



Experimental biomass burning emission assessment by combustion chamber

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Biomass burning is a significant source of several atmospheric gases and particles and it represents an important ecological factor in the Mediterranean ecosystem. In this work we describe the performances of a recently developed combustion chamber to show the potential of this facility in estimating the emission from wildland fire showing a case study with leaves, small branches and litter of two representative species of Mediterranean vegetation, *Quercus pubescens* and *Pinus halepensis*. The combustion chamber is equipped with a thermocouple, a high resolution balance, an epiradiometer, two different sampling lines to collect organic volatile compounds (VOCs) and particles, a sampling line connected to a Proton Transfer Reaction Mass-Spectrometer (PTR-MS) and a portable analyzer to measure CO and CO₂ emission. VOCs emission were both analyzed with GC-MS and monitored on-line with PTR-MS. The preliminary qualitative analysis of emission showed that CO and CO₂ are the main gaseous species emitted during the smoldering and flaming phase, respectively. Many aromatics VOCs as benzene and toluene, and many oxygenated VOC as acetaldehyde and methanol were also released. This combustion chamber represents an important tool to determine the emission factor of each plant species within an ecosystem, but also the contribution to the emissions of the different plant tissues and the kinetics of different compound emissions during the various combustion phases. Another important feature of the chamber is the monitoring of the carbon balance during the biomass combustion.