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# Increase in carbon monoxide concentration in the southern hemisphere over the past century

**D. Etheridge** (1), C. Trudinger (1), R. Langenfelds (1), P. Steele (1), D. Ferretti, (2) and A. Smith (3).

(1) CSIRO Marine and Atmospheric Research, Aspendale, Victoria, Australia, (2) National Institute of Water and Atmospheric Research Ltd, Wellington, New Zealand, (3) Australian Nuclear Science and Technology Organisation, Menai, N.S.W., Australia (david.etheridge@csiro.au)

Carbon monoxide (CO) is a short-lived trace gas with major roles in the atmosphere. Its main sink in the troposphere is reaction with hydroxyl (OH), so CO can indirectly affect the levels of other compounds including the greenhouse gases methane and ozone. The main known CO sources are biomass burning, fuel combustion and the oxidation of methane and non-methane hydrocarbons (NMHC), and are presently dominated by human activities. Changes in the atmospheric CO abundance could therefore be expected during the past century. However, detection of long term trends in atmospheric CO has been difficult because of sample storage and handling effects associated with archived air tanks and ice cores. Firn provides large air samples that can be quickly and cleanly collected. We present evidence for a 30% increase in southern hemisphere CO concentrations since about 1930 from firn air. Measurements from three firn sampling projects on Law Dome and one at the South Pole give consistent results and measurements of the air at the snow surface rule out the possibility of artifacts from photochemical production of CO. The increase can be explained by the oxidation of atmospheric methane, the concentration of which has also increased over this period. The combined source of CO from biomass burning, fuel combustion and NMHC oxidation in the southern hemisphere must therefore have been nearly constant during this time.