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# PARTICULATE AND GASEOUS EMISSIONS FROM PRESCRIBED FIRES IN A PROTECTED NATURAL AREA

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In Europe, forest fires have increased in number and surface over the last 50 years and the Mediterranean area is specially affected. Shrub fires produce large amounts of atmospheric carbonaceous material and greenhouse gases greatly affecting air quality and climate (Jacobson, 2001). In particular, elemental carbon (EC) is an important absorber of solar radiation playing an important role in global warming. On the other hand, organic carbon (OC) primarily scatters solar radiation opposing the heating effect of EC (Penner et al., 1998).

Six prescribed fires have been carried out on two types of shrub species in order to characterize the emission (particulate and gases) from the combustion process. The fires have been carried out in La Cueta, León (NW Spain), within a protected natural area ("Valle de San Emiliano") on October, 3rd and 4th, 2016.

Several sampling instruments were used: *i*) a low volume Echo PM of TECORA to collect $PM_{2.5}$ onto quartz filter; *ii*) a Gent stacked filter unit sampler to collect $PM_{10}$ onto polycarbonate filters (0.2 µm pore size); *iii*) a thermocouple network to register the temperature evolution of the fires; *iv*) TEDLAR bags for smoke sampling; *v*) CO and $CO_2$ Combo IAQ Meter. Two different species were burned: *Calluna vulgaris* and *Genista scorpius.* The air measuring equipment was placed about 10 meters upwind from the fire.

Four quartz filters have been sampled during *Genista scorpius* burning and two during *Calluna vulgaris* fire. Besides, four and one polycarbonate filters have been sampled during *Genista scorpius* and *Calluna vulgaris*, respectively. Subsequently the quartz filters have been analyzed by the thermo-optical method for EC and OC determination. Furthermore, the concentration of the main ions present in the filters has been obtained through ion chromatography. Major organic components in the smoke samples have also been obtained. Finally, polycarbonate filters have been analyzed by Scanning Electron Microscopy (SEM) in order to obtain an individual particle morphology characterization and to estimate the aerosol size distribution.

This study can acquire noteworthy implications not only for the air quality itself, but also for the ecological aspects of the environment due to the recent finding about the narrow relation between the smoke produced in shrub fires and the seeds germination processes after the fire (Bargmann et al., 2014). Besides, this work is the result of a field campaign, not a laboratory study, with real, not simulated, conditions.

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