Spatial variability of soil saturated hydraulic conductivity in paddy field in accordance to subsurface percolation

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Abstract	Insufficient puddling with inappropriate implements or imprecise time/intensity may alter saturated water flow in paddy soil spatially or temporary due to change in aggregate size distribution, dry bulk density, saturated hydraulic conductivity, and percolation rate of the soil. In this study, spatial variability of saturated hydraulic conductivity (K (s)), a key parameter of the saturated water flow, in Fuchu Honmachi paddy plot (100 m x 28 m) was characterized based on dielectric or ADR dry bulk density (rho(b-ADR)) with help of non-similar media concept (NSMC) and geostatistics model to meet its correlation to subsurface percolation. A 100 cc core and an ADR data were sampled from each sub-plot (7 m x 7.5 m), and then were used for measuring and predicting rho(b) and K (s). The predicted data agreed with the measured ones, in which they fitted well the x = y line with RMSE of 0.029 cm(3) cm(-3) (R (2) = 0.68), 0.027 g cm(-3) (R (2) = 0.71) (rho(b)), and 0.098 cm d(-1) (R (2) = 0.45) for theta, rho(b), and K (s), respectively. The predicted rho(b) and K (s) had similar trend in spatial variability to the measured ones particularly within the distance of 46.3-51.9 m and 26.2-27.9 m, respectively. The spatial variability of the predicted K (s) coincided to that of the subsurface percolation rate, in which they had similar distance of dependence. The results indicated that the presenting method can be reasonably accepted.
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