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Aplication of Positive Matrix Factorization and K-means clustering to source apportionment of ambient air VOCs in a urban area with high industrial influence.

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A sufficiently large data base of ambient air individual VOC concentrations in urban and industrial areas has an excellent potential for the identification of the sources linked to atmospheric pollution in the area.

The data base of 2007 comprising hourly measures of 62 VOC obtained on a complex topography site with urban and industrial influences has been used. The objective was to identify and to quantify the influence of several sources upon the average yearly concentrations of the measured VOCs.

The Positive Matrix Factorization (PMF) technique has been used to reduce the dimensionality of the variables pool, and the obtained factors have been classified with a K-means clustering algorithm to, first, identify the typical hourly behaviour patterns and, second, to quantify their frequency.

The PMF model used gets the best fit for Benzene, the only VOC for which there is a EU air quality standard. 5 patterns have been identified which accounts for 97% of the benzene' s yearly average concentration. Among those patterns, some are urban patterns heavily influenced by the dispersion phenomena typical of complex terrain areas which are close to the seashore. However, it has been possible to isolate the influences of traffic and some industrial sources closeby.