

Title	Metal-ligand complexes in atmospheric particles: formation processes, properties and relevance for public health in urban environment
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Project description:

The present research program aims to contribute to a better assessment of the air quality with particular attention to the health effects in urban environments, by understanding how organic compounds in particulate matter (PM) can coordinate with, and therefore increase both the solubility and the bioavailability of, metals present in the aerosol itself or in atmospheric aqueous environments, in view of the possible correlation with toxic and environmental effects.

PM from the urban area of Padova will be sampled, and it will be characterized in its metal and ligand contents by ionic chromatography (IC), HPLC-MS, and ICP-MS. Metal-ligand complex formation will be evaluated experimentally, theoretically and statistically. Metabolic alterations and toxicity mechanisms associated with exposures with PM and with the metal-ligand complexes detected in PM will be investigated *in vitro* using selected cellular lines. An "omic" (metabolomic/proteomic/metal-omic) approach will also be applied on cellular lines and real human tissues in order to detect PM markers.

Publications:

C. Giorio, A. Tapparo, M. Dall'Osto, D.C.S. Beddows, J.K. Gietl, R.M. Harrison. Local and regional components of aerosol in a heavily trafficked street canyon in central London derived from PMF and cluster analysis of single particle ATOFMS spectra. *Environ. Sci. Tech.* 49 (2015) 3330-3340.

C. Giorio, S. Campbell, M. Bruschi, F. Tampieri, A. Barbon, A. Toffoletti, A. Tapparo, C. Paijens, A.J. Wedlake, P. Grice, D.J. Howe and M. Kalberer. Online quantification of Criegee intermediates of α -pinene ozonolysis by stabilisation with spin traps and proton transfer reaction mass spectrometry detection. *J. Am. Chem. Soc.*, 139-11 (2017) 3999–4008

P. Sellitto, C. Zanetel, A. Di Sarra, G. Salerno, A. Tapparo, D. Meloni, G. Pace, T. Caltabiano, P. Briole, B. Legras. The impact of Mount Etna sulfur emissions on the atmospheric composition and aerosol properties in the central Mediterranean: A statistical analysis over the period 2000–2013 based on observations and Lagrangian modelling. *Atmos. Environ.* 148 (2017) 77-88

Collaborations/Network:

Yoshio Takahashi, University of Tokyo, Japan; Jean-François Doussin, University Paris-Est Créteil, France; Markus Kalberer, University of Cambridge, UK; Andrea Trevisan, Padova University Hospital, Italy; Erich Cosmi, Padova University Hospital, Italy.

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Ateneo