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Measurements of non-methane hydrocarbons over the Pacific Ocean and the Arctic Ocean

Susumu Nozoe[1*], Yoko Yokouchi[1]

[1]NIES

C_2-C_7non-methane hydrocarbons (NMHCs) were measured in marine boundary layer during three research cruises, the Pacific ocean in winter (MR08-06 Legs 1&2), the southern Pacific Ocean in spring (MR09-01) and the Arctic ocean in summer (MR09-03), conducted by R/V MIRAI. The routes of each cruise were from Japan to Chile (MR08-06), from Chile to Australia (MR09-01) and from Japan to Arctic Ocean (MR09-03). Air samples were collected in fused-silica-lined stainless-steel canisters and were analyzed with GC-FID after the cruises. Measured NMHCs were ethane, butane, propane, pentane, ethene, butene, propene, ethyne, hexane, benzene, toluene, ethyl benzene and m-/p-/o-xylene. The averaged mixing ratios of alkanes and benzene in northern hemisphere were higher than those in southern hemisphere as expected from higher anthropogenic activities in northern hemisphere. Over the Arctic Ocean, the mixing ratio of alkanes decreased with increasing latitude. The mixing ratios of ethene and propene which have shorter lifetime than the alkanes did not show significant difference in northern hemisphere and southern hemisphere. This suggests that natural source might be more important for them. The ratios of alkanes with different lifetimes changed drastically, when the origin of air mass changed. More detail considerations for latitudinal/longitudinal variations will be discussed in the session.
We would like to express our great appreciation to the staffs of GODI, and the captain, the crews and the researchers of R/V MIRAI during the research cruises.

Keywords: non-methane hydrocarbon, Pacific Ocean, Arctic Ocean, R/V MIRAI