Geophysical Research Abstracts, Vol. 9, 03209, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-03209

Monosaccharide Anhydrides determined at the pg/g level in Epica Dome C ice

R. Zangrando (1), A. Gambaro (1,2), P. Gabrielli,(2), **C. Barbante**,(1,2), C. F. Boutron (3,4) and P. Cescon (1,2)

(1) Department of Environmental Sciences, University of Venice, Ca' Foscari, 30123 Venice, Italy, (2) Institute for the Dynamics of Environmental Processes-CNR, University of Venice, Ca' Foscari, 30123 Venice, Italy, (barbante@unive.it) (3) Laboratoire de Glaciologie et Géophysique de l'Environnement (UMR CNRS/ Université Joseph Fourier 5183) 54, rue Molière, B.P. 96, 38402 St Martin d'Heres cedex, France, (4) Unité de Formation et de Recherche de Physique et Observatoire des Sciences de l'Univers (Institut Universitaire de France) , Université Joseph Fourier, Domaine Universitaire, B.P. 68 38041 Grenoble, France

On a global basis, biomass burning is a significant source of particulates to the atmosphere, which may produce a global climate impact by mostly absorbing radiation but by also acting as cloud condensation nuclei. They often affect regional and local air quality.

Pyrolysis compounds also derived from the biomass burning are dominant smoke tracers in continental airshelds, among them are monosaccharide anhydrides (MA): levoglucosan (1,6-anhydro-β-D-glucopyranose) produced from the thermal breakdown of cellulose, galactosan (1,6-anhydro-β-D-galactopyranose) and mannosan (1,6-anhydro-β-D-mannopyranose) derived from the combustion of emicellulose. They are very important as tracers for correlating the particulate matter with biomass burning, as they can not be generated by non-combustive process or combustion of other materials (e.g. fossil fuels). The emissions can be transported long distances and affect areas far away from the actual biomass burning events; so tracers are important tools in tracking the transport of particles produced by biomass burning.

In this work a liquid chromatography – electrospray ionization – tandem mass spectrometry (LC-ESI-MS/MS) method was developed using an Agilent 1100 Series HPLC system (Agilent, Böblingen, Germany) coupled with an API 4000 triple quadrupole mass spectrometer (Applied Biosystems/MDS SCIEX, Toronto, Canada)

for the determination of MA in less than 1 ml of molten Antartic ice without the need of any kind of preconcentration. The method was validated by estimating the linearity of response, limit of detection, repeatability and accuracy.

MA were determined in three outer layers and in the inner core of the Antarctic ice sections (Epica Dome C ice), at the concentration of pg/g; higher concentrations were observed in a glacial sample and lower concentrations in an interglacial sample.