

## ***Interactive comment on* “The influence of model grid resolution on estimation of national scale nitrogen deposition and exceedance of critical levels” by A. J. Dore et al.**

### **Anonymous Referee #3**

Received and published: 1 February 2012

Review of the article: “The influence of model grid resolution on estimation of national scale nitrogen deposition and exceedance of critical levels” by A. J. Dore, M. Kryza, J. R. Hall, S. Hallsworth, V. J. D. Keller, M. Vieno, and M. A. Sutton

### General remarks:

The undertaken subject is both scientifically interesting and politically important. From the scientific point of view the authors provide an interesting numerical and graphical experiment specifying the impact of spatial representation of nitrogen deposition on the extent and magnitude of ecosystems risk to their structure and functioning. This risk is defined by the exceedance of empirical critical loads of nitrogen, an internation-

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ally accepted quantitative measure of ecosystems sensitivity to actual or forecasted depositions of nitrogen.

The magnitude and regional extent of critical loads exceedance is a basic factor to set the environmental targets in negotiating further environmental improvements through technical emission reduction measures. Thus, it is a political well-tried tool in the negotiations of the Gothenburg Protocol of the UN LRTAP Convention and the EU NEC Directive. In these negotiations the EMEP 50 km grid was used for the nitrogen deposition spatial representation confronted with 5-percentile critical load values also aggregated to 50 km grid. So, the resulting exceedances were spatially reflected in the 50 km grid also. For countries which calculated and mapped critical loads with a finer resolution defined by a grid cell of 1km<sup>2</sup> size it was intuitively felt that the aggregation of critical loads to 50 km grid and the 50 km gridded nitrogen depositions will lead to some overestimation of the exceedance and in particular its regional extent. The conclusions of this study provide evidence to support this speculations.

Specific comments:

The scientific background of the manuscript refers to the BIOGEOSCIENCE thematic scope.

The title is not precisely reflecting the main subject of the manuscript which is addressed to exceedance of critical loads instead of critical levels.

On top of the page 12082 I would suggest to add point 3. with a definition what exceedance of critical load means to ecosystems according to (UBA, 2004).

On page 12082 line 10 I would introduce a message that for all the following text the term nitrogen critical load will hold for experimental critical load of nitrogen only, for clarity.

I would suggest to revise the wording in line 23 of page 12094 to the following: "... for local studies on acidifying and eutrophying effects of nitrogen deposition ..."

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Taking into account the other aspects of the manuscript quality I found that it is written in a smooth and explicit language, the methodology is relatively exhaustively described and the conclusions drawn support the scientific and practical significance of the studies reported in the manuscript.

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Interactive comment on Biogeosciences Discuss., 8, 12079, 2011.

**BGD**

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