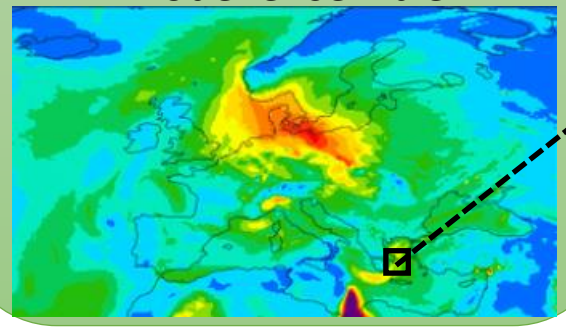
In Situ: down to street level

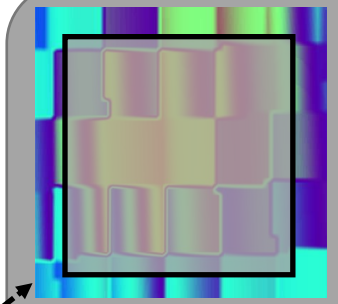
The application for Athens (Gr):

exploits and fuses data from all EO platforms (satellite retrievals, in situ observations, numerical modeling predictions, citizen observatories) to map the population exposure to air pollution. Emphasis is put to the exposure above the newly published (late 2021) WHO air quality guidelines for NO2 and PM2.5., and to the high spatial analysis (below 1 km) of the mapped information.

e-shape – The Athens pilot

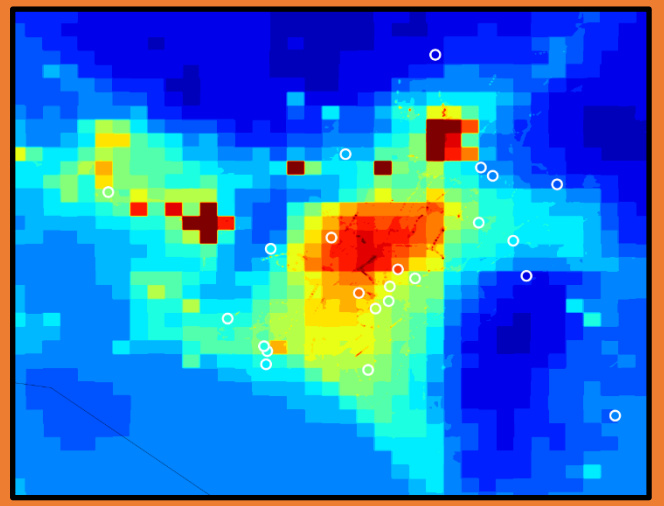
CAMS boundary conditions: European-scale air quality interim reanalysis from model ensemble





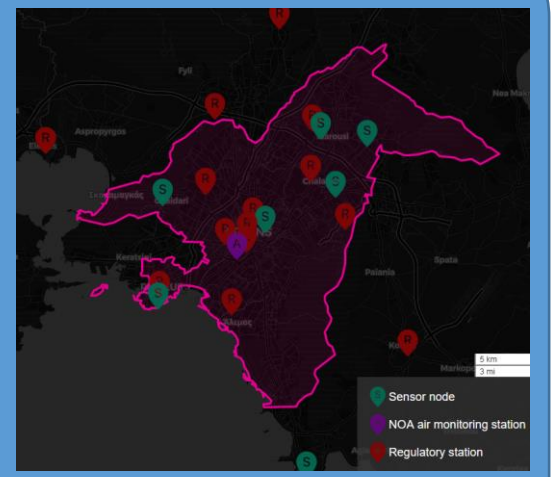
Boundary air Pollution conditions

Urban scale CTM modeling



Episode-CityChem

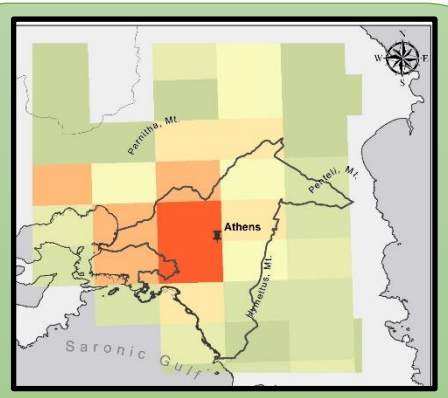
In situ &



Citizen observatory Air pollution measurements

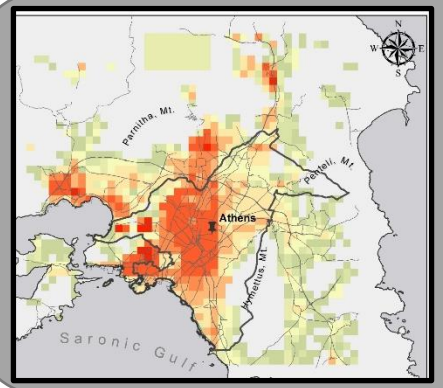
WRF meteorological simulations

Atmospheric meteorological parameters



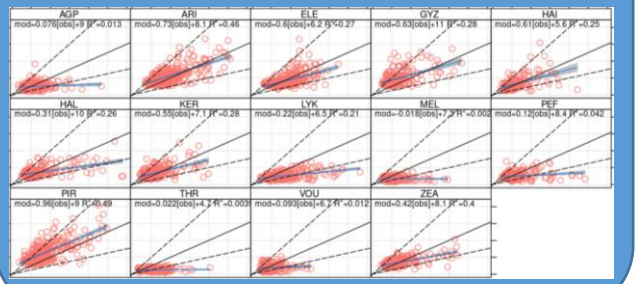
CAMS-REG-AP: regional anthropogenic emissions

UrbEm spatial disaggregation tool



High resolution Anthropogenic air pollution emissions

Model evaluation



Health-related parameters of air pollution per pixel/ municipality

Population exposure to urban air pollution – The Athens pilot

- Population exposure mapping, incl. % of population exposed to air pollution over limit values
- Days (Per month or per year) when PM2.5 or NO2 meets/was above WHO (and/or EC) guidelines: mapping per pixel and/or per municipality.
- Air Quality Index *(the overall air quality index for a certain timeframe is based on the worst air quality index rating for the individual pollutants)*
- Municipality ranking through annual average PM2.5 and NO2 concentrations.

e-shape

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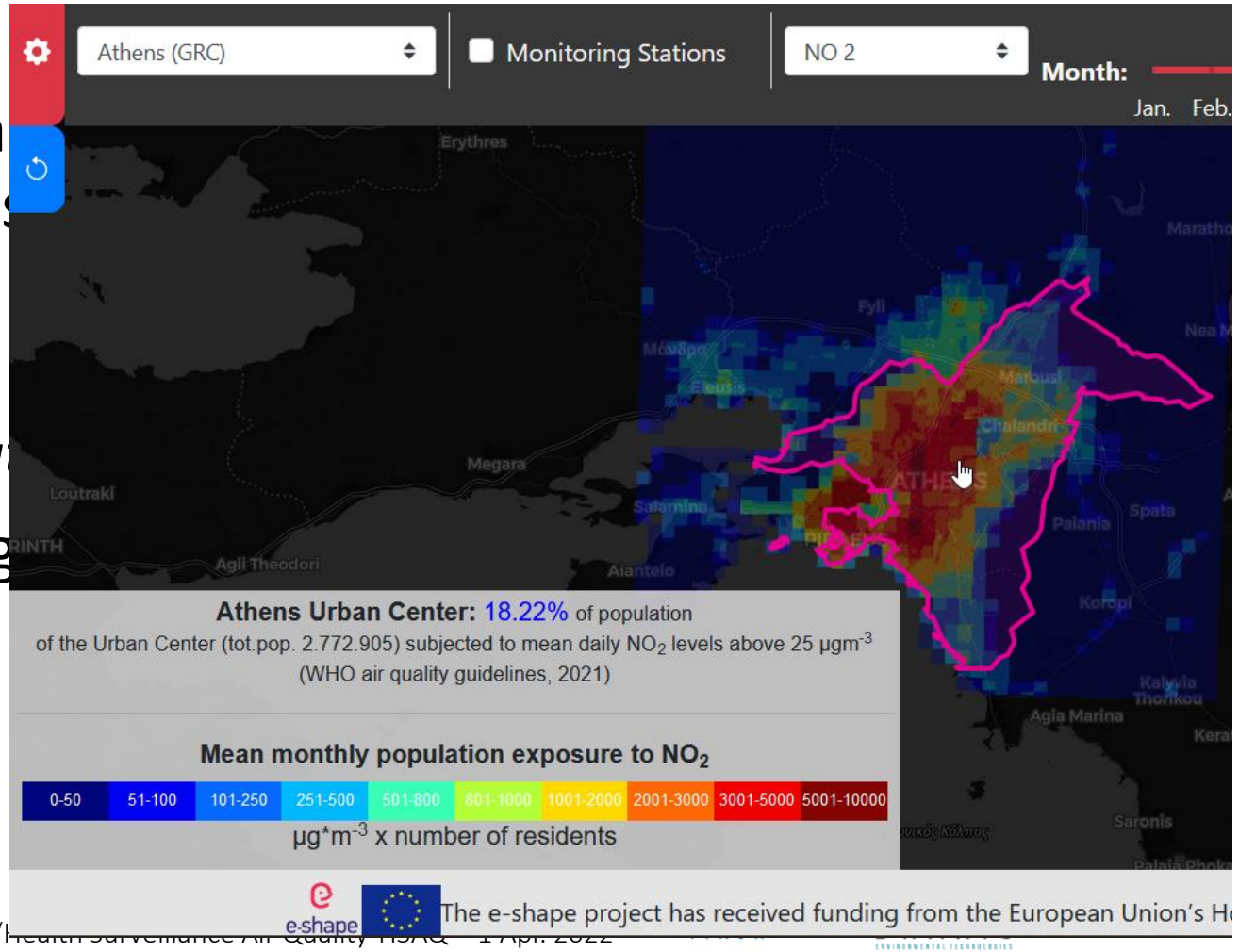

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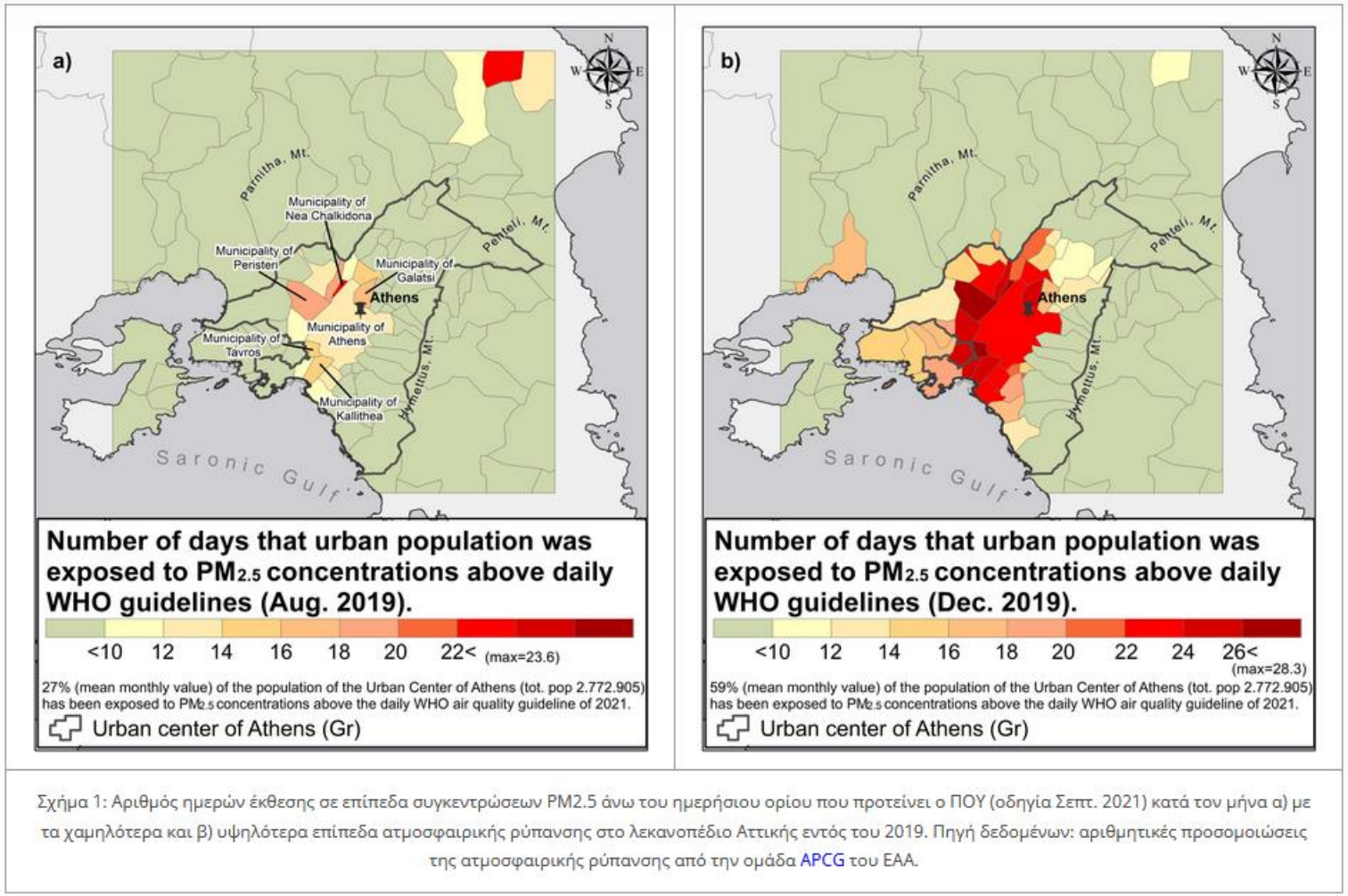

Σχήμα 1: Αριθμός ημερών έκθεσης σε επίπεδα συγκεντρώσεων PM2.5 άνω του ημερήσιου ορίου που προτείνει ο ΠΟΥ (οδηγία Σεπτ. 2021) κατά τον μήνα α) με τα χαμηλότερα και β) υψηλότερα επίπεδα ατμοσφαιρικής ρύπανσης στο λεκανοπέδιο Αττικής εντός του 2019. Πηγή δεδομένων: αριθμητικές προσομοιώσεις της ατμοσφαιρικής ρύπανσης από την ομάδα APCG του ΕΑΑ.