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Determination of particle tracers released in forest fire events in the Mediterranean basin. Ayoraburning experiment.

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In 2009 110,783ha of forested area were burned in Spain being 65,541 of them shrublands and woodlands. Currently, the released emissions to the atmosphere during these wildfires are also a current subject of study because of their influence in air quality and their impact on the climatic system. Taking into account that: a) shrublands are the most typical vegetation constituting current Mediterranean forest areas; b) this type of vegetation favourable to enhance the combustion process (an important proportion of the organic matter constituting these shrub-lands is die; d) the Mediterranean ecosystem is highly vulnerable to forest fires, especially in summer when extreme ambient conditions are recorded: high temperatures, dryness of soils and intense breeze circulations. In this context, Ayoraburning experiment (see García-Hurtado et al., 2011) was preformed with a number of objectives, in which the chemical characterization of the main tracers released to the atmosphere during these events was a priority.

To fulfil this purpose a number of instruments and analytical techniques were used including: high-volume samplers to collect TSP, PM_{10} and $PM_{2.5}$ samples, an ultrafine particle counter, an optical counter to determine TSP, PM_{10}, $PM_{2.5}$ and PM_1 concentrations, gaseous pollutants analyzers (CO_2, CO, CH_4, SO_2, NO_x), cartridges to capture VOC's, carbonylic and hydroxycarboxylic compounds. With respect to the analytical techniques used, different treatments were applied: a) acid digestion of filters and subsequent analysis by ICP-AES and ICP-MS were used to determine inorganic elements (Querol et al., 2008); b) ionic chromatography was applied to determine inorganic soluble species; c) a thermo-optic method was used to discriminate the organic and elemental carbon; and standardized methodologies to quantify VOC's, carbonylic and hydroxycarboxylic compounds.

Among hundred of elements and compounds analyzed and determined, these has been recognized as biomarkers in particulate form: Potassium, Sulphur, Levoglucosan, Palmitic acid, Glutaric acid, Phthalic acid, Cresol, Butanone, Pentanone, Pirene and Fluoranteno. In the gaseous phase we have identified the followings: Palmitic acid, Glutaric acid, Phthalic acid, Glyoxal, Methylglyoxal, Limonene and a-Pinene.