

Measurements of CH₄ Mixing Ratio, D/H and ¹³C/¹²C isotope Ratios in Atmospheric Samples from the Continental United States

S.C. Tyler¹, H.O. Ajie¹, A.L. Rice², and F.-M. Kai¹

¹Department of Earth System Science, University of California, Irvine, CA 92697-3100; 949-824-3256; Fax: 949-824-3256; E-mail: styler@uci.edu

²Department of Oceanography, University of Washington, Seattle, WA 98195-5351; formerly from the University of California, Irvine

Our research group at the University of California, Irvine, has measurement data of atmospheric CH₄ mixing ratio and its $\delta^{13}\text{C}$ and δD values, and CO mixing ratio spanning several years from a variety of sampling platforms [e.g., Gupta et al., *J. Geophys. Res.*, 101(D17), 22,923-22,932, 1996; Tyler et al., *J. Geophys. Res.*, 104, 13,895-13,910, 1999; Tyler et al., *Chemosphere: Global Change Sci.*, 1, 185-203, 1999; Rice et al., *Anal. Chem.*, 73, 4104-4110, 2001; Rice et al., *J. Geophys. Res.*, 108, 4460, doi:10.1029/2002JD003042, 2003]. Here we report measurement data made through our collaboration with CMDL scientists and others at fixed land surface sites located at the midcontinental site Niwot Ridge, Colorado (41°N, 105°W), where there is a record of CH₄ and CO back to 1995 (Figures 1 and 2), a Pacific coastal northern hemispheric site, Montaña de Oro, California (35°N, 121°W), where CH₄ and CO have been measured since 1996, and Pt. Barrow, Alaska (71°N, 157°W), inside the Arctic Circle, where a CH₄ measurement record begins in late 2004. These data, from multiyears approximately bi-monthly sampling, provide information relating seasonal cycling of CH₄ sources and sinks in background air, record long-term trends in CH₄ mixing and isotope ratio related to the atmospheric CH₄ loading, and may indicate regional CH₄ sources.

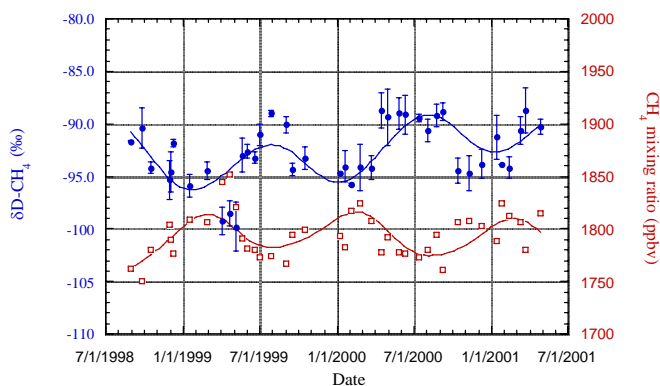


Figure 1. Niwot Ridge, Colorado, $\delta\text{D}-\text{CH}_4$ and mixing ratio versus date.

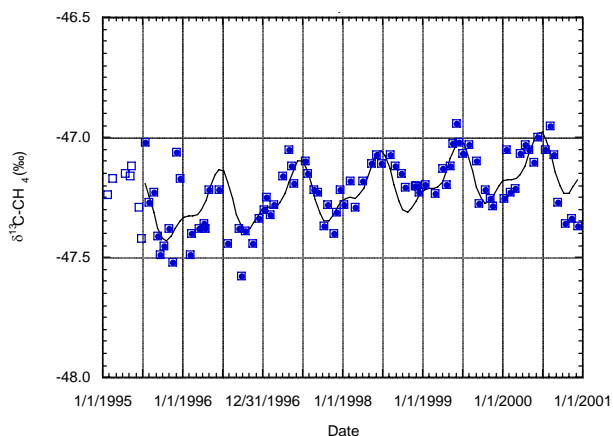


Figure 2. Niwot Ridge, Colorado, $\delta^{13}\text{C}-\text{CH}_4$ versus date.