Overview of the French contribution to the EMEP 2012-2013 summer and winter campaigns

V. Riffault[1], J.L. Jaffrezo[2], J. Sciare[3], K. Sellegri[4], S. Sauvage[1], V. Crenn[1], A. Waked[2], J.E. Petit[3,5], A. Colomb[4], S. Conil[6], J.L. Besombes[7], A. Setyan[1], E. Freney[4], T. Leonardis[1], N. Locoge[1], V. Gros[3], N. Bonnaire[3], R. Sarda-Estève[3], F. Dulac[3], M. Hervo[4], L. Chiappini[5], O. Favez[5], F. Gheusi[8], G. Athier[8], M. Mallet[8], T. Bourrianne[9], G. Roberts[9], N. Pascal[10], J. Descloitres[10]

[1]Mines Douai, CE, F-59508 Douai, France; [2]LGGE (Univ Grenoble / CNRS), F-38402 Saint-Martin d'Hères, France; [3]LSCE (CEA-CNRS-UVSQ), F-91190 Gif/Yvette, France; [4]LaMP (UPB-CNRS-OPGC), F-63171, Aubière, France; [5]INERIS, F-60550 Verneuil-en-Halatte, France; [6]ANDRA-OPE, F-55290, Bure, France; [7]LCME (Univ Savoie), F-73376 Le Bourget du Lac, France; [8]OMP/LA (Univ Toulouse / CNRS), F-31400, Toulouse, France; [9]CNRM(Météo-France / CNRS), F-31057 Toulouse, France ; [10]ICARE (Univ Lille1), F-59655 Villeneuve d'Ascq, France

Keywords: Chemical speciation, source apportionment, vertical profile, precursor VOCs

Presenting author email: veronique.riffault@mines-douai.fr

The EMEP network aims at providing scientific support on atmospheric monitoring and modelling, emission inventories and projections, and integrated assessment modelling. To reach these objectives, it has encouraged long- and short-term measurement periods in order to improve the scientific knowledge on PM levels, sources and formation processes at the European scale.

Within this framework and in coordination with the existing ChArMEx French program and ACTRIS EU project, two intensive periods have been held between June 8 and July 12, 2012 for summer and January 11 to February 8, 2013 for winter. Five locations in France (cf. Figure 1) were equipped with various on-line and off-line instruments (cf. Table 1) aiming at measuring PM chemical and physical properties, as well as precursor gases (both organic and inorganic).

The main objectives of these two campaigns were to (i) provide a large quality controlled database of PM levels and chemical composition for sites under rural, mid-altitude, urban or marine influences during two contrasted seasons; (ii) measure simultaneously PM compounds and their precursors to better understand processes such as secondary organic aerosols (SOA) formation or condensation of semi-volatile species; (iii) assess the importance of vertical exchanges in the variability of PM ground levels, especially in case of dust events; (iv) determine PM sources and their relative contributions.

Preliminary results will be presented and discussed.

The authors acknowledge funding from the French Agency of Environment and Energy Management (ADEME grants 1262C0022 and 1262C0039), the MISTRALS/ChArMEx program, the EU-FP7 ACTRIS program, CTC-CORSiCA and the CaPPA project (ANR-10-LABX-005).

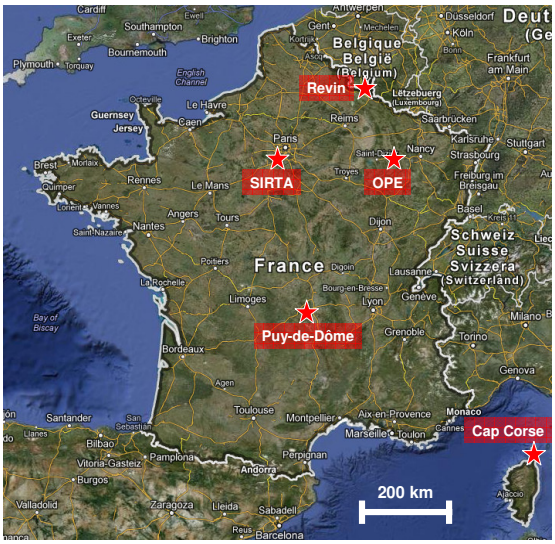

Figure 1. Map of the EMEP winter and summer campaign sites in France (Google Maps - ©2013 Google)

Table 1. List of the various measurements carried out at the 5 sites during the winter (W) and summer (S) campaigns.

	Sampling period	Cap Corse	OPE	Puy-de-Dôme	Revin	SIRTA
PM_{10} mass	< 1hr	S, W	S, W	S, W	S, W	
$PM_{2.5}$ mass	< 1hr		S, W		S, W	
PM_1 mass		S, W				S, W
PM_{10} speciation	≥ daily	S, W	S, W	S, W	S, W	S, W
$PM_{2.5}$ speciation	≥ daily	S, W	S, W			S, W
PM_1 speciation (AMS, ACSM)	< 1hr	S, W		W	S	S, W
Black Carbon	< 1 hr	S, W	W	S, W	S, W	S, W
Precursor (O)VOCs	≤ 6 hrs	S, W		S, W	S, W	
NMHCs / (O)VOCs	< 1 hr	S			W	S, W
NO_x, CO and O_3	< 1 hr	S, W	S, W	S, W	S, W	S, W
CO_2	< 1 hr			S, W	S, W	S, W
SO_2	< 1 hr			S, W	S	
NH_3	< 1 hr				S	S, W
Diff./scat. coef.	< 1 hr	S, W	W	S, W		S, W
Extinction, AOD	< 1 hr	S, W	W	S, W		
Size distribution	< 1 hr	S, W	S, W	S, W		S, W