

First Results on Moss Biomonitoring of Trace Elements in the Central Part of Georgia

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The moss biomonitoring technique was used for assessment of air pollution in the central part of Georgia in the framework of the UNECE ICP Vegetation. In 2019 four moss species (*Hylocomium splendens* (Hedw.) Schimp. (n=4), *Hypnum cupressiforme* Hedw. (n=12), *Pleurozium schreberi* (Brid.) Mitt (n=5), and *Abietinella abietina* (Hedw.) M. Fleisch (n=14)) were collected from 35 locations throughout the Central Georgia. Concentrations of 41 elements in mg/kg were determined by two complementary analytical techniques, epithermal neutron activation analysis (Na, Mg, Al, Cl, K, Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Zn, As, Se, Br, Rb, Sr, Zr, Mo, Sb, I, Cs, Ba, La, Ce, Nd, Sm, Eu, Tb, Yb, Hf, Ta, W, Th, and U) and atomic absorption spectrometry (Cu, Cd, and Pb).

Principal Component Analyses was applied to show the association between the elements in the study area. Four factors were determined, of which two are of geogenic origin (Factor 1 including Na, Al, Sc, Ti, V, Cr, Fe, Co, Ni, Th, and U and Factor 3 with As, Sb, and W), mixed geogenic–anthropogenic (Factor 2 with Cl, K, Zn, Se, Br, I, and Cu) and anthropogenic (Factor 4 comprising Ca, Cd, Pb, and Br).

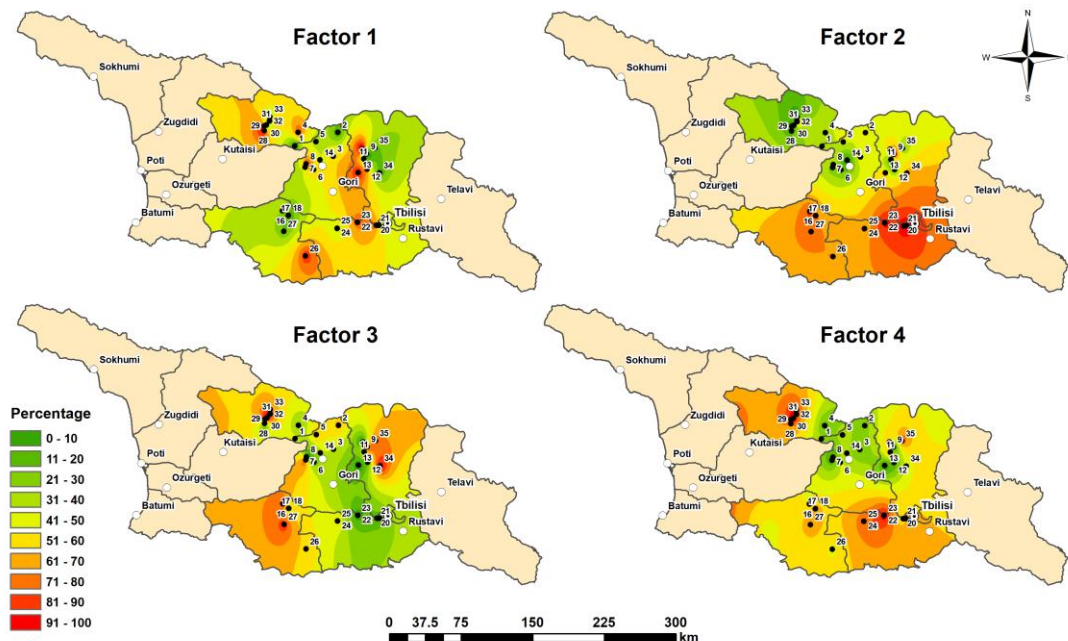


Figure 1. Factor Scores

Geographic information system (GIS) technologies were used to construct distributions maps of factor scores over the investigated territory (Fig.1). The concentrations were compared with the previous survey in Georgia and corresponding values in the literature.