

## ***Interactive comment on “Using isotopes to constrain water flux and age estimates in snow-influenced catchments using the STARR (Spatially distributed Tracer-Aided Rainfall-Runoff) model” by Pertti Ala-aho et al.***

**Anonymous Referee #3**

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The article developed a calculation scheme to describe the spatially and temporally variable isotope fractionation processes in seasonal snowpacks, and the calculation scheme was linked to the STARR model to simulate the stream flows, isotope ratios and snow pack dynamics in three long term experimental catchments. General Comments: 1. The spatially distributed water age was simulated as shown in Fig.9. Does the spatially distributed water age is estimated by averaging the water age of surface water, soil stored water and groundwater stored water in each computing unit? The water age of incoming precipitation is taken as 1, which means the water age of stored water in the catchment should be larger than 1. Why the calculated water age is less

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than 1, even equal to 0, in many places of the three catchments? Specific Comments: 1. L18P1, P4 It is better to specify how long does the “exceptionally long” mean? The observation period for the hydrometric data and the stable water isotopes date should also be given in the “Study sites” section for better understanding the simulation process and calibration results. 2.L24P1, The geology setting is only briefly described for the Bogus Creek, but not given for the other two study sites in the article. How to make a conclusion that the geology is an important factor causing contrasting water age distribution among the three catchments? 3. L8P2, The meaning of abbreviation of “STARR” has been given in L2P2. 4. L12P2, The literature “Ala-aho et al., in review” has been cited several times in the article. It’s better to give a specific published journal or publishing house etc. of the literature. 5. L25P2, The sentence seems written in Latin. 6. L26P5, The meaning of DCEW should be given here. 7. L33P5-L5P6, The meteorological date from stations in the neighboring catchments are used for the Krycklan and Bruntland Burn catchments. It’s better to describe the distance of the stations from the study sites, or give the latitude and longitude coordinates of the stations for better judging the reliability of the inputted meteorological data in the model. 8. L31P8, What does the “kg” means? Hydraulic conductivity?

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