

Particulate atmospheric pollution around an alumina factory, Gardanne, SE France.

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The particulate atmospheric pollution around the alumina factory of Gardanne (SE France) has been studied for dust deposits, PM10 and PM2.5. Two sampling campaigns were carried out in July 2010 and January 2011. The samples were studied for their mineralogical composition (XRD), chemical composition of bulk samples, morphology and chemical composition of single particles (SEM-EDS). The dust deposits are essentially composed by aluminous phases (hydroxides and oxides), quartz and carbonates. The presence of sodium adsorbed on the dusts surface is the result of the atmospheric emission of caustic soda used in the industrial process. These red and white dusts, and the soda odour, are considered as an important nuisance by the surrounding populations. The average concentrations are 33 $\mu\text{g}/\text{m}^3$ in summer and 30 $\mu\text{g}/\text{m}^3$ in winter for PM10 and respectively 14 $\mu\text{g}/\text{m}^3$ and 26 $\mu\text{g}/\text{m}^3$ for PM2.5. The increase of PM2.5 concentration in winter is attributed to the use of wood for heating. The evolution of the chemical composition of the different size-fractions shows that the impact of the alumina factory to the atmospheric pollution decreases with the size of the

particles. If the EU rules for PM10 are very often over passed (in 2011, 79 days above the 50 $\mu\text{g}/\text{m}^3$ limit) in this site, the responsibility of the factory's emissions is probably less than 30 %.

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