

Trends and interannual variability of atmospheric methane over the western Pacific: Latitudinal differences in recent regrowth

Yukio Terao[1]; Hitoshi Mukai[1]; Yukihiro Nojiri[1]; Yasunori Tohjima[1]; Toshinobu Machida[1]; Atsuko Sunaga[1]

[1] NIES

National Institute for Environmental Studies (NIES) Center for Global Environmental Research (CGER) has conducted the atmosphere and ocean observation using regular cargo ships on two transects of the Japan-Australia/New Zealand and Japan-North America (volunteer observing ship program). We have been collecting the maritime air samples for measurements of greenhouse gases and CO₂ isotopes by an automatic canister sampling system at the interval of 3° latitudes for Japan-Australia and at the interval of 10° longitudes for Japan-North America, about eight times a year for each transect.

We show trends and growth rates of atmospheric methane (CH₄) from 1994 to 2008 over the western Pacific between 55°N and 35°S. The largest growth event (growth rate of 11-17 ppbv/year) occurred at all latitudes in 1997 and 1998 during El Nino. The second-largest increase is observed in 2005-2007 and we find obvious latitudinal differences: The CH₄ trends have leveled off at the low latitudes in the Northern Hemisphere (from the equator to 15°N), although significant increases (growth rate of 5-13 ppbv/year) for the rest regions, 20°-55°N and 0-35°S. The no increase of CH₄ is simultaneous with a rapid decrease in carbon monoxide (CO) that occurred only in 0-15°N. Other ground-based measurement networks, AGAGE and CSIRO, show that the renewed growth starting near the beginning 2007 at all latitudes [Rigby et al., 2008]. The NOAA ground-based measurements show global increases in 2007 with the exception of Guam station. Thus, the latitudinal differences in recent growth we observed might be characteristic of the western Pacific.