

Records of Northern Hemisphere Atmospheric Carbon Monoxide Back to ~1950 AD from Greenland Firn Air

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Carbon monoxide (CO) plays a key role in global atmospheric chemistry by being the main sink of atmospheric hydroxyl radicals (OH). Records of past [CO] from both hemispheres are essential for understanding past changes in atmospheric [OH] because the atmospheric lifetime of CO is less than the interhemispheric mixing time. Earlier attempts at reconstruction of northern hemisphere (NH) [CO] suffered from apparent *in situ* CO production in ice and firn. We present a record of high-latitude NH [CO] to ~1950 AD, from measurements by four different laboratories of firn air collected from three different boreholes at the North EEMian (NEEM) ice core site in Greenland. Procedural blanks indicate no detectable [CO] contamination from sampling. Excellent agreement with a firn air record from another cold Greenland site North Greenland Ice Core Project is consistent with the NEEM firn CO record being unaltered. A preliminary analysis of our measurements, interpreted using two different firn air diffusion models, suggests that high-latitude NH [CO]: 1) was ~150 ppb in the year 1950, 2) increased from 1950 to the 1970s, 3) peaked above 160 ppb in the 1970s and 4) gradually declined after the 1970s. Work is in progress to finalize the [CO] reconstruction and interpret the record in the context of historical CO emissions estimates as well as changes in other relevant trace atmospheric constituents.

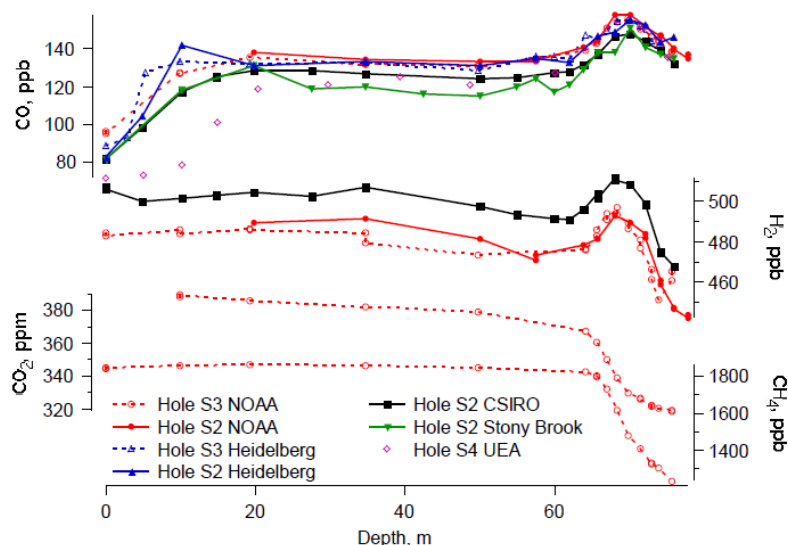


Figure 1. Depth – mixing ratio data for CO from the NEEM 2008 firn air campaign. H₂, CO₂ and CH₄ depth profiles are also shown for reference.