Tree leaves used as indicators of dispersion of particulate atmospheric pollution.

[a,b]Noack Y, [a,b]Leoni C, [c,d]Robert S, [e]Reis AP, [e]Patinha C, [a,b]Fleury J

Plants are especially useful as biological indicators to assess air pollution because of their wide distribution. The use of this low-cost sampler allows to have a picture of the pollution on a large area and to have an idea on the spatial dispersion of the pollutants emitted by different sources. Using statistical models and geographic information systems, dispersion maps can be build, allowing to precise pollution hotspots and also to follow the spatial evolution of the pollution year after year. In this study we used tree leaves as indicators of the dispersion of particulate atmospheric pollution. Two parameters were considered: (1) the mineralogy of the dusts deposited on the leaves; (2) the chemical composition (essentially heavy metals) of these dusts and of the leaves tissues. Two areas were investigated: Gardanne area (SE France) with a cement plant, an alumina factory and a coal power plant; Estarreja area (central Portugal) with a chemical complex. For the Gardanne area, the study by XRD of the mineralogical composition of the foliage dusts shows a large dispersion (several km around the alumina factory) of aluminium hydroxide, which is related with major wind directions and also the topography. In contrast, the dispersion of fly-ashes around the coal power-plant is very restricted. For Estarreja area, the mineralogy of foliage dusts shows large amounts of "natural" phases (quartz, feldspars, clay minerals), but particles with lead, barium and nickel were detected by SEM-EDS.

[a] *CNRS, CEREGE, UMR 7330, 13545 Aix en Provence Cedex 4, France (noack@cerege.fr)*
[b] *Aix-Marseille Université, CEREGE, UMR 7330, 13545 Aix en Provence Cedex 4, France*
[c] *CNRS, ESPACE, UMR 6012, MMSH, BP 647, 13094, Aix en Provence, France*
[d] *Aix-Marseille Université, ESPACE, UMR 6012, MMSH, BP 647, 13094, Aix en Provence, France*
[e] *GEOBIOTEC, Department of Geosciences, University of Aveiro, Aveiro, Portugal.*