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MULTIYEAR MODELING AND MEASURING OF CARBON DIOXIDE AND METHANE EXCHANGE AT A POOR FEN

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We have made CO_2 and CH_4 flux measurements with manual chambers at Sallie's Fen, NH, USA at weekly to monthly intervals over the past decade. We have also made quasi-continuous CO_2 flux measurements with an automated chamber flux system for the past three years. Additional ancillary data (temperature, water table depth, incoming radiation, and precipitation) have also been regularly recorded for the past decade. We also ran the PCARS peatland ecosystem model to simulate daily CO_2 and CH_4 exchange for 1997 through 2001. We compare model results to observations, and evaluate interannual variability in CO_2 and CH_4 budgets. Preliminary simulations show annual methane flux varied by about 20% around a 5-year mean of 75 g CH_4-C m^{-2} yr^{-1}. Net C uptake by the fen varied from 50-150 g C m^{-2} yr^{-1}. Using a 100-year global warming potential (GWP) of 1 for CO_2 and 23 for CH_4, the simulated annual GWP of the fen is -650 g CO_2-equiv m^{-2} yr^{-1} for CO_2, $+2300$ g CO_2-equiv m^{-2} yr^{-1} for CH_4, and a net value of $+1650$ g CO_2-equiv m^{-2} yr^{-1}.