

## Markers for biomass burning in Saharan dust and marine sinking particles

LAURA T. SCHREUDER<sup>1\*</sup>, ELLEN C. HOPMANS<sup>1</sup>,  
JAN-BEREND W. STUUT<sup>1,2</sup>, JAAP S. SINNINGHE  
DAMSTÉ<sup>1,3</sup>, STEFAN SCHOUTEN<sup>1,3</sup>

<sup>1</sup> NIOZ, Royal Netherlands Institute for Sea Research, Department of Marine Microbiology and Biogeochemistry (MMB), and Utrecht University, The Netherlands

<sup>2</sup> MARUM – Center for Marine Environmental Sciences, Bremen, Germany

<sup>3</sup> Utrecht University, Faculty of Geosciences, Utrecht, The Netherlands

(\* correspondence: laura.schreuder@nioz.nl)

Levoglucosan is an important and specific compound generated during biomass burning of higher plants and can, therefore, be applied as a biomarker for vegetation fire events in sedimentary archives [1]. In this study, we applied our HPLC-MS/MS method developed for rapid and quantitative analysis of levoglucosan in complex sedimentary matrices [2]. Quantification was improved by incorporating an internal standard, i.e. deuterated levoglucosan, in the analytical protocol. Furthermore, the separation of other anhydrosugars, such as mannosan and galactosan, was improved by using two amino columns in series. This improved methodology was applied to the analysis of airborne Saharan dust, sampled with increasing distance from the African coast, to investigate the impact of atmospheric transport on levoglucosan concentrations and terrestrial biomarkers. The concentration of levoglucosan was elevated at two locations, coinciding with two different dust events, while terrestrial biomarkers show a steady decrease in concentration with increasing distance from the African coast. To examine the fate of biomass burning markers when they settle in the ocean, we analyzed sinking particulate matter collected over a year with a sediment trap at 1200 m water depth in the North Atlantic Ocean. Levoglucosan was detected and varied seasonally, with highest flux during spring, coinciding with a peak in the total mass flux. We will compare our results with records of vegetation fires to see how well levoglucosan in dust and sediment traps reflects these events.

### References

- [1] Elias, V.O., Simoneit, B.R.T., Cordeiro, R.C., Turcq, B. (2001) *Geochimica et Cosmochimica Acta* 65, 267–272.
- [2] Hopmans, E.C., Lopes dos Santos, R.A., Mets, A., Sinninghe Damsté, J.S., Schouten, S. (2013) *Organic Geochemistry* 58, 86–88.