

## **Main comments:**

### **1. The equation for the negative $\lambda - K$ correlation case is incorrect (also noted by reviewer 1)**

The equation (p. 4731, line 1 in the discussion paper) has been corrected and is now written  $\lambda = \lambda_g \cdot (K/K_g)^{-1}$ .

### **2. The introduction is too lengthy**

We have made the introduction a little shorter and tried to improve readability. We have also made the explanation of the two  $K$  variability scenarios in the second last paragraph more general. In light of reviewer 3's comment that the scientific contribution of the paper was not made clear enough, however, we think that it is necessary to explain the considered scenarios already in the introduction (as previous related studies only considered a scenario of constant  $K$  in the catchment and did not at all consider variability in mass attenuation rate)

### **3. The number of references is excessive and could easily be reduced by half, if not 2/3**

We have greatly reduced the number of references as suggested.

### **4. The text is often too dense and hard to follow. Its readability should be improved**

We have tried to improve the overall readability of the text. For instance, we have followed the reviewer 2's advice to summarise key sources of uncertainty in a bulleted list in the introduction.

### **5. It should be made clear that the subsurface transport model is based on the simplistic assumption of single flow directions approximated by surface topography**

This has been clarified in the methods section 2.2.

### **6. Some discussions and conclusions are hard to follow and would benefit from more explanation**

We now define more clearly what we mean by "lowest impact areas" in section 3.3. The sentence on p.4732, line 27 was confusing in the discussion paper because it contained an editing error. It should read "travel times much *shorter* than  $\tau_g$ ", not "much *longer*".

## **Minor suggestions to improve the text:**

### **p. 4723, line 24 & p. 4725, line 1 in the discussion paper: "Dependencies" needs to be defined to help the reader.**

We have rewritten those passages in the introduction without using the word "dependencies"

### **p. 4730, line 6 in the discussion paper: Can you add the formula for the mean as for the other 2 key calculations.**

We have added the formula  $\tau = \sum_{i=1}^N \Delta\tau_i$  in section 2.2. We think that was what the reviewer meant.

We have further made the following changes according to the suggestions made by reviewer 2 (page and line numbers are from the discussion paper):

**p. 4722, line 13 & p. 4737, line 11: “Of” instead of “between”?**

**p. 4725, line 14: “Few” instead of “limited”?** The revised manuscript explains more clearly: “local sources, with to large degree known locations and relatively limited spatial extents”

**p. 4725, line 19: “Point” confuses in this context of diffuse pollution.**

**p. 4730, line 2: Write “deltax =” in front of sum. Leave out “i =” in front of “N as well as “at**

**a” and “at XCP”. Replace “cell” with “of N cells”.**

**p. 4731, line 6: Leave out “i =” in front of “N as well as “at a” and “at XCP”.**

**p. 4731, line 7: “Results and discussion” if you don’t want to separate out a proper discussion section.**

**p. 4733, line 4: I don’t think the sentence in brackets is right so should be deleted.**

**p. 4734, line 18: “associate”**

**p. 4735, line 9: Bracket after 4.**

**p. 4735, line 11: Delete 1st “the”.**