

Interactive comment on “Using soil water isotopes to infer the influence of contrasting urban green space on ecohydrological partitioning” by Lena-Marie Kuhlemann et al.

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We thank reviewer 1 for their comments.

We are pleased that the reviewer recognises that our study presents an “incredible amount of data” and that we carry out a “valid analyses” of these. We also appreciate the limited number of major and minor comments on technical aspects of the paper that we feel that we can easily address in review.

However, the reviewer expresses more fundamental concern about how we contextualise (and then discuss) the motivation behind this work in terms of urban ecohydrology

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and urban water management. These concerns revolve around the following issues: (1) the introduction provides a broad background to urban water management issues, many of which, in the reviewer's opinion, are of minor relevance to the study presented (e.g. green infrastructure, urban drainage etc.), making the motivation for the work is unclear. (2) Our study plots happen to be in an urban area and are not subject to many common urban pressures (e.g. receiving storm drainage, compaction etc.). (3) We make inappropriate and unsupported inferences about drought stress on the tree plot and possible need for irrigation. (4) We inappropriately compare the isotopic element or our work to results from irrigation studies in other urban settings. We address these in turn.

1. Context

In retrospect we can see that our introduction is too broad and needs to be shortened and re-focused in revision. However, we were trying to set the issue of water partitioning in urban green space in the broader context of issues for urban water management. In this regard, we, like Berlin's water managers, view "green infrastructure" more broadly than technical structures, to include all green space affecting water partitioning. In this regard, we see our work contributing to the growing (but still limited) number of studies assessing water partitioning in contrasting urban green space. Moreover, a fundamental motivation was to use isotopes as tools to help in this, again because there are so few urban studies. While we see that introduction could cause confusion on the motivation of the work, we would argue that the title of the paper and the objectives the study are actually quite clear.

2. Urban setting

Whilst the reviewer is correct that our plots are not irrigated, compacted or in receipt of storm drains, they are still typical of tree, shrub and grassland in managed urban green space in a major European city. Thus, they are not natural vegetation, have small dimensionality, and are subject to urban climate effects, artificial soil debris etc.

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Moreover, they are typical of the majority of Berlin's urban vegetation, in not being irrigated and not in receipt of storm runoff. They are clearly informative urban study sites, that form part of the green infrastructure. We will emphasise these issues on revision.

3. Drought stress on trees

The reviewer is right that we have limited information on this and no proof, though we would highlight that our comments on the water-limitation on trees were suitably circumspect. But we do feel that the issue is worth raising in that it provides a potential explanation why the ET under trees was not significantly greater than from the grassland. The point we are making is that with climate change, vegetation that has been sustainable in the past, may no longer continue to be. However, we will be even more circumspect in revision.

4. Comparison to irrigation studies

The reviewer questions the comparison of our work to other papers where isotopes have been used to assess the effects of urban irrigation. The issue here is that these are some of the very limited number of isotope studies in urban settings that we can actually compare our work to, and so help evaluate the potential of isotopes in urban ecohydrology. Of course, there are a plethora of isotope studies in more natural settings in a wide range of geographical regions, most of which are irrelevant to the study site. Hence, we refer to some of the studies more relevant to Berlin. On revision, we will search the literature for any very recent, potentially relevant studies.

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