Geophysical Research Abstracts
Vol. 19, EGU2017-5143, 2017
EGU General Assembly 2017

How does different arable management affect potential N mineralisation?

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The production of food and animal feed on agricultural soils and an increasing need to generate biomass for material and energy use on the limited resource soil require optimal nutrient storage and cycling. Especially nitrogen (N) should be managed as accurate as possible to ensure beneficial yields and product qualities and to avoid adverse environmental effects, e.g. N leaching into waters and gaseous losses into the atmosphere. One biological indicator to assess the site specific potential to release N is the "potential N mineralisation". This parameter can be measured by routine analysis with the anaerobic incubation method (KEENEY, 1982), modified according to KANDELER (1993) on dried soils. The results of the potential N mineralisation measurements can be classified (high: > 70 mg N kg-1 7 d-1, medium and low: 35–70 mg and $\leq$ 35 N kg-1 7d-1, respectively) according to the Austrian guidelines for appropriate fertilisation (BMLFUW, 2017). The results of this biological soil parameter provide information about soil fertility and the nutrient status to the farmers and can be used to adjust N fertilisation recommendations.
Furthermore, AGES runs long-term field experiments since several decades. We have evaluated the effects of different agricultural management, such as organic and mineral fertilisation and tillage, on the potential N mineralisation at different sites in Austria. Our results indicate that the potential N mineralisation increases significantly after long-term organic fertilisation (farmyard manure (FYM)), after long-term incorporation of crop residues and the reduction of tillage.