DISTRIBUTIONS OF EXTRACTABLE ORGANIC COMPOUNDS IN AIRBORNE PARTICULATE MATTER OVER THE STRAITS OF MALACCA, SOUTH CHINA SEA AND SULU-SULAWESI SEAS

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ABSTRACT

The solvent-extractable hydrocarbons of 26 atmospheric samples, collected during a 2 months cruise starting from the Straits of Malacca, South China Sea and ends at Sulu-Sulawesi Seas were analyzed to determine the sources and distributions of homologous compounds series. The atmospheric aerosols were collected using a standard high volume air sampler at the rate of 1.13 m^3/min for 24 hours. The filters with suspended particles were then extracted by ultrasonic agitation with dichloromethane and analyzed using gas chromatography-mass spectrometry. The particulate matter contains mainly fatty acids, *n*-alkanes and low levels of *n*-alcohols, *n*-aldehydes and aliphatic ketones derived from both natural and biomass burning emissions. Long chain aliphatic compounds were predominant in all the air particulate extracts, which could be attributed to terrestrial plant waxes. Aliphatic lipids from phytoplankton, algae and bacteria were also present in significant quantities.

ABSTRAK

Hidrokarbon-hidrokarbon yang boleh diesktrakkan dari 26 sampel atmosfera yang dikumpul selama 2 bulan pelayaran bermula dari Selat Melaka, Laut China Selatan dan berakhir di Laut Sulu-Sulawesi telah dianalisa bagi menentukan sumber dan taburannya. Jirim terampai atmosfera dikumpul menggunakan persampel udara isipadu tinggi dengan kadar 1.13 m^3/min selama 24 jam. Kertas turas berserta zarahan itu kemudian diekstrak dengan diklorometana menggunakan kaedah getaran ultrasonik dan dianalisis menggunakan kromatografi gas-spektrometri jisim. Jisim terampai mengandungi kandungan sebatian asid lemak dan *n*-alkana yang tinggi, dan juga sedikit *n*-alkohol, *n*-aldehid dan keton alifatik yang berasal dari semulajadi dan pembakaran biojisim. Sebatian alifatik rantai panjang di dalam partikel udara yang diekstrak boleh dikaitkan dengan lilin tumbuhan daratan. Sebatian lipid alifatik yang berasal dari fitoplankton, alga dan bakteria juga hadir dalam jumlah yang signifikan.

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ABBREVIATIONS

ACL	Average Chain Length
AI	Alcohol Index
C	Carbon
CPI	Carbon Preference Index
C_{max}	Carbon Number Maximum
DCM	Dichloromethane
EI	Electron Ionization
g	Gram
GC	Gas Chromatography
GCMS	Gas Chromatography-Mass Spectrometry
h	Hour
HMW	Higher molecular weight
HPA	Higher Plant Alkane Index
I.D	Internal diameter
LMW	Lower molecular weight
min	Minute
n. a	Not available
n. d	Not detected
sec	Second
SIM	Selected Ion Monitoring
TIC	Total ion chromatogram
TLC	Thin Layer Chromatography
VOCs	Volatile organic compounds