

## **1.014 Characteristics of personal exposure to PM<sub>2.5</sub> from household solid fuels burning in rural Guanzhong Plain, China.**

Presenting Author:

**Hongmei Xu**, Department of Environmental Science and Engineering, Xi'an Jiaotong University, Xi'an, Shaanxi, China, [xuhongmei@xjtu.edu.cn](mailto:xuhongmei@xjtu.edu.cn)

Co-Authors:

**Yaqi Li**, Department of Environmental Science and Engineering, Xi'an Jiaotong University, Xi'an, Shaanxi, China

Abstract:

Household solid fuel combustion for heating and cooking in rural areas is an important source of air pollution in Northwestern China, which largely contributes to PM<sub>2.5</sub> personal exposure concentrations during the cold winter. There is a general lack of understanding about the personal exposure to PM<sub>2.5</sub> levels and its chemical components emitted from household heating in northwestern Chinese rural populations. In this work, personal PM<sub>2.5</sub> sampling associated to indoor and outdoor fixed samplings were carried out in Guanzhong Plain in December 2016 for the purpose of characterizing personal exposure to PM<sub>2.5</sub> as a function of different solid fuels used in rural households. Correlations among personal exposure, indoor and outdoor PM<sub>2.5</sub> levels and their mutual ratios were computed to investigate how personal exposure to fine aerosols can be related to microenvironmental PM levels and to individual activities. Housewife's personal exposure to PM<sub>2.5</sub> concentration was 1.4 times higher than both indoor and outdoor values, and was related to the ignition of solid fuels for heating. Overall, the results showed that households using electric power for heating and cooking divided personal exposure to PM<sub>2.5</sub> by at least a factor of two. Solid fuel combustion products and related secondary formed species dominated PM<sub>2.5</sub> mass in personal exposure, indoor and outdoor samples. Motor vehicle emission and various dust sources were another two main identified contributors. Our results proved that the use of clean energy could be an effective measure to reduce personal exposure levels of PM<sub>2.5</sub> from winter heating in rural areas,, which implied that the state should speed up the upgrade of the heating equipment fleet to protect the respiratory health of rural residents in Northwestern China.