

Interactive comment on “Land use change associated with urbanization modifies soil nitrogen cycling and increases N₂O emissions” by Lona van Delden et al.

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The authors would like to thank reviewer 2 for the great feedback. We agree on all of the mentioned suggestions and would prepare the revised manuscript accordingly. The detailed response is as follows:

1. Title modification “Urbanization related land use change from forest and pasture into turf grass modifies soil nitrogen cycling and increases N₂O emissions”
2. CEC of the soil

CEC analysis will be included into the site description (Table 1) for each soil profile horizon. However, the sandy topsoil showed very low CEC between 0.9 and 4 meq+

C1

100g⁻¹. Even the subsoil (B horizon) with high clay content barely reached 12 meq+ 100g⁻¹. The most occurring clay in the highly weathered soils of Australia is kaolinite with a low CEC of approximately 10 meq+ 100g⁻¹ (Moore et al. 1998).

These CEC results will be included into the text:

In the Materials and Methods section: “The cation exchange capacity (CEC) was determined based on Rayment and Higginson (1992).”

In the Results section: “The CEC of the sandy topsoil is very low, and slightly higher in the A1 compared to the A2 horizon due to the higher soil organic matter as indicated by the total C and N content.”

In the Discussion section: “The low CEC of the sandy topsoil highlights the minor nutrient holding capacity of this peri-urban environment.”

3. Minor comments will be incorporated as follows:

- a. heat
- b. turf grass industry
- c. illustrate
- d. two-thirds of the N content
- e. “NH₄⁺ and NO₃⁻ were extracted from the soil using a 1:5 KCl solution with 20 g of fresh soil with additional soil moisture determination at 105°C to identify the dry soil weight for the mineral N calculation as described by Carter and Gregorich (2007).” And “Total C and N content of air dried soil and plant material was determined by dry combustion (CNS-2000, LECO Corporation, St. Joseph, MI, USA) from ground samples.”
- f. possibly
- g. We agree on the advantage of a N balance for these systems. However, as reviewer

C2

1 highlighted, this study did not quantify nitrate leaching, which seems to be one of the major N losses in these systems. Therefore, a rough calculated N balance based solely on fertilizer input and N₂O emissions would not be representative but will be subject for further research.

4. The bibliography will be updated to make sure the Copernicus output style matches the authors reference list

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