

**Supplementary Material**  
**to paper**

**“On the effect of the uncertainty in soil properties on the simulated  
state and fluxes at different spatio-temporal scales”**

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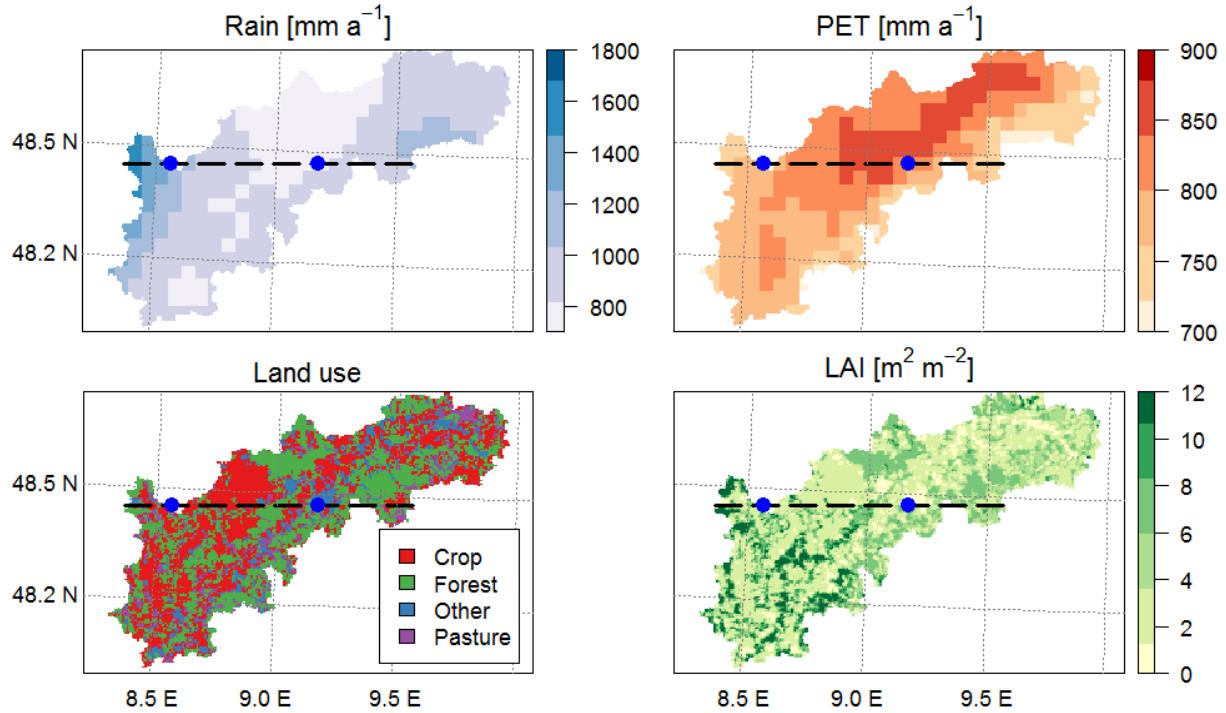
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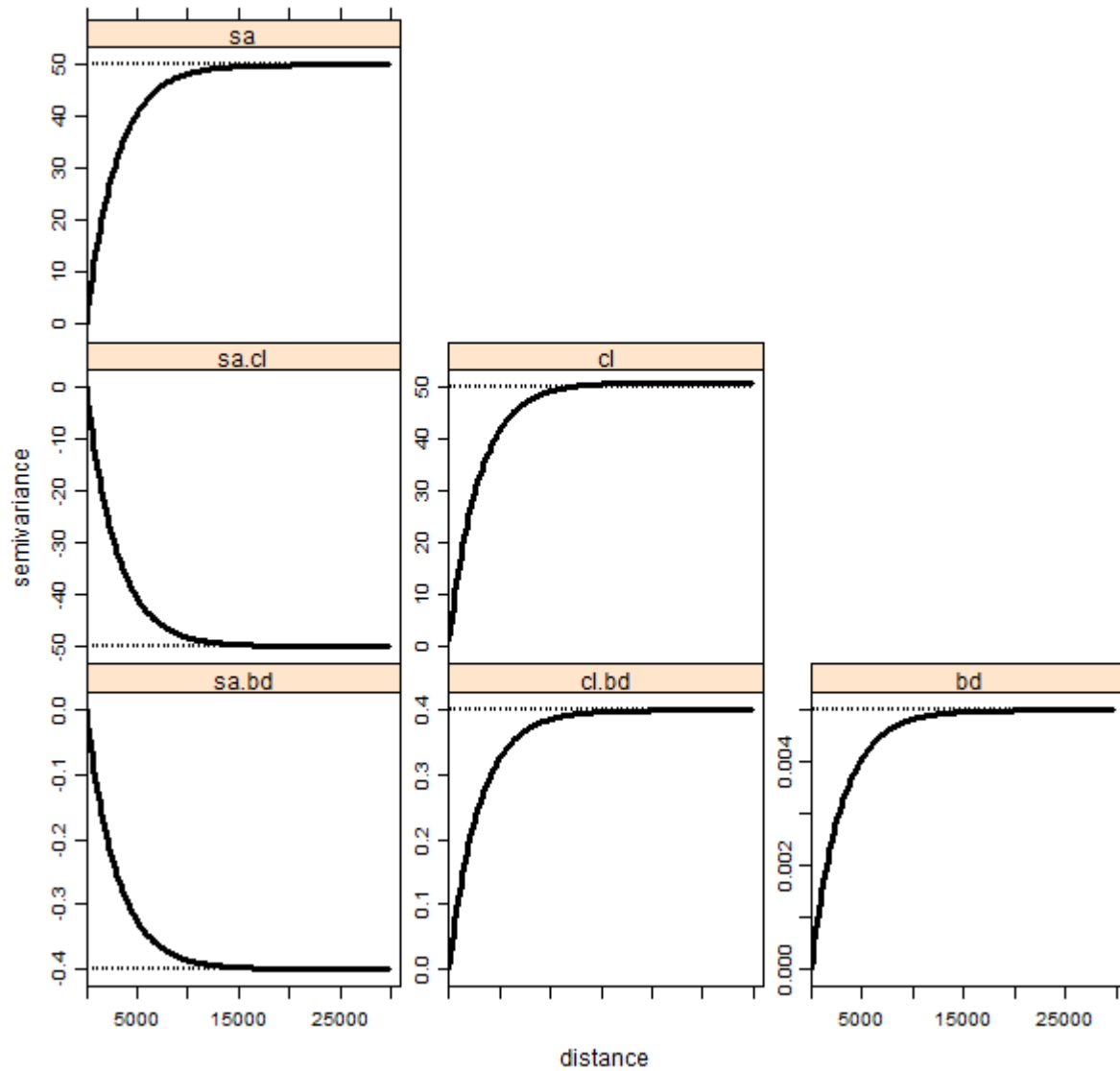
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This supplementary material contains seven additional figures that support the discussion  
presented in the study.

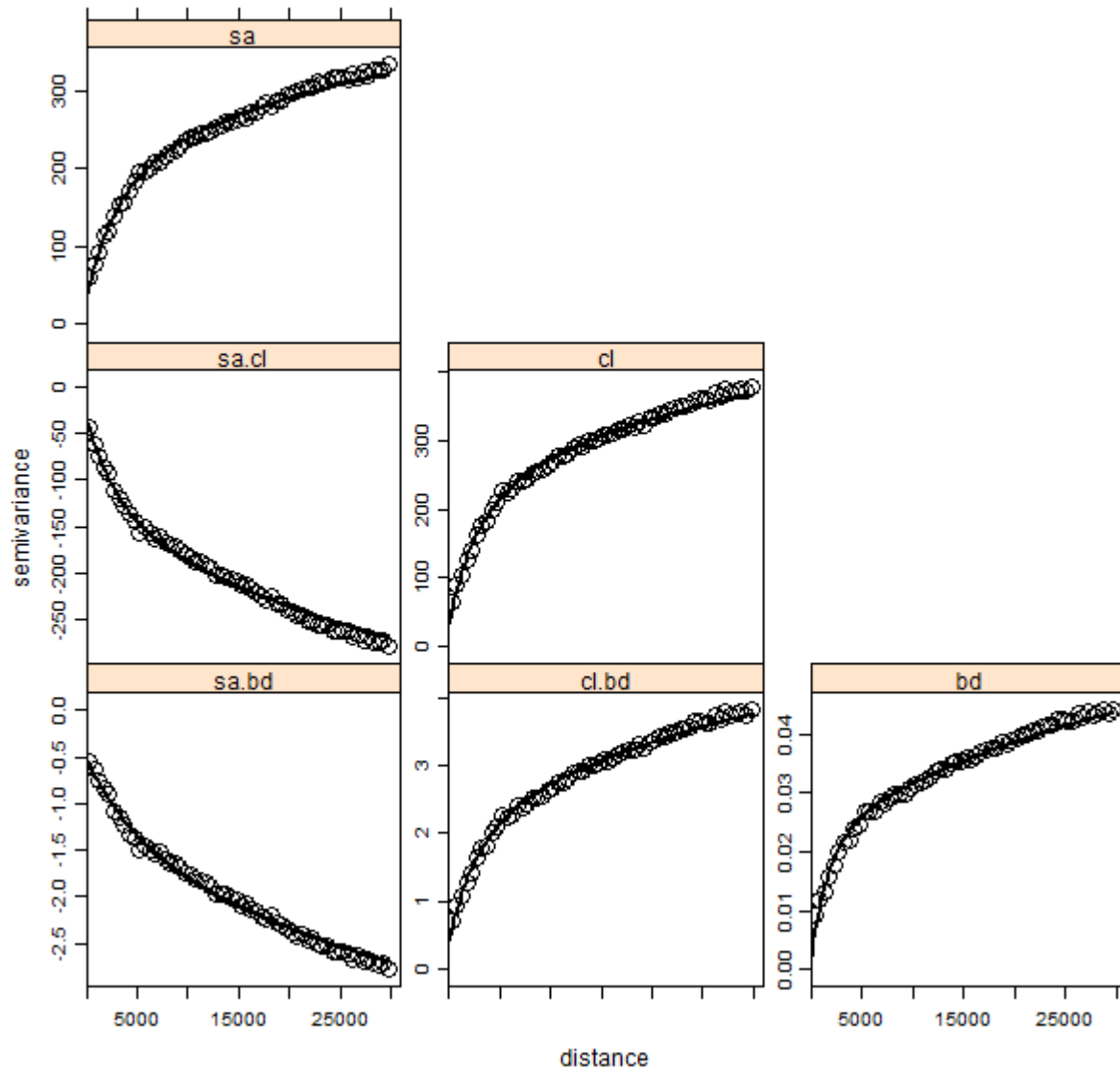
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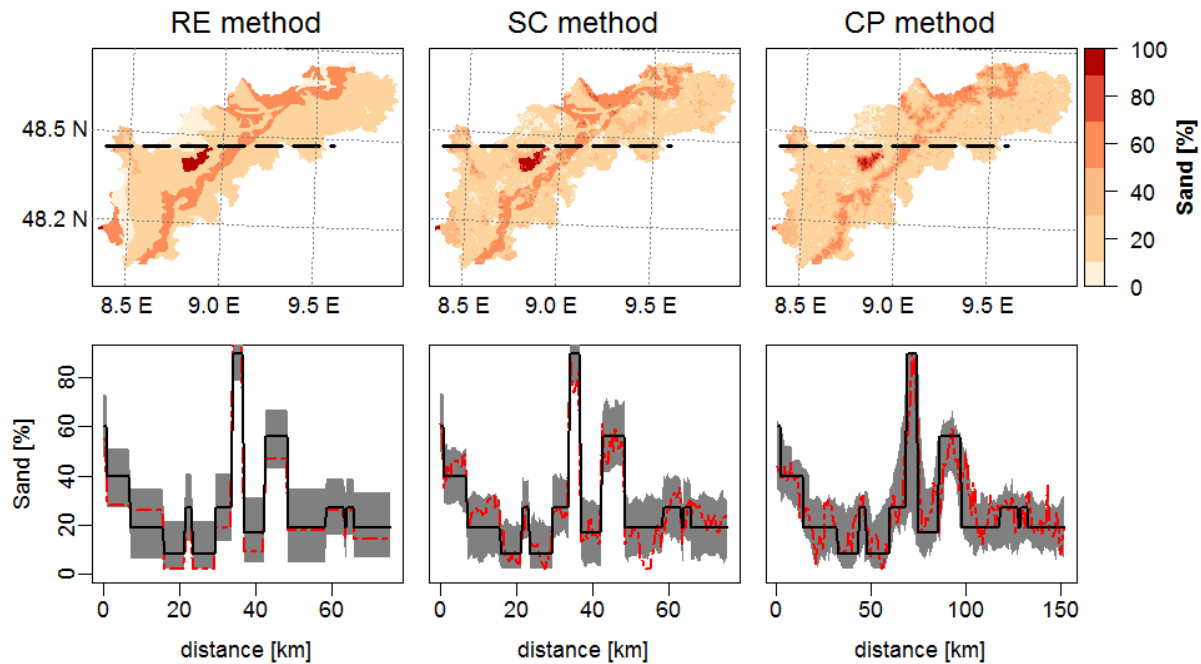
**Figure S1.** Cumulative rainfall [mm a<sup>-1</sup>] and cumulative potential evapotranspiration [mm a<sup>-1</sup>] during the simulated year (1990); main land use within the catchment; mean leaf area index (LAI [m<sup>2</sup> m<sup>-2</sup>]) over the same simulated year (1990). Transect (dashed black line) and locations of the two grid cells are also depicted.



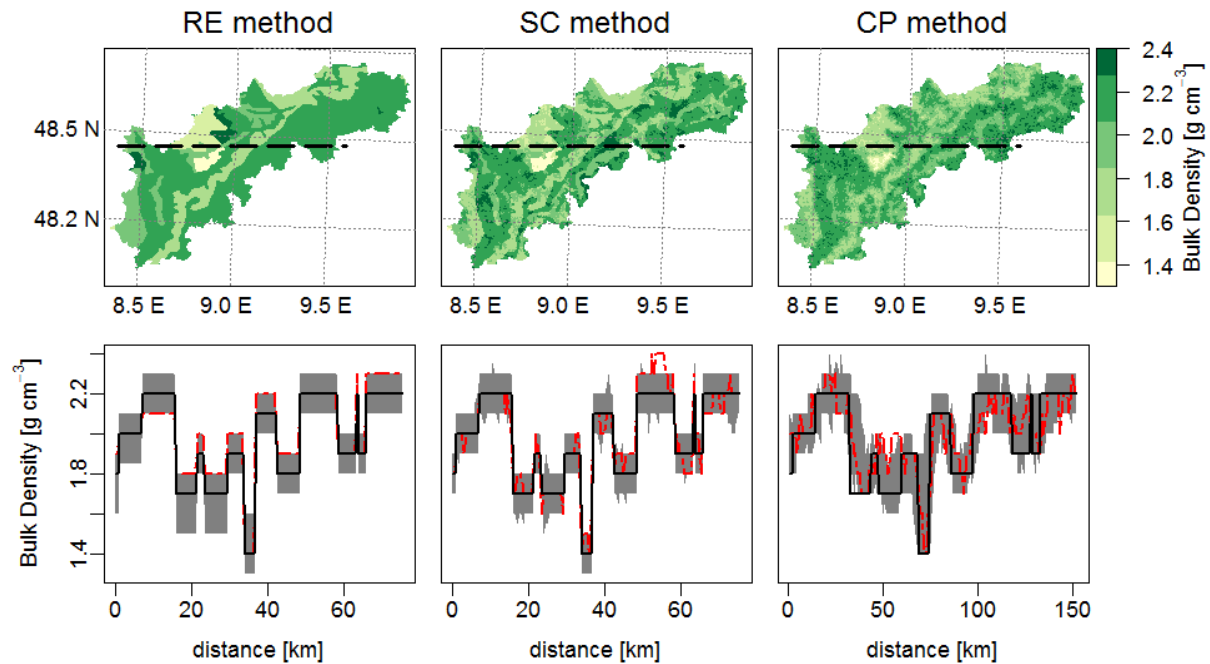
**Figure S2.** Semivariograms and co-semivariograms models used in the spatially correlated method for sa = Sand [%], cl = Clay [%], bd = bulk density [g cm<sup>-3</sup>], respectively. Distance is in meters.



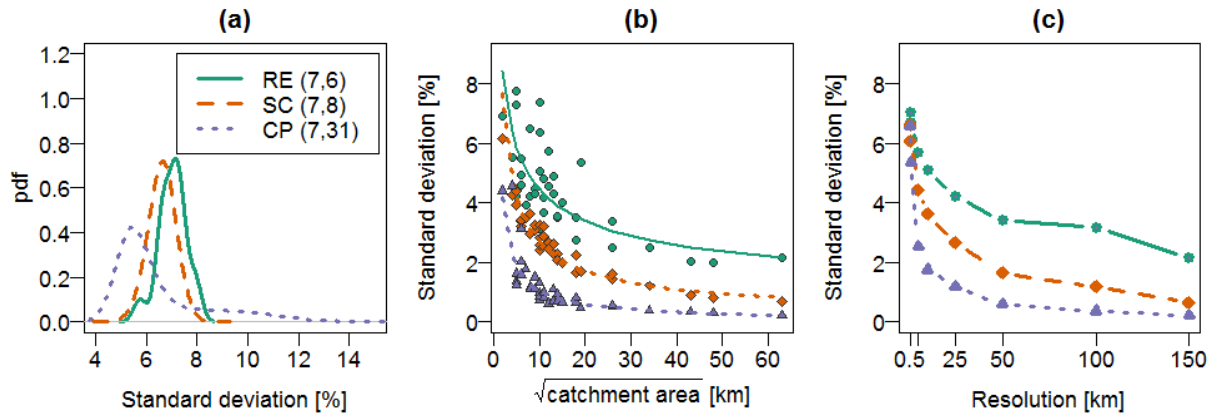
**Figure S3.** Experimental semivariograms and co-semivariograms (circle) and fitted models (black line) used for the conditional points method for sa=Sand [%], cl = Clay [%], bd = Bulk density [ $\text{g cm}^{-3}$ ], respectively. Distance is in meters.



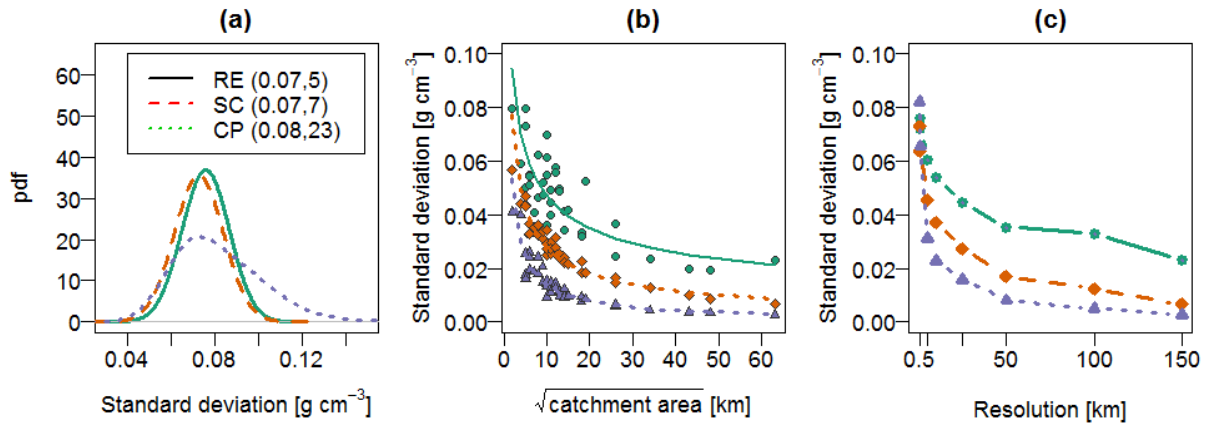
**Figure S4.** As Figure 4 but for sand [%]: soil realizations based on the Random Error method (RE, left column), Spatially Correlated method (SC, middle) and Conditional Points method (CP, right column). The top row shows one realization for each method and the transect (dashed black line). The bottom row depicts the spread of the 100 realizations by using the 5th and 95th percentile for the selected transect (gray area). The red line depicts one realization, whereas the black line shows the percentage of sand by the original soil map.



**Figure S5.** As Figure 4 but for bulk density [ $\text{g cm}^{-3}$ ]: soil realizations based on the Random Error method (RE, left column), Spatially Correlated method (SC, middle) and Conditional Points method (CP, right column). The top row shows one realization for each method and the transect (dashed black line). The bottom row depicts the spread of the 100 realizations by using the 5th and 95th percentile for the selected transect (gray area). The red line depicts one realization, whereas the black line shows the bulk density by the original soil map.



**Figure S6.** As Figure 5 but for sand [%]: (a) probability distribution of the standard deviation of the sand percentage based on 100 realizations of the soil map calculated for all grid cells and each method (RE = Random Error method; SC = Spatially Correlated method; CP = Conditional Points method). The mean and coefficient of variation of the distribution are indicated in parenthesis. (b) Standard deviation calculated by aggregating the sand percentage at subcatchments with different size. (c) Standard deviation calculated by aggregating the sand percentage at different grid resolutions.



**Figure S7.** As Figure 5 but for bulk density [g cm<sup>-3</sup>]: (a) probability distribution of the standard deviation of the bulk density based on 100 realizations of the soil map calculated for all grid cells and each method (RE = Random Error method; SC = Spatially Correlated method; CP = Conditional Points method). The mean and coefficient of variation of the distribution are indicated in parenthesis. (b) Standard deviation calculated by aggregating the bulk density at subcatchments with different size. (c) Standard deviation calculated by aggregating the bulk density at different grid resolutions.