I would like to thank the Editor and independent reviewers both for their time and input on the manuscript. The following is a list of comments and revisions made after considering the comments provided in the “editor review”.

“Looking to the morphological setting, it is apparent that the Tambo River drains groundwater and is not recharging the aquifer in the studied section. To find such things out, it is not necessary to do all these measurements”.

The reviewer is correct in this assertion. However, the major focus of the study was not to characterise the gaining or loosing nature of the Tambo River (which was established in previous studies as referenced, eg: pg. 5, lines 4-9), but to characterise groundwater surface water exchange in river banks and the potential implications on near river groundwater chemistry. Even in gaining rivers, bank exchange is an important but poorly understood process that has the potential to influence river discharges and also the flux of solutes and contaminants to the river. While this is recognised, there have been relatively few studies on bank exchange and even fewer that have used geochemistry. This latter point is important as while groundwater heads show that water has the potential to flow, changes to geochemistry are important in showing that water has actually migrated. Also our use of radioisotopes is important and relatively novel as they allow the timescales to be constrained and also allow detection of older water (eg from underlying aquifers) in the river banks.

While these aims were outlined in the introduction (pg. 4, lines 5-12; pg. 3, lines 15-16), they have now been further highlighted in the abstract and conclusion sections as per the following:

Pg 1. Lines 18-19: River-bank exchange processes within 50 m of the Tambo River, South East Australia, have been investigated through the combined use of ^{3}H and ^{14}C.

Pg. 17. Lines 23-24: This study was able to determine the absence of significant bank storage near the Tambo River by dating near river groundwater and characterising its major ion chemistry before and after flooding.

"The presence of this semi-confined aquifer has also been used to help explain the absence of bank storage, as rapid pressure propagation into the semi-confined aquifer during flooding will minimise bank infiltration." In the conclusions the Authors mention that another justification could be the fact that "the strongly gaining nature of the Tambo River at the study locations is preventing significant lateral infiltration of river water into the bank". As a consequence, it seems that a simple river/aquifer interaction scheme and a simple hydrogeological structure could explain the absence of bank infiltration.

It is correct that gaining conditions should return bank storage waters to the river – however other studies (e.g., McCallum et al, 2010) suggest that even under gaining conditions, near

river groundwater should be chemically impacted for months or even years after a flood event. This has been indicated Pg. 2, lines 24-30. In the study area, it is likely to be a combination of a number of factors that are limiting the chemical impact of bank storage.

These are (1) pressure propagation into the confined system results in upward groundwater flow into the overlying unconfined system that may be limiting bank infiltration (2) as groundwater in the confined system has a significantly higher TDS than other waters in the system, the chemical signature of groundwater in the bank will become dominated by this component as post flood conditions resume – limiting the chemical impact of bank infiltration (3) river water stored in the banks returning to the river under gaining conditions. These points have been highlighted as per the following:

Pg. 1 line 27 and pg. 2 line 3. “It is likely that the upward infiltration of deeper groundwater into the semi-confined aquifer during flooding limits bank infiltration. Furthermore, the more saline deeper groundwater likely controls the geochemistry of water in the river bank, minimising the chemical impact that bank infiltration has in this setting.”.

Pg. 17 line 23-28. “It is likely that the apparent absence of bank storage near the Tambo River is being driven by a combination of such factors, including: (1) upward flow of groundwater from the deeper aquifer into the river bank due to pressure loading on the floodplain; (2) the return of any bank waters back into the river under strongly gaining conditions; and (3) the high TDS water from the confined system masking the chemical impact of infiltrating river water.”

"This study illustrates the complex nature of river groundwater interactions and the potential downfall in assuming simple or idealised conditions when conducting hydrogeological studies." Which are the details that could not be reproduced by a "standard" approach or by the simple scheme that was suggested by the Authors in the conclusions and I copied at point (A) above?

Groundwater - surface water studies typically involve chemical analysis of river water along a stretch and the characterisation of a regional groundwater end member to calculate groundwater fluxes via a mass balance. These are often coupled with numerical baseflow filters or differential flow gauging to monitor groundwater discharge volumes or calculate catchment water balances. When such methods do not match chemical methods, processes such as bank flow are often attributed to the discrepancy. In this setting however, this assumption would be incorrect and could potentially lead to poor groundwater flux estimates, incorrect model calibration and poor water balances. This study highlights such potential downfalls when conducting these studies without considering near river groundwater processes via nested groundwater sites near rivers.

Pg. 18 lines 24-27. “In this setting, the assumption of typical bank storage processes and the use of a regional groundwater end member during mass balance calculations would lead to poor groundwater flux estimates. In this context, the importance of nested piezometers near

rivers to more accurately characterise near river groundwater processes has been highlighted".

Which are the most sensitive data to obtain a better insight in the interaction between the river and the banks?

While ^{3}H, ^{14}C and major ion chemistry proved useful in characterising river-bank interactions in this study, inexpensive and easy to measure parameters such as water levels, EC and Cl proved to be just as useful. This has been highlighted:

Pg 18. 27-30. "Even the monitoring of relatively inexpensive parameters such as groundwater levels, EC and Cl can provide significant information to researchers and groundwater managers when conducting such studies."