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WOOD COMBUSTION RELATED AIR POLLUTION IN URBAN AND RURAL BACKGROUND

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ABSTRACT

Atmospheric particles are responsible for the main part of the annual 2 million deaths worldwide, which according to WHO are attributed to air pollution. While the majority of ambient respirable particles in Denmark are long-range transported, emissions from traffic and woodstoves make up the main domestic sources of primary particles. Regulation of vehicular emissions for the past decades have reduced traffic emissions, whereas emissions from woodstoves are currently subject to only minor regulation, though they constitute the largest domestic source of ambient primary particles. Wood combustion can partly substitute fossil carbon for heating appliances, and thus reduce the build-up of CO₂ in the atmosphere, for which reason wood stoves may be considered a “climate friendly” energy alternative. Still, emitted light-absorbing particles such as soot and brown carbon exert a negative climate effect. The proposed health effects from inhalation of particles and volatile organic compounds warrant a quantitative study of air pollution from woodstoves. Field campaigns as conducted by ENVS during the last decade provide estimates on annual particulate contributions of 0.5 - 2.3 µg/m³ from woodstoves. In the WOODMAD project we use existing data from the Danish Air Quality Monitoring Programme to provide new estimates on the prevalence of wood combustion related particles from receptor sites with larger spatial and temporal covering, i.e. Copenhagen urban background 2011-2014, and Copenhagen suburban background 2013-2014 based on the application of chemical markers. Furthermore, campaign measurements using a new Aerosol Mass Spectrometry (AMS) technique with minute-scale time resolution of chemical markers have been initiated in rural background, Roskilde since 2015. The mapping of wood combustion related particles will be related to observations of acute health effects in collaboration with the interdisciplinary AU center CIRRAU.



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