

Is there a link between hydraulic conductivity of the subsoil and classification according to the soil map of Belgium?

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Soil classification as implemented on the soil map of Belgium displays a wealth of information about texture class, drainage status and profile evolution. A logical question in context of water management at the regional or local scale is; can infiltration characteristics be derived from this map?



Single Ring (ER)



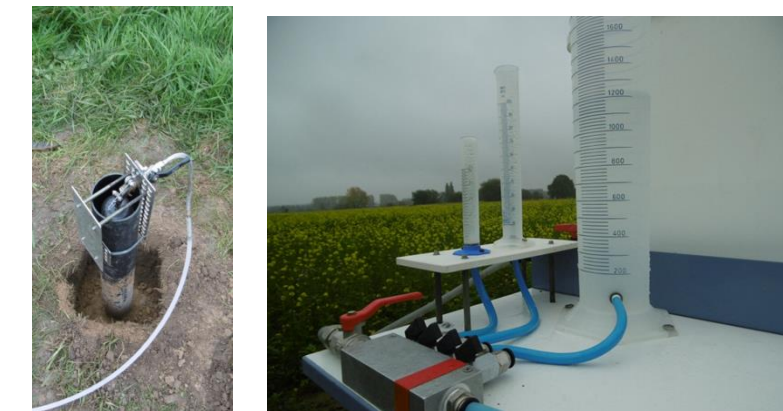
Soakaway (SO)



Open end (OE)



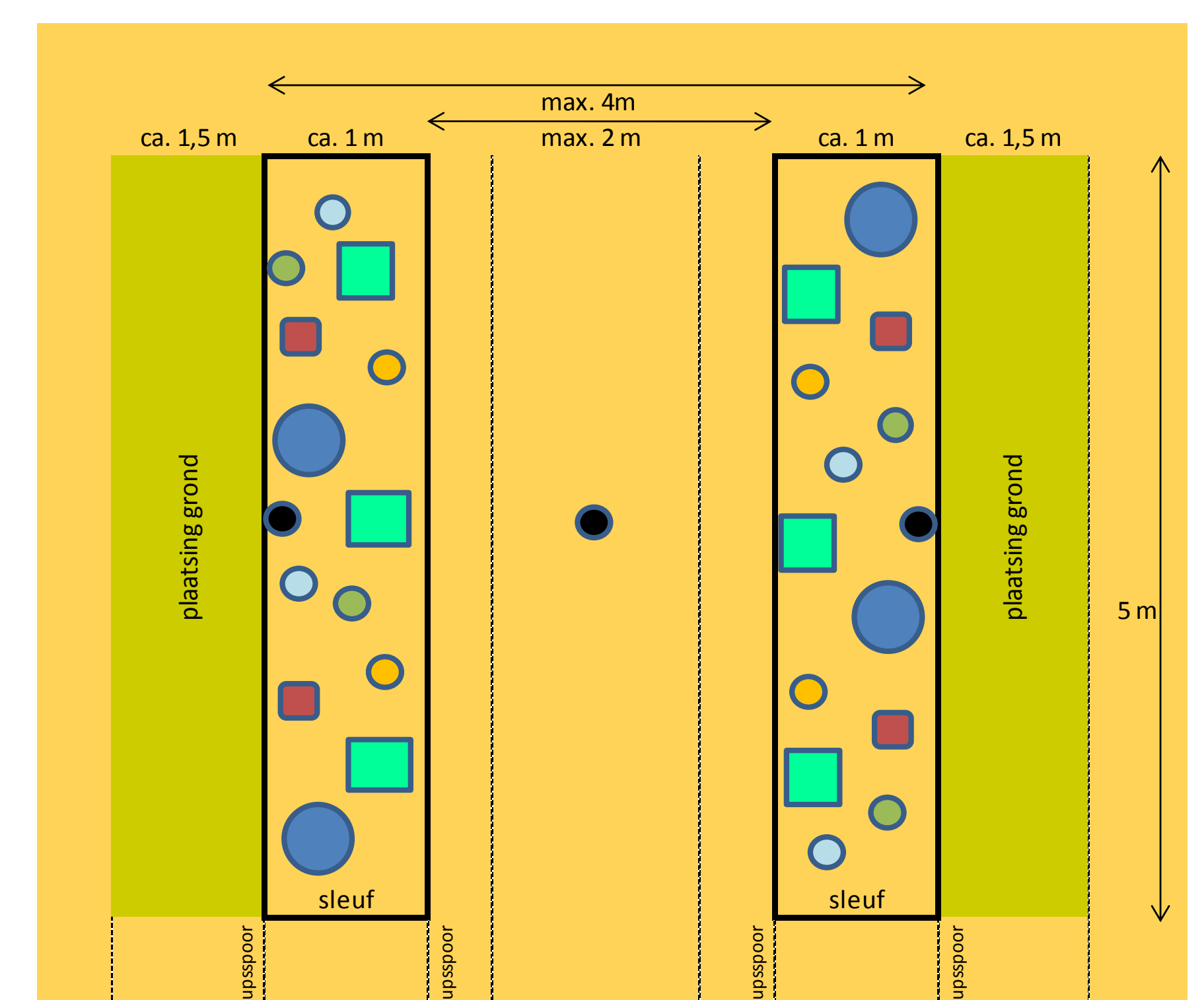
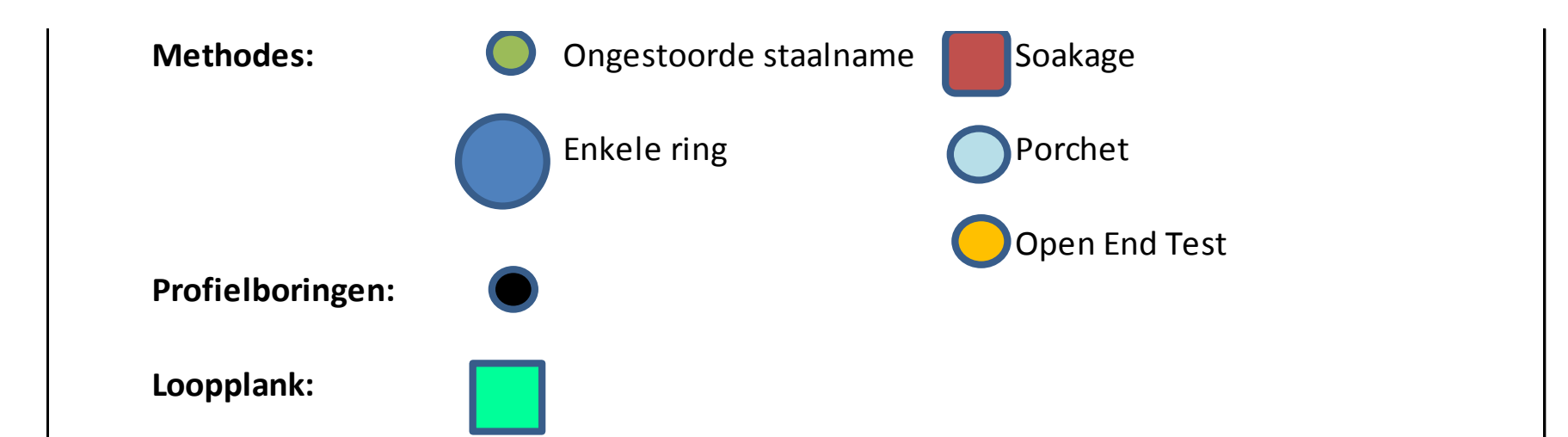
Porchet (PO)



4 infiltration methods to observe saturated hydraulic conductivity (K_{sat}) in B horizon were tested on 38 different sites

minimal 5 sites per texture class as indicated on the soil map (Zg, Z, S, P, L, A, UorE)

4 replications per test method



Results

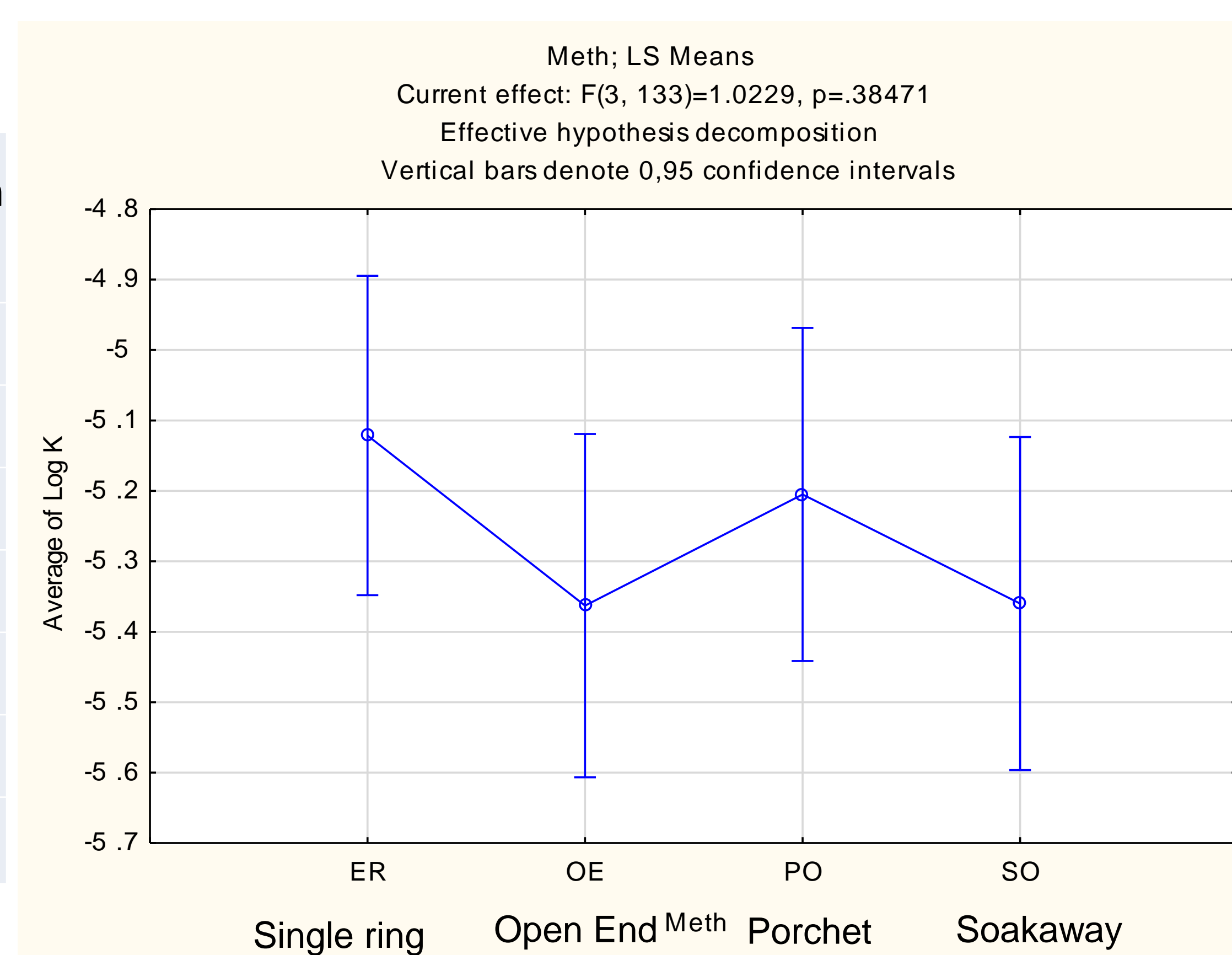
In 17 of the 38 sites soil texture of the B horizon, determined by granulometric analysis corresponded with texture according to the soil map

Average K_{sat} in B-horizon observed per texture class as indicated on soil map

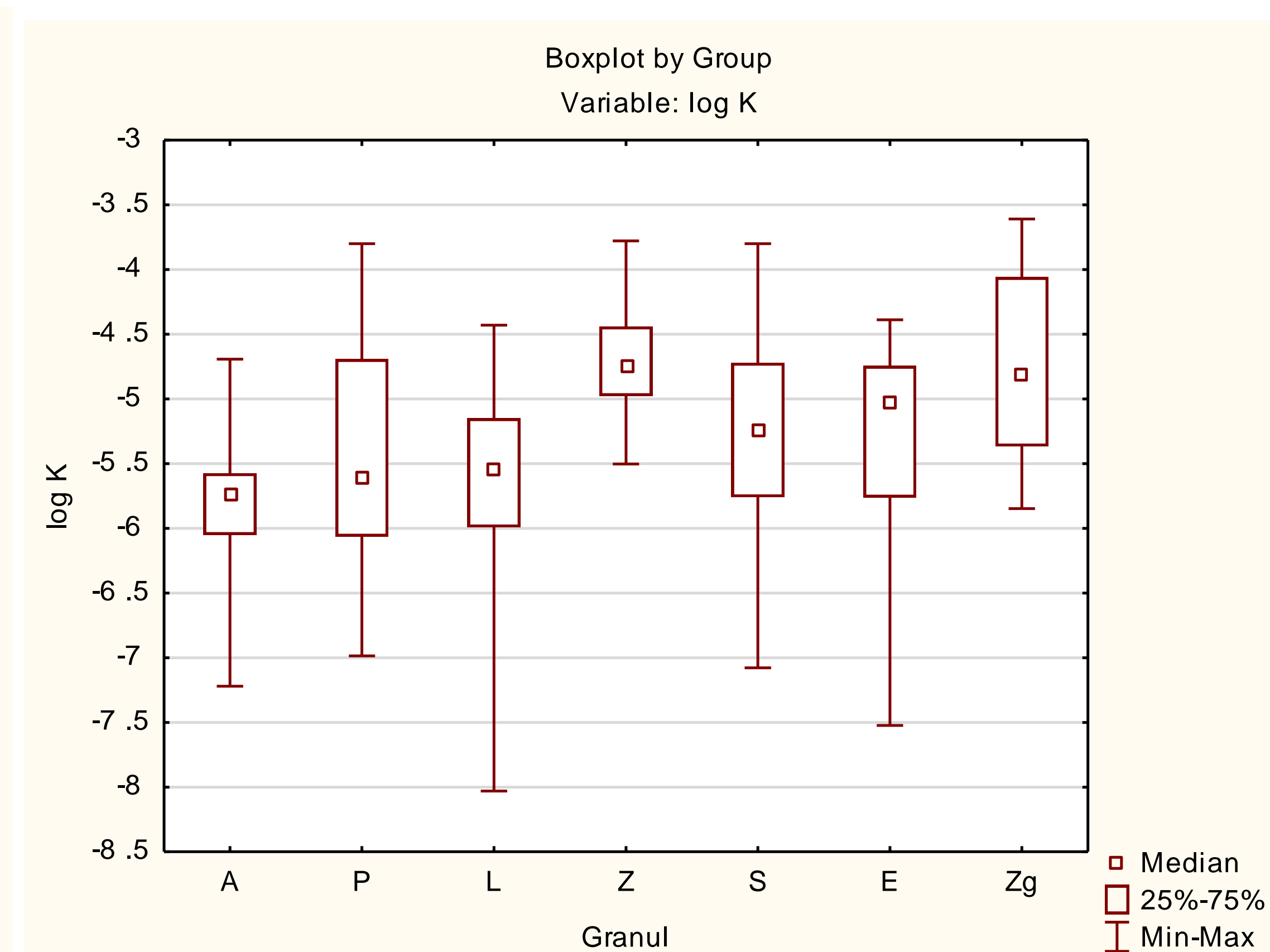
Texture class according to soil map	K_{sat} (m/s)	Classification in relation to total dataset*
Z	2.05×10^{-5}	High
Zg	1.70×10^{-5}	High
S	5.44×10^{-6}	Normal
E	4.85×10^{-6}	Normal
P	3.79×10^{-6}	Normal
L	2.07×10^{-6}	Normal
A	1.58×10^{-6}	Normal

*High: higher than 0.75 percentile, normal: between 0.25 and 0.75 percentile, low: lower than 0.25 percentile.

There was no significant influence from the method of K_{sat} observations according to ANOVA analysis of Log K



K_{sat} observed in Z, Zg textured soils was higher compared to K_{sat} in other soil textures (A, P, L, S, E). No other differences were observed according to Kruskal Wallis test



Discussion

Texture in sandy soil (Z, Zg) was significantly higher compared to other soil textures. However variation between measurement locations in the same texture class was very high, up to tenfold the average value. Due to this high variation way no further relation between texture class and K_{sat} was observed. There was no relationship between K_{sat} and drainage status as indicated on the soil map. Within the same texture class there was however a difference between the sites. This illustrates that for estimation of K_{sat} , which may be requirement to manage water discharge or infiltration, field measurements are preferred before a general classification linked to soil texture. For example in heavy textured soils, as texture E, K_{sat} was observed a reasonably high in some of the sites.

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