Geophysical Research Abstracts
Vol. 15, EGU2013-7333, 2013
EGU General Assembly 2013

N_{trace} a ^{15}N tracing model to analyse gross N transformations and sources of gaseous N emissions

Christoph Muller

Department of Plant Ecology, Justus-Liebig University, Giessen, Germany, (Christoph.Mueller@bot2.bio.uni-giessen.de)

Anthropogenically generated reactive nitrogen (N) cascades throughout the global environment ...(Galloway and Cowling, 2002). This reactive N may be lost from ecosystems via leaching, as nitrate (NO_3^-), or in gaseous forms such as ammonia and nitrous oxide (N_2O) and the loss is governed by the N dynamics of the system. Thus, to be rendered environmentally benign NO_3^- must be reduced to a non-reactive form, dinitrogen (N_2) which requires the evaluation of three major biological pathways of NO_3^- reduction: i) assimilatory NO_3^- reduction into biomass, ii) dissimilatory NO_3^- reduction to NH_4^+ (DNRA) and iii) dissimilatory NO_3^- reduction to N_2 (denitrification) ...(Burger and Jackson, 2004).

Advanced techniques based on ^{15}N tracing in combination with suitable model analyses are the method of choice to analyse complex N interactions and simultaneous N transformation process. Techniques are based on dilution – enrichment principles and usually rely on the simultaneous labelling of various N pools. The data sets are then analysed by suitable ^{15}N tracing models which allow the individual N transformation rates to be calculated based on realistic kinetic settings. The ^{15}N tracing model N_{trace} has been developed to analyse the simultaneously occurring N transformation rates in soil-plant systems and includes submodels for the evaluation of the processes associated with gaseous N emissions. The ^{15}N tracing model and some typical model results will be presented.

Literature cited

.Burger, M., and Jackson, L. E. (2004). Plant and microbial use and turnover: rapid conversion of nitrate to ammonium in soil with roots. *Plant and Soil* **266**, 289-301.

Galloway, J. N., and Cowling, E. B. (2002). Reactive nitrogen and the world: 200 years of change. *Ambio* **31**, 64-71.

.