

JOINT PROPOSAL

of University of Warsaw (UW) (Poland) and
SIR Center for Physical Sciences and Technology (FTMC) (Lithuania)

Importance of long range transport of BIOMass burning emissions to local Smog events in URban Environments (BIOSURE)

Poor air quality remains one of the highest threat for human health in cities. Due to increased levels of both local and transported Particular Matter (PM) smog formation becomes more frequent. In order to implement efficient tools for air quality improvement, the thorough investigation is crucial. Biomass burning is known as an important source of pollution in urban environment. Nevertheless, the lack of knowledge of its origin (local versus long-range transport) does not allow to design an efficient policy instruments which could address the issue. Furthermore, high PM levels directly affect atmospheric radiative balance and therefore play an important role in climate change.

The joint Polish and Lithuanian research effort is proposed by expert teams in remote sensing at University of Warsaw (UW) and in-situ observations at SIR Center for Physical Sciences and Technology (FTMC) with an aim to assess the importance of local versus long-range transported biomass burning aerosol on smog conditions in urban environment. Simultaneous measurements in two cities characterized by distinctly different urban air-pollution conditions (Warsaw vs Vilnius) will be conducted with the same set of instruments: modern in-situ sensors (aethalometer and nephelometer), sun-photometers (AERONET/ACTRIS), and new generation complex lidar systems (operated at University of Warsaw in the frame of EARLINET/ACTRIS - PollyXT lidar and ESA ground based support - EMORAL lidar). Observations will be conducted during dedicated IOPs (winter smog vs summer photo-smog) and during long-term study (covering at least one year of continuous 24/7 data provision). For multifactorial analyses, established modern methods together with some methods developed by the Partners of this proposal will be used in a combination with other data sources (satellite MODIS and SEVIRI observations), air-mass transport models (HySPLIT) and air-quality/aerosol models (NAAPS, CAMS). Combined data will enable a unique and detailed analysis of aerosol origin, size, complex optical properties and an impact on atmospheric radiative balance. The project is a follow up activity of a pilot study performed on voluntary basis in summer 2019 in Warsaw, which indicated high levels of pollution. Nevertheless, for elaborated analysis a further collaboration is needed.

This project, if kindly funded, will help us to maintain and tighten our joint research activities. The results of combined in-situ and remote sensing analysis will provide a comprehensive insight into radiative forcing field. Moreover, results of this project will have a high societal impact as they are directly related to air-quality and could provide valuable insight for policy makers, both on the local and national levels.