

First results on atmospheric trace element deposition in Republic of Moldova monitored by the moss *Hypnum cupressiforme*

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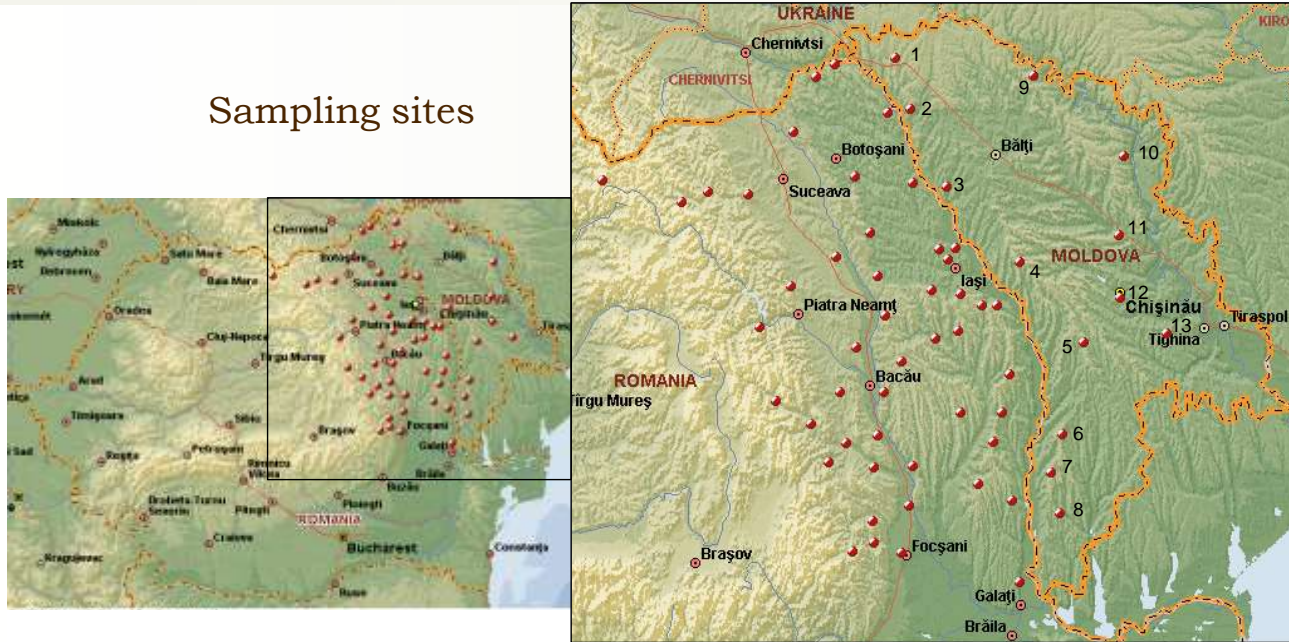
Aims

- To assess the spatial distribution of elements in atmospheric depositions in Republic of Moldova
- To create a database for future monitoring in Republic of Moldova
- To investigate the existence of a possible atmospheric transport of pollutants from Eastern Romania

Sampling

- epiphytic *Hypnum cupressiforme*
- 13 locations in Republic of Moldova
- 44 locations in eastern Romania

Sampling sites



Analyses

- ICP-MS:** V, Cr, Ni, Cu, Zn, As, Mo, Cd, In, Tl, Sn, Pb, and Bi
- NAA:** Na, Mg, Al, Cl, K, Sc, Ca, Ti, Cr, V, Mn, Ni, Fe, Co, Zn, Se, As, Br, Sr, Rb, Mo, Sb, I, Ba, Cs, La, Ce, Eu, Gd, Tb, Lu, Hf, Ta, W, Th, and U.

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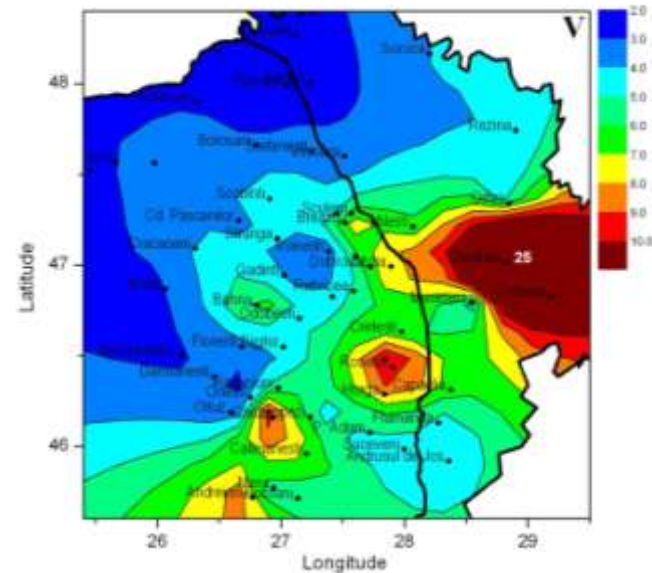
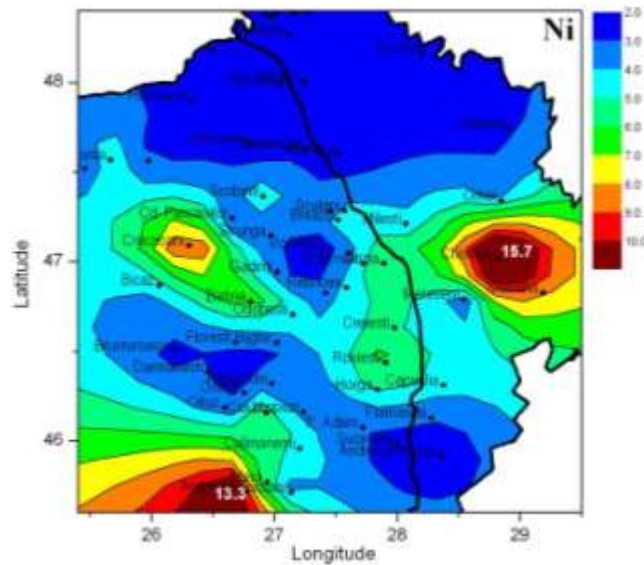
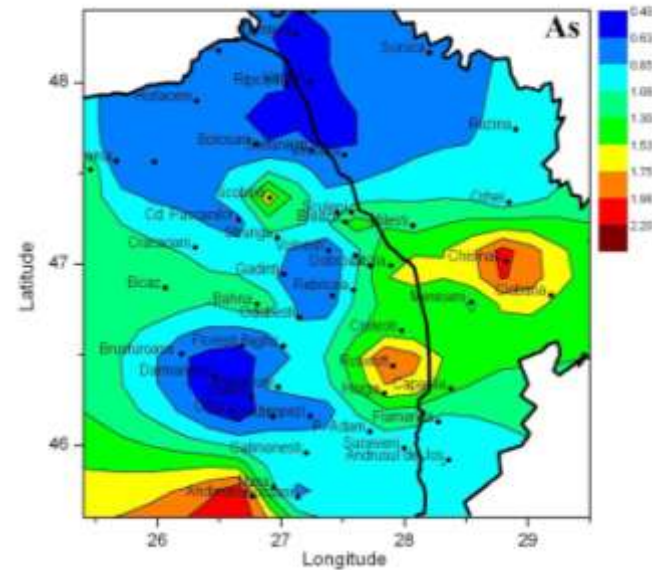
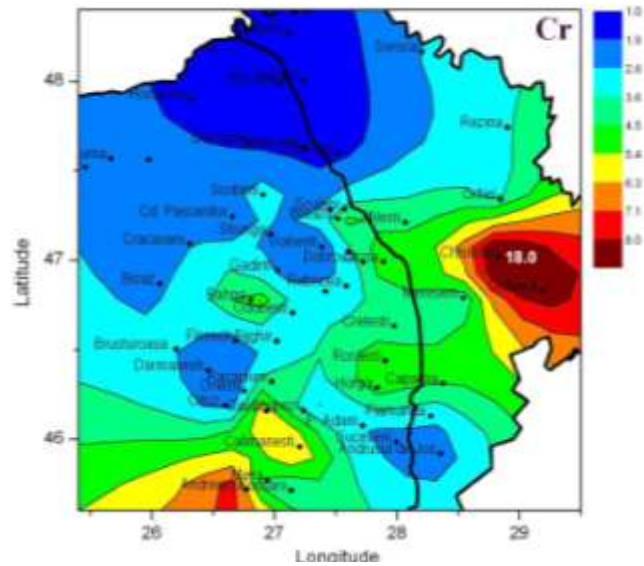
Results and discussion

Loadings and explained variance (%) for the extracted factors for moss samples from Republic of Moldova

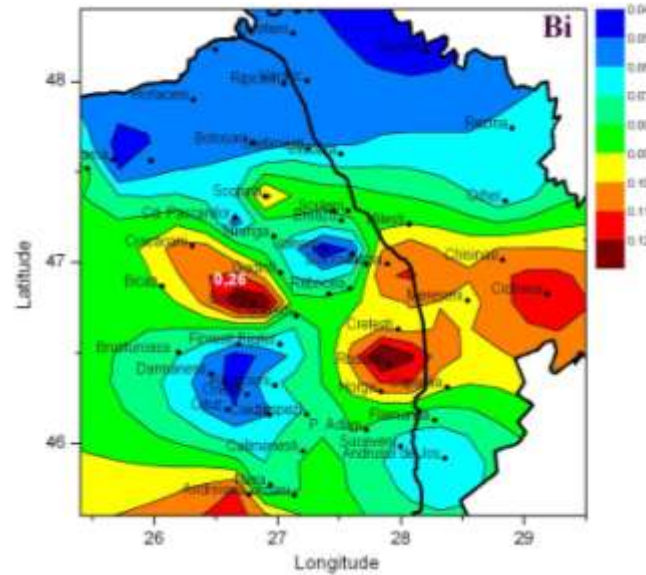
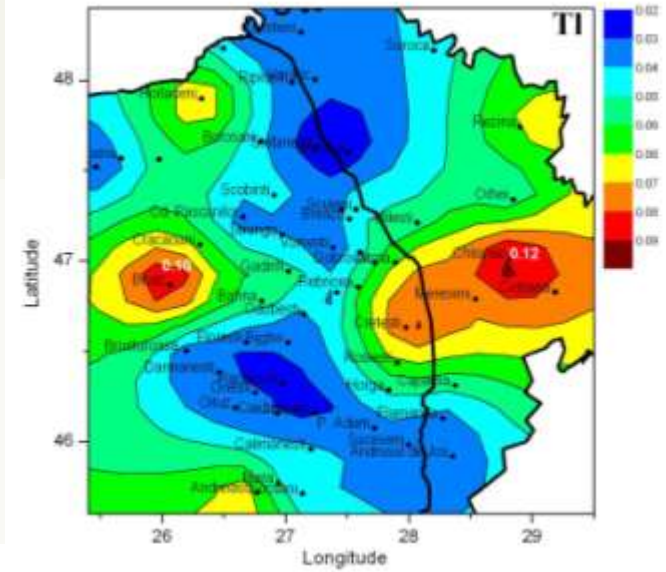
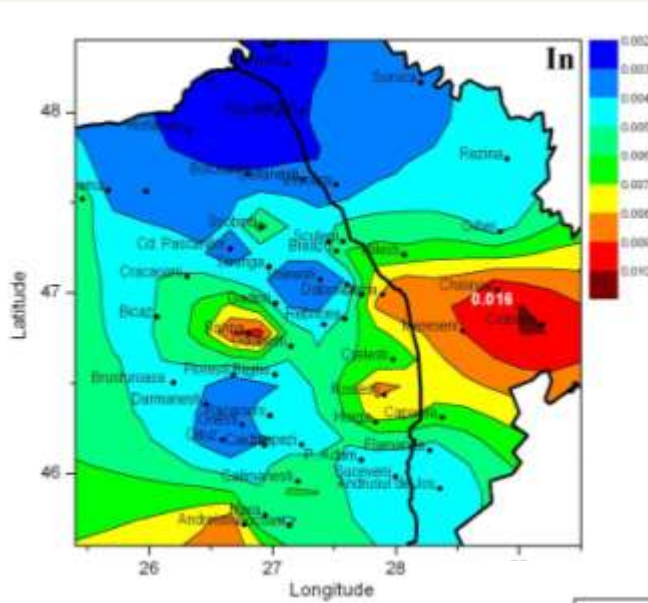
Element	Factor 1	Factor 2	Factor 3	Factor 4
Var. %	72.52	10.65	4.27	3.94
Na	0.79	0.51	0.08	0.26
Mg	0.68	0.45	0.07	0.50
Al	0.79	0.42	-0.05	0.32
Cl	0.54	0.78	0.15	0.08
K	0.30	0.24	-0.07	0.85
Sc	0.89	0.36	-0.04	0.24
Ca	0.14	-0.11	0.94	0.04
Ti	0.79	0.52	-0.01	0.31
Cr	0.40	0.75	-0.35	0.36
V	0.40	0.71	-0.34	0.43
Mn	0.33	0.60	0.41	0.16
Ni	0.41	0.72	-0.34	0.41
Fe	0.88	0.38	-0.05	0.26
Co	0.86	0.36	0.05	0.24
Zn	0.49	0.57	0.05	0.60
Cu	0.34	0.54	0.12	0.71
Se	0.81	0.42	-0.01	0.25
As	0.26	0.84	-0.23	0.32
Br	0.54	0.41	0.31	0.51
Sr	0.89	0.38	0.16	0.13
Rb	0.70	-0.08	-0.06	-0.29
Mo	0.38	0.88	0.14	0.11

Element	Factor 1	Factor 2	Factor 3	Factor 4
Var. %	72.52	10.65	4.27	3.94
Sn	0.54	0.53	0.09	0.53
Cd	0.35	0.87	0.15	0.16
In	0.30	0.90	-0.13	0.26
Tl	0.31	0.88	-0.18	0.12
Pb	0.33	0.53	-0.01	0.70
Bi	0.11	0.83	0.22	0.42
Sb	0.73	0.51	0.08	0.38
I	0.92	0.21	0.01	0.13
Ba	0.82	0.38	0.24	-0.11
Cs	0.92	0.32	0.02	0.23
La	0.85	0.35	-0.03	0.38
Ce	0.91	0.32	0.01	0.24
Nd	0.82	0.46	0.13	0.15
Eu	0.46	0.76	0.20	0.07
Gd	0.96	0.24	0.03	0.13
Tb	0.95	0.15	0.01	0.21
Dy	0.55	0.34	0.00	0.39
Lu	0.94	0.17	-0.01	0.19
Hf	0.93	0.29	0.05	0.21
Ta	0.95	0.21	0.05	0.19
W	0.76	0.53	0.04	-0.09
Th	0.95	0.24	0.06	0.18
U	0.83	0.27	-0.14	0.28

Results and discussion



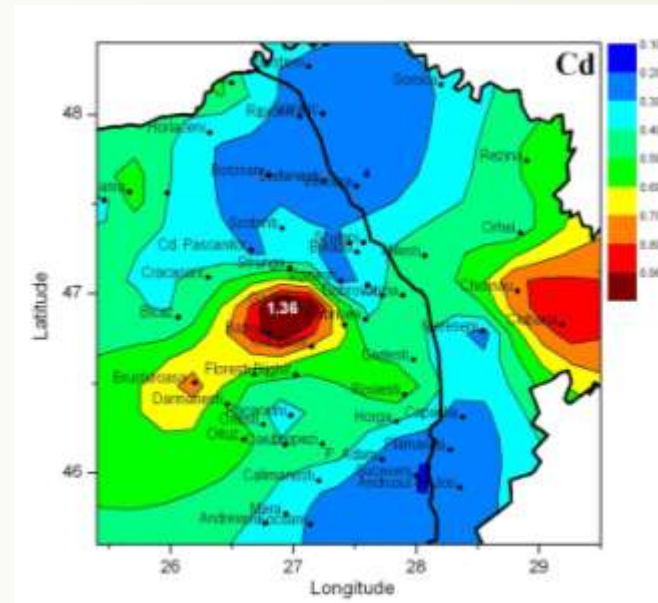
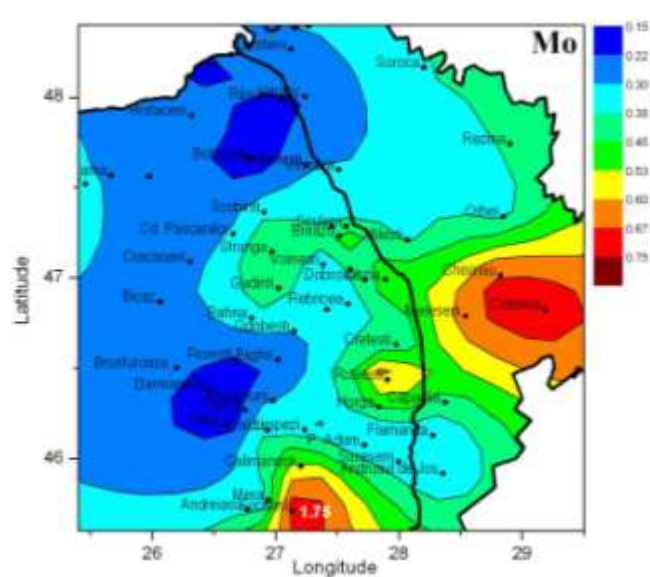
Results and discussion



In, Tl, and Bi concentrations in moss (mg kg⁻¹)

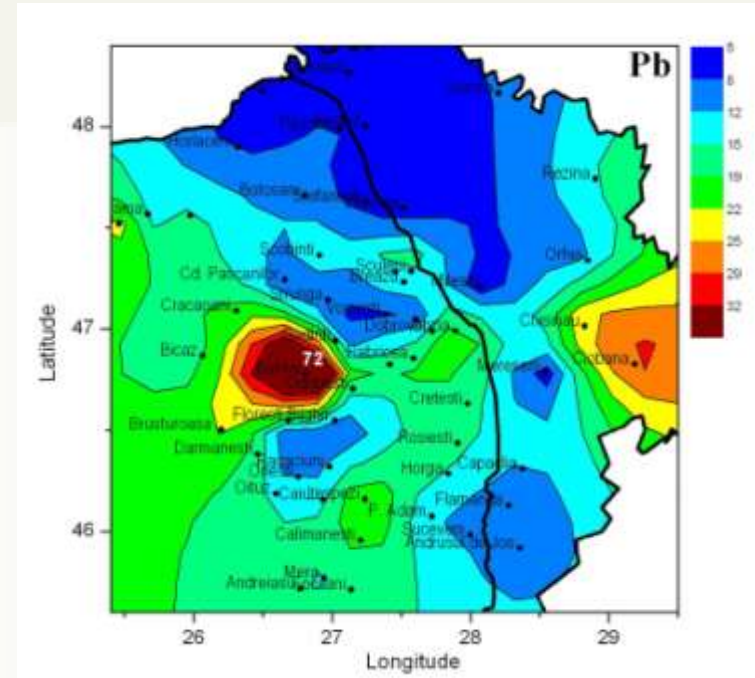
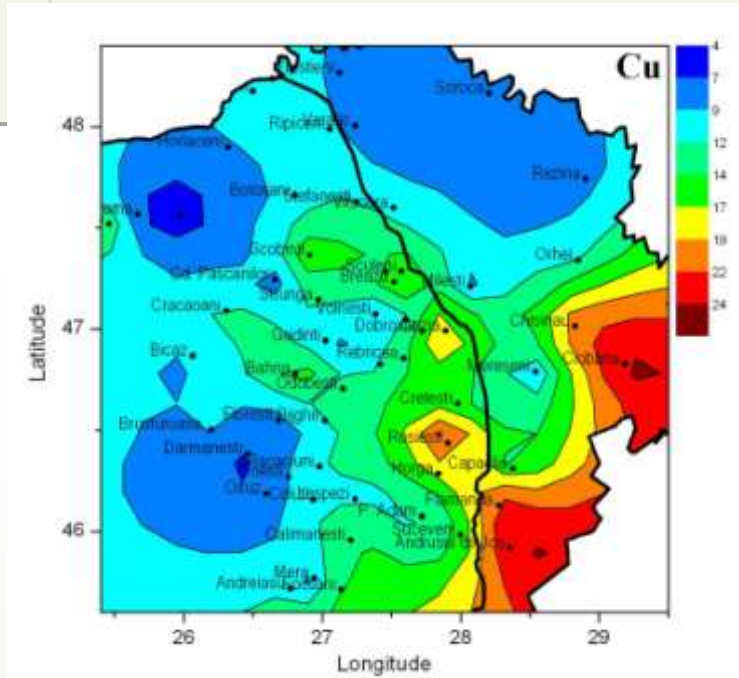
ISINN-21, May 20-25 Alushta

Results and discussion



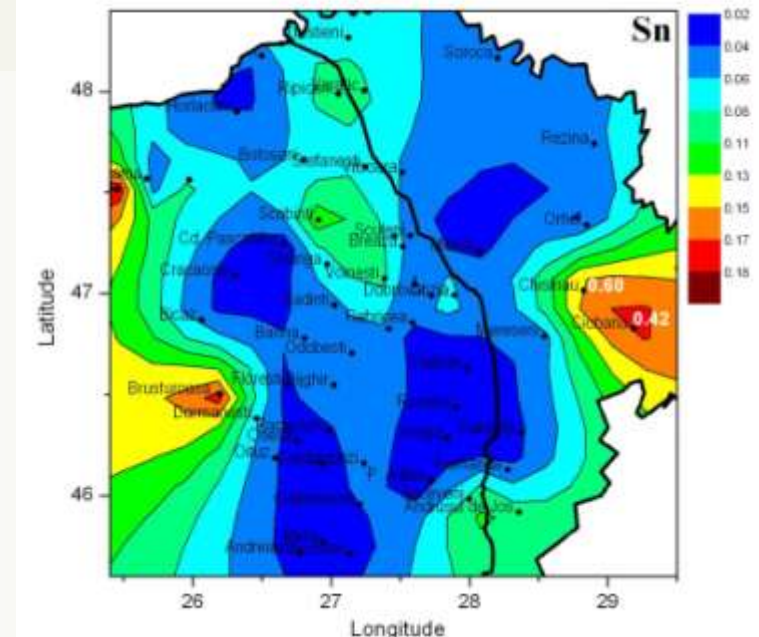
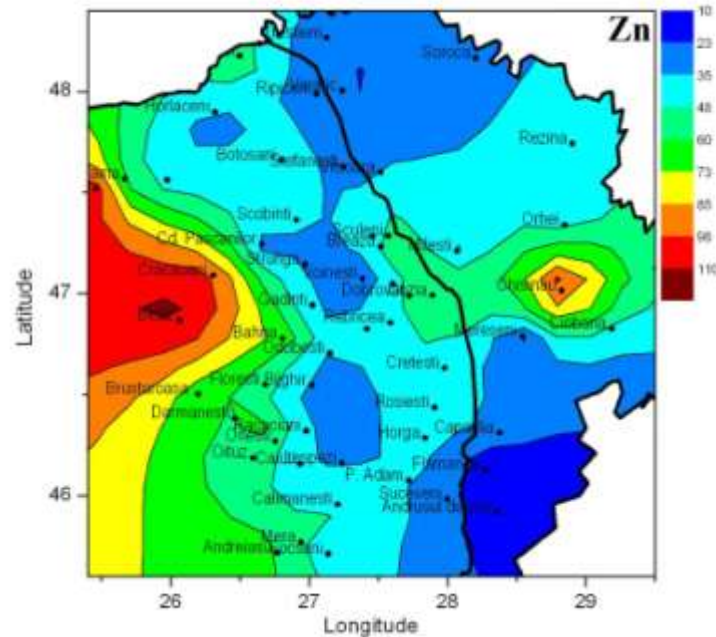
Mo and Cd concentrations in moss (mg kg^{-1})

Results and discussion



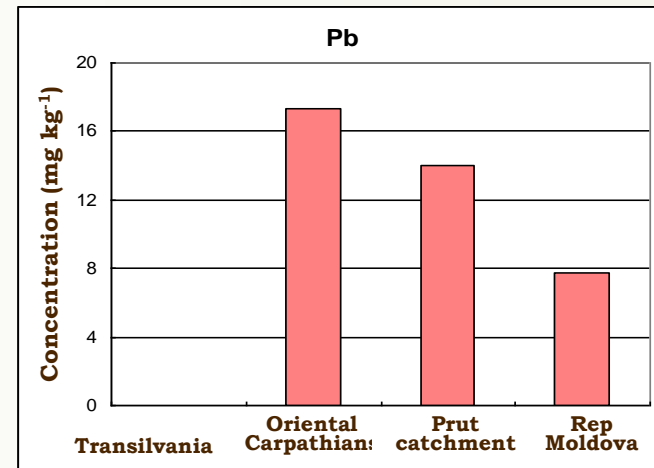
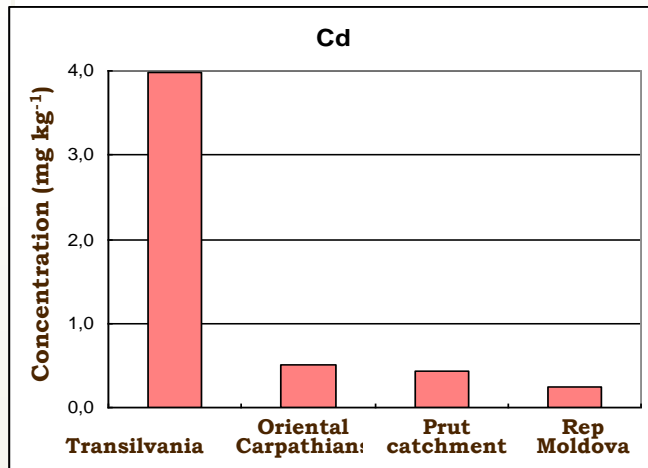
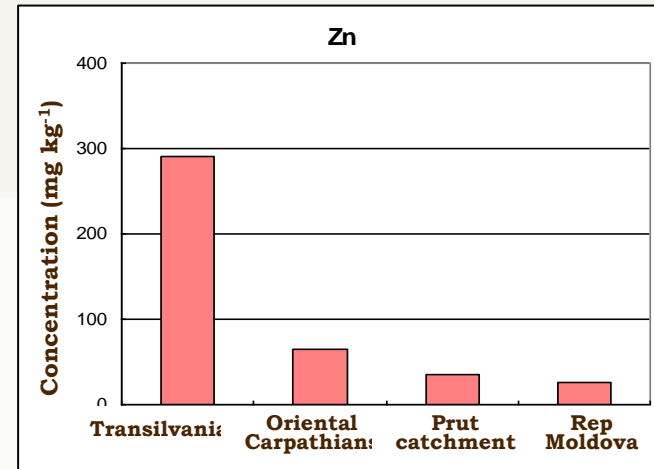
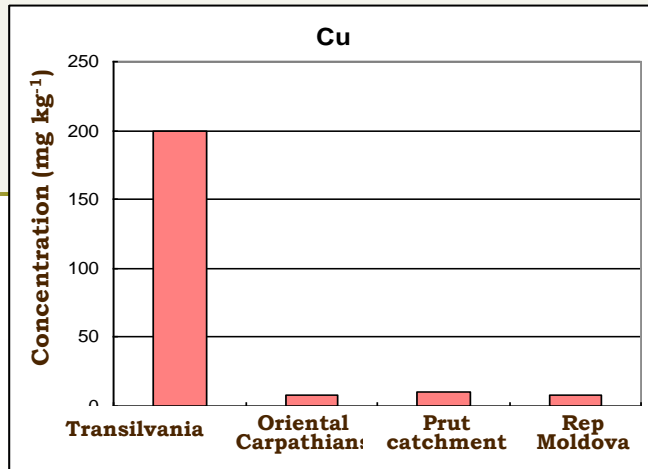
Cu and Pb concentrations in moss (mg kg⁻¹)

Results and discussion



Zn and Sn concentrations in moss (mg kg⁻¹)

Results and discussion



Conclusions

- By means of moss biomonitoring techniques it was possible to characterize the spatial distribution of trace element deposition in Republic of Moldova.
- The main sources of pollution are emissions from power plants (V, Cr, Ni, As, Cd, Tl), emissions from road traffic (Pb)
- Republic of Moldova appears to be less polluted with heavy metals, compared to Eastern Romania.
- Element concentrations in moss are lower than the mean values in Romania and do not support the existence of the transboundary pollution between the two countries.