

## POSITIVE MATRIX FACTORIZATION ON AEROSOL MONITORING DATA IN THE CHAIR PRODUCTION DISTRICT OF FRIULI VENEZIA GIULIA REGION: SOURCE IDENTIFICATION AND SMALL SCALE HETEROGENEITY

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In order to assess the possible relevance on particulate composition of emissions from an incinerator serving a furniture production district in Manzano (Ud), two sampling sites were identified, respectively downwind and upwind to the plant, by means of the CalPuff computational code (1) for modeling the particulate dispersion, considering local orography and meteorology. Two Hydra samplers from FAI Instruments were positioned at the selected sites, allowing the collection of daily PM<sub>10</sub> on quartz filters between February and April 2010. Analytical determinations of OC, EC, WSOC, WINSOC, TC, thirteen PAHs (including benzo[a]pyrene), Na<sup>+</sup>, NH<sub>4</sub><sup>+</sup>, K<sup>+</sup>, Mg<sup>2+</sup>, Ca<sup>2+</sup>, Cl<sup>-</sup>, NO<sub>3</sub><sup>-</sup>, SO<sub>4</sub><sup>2-</sup>, levoglucosan (2), As, Cd, Ni, Pb were performed. The PM<sub>10</sub> concentration is very similar at the two sites, located 3 km apart, but chemical composition is not perfectly overlapping. A source apportionment study has been performed for the two sites, pointing at the relevance of each source in each sampled day, by Positive Matrix Factorization (3). An agricultural source (ammonia nitrate) was identified, as well as biomass combustion, crustal/dust resuspension (Ca<sup>2+</sup>, Pb/ Na<sup>+</sup>, Cl<sup>-</sup>) and sulfate sources. Unexpectedly, the factor associated to biomass burning, related to EC, BaP, K and levoglucosan, is more relevant at the site upwind from the considered incinerator. The contribution of agricultural activities to the local aerosol is evident and it is highlighted by the “ammonia nitrate” factor but also by the presence of a herbicide in the particulate matter (4), which is one hundred times higher at the downwind site than upwind.

(1) <http://www.src.com/calpuff/calpuff1.htm>

(2) A. Piazzalunga, P. Fermo, V. Bernardoni, R. Vecchi, G. Valli, M.A. de Gregorio, 90 (2010) Int. J. of Environ. Analytical Chemistry, 934-947

(3) <http://www.epa.gov/heasd/products/pmf/pmf.html>

(4) S. Cozzutto, S. Licen, P. Barbieri, in preparation