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Atmos. Chem. Phys., 6, 1003-1019, 2006

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## Functional group analysis by H NMR/chemical derivatization for the characterization of organic aerosol from the SMOCC field campaign

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**Abstract.** Water soluble organic compounds (WSOC) in aerosol samples collected in the Amazon Basin in a period encompassing the middle/late dry season and the beginning of the wet season, were investigated by H NMR spectroscopy. HiVol filter samples (PM<sub>2.5</sub> and PM<sub>>2.5</sub>) and size-segregated samples from multistage impactor were subjected to H NMR characterization. The H NMR methodology, recently developed for the analysis of organic aerosol samples, has been improved by exploiting chemical methylation of carboxylic groups with diazomethane, which allows the direct determination of the carboxylic acid content of WSOC. The content of carboxylic carbons for the different periods and sizes ranged from 12% to 20% of total measured carbon depending on the season and aerosol size, with higher contents for the fine particles in the transition and wet periods with respect to the dry period. A comprehensive picture is presented of WSOC functional groups in aerosol samples representative of the biomass burning period, as well as of transition and semi-clean atmospheric conditions. A difference in composition between fine (PM<sub>2.5</sub>) and coarse (PM<sub>>2.5</sub>) size fractions emerged from the NMR data, the former showing higher alkylic content, the latter being largely dominated by R-O-H (or R-O-R') functional groups. Very small particles (<0.14 μm), however, present higher alkyl-chain content and less oxygenated carbons than larger fine particles (0.42–1.2 μm). More limited variations were found between the average compositions in the different periods of the campaign.

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Citation: Tagliavini, E., Moretti, F., Decesari, S., Facchini, M. C., Fuzzi, S., and Maenhaut, W.: Functional group analysis by H NMR/chemical derivatization for the characterization of organic aerosol from the SMOCC field campaign, Atmos. Chem. Phys., 6, 1003-1019, 2006. ▣ [Bibtex](#) ▣ [EndNote](#) ▣ [Reference Manager](#)

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