

Additional comments to our replies from December 13<sup>th</sup>, 2012

1. *Original referee comment:*

*p. 11023, l. 10: Is this a common goodness-of-fit measure? Why not use the Nash-Sutcliffe Efficiency, it would also provide information on whether your modeling is better than using an average value.*

First reply:

The FlowPC software also provides the Nash-Sutcliffe efficiency (Maloszewski and Zuber, 2002).\* (...)

\*Additional comment: We have to correct our original statement on the model efficiency according to Nash and Sutcliffe (1970). The software, which we used, does not calculate the Nash-Sutcliffe efficiency but a coefficient of model efficiency SIMILAR to it. In the revised version of the manuscript we also provide the Nash-Sutcliffe efficiency for the best fits (according to the calculated values of  $\sigma$ ). More details are provided in the revised manuscript.

2. *Original referee comment:*

*p. 11010, l. 23: Did you melt the whole snow column to measure water isotopes? Did you also measure water isotopes from naturally occurring snow melt (as input to the flow system)? The two methods could potentially yield significantly different isotope values...*

First reply:

During snow sampling in the field we directly transferred the snow into 2-L-bottles which were closed tightly. Afterwards these bottles were transported to the lab and we waited until snow was melted to take a subsample for stable isotope analysis. In spring 2012 we sampled the (bulk) melt water of snow at one location and there was only a slight difference between the bulk snow sample and the melt water at this site.\* Nevertheless, we are aware of the uncertainty we introduce by taking the bulk snow sample as our input signal for the mean transit time modeling and we discussed this in section 3.2.2 'Evaporation of snow...'. Please see also further comments on snow melt inputs below.

\* Additional comment: Since the installed lysimeter was only used for testing the method we did not consider the result in the mean transit time modeling. We only used a test lysimeter at one location and we consider it not to be representative. Re-evaluation of the data also showed that there in fact was a difference of the bulk snow melt water in comparison to the bulk snow before the onset of snow melt. The influence of stable isotope fractionation during snow melt and the uncertainty of stable isotope signals of snow are discussed in more detail in our comments and the revised manuscript.