Air pollution in the Western Balkans: lessons learned from atmospheric aerosol research in the city of Sarajevo, Bosnia and Herzegovina

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Atmospheric aerosols have well documented detrimental effects on human health, ecosystems and air quality and are the key uncertainty in assessing the anthropogenic influence on climate change. Particularly during the cold weather season, urban centers in countries of the Western Balkans region such as Bosnia and Herzegovina (BiH) are experiencing some of the globally poorest air quality due to the extensive use of solid fuels and old vehicle fleet. The city of Sarajevo is the capital of BiH and is situated in Southeastern Europe within a plain surrounded by mountains. In the winter months (domestic heating season), topography and meteorology cause the pollutants to be trapped within the city plain. Recent analysis with an US EPA BenMAP model applied to BiH found that an annual decrease of 50% in fine aerosol would save 4760+ lives and costs of $2.3B annually. Similarly, a recent World Bank report estimated that in BiH, air pollution causes 3300 deaths and costs 8.2% of GDP annually. Countries of the Western Balkans lack state-of-the-art atmospheric sciences research despite high levels of ambient pollution and position within the EU borders, which makes it imperative to understand the emission sources, processing and the adverse health effects of their atmospheric aerosol pollution.

This presentation will highlight the Sarajevo Canton Winter Field Campaign 2018 (SAFICA), the first Sarajevo, BiH project since 1992 aiming to yield crucial, not previously available information about aerosol emission sources and atmospheric transformations through combination of data collected online in the field (black carbon and particle number and size distribution) and offline laboratory measurements (physicochemical characterization of daily filter samples). Main SAFICA results show that ~3/4 of aerosol mass is carbonaceous (organic aerosol + black carbon) and ~2/3 of total carbon mass is from non-fossil sources. Further, SAFICA aerosol has high loadings of black carbon and toxic species, indicating strong and diverse combustion sources and likely a major public health danger. Finally, this presentation will show how SAFICA knowledge gaps will be overcome in a future Sarajevo, BiH project Sarajevo Aerosol Experiment: Composition, Sources and Health Effects of Atmospheric Aerosol (SAAERO) (EU H2020 MSCA IF grant #101028909).