

First Results of Tall Tower Surface-atmosphere N₂O Flux Measurements over a Mixed Agricultural Region in Central Europe

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In summer 2015 an eddy covariance (EC) system was put into operation at the Hungarian tall tower greenhouse gas monitoring site (Hegyhátsál - 46°57'N, 16°39'E, 248 m a.s.l.) to monitor the vertical flux of nitrous oxide (N₂O). The N₂O EC system is co-located with a previously installed EC system that monitors the surface/atmosphere exchange of carbon dioxide (CO₂) at 82 m above the ground. The high-elevation, large-footprint EC systems are primarily intended for the monitoring of the net fluxes of the mixed agricultural fields surrounding the tower and characteristic for an extended region. Monitoring of the greenhouse gas exchange of a typical mixture of different agricultural fields might better support the estimation of the regional/national level emission than that of specific ecosystems. It also contributes to the development and validation of ecosystem models. Both EC systems are precisely calibrated and also suitable for the long-term monitoring of the atmospheric concentrations. The poster focuses on the first results of the N₂O flux measurement system describing the setup, presenting the temporal variations in both the concentration and the vertical flux, as well as the upgraded version of Biome-BGCMuSo process oriented biogeochemical model (Hidy et al., 2016) extended for the simulation of the full nitrogen budget of the ecosystems. The available data series (covering the period of Jul, 2015 - Dec, 2016) indicate 0.95 ppb/year concentration trend. The annual N₂O emission for year 2016 was ~340 mg/m².

Hidy, D. et al., 2016: Terrestrial ecosystem process model Biome-BGCMuSo v4.0: summary of improvements and new modeling possibilities. *Geoscientific Model Development* 9, 4405-4437. doi:10.5194/gmd-9-4405-2016

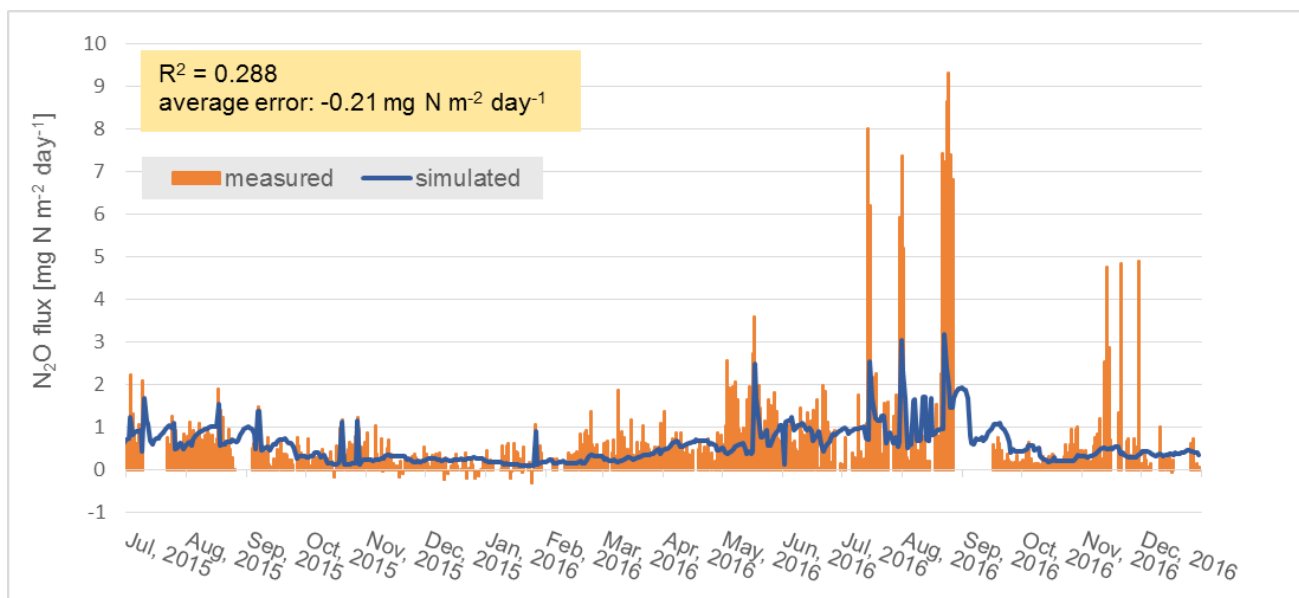


Figure 1. Measured and modelled N₂O flux of the agricultural fields surrounding Hegyhátsál greenhouse gas monitoring site.