Geophysical Research Abstracts
Vol. 18, EGU2016-16455-1, 2016
EGU General Assembly 2016


# On the possibility of real time air quality and toxicology assessment using multi-wavelength photoacoustic spectroscopy

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In this study we present results of field measurement campaigns focusing on the in-situ characterization of absorption spectra and the health relevance of light absorbing carbonaceous (LAC) in the ambient. The absorption spectra is measured @ 266, 355, 532 and 1064 nm by our state-of-the-art four-wavelength photoacoustic instrument, while for health relevance the eco- cito and genotoxicity parameters were measured using standardized methodologies. We experimentally demonstrated a correlation between the toxicities and the measured absorption spectra quantified by its wavelength dependency. Based on this correlation, we present novel possibilities on real-time air quality monitoring.

LAC is extensively studied not only because of its considerable climate effects but as a serious air pollutant too. Gradually increasing number of studies demonstrated experimentally that the health effect of LAC is more serious than it is expected based on its share in total atmospheric aerosol mass. Furthermore during many local pollution events LAC not only has dominancy but it is close to exclusivity. Altogether due to its climate and health effects many studies and proposed regulations focus on the physical, chemical and toxicological properties of LAC as well as on its source apportionment. Despites of its importance, there is not yet a widely accepted standard methodology for the real-time and selective identification of LAC. There are many different reasons of that: starting from its complex inherent physicochemical features including many unknown constituents, via masking effect of ambient on the inherent physicochemical properties taking place even in case of a short residence, ending with the lack of reliable instrumentation for its health or source relevant parameters. Therefore, the methodology and instrument development for selective and reliable identification of LAC is timely and important issues in climate and air quality researches. Recently, many studies demonstrated correlation between the chemical compositions and the absorption features of LAC which open up novel possibilities in real time source apportionment and in air quality monitoring.