

## ***Interactive comment on “Chemical footprints of anthropogenic nitrogen deposition on recent soil C : N ratios in Europe” by C. Mulder et al.***

**A. Neftel (Editor)**

albrecht.neftel@agroscope.admin.ch

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The paper tries to bring light into an interesting topic that seems trivial at a first glance. Does the C:N ratio in the top soil reflect the systematic increase of atmospheric N deposition? The authors present a cluster analysis and try to combine information on the spatial trend of N-deposition based on the EMEP model with about 20'000 soil profiles across Europe. The statistical analysis needs to bring together two different things, a spatial distribution of soil C:N ratio at a given time with a N-deposition trend (divided into three categories) on a rather coarse grid over Europe. C:N ratio in a specific soil core reflect an integrated time history on a very local scale. N deposition processes are necessarily over smoothed by the used model approach. The idea of the statistical analysis needs to be presented in a way that it is transparent also for

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interested reader without a strong statistical background. How you can convince the readers that the observed spatial pattern of C:N ratios in the soil is causally linked with the N-deposition? Especially the figures need to be better explained, how are the clusters defined, what are the mass units? Half of the 20'000 soil sites are coming from soils that are classified as unmanaged, thus not from intensively managed agricultural land. I guess that many of the so called unmanaged sites have been affected by anthropogenic activities, e.g. alp meadows etc. It is important to give more details on the soil sampling procedure, what was sampled, the top soil, profiles etc.

The papers addresses an important topic well in scope of BG. The presented analyses are showing promising results, but the paper needs to be substantially improved in order to be published in BG.

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