Legend

Reviewers' comments

Authors' responses

Direct quotes from the revised manuscript

Reply to Reviewers' comments (Reviewer#1)

Reviewer #1: For final publication, the manuscript should be accepted as is.

Response: Thank you for your positive feedback and recommendation for final acceptance. We sincerely appreciate the time and effort you invested in reviewing our manuscript. Your thoughtful comments and suggestions helped us clarify our methods and results, ultimately enhancing the overall quality of the work. We are grateful for your support and valuable insights.

Reply to Reviewers' comments (Reviewer#2)

Reviewer #2: I thank the authors for their revisions. I think the paper, despite its limitations, makes a useful contribution and should be published. Please consider the below points in this process.

Response: We would like to thank the reviewer for their positive feedback and for recognizing the value of our dataset. We have carefully considered the suggestions made by the reviewer and incorporated them to the best of our ability.

Reviewer #2: the figures still have low quality. Export them in 300dpi and a reasonable format (ideally vector) and they will still come a bit better. This seems like low-hanging fruit to make the work look more professional.

Response: We sincerely appreciate the reviewer's comment. We would like to clarify that all figures were originally produced and exported at a resolution of at least 600 dpi (often higher). However, it appears that the conversion to PDF during the submission process may have inadvertently reduced their quality. In response to the suggestion, we ensured that the figures are submitted at high resolution. We have also submitted the figures separately in high resolution (600 dpi).

Reviewer #2: Figure 1: The fitting of H vs dH/dt is odd. I understand that strong correlations (that are accepted) and weak correlations (that are rejected) exist, but the current fitsshow how well do variations in H fit dH/dt rather than the other way around. As a result, very low correlations get very steep slopes of fitted lines (while normally they should be very horizontal instead). It won't change the overall results, but it's just odd at present.

Response: We thank the reviewer for their note regarding Figure 1. We appreciate their observation that the correlation could be more intuitively represented by interchanging the axes. In the revised

figure, we have swapped the axes to make it consistent with the conventional representation of dH/dt vs. H relation.

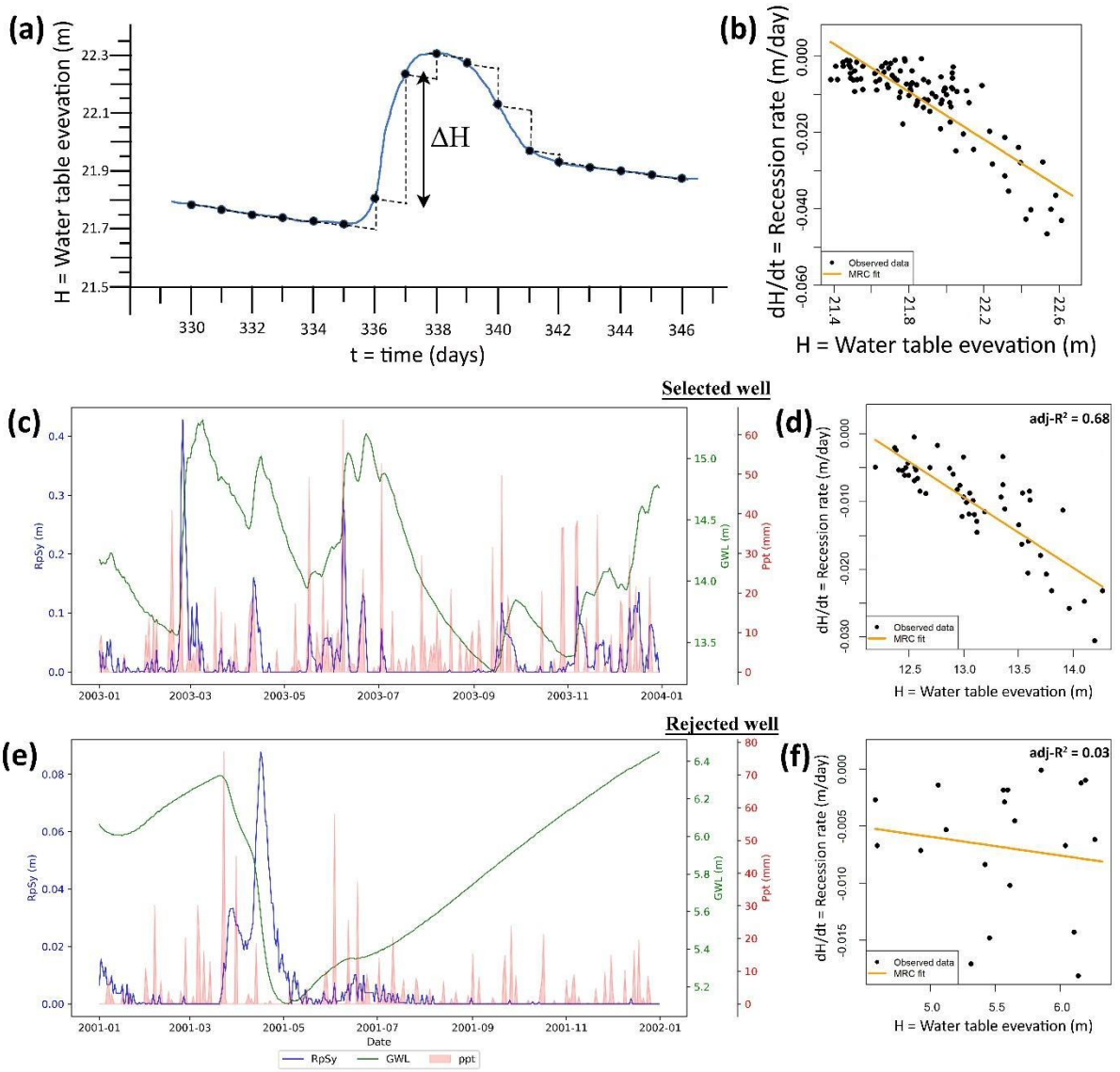

Figure 1: (a) Schematic representation of ΔH evaluation in the WTF method, which is then used to obtain daily groundwater recharge using Eqn 1, (b) a typical dH/dt vs. H plot used to derive the MRC. The hydrographs (c) and (e) show daily groundwater level (GWL, in m), precipitation (Ppt, in mm), and estimated recharge per unit specific yield (RpSy, in m, discussed later) for a selected and a rejected well, respectively. Here, selection/rejection is based on representativeness of the MRC, which here is determined based on an adj-R2 value of 0.2. (d) and (f) show the dH/dt vs. H plot for the corresponding selected and rejected wells, respectively.

Reviewer #2: Units of figure 4 are %/month.

Response: Thank you for your feedback regarding Figure 4. Following the reviewer's concern, we have taken steps to enhance clarity and consistency. Specifically, we have converted the percentage units to fractions and updated the axis labels to "Monthly fraction of USGS recharge" and "Monthly fraction of RpSy."

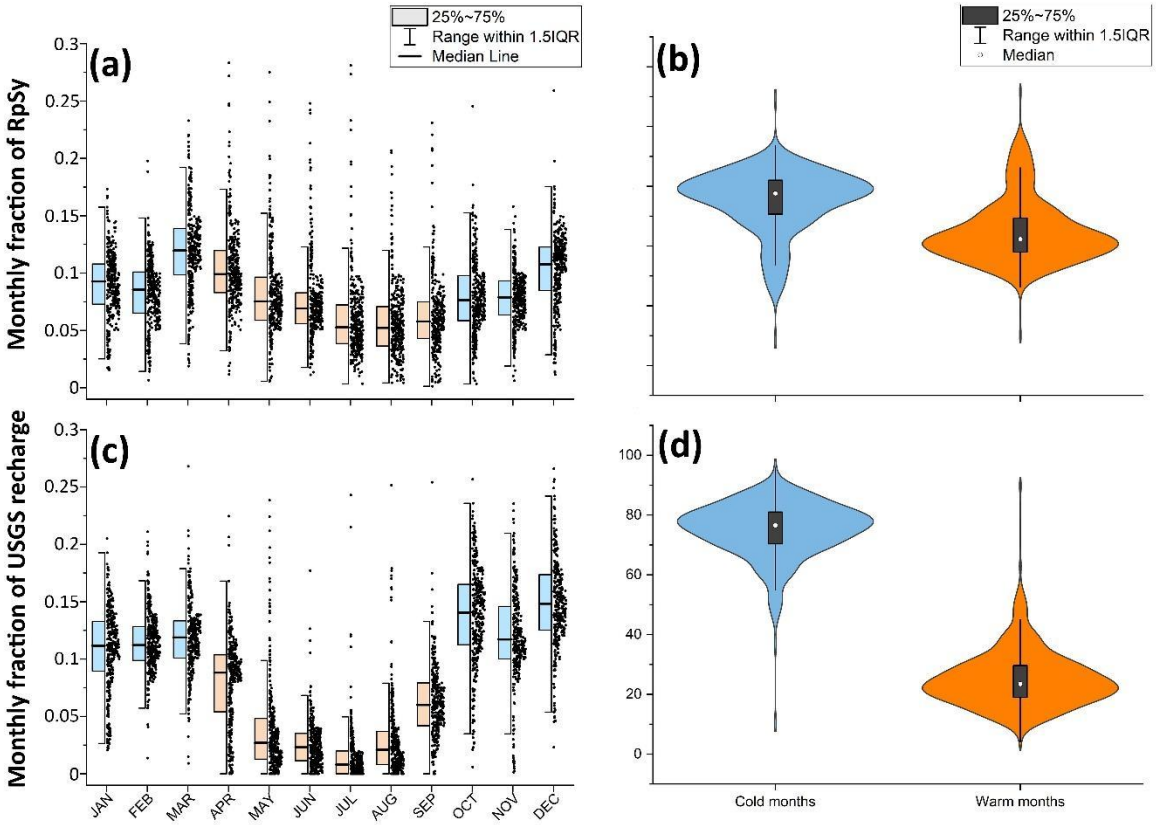

Figure 4: Fraction of recharge in different months and seasons (i.e., Cold seasons (Oct to Mar), Warm-season (Apr to Sept)) relative to the total recharge(/equivalents) for Recharge per unit specific yield (RpSy) (top, a and b) and USGS (bottom, c, and d) recharge products. In this plot, USGS recharge data for the grids with RpSy estimates are used. IQR indicates the interquartile range.

Reviewer #2: Figure 4: Fractions vary between 0 and 1 and so don't state fractions and plot percentages, be consistent

Response: Thank you for the comment. To maintain consistency and clarity, we have revised Figure 4 and Figure 5 to display the values as fractions rather than percentages. This change better reflects the data range and ensures uniformity across all figures. We appreciate your suggestion and have incorporated it into the final version of the manuscript.

Reviewer #2: - Figure 5 be consistent with using either fractions or percentages but do not mix them.

Response: Thank you for highlighting the need to maintain consistency in the representation of data. We have revised Figure 4 and Figure 5 to use fractions, ensuring uniformity across the manuscript.

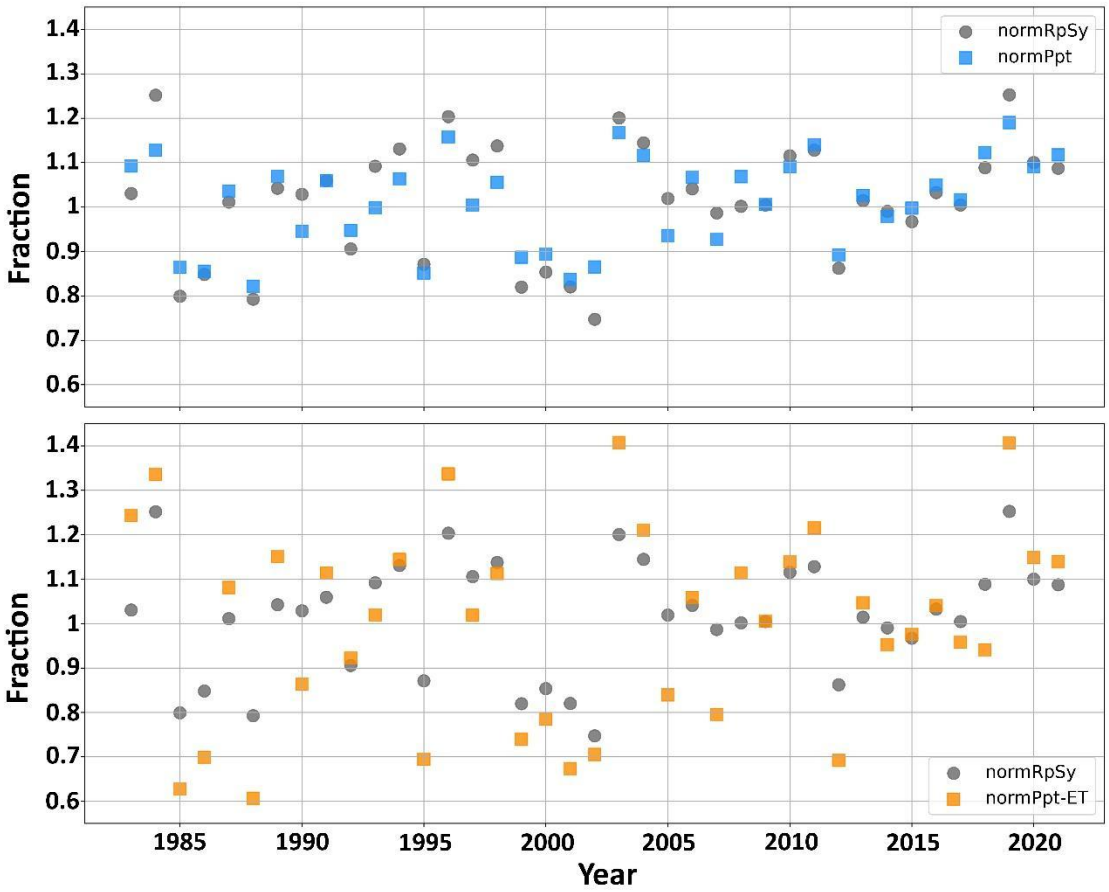

Figure 5: Inter-annual variation of normalized annual recharge (normRpSy, shown using grey solid dots), precipitation (normPpt, blue squares), and Ppt-ET (normPpt-ET, orange squares).

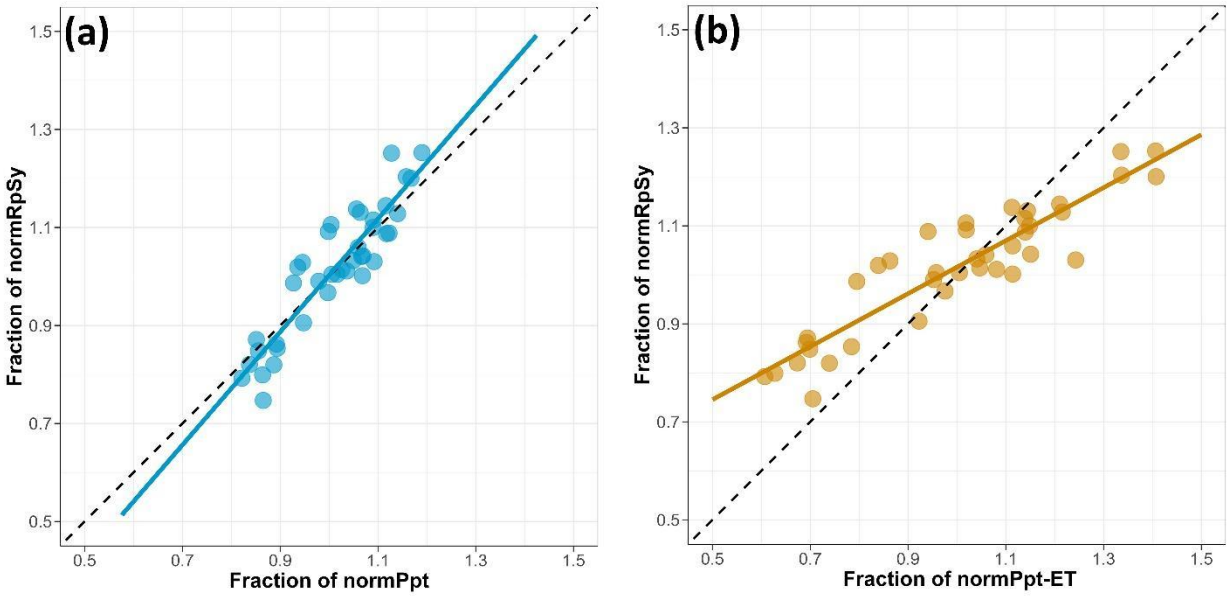

Figure S7: Scatter plot showing the Inter-annual variation between (a) normalized annual recharge (normRpSy) and precipitation (normPpt) shown using blue dots; (b) normalized annual recharge (normRpSy) and Ppt-ET (normPpt-ET) shown using orange dots. The scatter of normRpSy vs normPpt

has a higher slope relative to the 1:1 line. The scatter of normRpSy vs normPpt-ET has a lower slope relative to the 1:1 line.

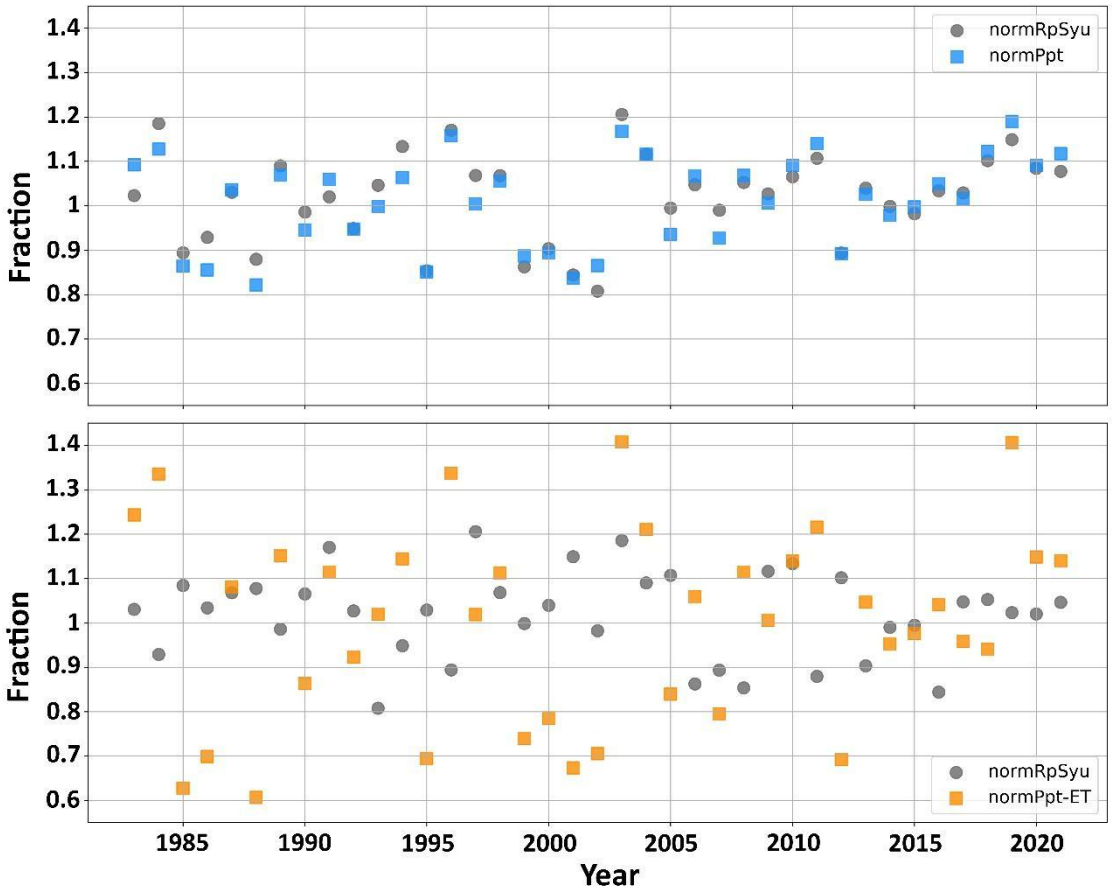

Figure S8: Inter-annual variation of normalized annual recharge (normRpSyu, shown using grey solid dots), precipitation (normPpt, blue squares), and Ppt-ET (normPpt-ET, orange squares).

Reviewer #2: - Generally the units of the presented variable need to be made clear. Specific yield is dimensionless and the unit of the recharge is in a length unit (i.e. m). At some plots this is listed, at others it isn't. Include it, and do this consistently for RpSpy (m).

Response: We thank the reviewer for the comment. Following the reviewer's suggestion we noted the unit of RpSy that is meter, where applicable.

Figure 1: (a) Schematic representation of ΔH evaluation in the WTF method, which is then used to obtain daily groundwater recharge using Eqn 1, (b) a typical dH/dt vs. H plot used to derive the MRC. The hydrographs (c) and (e) show daily groundwater level (GWL, in m), precipitation (Ppt, in mm), and estimated recharge per unit specific yield (RpSy, in m, discussed later) for a selected and a rejected well, respectively. Here, selection/rejection is based on representativeness of the MRC, which here is determined based on an adj-R2 value of 0.2. (d) and (f) show the dH/dt vs. H plot for the corresponding selected and rejected wells, respectively.

Figure 3: Spatial variation of temporal correlation between RpSy (m) and USGS recharge (m).

Reply to Reviewers' comments (Reviewer#3)

Reviewer #3: For final publication, the manuscript should be accepted as is.

Response: We would like to thank the reviewer for their recommendation and constructive review. Your detailed feedback and observations were instrumental in refining our manuscript. We appreciate your support and are pleased that you find our study a worthwhile contribution.