The aim of the work presented here was to simulate with biogeochemical process-oriented models a potential change of NO and N\textsubscript{2}O emissions from agricultural and forest soils in Southern Germany caused by a regional change of climate predicted for the near future.

**Regional climate change**

The regional climate for southern Germany was calculated for the periods 1991 to 1999 and 2031 to 2039, respectively, with the regional climate model MCCM (e.g. Grell et al., 2000) in a 20 km x 20 km resolution, using frame input data of the global circulation model ECHAM4. The future climate change scenario was calculated according to the IS92a scenario of the IPCC. The predicted change of mean annual surface temperature and precipitation is shown in the two figures on the right.

**Biogeochemical process modelling**

Biogeochemical modelling of N trace gas emissions was performed with the process-oriented models DNDC for agricultural soils (e.g. Li, 2000) and PnET-N-DNDC for forest soils (e.g. Li et al., 2000; Stange et al., 2000; Butterbach-Bahl et al., 2004). All input parameters and model drivers required for the calculation of regional inventories of NO and N\textsubscript{2}O emissions (e.g., administrative boundaries, land use, land management, forest structure and age, soil properties, meteorology) were gathered in a GIS database. Specific attention was paid to a most realistic representation of agricultural practices (e.g. timing of sowing/ harvest, amount and timing of fertilizer application etc.). See image below for details.

**Conclusions**

A likely regional climate change scenario for the near future for southern Germany revealed an increase of mean annual surface temperatures mainly in the southern part of the study area, and an increase of precipitation mainly in the northern part. As a consequence two counteracting processes will be promoted, the one is the stimulation of NO and N\textsubscript{2}O formation by higher soil temperatures, and the other is the inhibition of NO and even more of N\textsubscript{2}O formation by lower soil humidity due to more frequent and prolonged summer drought events expected in the future. For a specific location the interaction of these two processes will determine the rate of change of NO and N\textsubscript{2}O emissions, but from our work we can conclude that the stimulation of N trace gas emissions from agricultural and forest soils in Southern Germany will on average increase slightly to significantly under the predicted future climate.

**References**


