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Phenolic compounds in Ross Sea water

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Phenolic compounds are semi-volatile organic compounds produced during biomass burning and lignin degradation in water. In atmospheric and paleoclimatic ice cores studies, these compounds are used as biomarkers of wood combustion and supply information on the type of combusted biomass. Phenolic compounds are therefore indicators of paleoclimatic interest. Recent studies of Antarctic aerosols highlighted that phenolic compounds in Antarctica are not exclusively attributable to biomass burning but also derive from marine sources. In order to study the marine contribution to aerosols we developed an analytical method to determine the concentration of vanillic acid, vanillin, p-coumaric acid, syringic acid, isovanillic acid, homovanillic acid, syringaldehyde, acetosyringone and acetovanillone present in dissolved and particle phases in Sea Ross waters using HPLC-MS/MS. The analytical method was validated and used to quantify phenolic compounds in 28 sea water samples collected during a 2012 Ross Sea R/V cruise.
The observed compounds were vanillic acid, vanillin, acetovanillone and p-coumaric acid with concentrations in the ng/L range. Higher concentrations of analytes were present in the dissolved phase than in the particle phase. Sample concentrations were greatest in the coastal, surficial and less saline Ross Sea waters near Victoria Land.