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Greenhouse gas emission and mitigation potential of changes in water management for two rice sites in Bangladesh

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Agriculture is one of the main contributors to greenhouse gas (GHG) emissions in Bangladesh and rice production is one of the largest sources of GHG emissions. This study considers measurements from two test sites, situated in Mymensingh (Bangladesh), to calibrate and validate the biogeochemical model DailyDayCent and estimate the mitigation potential of alternative management practices at the sites. There are two different N application treatments on the two test sites, which are on the first site a control with no N application and a mineral fertilizer application (120 kg N ha-1) and on the second site only a mineral fertilizer application (110 kg N ha-1). For mitigation, the water management is modified in a modelling approach to estimate the mitigation potential for reducing GHG emissions. The model shows partial agreement with the observations. The modifications to the water management, by changing from permanent wetting to alternate wetting, shows a decrease in GHG emissions of up to 46 % and 37 % for the two test sites, respectively. These tests enable an optimization of the management options to reduce the GHG emissions while maintaining yields.