We thank the referee for providing helpful feedback. We respond to all issues addressed in their comments below, as well as adding the revised changes in the manuscript. The Reviewer comments are included here in black, and our answers below their respective comments in blue.

In the revised manuscript, the authors have clearly responded to all of my suggestions. I believe the manuscript is ready for acceptance. I do offer a few very minor comments relating to the material added only to offer improved readability.

- Minor comments Line 155: the word 'then' is not required on this line.
  Removed.
- Line 160: The updated mathematical description of Π is good. I think to help a reader even more, a short description of what Π is in words would be a good addition to the text here e.g. "The function Π, defined as ..., determines if a water parcel falls into a chosen $\sigma - \tau$ class."
  Changed.
- Line 165-166: I suggest changing 'built' to 'generated', 'link' to 'equate', 'to' to 'and', and removing 'as' prior to the inline volume trend equation. So the sentence becomes: Using equation [1], a set of linear equations can be generated to equate the volume trend and the interior water-mass transformation in $\sigma - \tau$ coordinates, $dV/dt = Ax$... I appreciate this is the study of the authors so if they do not find this suggestion helpful, and the current wording clear enough, they may disregard this suggestion.
  Changed as suggested.
- Supplementary info: Remove the bold font from the word 'is' in the dot point describing the vector of unknowns x.
  Fixed.
- Supplementary info: On the fourth last line, the σ and τ should be subscripts to the U.
- Fixed.
- Supplementary info: In the last sentence, I suggest changing 'The detailed methodology' to something like "See also Evans et al (2014) and Portela et al (2020) for other explanations of the methodology." The authors have provided plenty of detail in this supplementary info.
  Changed as suggested.