Partnership for the Assessment of the Risks from Chemicals

Nadaljnje analize HBM4EU podatkov: **povezovanje HBM in okoljskih podatkov** (P4.1.4.2)

Sestanek slovenskega vozlišča, 5. 12. 2024

(predstavljeno na letnem sestanku DS4, Berlin 7. - 9. 10. 2024)

PARC

Objective

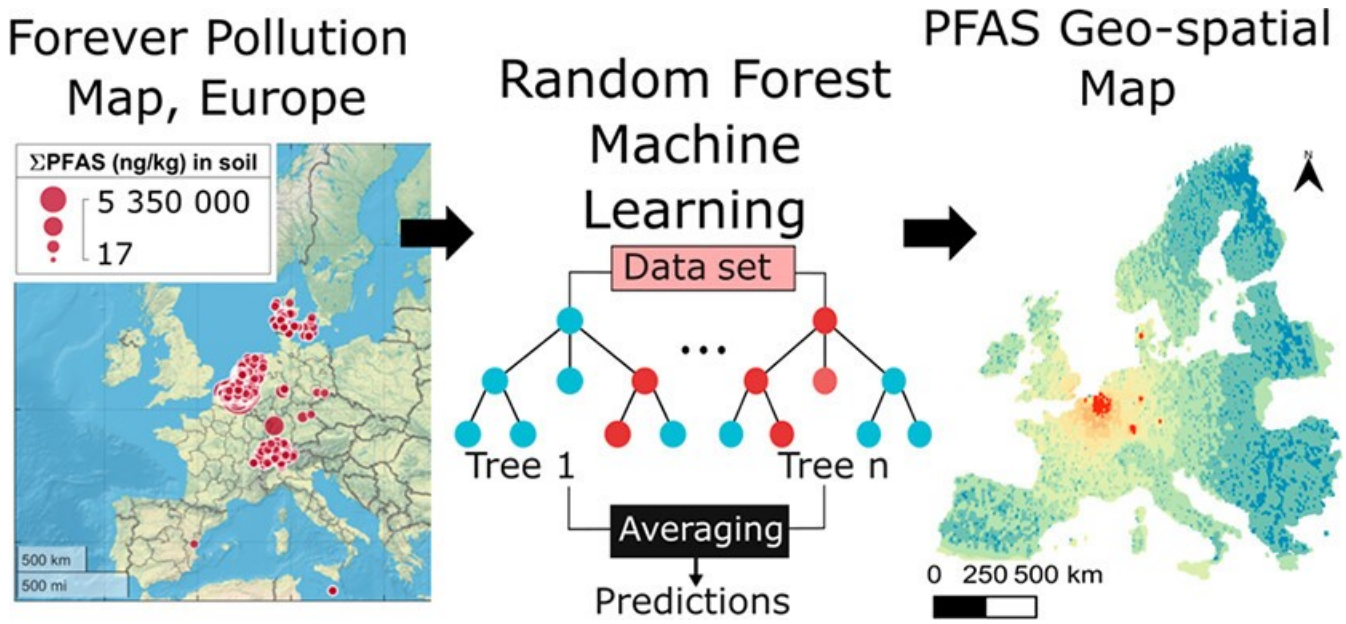
- To derive additional **data describing external environment** of study participants and amend them to the existing data on chemical exposures and questionnaire data
- SPATIAL DETERMINANTS of EXPOSURE

Research questions

- Research questions set for **PFAS**, **pesticides** (pyrethroids, glyphosate & AMPA), **PAHs**, **arsenic** and **cadmium**
- Established a data catalogue of possible data sources
- Assessment of spatial coverage of the identified external data on the areas of HBM data occurrence
- Identification of **relevant variables** that could be used for the defined research questions

PFAS

Lead: VITO
Contributing: NIPH, SZU-SK, ISSeP, ISCIII, Sciensano



Concentration of PFAS in underlaying cell of the residential address

Average concentration of PFAS in cells within NUTs & buffer zones surrounding residential address

Buffer zones: 50m, 100m, 250m, 500m, 1000m, 2000m, 5000m

Spatial Prediction of Concentrations of Per- and Polyfluoroalkyl Substances (PFAS) in European Soils
Environ. Sci. Technol. Lett. 2023, 10, 11, 1125-1129

Pesticides

Lead: MU
VITO, ISSeP, UBA

Source	Variable	Data extraction details	Buffer zone(s)
CORINE LAND Cover	Proximity to agricultural fields (m)	Distances to agricultural land (CLC no. 2) use classes at level 3 according to the CLC categorization nomenclature	NA
CORINE LAND Cover	Proportion of agricultural fields (%)	Proportion of agricultural land (CLC no. 2) use classes at level 3 according to the CLC categorization nomenclature within the predefined buffer zones / NUTs	50m, 100m, 250m, 500m, 1000m, 2000m, 5000m
JRC - EU Crop Map			
EUROSTAT	Annual pesticide use (t/area)	Average annual pesticide use per NUTs areas	NUTs

- **Improved pesticides use estimation**: Pesticide estimates for 150 Active Substances at 1km over EU28
- **Pesticide risk indicator** – detailed info available for France (parcel level, based on crop type and plant protection product use) (**Pestirisk, JRC**)

PAH

Lead: MU
Contributing: AUTH, UBA

PAH air monitoring data

HBM4EU data availability

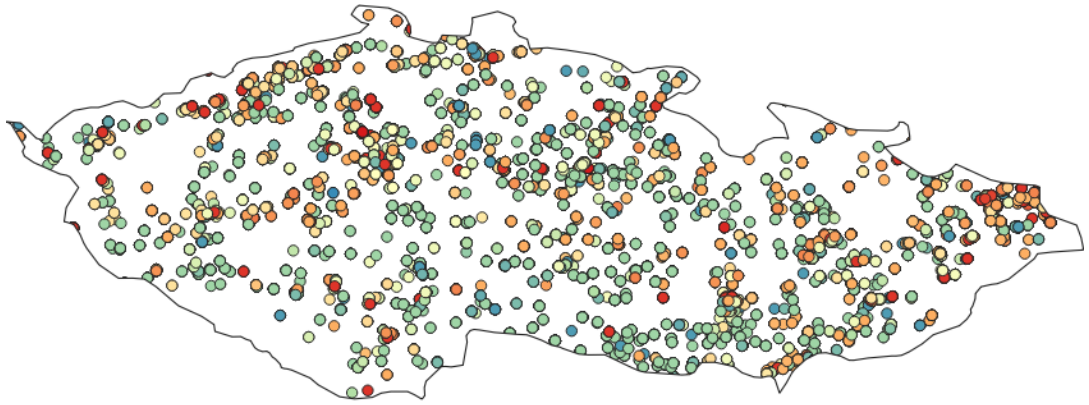
MONET air data (numbers of samples)					
	FR	HR	IS	PL	CZ
NAP	138	142	51	87	9,135
PHEN	138	142	51	87	9,135
FLUO	138	142	51	87	9,135
PYR	138	142	51	87	9,135
BAP	138	142	51	87	9,135

Assignment of the closest MONET or EMEP monitoring station

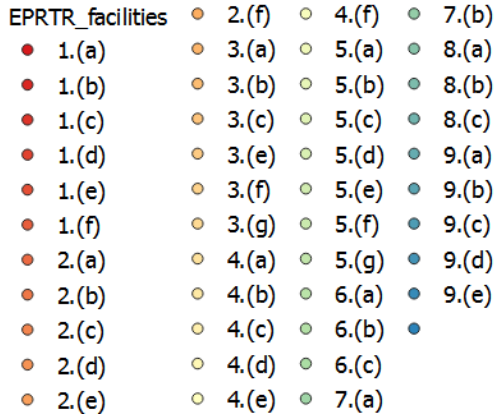
Other relevant variables that will be obtained: proximity to green space (m), proportion of green space (%) (CLC no. 3); distance to nearest roads (km), density of roads within buffer zones (km/km2) (OSM); average wind speed (m/s); precipitation (mm/year); number of facilities in the E-PRTR; …

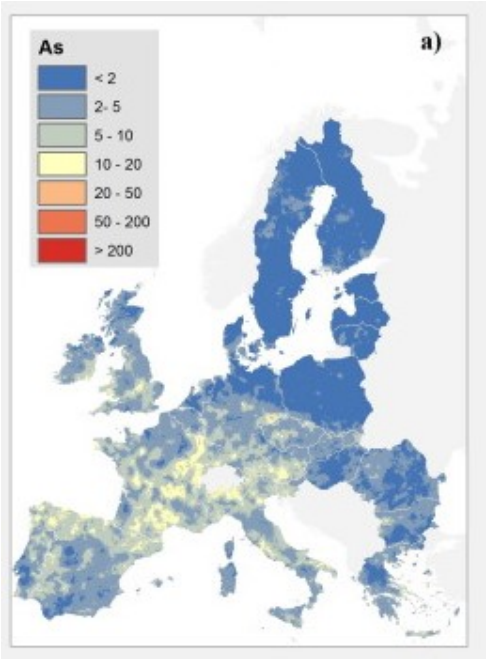
Arsenic & Cadmium

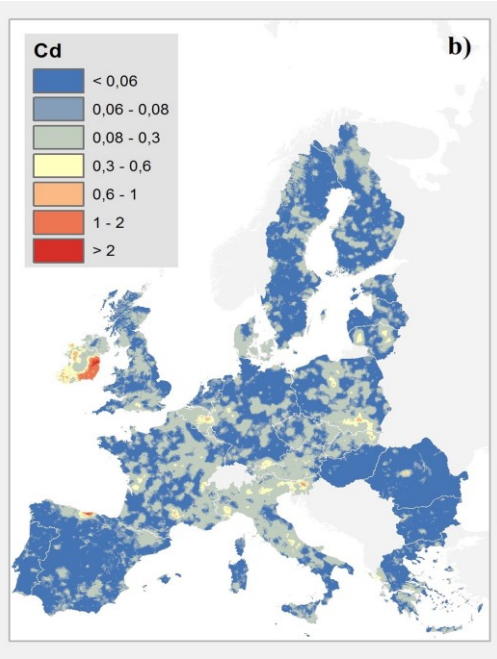
Lead: JSI
VITO, ISCIII, Sciensano, ISSeP



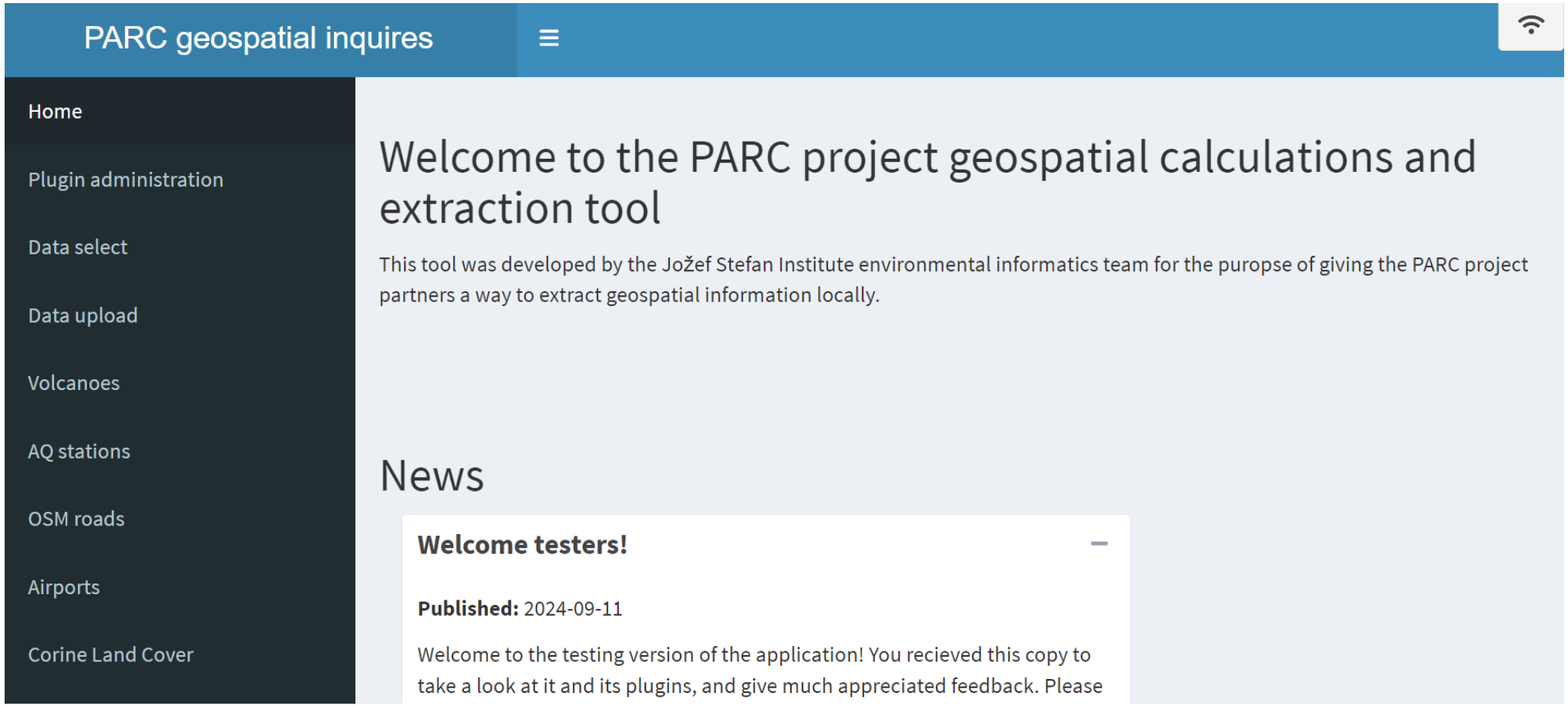
Variable	Source
As & Cd emissions from industry - No. of facilities - t/NUTs & t/buffer - No./km2	**The European Pollutant Release and Transfer Register (E-PRTR)**
Distance to As & Cd-emitting industry (km)	
As & Cd concentration in top soil (mg/kg)	**Maps of heavy metals in the soils of the European Union (LUCAS)**







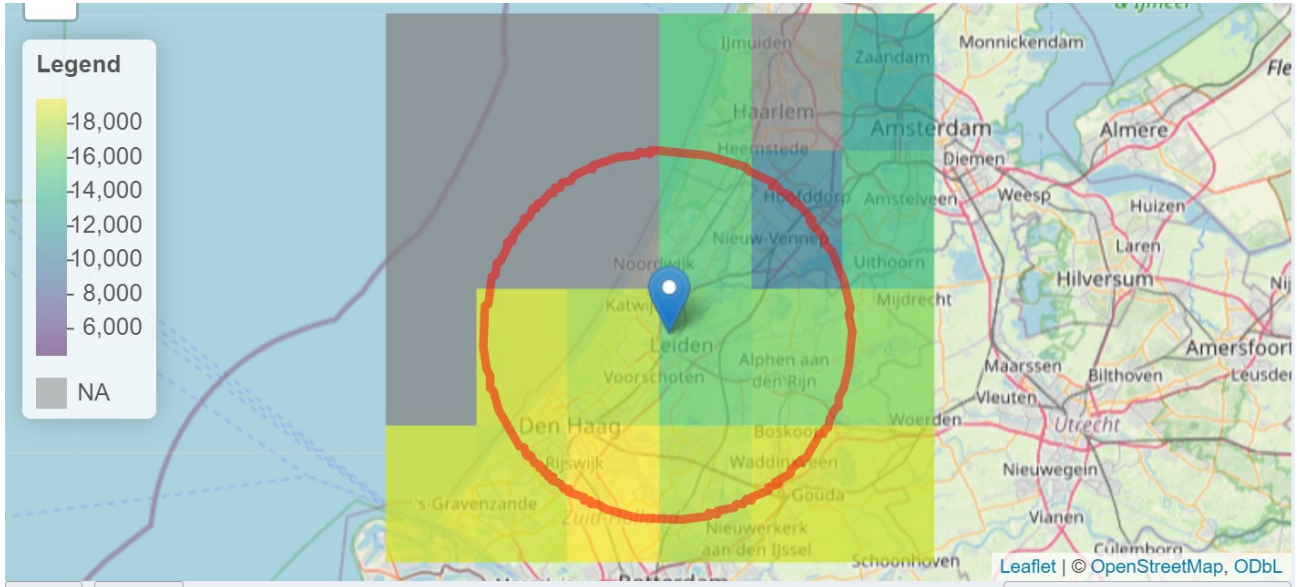
Development of geospatial data based on the postal addresses of the study subjects



Development of geospatial data based on the postal addresses of the study subjects

- Tool for extracting geodata based on participant's address (longitude and latitude)
- Developed because sharing of sensitive info (locations of study participants) is not allowed & partners don't have the GIS expertise
- Functionalities based on research questions
- As few functionalities as possible
- Can be used for individual or multiple sources (additional plugins)
- For non-experienced Geographic Information System (GIS) users

Usage and calculations: examples



CSV Excel Search:

	id	longitude	latitude	value_at_point	buffer_diameter	buffer_mean
1	1	4.46847120806282	52.16816354942	14901.5107421875	20000	16752.5595703125

Tool | Description

PFAS

This dataset was retrieved from the University of Gothenburg, as described in the article 'Spatial Prediction of Concentrations of Per- and Polyfluoroalkyl Substances (PFAS) in European Soils'. In it, the Le Monde database is us
of Europe. Based on soil concentrations and vicinity of polluted sites, factories an 'AI model' was applied to predict soil concentrations at place where no data on soil concentrations was available.

Citing

Ramin Moghadasi, Tabea Mumberg, and Philipp Wanner

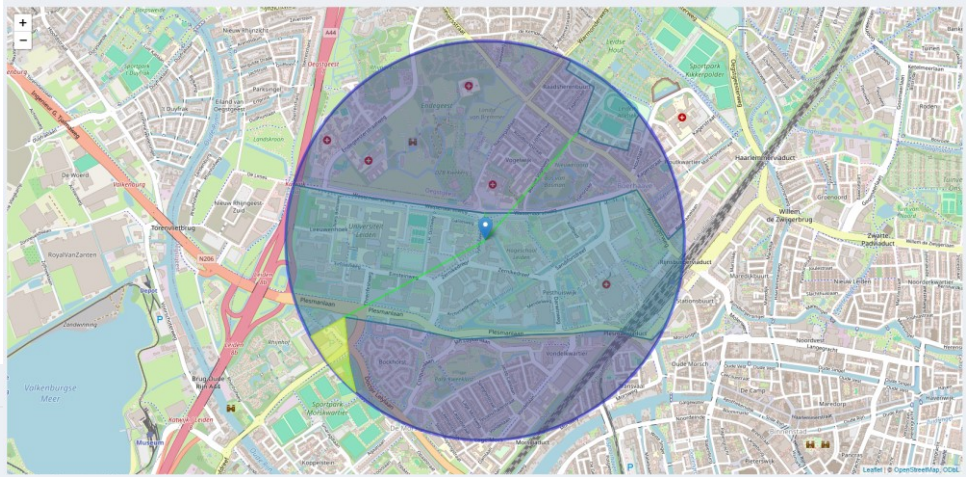
Environmental Science & Technology Letters 2023 10 (11), 1125-1129

DOI: 10.1021/acs.estlett.3c00633

Link to article

Show 10 entries Search:

	nearest_airport_name	distance_km
1	Leiden University Medical Center Heliport	0.674790713751103



CSV Excel Search:

	id	longitude	latitude	buffer_radius	land_cover_type	calculated_area	percentage	nearest_distance
	All	All	All	All	All	All	All	All
1	1	4.46847120806282	52.16816354942	1000	Discontinuous urban fabric	1791081.49482184	57.0379532352342	136.957528879083
2	1	4.46847120806282	52.16816354942	1000	Green urban areas	75208.822410075	2.39506538809369	715.407861567942
3	1	4.46847120806282	52.16816354942	1000	Industrial or commercial units	1237589.76532261	39.4117115066823	0
4	1	4.46847120806282	52.16816354942	1000	Sport and leisure facilities	36277.2920219302	1.15526987009244	804.659968555817

Showing 1 to 4 of 4 entries
Sort by row by clicking on column name. Filter by row by selecting values in box under column name. Download on buttons above the table.

Current work…

The tool

- Tailoring output to desired PARC (FAIR) specifications
- Additional testing: PAH working group (MU, Czech R)
- **Fine-tuning**
- Tutorial for data providers
- Geospatial variables added to the PARC codebook

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