

## Abstract

Fog samples have been collected throughout the fall-winter season during each dense fog episode since 1989 at the field station of San Pietro Capofiume (Bologna, Italy) located in a rural area in the south-eastern part of the Po Valley. Since the fall-winter season 1997/98 both soluble and insoluble carbon content was also measured and now a sixteen years long dataset is available. Carbonaceous matter accounts for a significant fraction of the insoluble material suspended in fog water. The sum of EC and water insoluble organic mass accounts on average for 46%-56% of the mass of total suspended material. Insoluble carbonaceous material is composed mainly by organic matter, EC accounting on average only for 17% of the total insoluble carbon. A good correlation observed between EC and OC through the different years, suggests that anthropogenic combustion processes, which represent the main source of EC, are also the most important source of OC in fog droplets. Recent results also show that a potential important contribution to WSOC in fog water is derived by aqueous secondary organic aerosol from biomass burning emissions. The water soluble organic carbon (WSOC) represents on average 25% of the total solute mass and its contribution to the total organic carbon (TOC) ranges from 52 to 95% with an average of 86%. The high amount of carbonaceous compounds in the Po Valley fog detected and the simultaneous decrease of the main inorganic species concentration (Giulianelli et al., 2014) in the last two decades highlight the potential influence of organics on the decrease of fog frequency. Giulianelli L., Gilardoni S., Tarozzi L., Rinaldi M., Decesari S, Carbone C., Facchini M.C. and Fuzzi S., *Atmos. Environ.* 98, 394-401.