

Application of three dimensional source contribution function (3D-PSCF) for levoglucosan at Seoul

In Sun Kim¹, Daehyun Wee¹, Yong Pyo Kim^{1,2}, Ji Yi Lee³

¹ Department of Environmental Science and Engineering, Ewha Womans University, 52, Ewhayeodae-gil, Seodaemun-gu, Seoul 03760, Korea

² Department of Chemical Engineering and Materials Science, Ewha Womans University, 52, Ewhayeodae-gil, Seodaemun-gu, Seoul 03760, Korea

³ Department of Environmental Engineering, Chosun University, 309 Pilmun-daero, Dong-Gu, Gwangju 61452, Korea

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Presenting author email: supidang@gmail.com

A potential source contribution function (PSCF) can indicate the source areas of high air pollutant concentrations using backward trajectories. However, the conventional two-dimensional potential source contribution function (2D-PSCF) cannot consider the emission and transport height of air pollutants. That missing information might be critical because injection height varies depending on the source type, such as with biomass burning. Kim et al. (2016) developed a simple algorithm to account for the height of trajectories with high concentrations and combined it with the 2D-PSCF to devise three-dimensional potential source contribution function (3D-PSCF).

In this study, 3D-PSCF was conducted to determine the possible source areas of air pollutants from biomass fuel burning that were affecting the air quality in Seoul. 3D-PSCF was applied for levoglucosan (1,6-anhydro- β -D-glucopyranose) concentrations at Seoul between 2006 and 2014. In order to identify the apportionment of biomass burning, the ratio of levoglucosan to OC was also applied in the calculation of 3D-PSCF.

Based on the result of 3D-PSCF for levoglucosan at Seoul, we understood the impact of biomass fuel burning in China on the air quality of Seoul. Furthermore, we verified the influence of biomass fuel burning in North Korea on the air quality of Seoul by levoglucosan/OC ratio in 3D-PSCF. This work would support the research for quantifying the impact of air pollutants emitted from biomass fuel burning in China and North Korea to air quality in Seoul.

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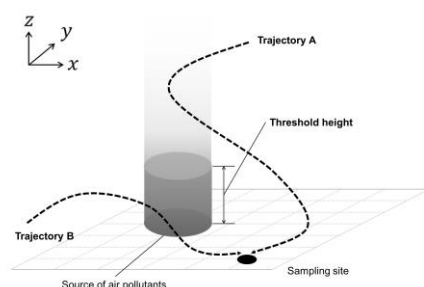


Figure 1. Schematic illustration of the concept of 3D-PSCF (Kim et al., 2016).