

Controls on methanol and acetone in marine and continental atmospheres

Huiting Mao, Robert Talbot, Carsten Nielsen, and Barkley Sive

We present a regional analysis of CH_3OH and $(\text{CH}_3)_2\text{CO}$ in the New England continental and coastal marine atmospheres. Vegetative emissions over land comprise 60–80% of the daily peak-to-peak differences in the diurnal cycles of these oxygenated hydrocarbons. In the morning downward mixing of remnant boundary layer air over land provides an additional source equal to more than half of the vegetative emission strength. The ocean is both a sink and a source of CH_3OH and $(\text{CH}_3)_2\text{CO}$, with dry depositional losses 2-fold greater than their source counterparts of 0.35 and 0.17 ppbv d^{-1} respectively. Anthropogenic emissions compensate for 59% and 52% of CH_3OH and $(\text{CH}_3)_2\text{CO}$ oceanic sink respectively, whereas over land this source is relatively small compared to substantial vegetative sources. Direct measurements of ocean- and land-air fluxes of CH_3OH and $(\text{CH}_3)_2\text{CO}$ and boundary layer height are needed to better constrain their regional budgets.

GEOPHYSICAL RESEARCH LETTERS, VOL. 33, L02803, doi:10.1029/2005GL024810, 2006