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Interactive comment on “Managing soil nitrate with cover crops and buffer strips in Sicilian vineyards” by A. Novara et al.

Anonymous Referee #2

Received and published: 17 May 2013

General comments: The paper is focused on a relevant problem of vineyard and environmental management in Mediterranean climate. It has relevant theoretical and practical implications, and in my opinion is fully relevant for a publication in SE. I think that the experimental scheme, the sampling size, and the treatments under examination are fully appropriate for new achievement in the field of vineyard management. The use of ^{15}N as a tracer gives important confirmations to the results. The results are presented in depth, and the conclusions are innovative and relevant. Nevertheless, there are several points that need some clarification before acceptance. First of all, I found the abstract not sufficiently explicative, and is really difficult to understand what is the experimental scheme. After, I think that more clarifications in the statistical analysis are needed, in particular regarding the analysis of ANOVA requirements, and the criteria used for multiple comparison. Another important consideration is about the

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consideration at page 260, lines 20-25. Please give a little bit more information about the NO₃ concentration in groundwater. The data in fig. 1 are obtained from a well or a piezometer in the site or represent an average condition of a wider area? In the first case, are they due to vertical recharge only, and really due to agricultural activities? I don't know the groundwater structure in Sicily, but the reported values are very high, greater than that are reported in critical areas with very high intensity of livestock. Minor comments As a premise, I fully agree with the detailed work done by the Referee #1. Page 261, lines 23-28. The experimental scheme is for sure an RCB one for the effect of cover crop, but is a split-plot when the subplots are presence/absence of buffer strip is analyzed: please, anticipate here this difference, because the reader can suppose an error in the interpretation of the data scheme. This doubt is totally dissipated only at line 15 of page 262. Page 263, lines 20-25: it is not clear if the differences among nitrate contents are referred to an average of all sampling or to someone else. Page 267, lines 1-5. The reported standard deviation for 15N differs for a factor of 10. I have some doubt that the assumption of homogeneity of variances needed for ANOVA is not meet. My impression is confirmed by the error bars in figure 4 and 5. Or have the Authors used a mixed model there the structure of covariance matrix is considered? Table 1: the caption is not sufficient to understand what is reported in the table. The word "Altitude" is present only in this caption. IN the description of the experimental scheme there is the need to describe this factor. Moreover, factor like "altitude" (if I understand well, this factor is represented by the 3 sampling point within each plot) is impossible to correctly randomize, so a more in depth consideration could be done about this effect.

Interactive comment on Solid Earth Discuss., 5, 257, 2013.

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