

## **Temporal and Spatial Contributions of Biomass Combustion to the Carbon Composition in Sediments**

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The occurrence of fossil charcoal is the most frequently used indicator in the reconstruction of fire history from the geological record. However, other indicators have to be considered because different processes than solely biomass burning may form charcoal. Here we report the characterization and application of a new organic tracer to specifically trace forest fires (recent and past) in the environment. This marker is levoglucosan (1,6-anhydro- $\beta$ -D-glucose) formed as a result of the thermal breakdown alteration of cellulose present in the vegetation subjected to biomass burning. Consequently, it is a source specific tracer for delineating the occurrence and history of vegetation burning recorded in sediments. A sample series of smoke particulate matter from vegetation subjected to controlled burning was studied in order to validate the specificity of this tracer. The occurrence of this new marker has been conducted in surficial and core sediments of the different locations. The characterization of the levoglucosan tracer is relatively simple. This compound can be readily detected and quantified in total extracts of aerosol particulate matter and sediments, an advantage over other indicators, which require extensive workup prior to their complete characterization and application. The conventional methodology used in molecular organic geochemical studies is followed to identify this compound. Basically, it involves the extraction of the samples with organic solvents, derivatization of the total extracts, analysis and quantification of the tracer by gas chromatography and gas chromatography-mass spectrometry techniques.