Biogeosciences Discuss., 9, C2578–C2579, 2012
www.biogeosciences-discuss.net/9/C2578/2012/

Biogeosciences Discussions

Interactive comment on "Estimating nitrogen fluxes at the European scale by upscaling INTEGRATOR model outputs from selected sites" *by* G. J. Reinds et al.

Anonymous Referee #1

Received and published: 19 July 2012

The aim of the paper is to show that a limited statistical sample of 450 sites can be used to give a representative estimate over Europe of total N inputs, N uptake by crops, emission of N2O, NH3, and NOx, and losses of N to ground water and surface water from arable land. The cluster analysis approach used to select the 450 sites is described, with 3 sites for each of 50 clusters for arable, grassland and nature respectively. It is suggested that inter-comparison of a wider range of more complex models could be made much easier with more feasible requirements for computing resources by focusing on this limited sample of sites. There are some points of clarification needed: i)The INTEGRATOR model is partly based on MITERRA Europe which allows for different ways of applying manures and slurries affecting NH3 emissions etc. How are

these allowed for in INTEGRATOR? ii) INTEGRATOR estimates N deposition based on source0 receptor relationships from the EMEO model. But this seems to be missed out in the cluster analysis methods used in this paper? (See comments below re natural/forest sites) iii) A bit more explanation is required for the ,/(T+To) factor, where To=7 seems to be a rather arbitrary adjustment to avoid square roots of negative numbers. I presume T is annual average temperature in degrees centigrade? Similarly more explanation required for the form of equation 2. iv) The paper distinguishes arable, grassland and nature but in the statistical analysis "nature" seem to equate to "forest"? v) The application of the model to nature/forest seems to be somewhat artificial in that the N deposition is not included despite being an important factor for natural ecosystems? Does this approach really tell us anything useful about these "natural" areas, and if they were just missed out what difference would it make to the totals estimated at a EUROPEAN level? I can see you need to include representative sites for these areas for comparison of more detailed modelling that treats them more specifically, but is your cluster analysis suitable for selecting "nature sites" for more general use in model inter-comparisons when it treats them in a very restricted way?

Interactive comment on Biogeosciences Discuss., 9, 6335, 2012.