

Biomass burning emissions and impacts on air quality

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General aspects

Biomass burning is a significant air pollution source with global, regional and local impact on air quality, public health and climate. Although biomass is a renewable source of energy with potential advantages from climate changes mitigation perspective, biomass combustion significantly contribute to the aerosol loads in many regions of the world. A very important role is played by the emissions from small residential installations. Particles resulting from residential wood combustion encompass several toxic constituents, including carcinogenic and mutagenic compounds, as polycyclic aromatic hydrocarbons (PAHs), dioxins, volatile organic compounds (VOCs), and heavy metals. Estimation of the contribution of biomass burning to PM_{2.5} or PM₁₀ are difficult to obtain, because emissions vary greatly in dependence on biomass type and burning appliances. Identification and quantification of particulate matter (PM) sources using receptor modelling as a tool, could be applied. Significant share of the population in Bosnia and Herzegovina lives in the small and medium size settlements where air quality is heavily influenced by the residential heating systems, mainly using wood biomass as a fuel. Residents use mainly wood (from 55 to 88%) for the heating purpose in their homes, due to availability of fuel, economic crisis and tradition. Air quality measurements and emission inventory data are limited in the whole country and additional research will be necessary in this area.

Based on the mass concentrations of PM₁₀, elemental composition and the results from the application of Positive Matrix Factorization, this study examines the contribution of wood burning to the atmospheric particle loads in urban, rural and industrial region in Bosnia and Herzegovina.

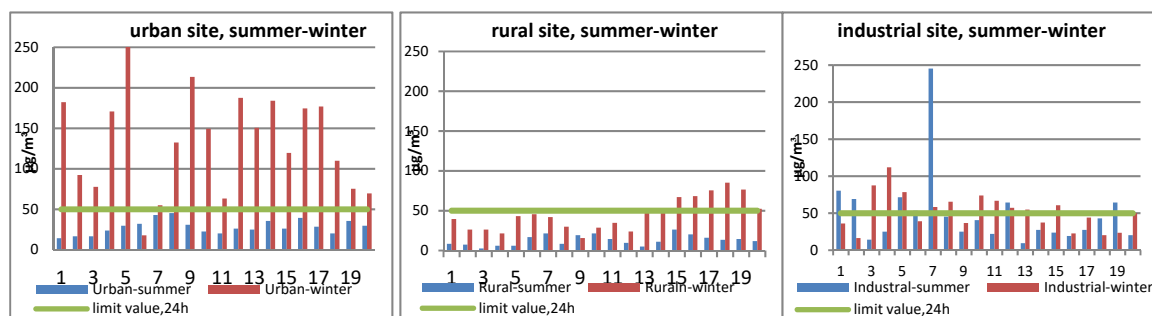


Fig. 1. Mass concentration of PM₁₀ in urban, rural and industrial sites during summer and winter

The analysis shown that mass concentration of PM₁₀ were higher during the winter season in urban and rural areas, where wood burning is dominant residential source of heating in comparison with industrial region with continuous sources of pollution. Applied receptor modelling pointed out that wood burning is a major contributor to the PM₁₀ atmospheric levels during wintertime in urban and rural areas indicated K as universal tracer.

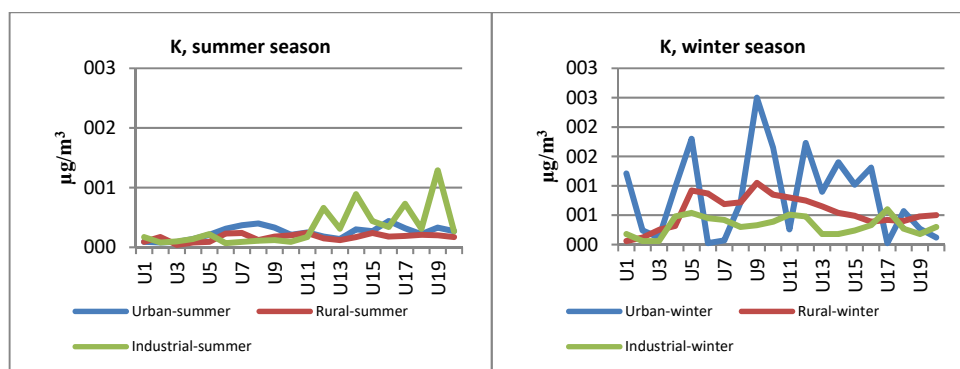


Fig.2. Mass concentration of K in urban, rural and industrial sites during summer and winter

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