**Hydrology and
Earth System
Sciences
Discussions**

Interactive comment on "Dating of streamwater using tritium in a post-bomb world: continuous variation of mean transit time with streamflow" *by* U. Morgenstern et al.

Anonymous Referee #1

Received and published: 1 September 2010

The presented manuscript is exactly within the scope of the journal and can be accepted after minor revision. In comparison to the previous works related to the mathematical modelling of environmental tracer data, here the authors analyse, how the mean transit time is dependent from the discharge from the system, which is very interesting and novel. However, there are some points which need to be clarified. 1) The reviewer does not understand why the authors decided to use the model approach (EPM) with the exponential fraction of 80%. It means that 20% has the piston flow fraction. Was it found by fitting procedure for all discharges considered or it was generally assumed? If generally assumed than where is the geological (hydrogeological) justifi-

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cation for 20% fraction of piston flow, which here probably corresponds to vertical flow through the unsaturated zone. Why the authors do not try to calculate the piston flow time to check with known recharge if the water equivalent (water volume)agrees e.g. with the thickness of the unsaturated zone? 2) Equation (1) applied here was already well described by Maloszewski and Zuber (1982) but here the authors suggest that the infiltration coefficient was different for each month without giving any information what was it value(s) and how was estimated. 3) Additionally to Eq. (2) the authors could check what is the relation between V and Q: V(Q) which would give the information how saturated was the system and how realistic is the relation described by Eq. (2). 4) The mathematical relationships between SiO2 as f(MTT) and NO3 as f(Q) are very interesting but seems to be very apparent. The authors should try to show what is the error of such indirect finding. 5) Goode (1996) published his paper in Water Resources Research alone and not with Maloszewski and Zuber (double citation of the same paper).

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 4731, 2010.