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Combining low-N2 background and 15N soil gas flux - lessons from the field

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Accurate models of soil N cycling are an important tool for optimizing N use efficiency within agricultural systems and predicting N emissions to the environment. However, due to the methodological limitations for the measurement of N_2 emissions, in particular high atmospheric N_2, only a very limited number of soil N2 flux datasets are available to validate model estimates of denitrification. As part of the DFG-research unit "Denitrification in Agricultural Soils: Integrated Control and Modelling at Various Scales (DASIM)", we are building on existing methods to take *in situ* measurements of denitrification under a variety of field conditions, with an emphasis on the detection of non-peak events. Using static chambers, we establish a low-N_2 background through headspace and soil flushing, and then use stable isotope techniques (natural abundance and ^{15}N labeling of the soil mineral N pool) to assess the response of soil denitrification to combinations of climate, soil and plant factors found in the field. Here we present results of N_2 and N_2O fluxes from the field, which highlight both the potential and the challenges of using this combined method.