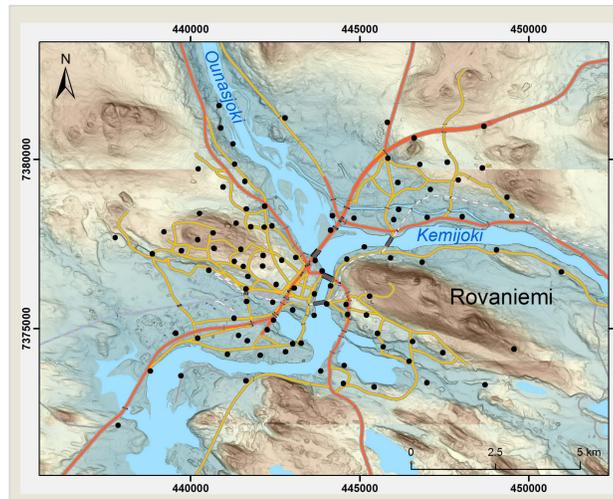


Geochemical baseline mapping in Rovaniemi, northern Finland

Soil geochemical baselines include both natural geological background concentrations and the diffuse anthropogenic input of substances. Concentrations of the elements in natural and urban soils are important to know for directing land-use and detecting harmful soil areas in the constructed areas.

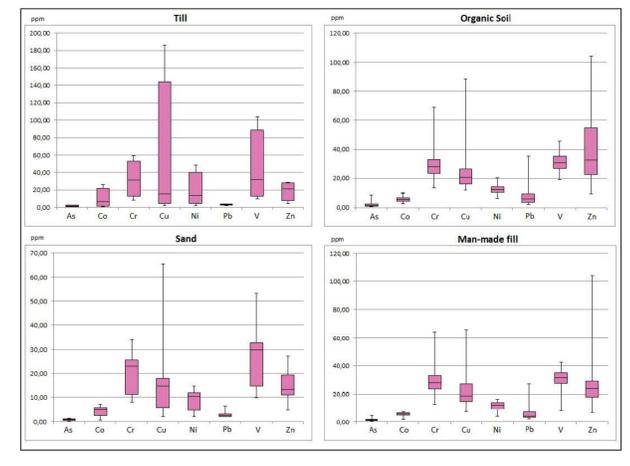
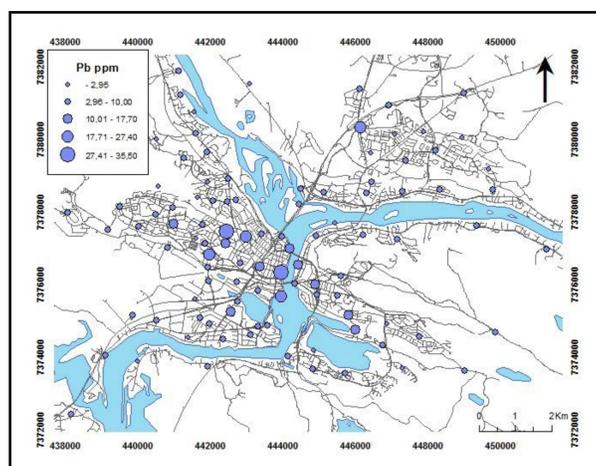
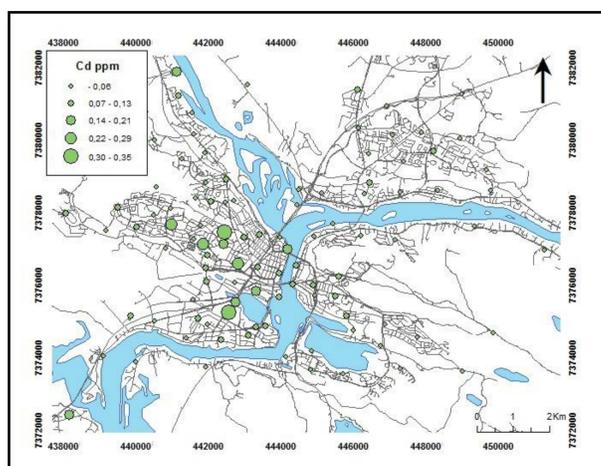
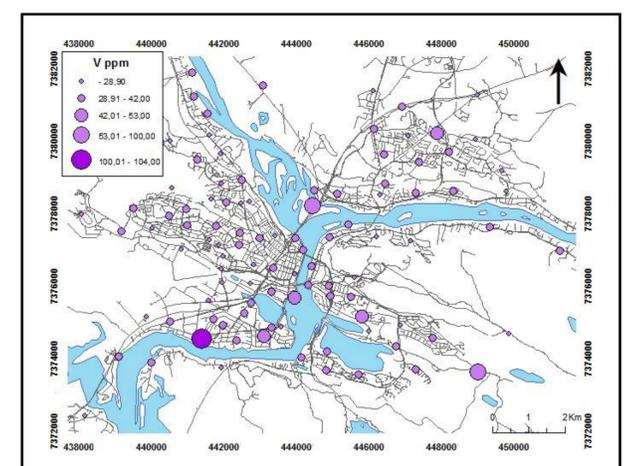
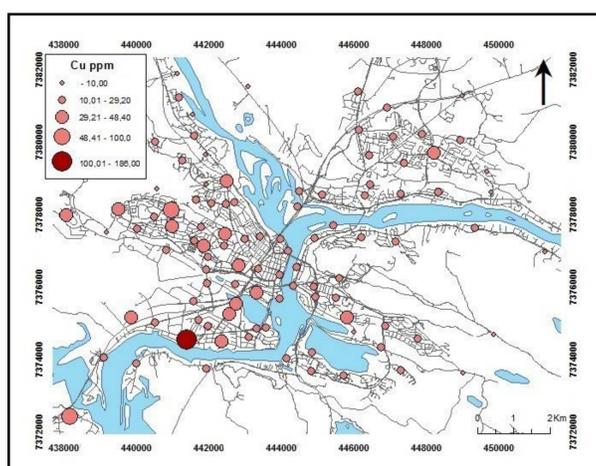
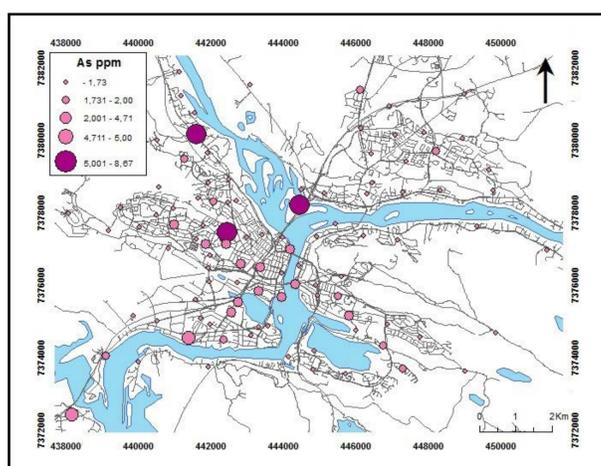
By geochemical baseline studies it is possible to define natural background levels of the elements in different soil types, to calculate upper recommended limit of soil baseline variation, and to estimate the need of acts for the safe use of land areas.

In Finland, the geochemical baseline mapping was guided by the Government Decree on the Assessment of Soil Contamination and Remediation Needs 214/2007 (Ministry of the Environment, 2007). Information on soil geochemical baselines is available from the national geochemical baseline database, Tapir (www.geo.fi/tapir).



In 2013-2014, following the EuroGeoSurveys urban geochemistry sampling protocol, the geochemical baseline study was carried out in the centre of Rovaniemi town in northern Finland. Soil samples (104) were collected from upper soil (depth 0-10 cm) in 2013-2014 and the sieved

< 2 mm fractions were analysed using multielemental analysis package (ICP-OES/MS) after aqua regia digestion. Furthermore, ten samples were analysed for PAH concentrations. The sampling sites were located in areas of different urban land use.



The results from Rovaniemi show that practically all the concentrations of elements listed in the Government Decree are under recommended values. Only arsenic concentrations were higher (up to 8.7 ppm) than recommended value (5 ppm) in couple of the sampling points, and Cu and V in one sampling

point at southern part of the town. Many elements indicate normal elevation of the concentrations in the central part which is mainly caused by the increased traffic and house construction within relative long period. PAH concentrations were all under detection limits in the ten analysed samples in Rovaniemi.

Sample number	As	Cd	Co	Cr	Cu	Ni	Pb	Sb	V	Zn
Average	1.56	0.06	5.74	29.17	22.45	12.02	5.86	0.12	31.75	29.71
Median	1.23	0.04	5.39	27.55	17.50	11.60	3.96	0.09	30.50	23.60
Min	0.03	0.01	0.50	7.87	1.80	1.91	1.95	0.02	7.98	4.59
Max	8.67	0.35	26.40	68.90	186.00	48.20	35.50	0.58	104.00	104.00
Threshold value	5	1	20	100	100	50	60	2	100	200

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