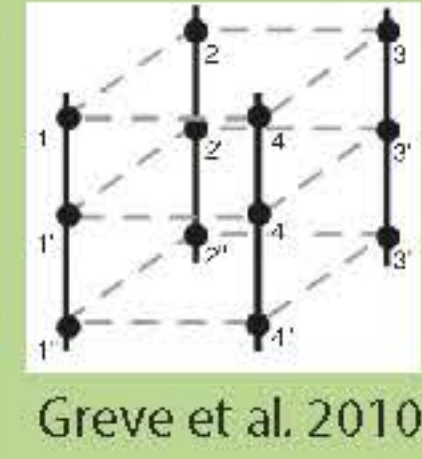
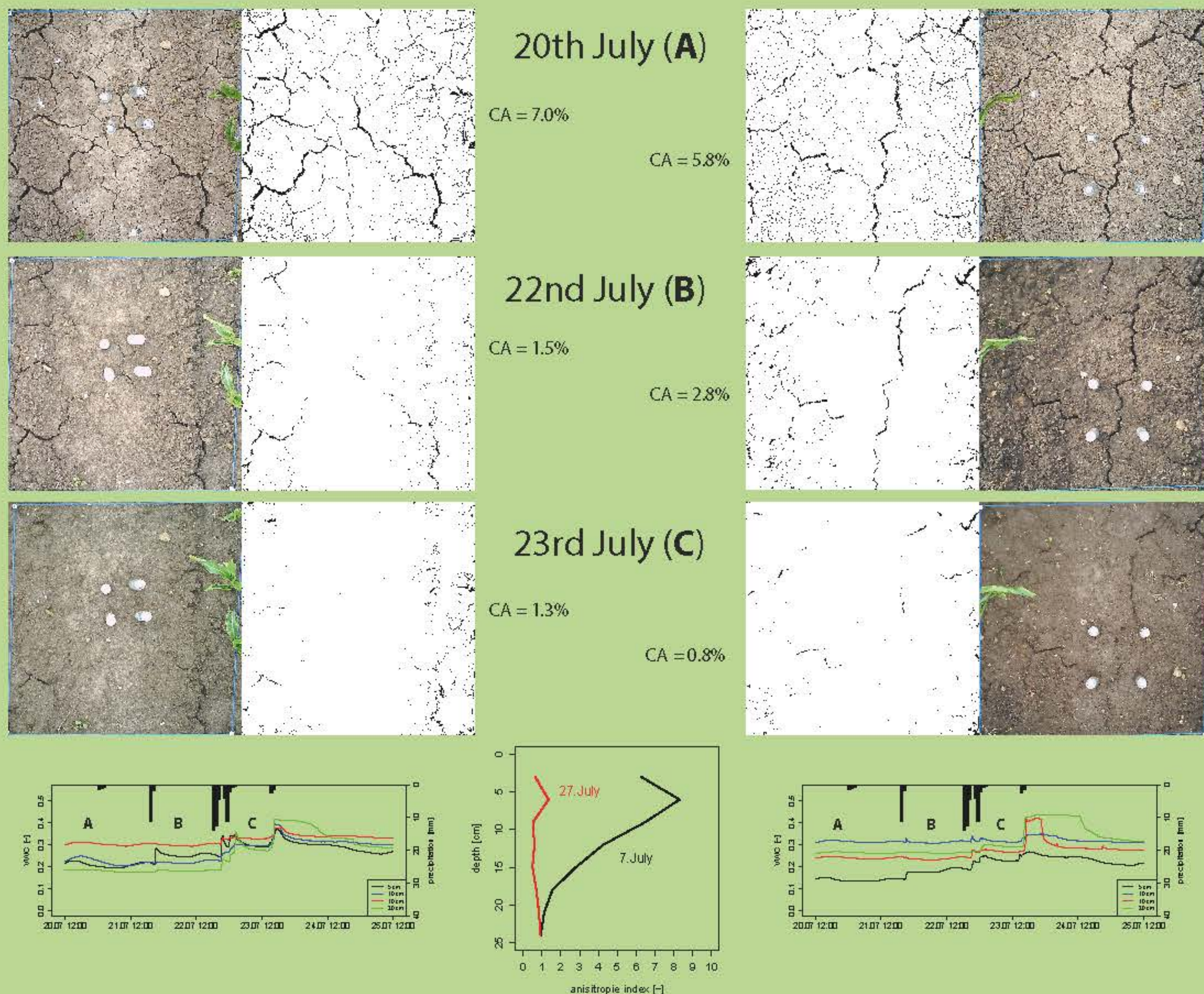


Measuring soil crack area and infiltration

- infiltration behavior on a maize field with clay soil
- measuring soil crack area (CA) with time lapse photography (1 photo/hour) and crack depth (anisotropy apparent electrical resistivity)
- analysing results for different events in regards to soil crack and soil moisture change



Greve et al. 2010

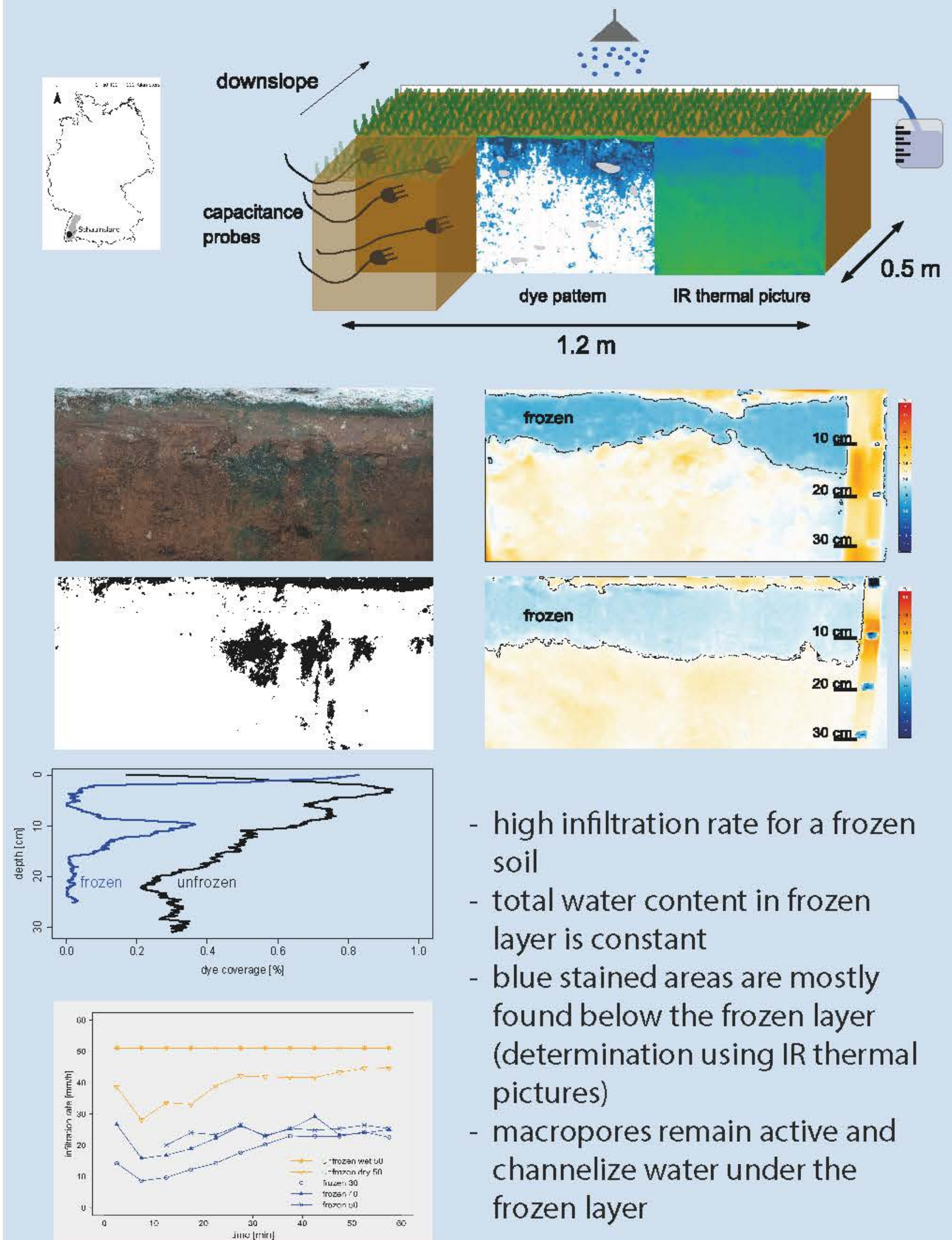


- despite reduction of soil crack area due to rain events on the 21st and 22nd fast water transport to 20cm depth takes place on 23rd
- anisotropy apparent electrical resistivity shows a crack depth of ~ 20 cm
- noise causes uncertainty in crack area estimation from image analysis

Macropores in seasonally frozen soil

Sprinkling experiments under frozen conditions with different rates for 1 h (30,40,50 mm/h)

Four plots, each with an area of 0.6 m²

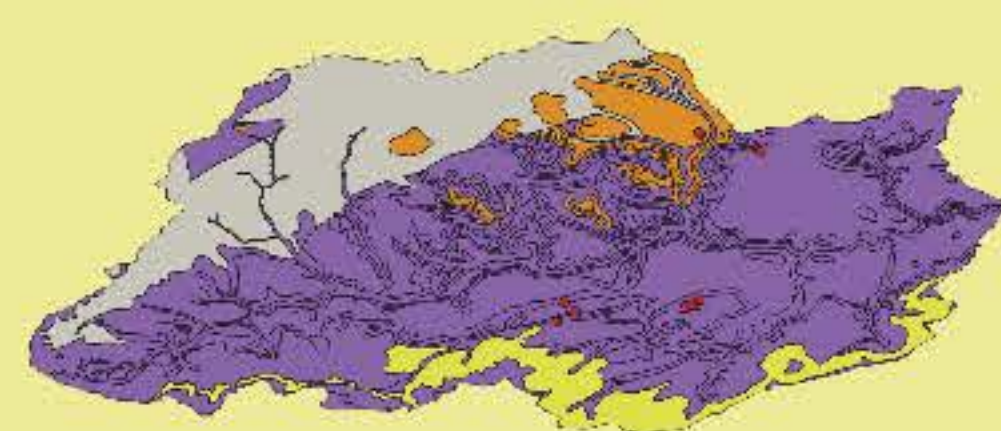


Comparing macropore estimation

- manual macropore (MP) counts are limited to soils with low rock content, root densities and clearly visible pores
- problems in dry sandy and silty soils
- as an alternative Watson & Luxmoore (1986) method can be used to estimate macroporosity from hood infiltrrometer measurements

$$r = - \frac{2\sigma \cos \alpha}{\rho g h}$$

$$N = 8\mu K_m / \pi \rho g (0.05)^4$$



position	Maximum No.MP > 2mm Ø / m ²		
	hood infiltrrometer (mean)	manual	ratio
M_J	60	163	0.37
M_I & K	26	67	0.39
M_H	22	44	0.50
M_G	31	40	0.78

- hood infiltrrometer MP estimates in the marl are lower than manual counts
- not all manually counted MPs are active during infiltration
- sampling size of the hood infiltrrometer is smaller

Outlook

- analysis of infiltration data (Amoozemeter, hood infiltrrometer) to obtain hydraulic conductivity at/near saturation for different textures
- infiltration and runoff generation modelling for specific events and different soil moisture states for some cluster sites
- include process knowledge on preferential flow in model
- identification of vadose zone controls on subsurface flow generation on larger scale

