Resorcinol specific ^{13}C-composition: New insights into Holocene environmental changes in Tanzania

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Although East African highlands constitute a main freshwater and food source for human population, their climatic and environmental susceptibility remains only partially understood. This study aims at better documenting the relationships between vegetation and environmental changes within the Rungwe province (South-West Tanzania) along the last 4,000 years. As humid environments such as peatbogs and swamps are especially sensitive to climate change, this study focuses on a swampy area: the maar crater of Kyambangunguru. We developped the quantification and the ^{13}C-compound specific isotope analyses of 5-*n*-alkyl-resorcinols that are considered as biomarker typical for sedges in East African humid environments.

Resorcinols were isolated from the intermediate polarity hydroxylated lipids by semi-preparative high-performance liquid chromatography using an Inertsil Diol column (GL Sciences), according to a protocol adapted from litterature. An aliquot of the intermediate polarity fraction was trimethylsilylated prior to GC-MS analyses for biomarker identification and quantification. Specific resorcinol isotope composition was determined by GC-C-IRMS.

5-*n*-alkylresorcinols displayed concentrations covariating with Cyperaceae pollen abundance, validating their use as biomarkers of this sedge family. Preliminary analyses of resorcinol specific isotope composition show contrasted δ^{13}C values for resorcinols during the last 4.000 years, pointing to different photosynthetic pathways for *Cyperus* species around the maar crater over the Holocene. Resorcinol homologues with different chain length exhibit isotope composition differing by up to 15‰ along the profile. As a result, the various *Cyperus* species developing around the crater probably synthesize different resorcinol chain lengths and/or adapt differently to variations in environmental conditions. Additional GC-C-IRMS analyses of resorcinols isolated from the core and from the surrounding vegetation should help in precising (1) paleovegetation changes during the Holocene, as well as (2) ecological plasticity of *Cyperus* species.