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Six year simulation of carbon fluxes for a minerotrophic mire in Northern Sweden using the McGill Wetland Model (MWM)

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Northern peatlands represent one of the largest terrestrial soil carbon pools storing 20-30% of soil carbon, despite covering 3% of the land. To investigate the role of northern peatlands in coupled climate-carbon simulations we have developed a peatland ecosystem model –the McGill Wetland Model (MWM). With inputs of basic weather data, data on water table depth and peat temperature, either from a surface climate model or from observations, MWM calculates photosynthesis and autotrophic and heterotrophic respiration and allocates carbon to moss and vascular plant biomass, litter and peat pools. MWM was originally developed to simulate the carbon dynamics of ombrotrophic peatlands (bogs) but we have modified it to simulate the biogeochemical processes of poor minerotrophic peatlands (poor fens), a peatland type common in boreal and sub-arctic landscapes. The poor-fen version of MWM_is evaluated using the eddy-covariance tower measurements of NEE from Degero Stormyr (64˚11'N, 19˚33'E), in Northern Sweden. The measurement record is continuous from 2001-2006. RMSE for daily NEE is $\sim$0.20 g C m^{-2} d^{-1} and the index of agreement between the observed and simulated NEE is $\sim$85%. This performance is comparable with the one for an ombrotrophic bog, for which RMSE for daily NEE is $\sim$0.15 g C m^{-2} d^{-1} and the index of agreement between the observed and simulated NEE is $\sim$80%. The result suggests that poor-fen MWM captures adequately the magnitude and direction of the CO_2 fluxes and simulates the seasonal and interannual variability reasonably

well. We are currently coupling MWM to a climate model to extend our assessments to the regional and global scale to explore how poor fen carbon biogeochemistry may change in future climates.