

# Visualization with X-ray microtomography of soil samples under a growing draining pressure

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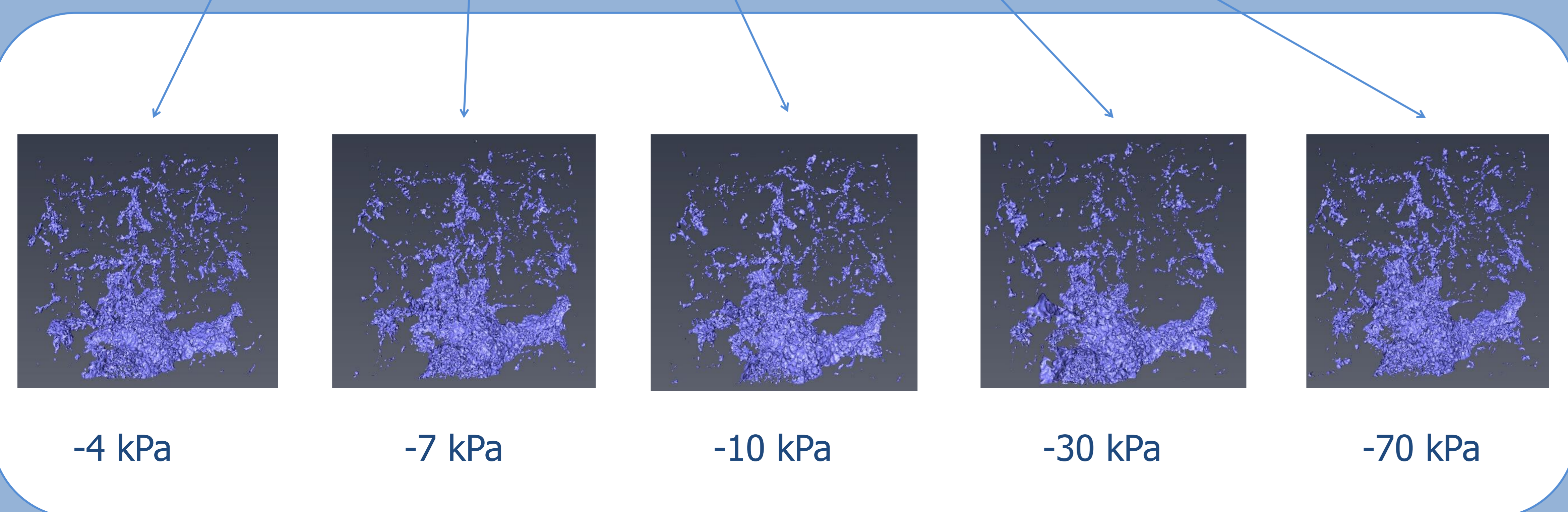
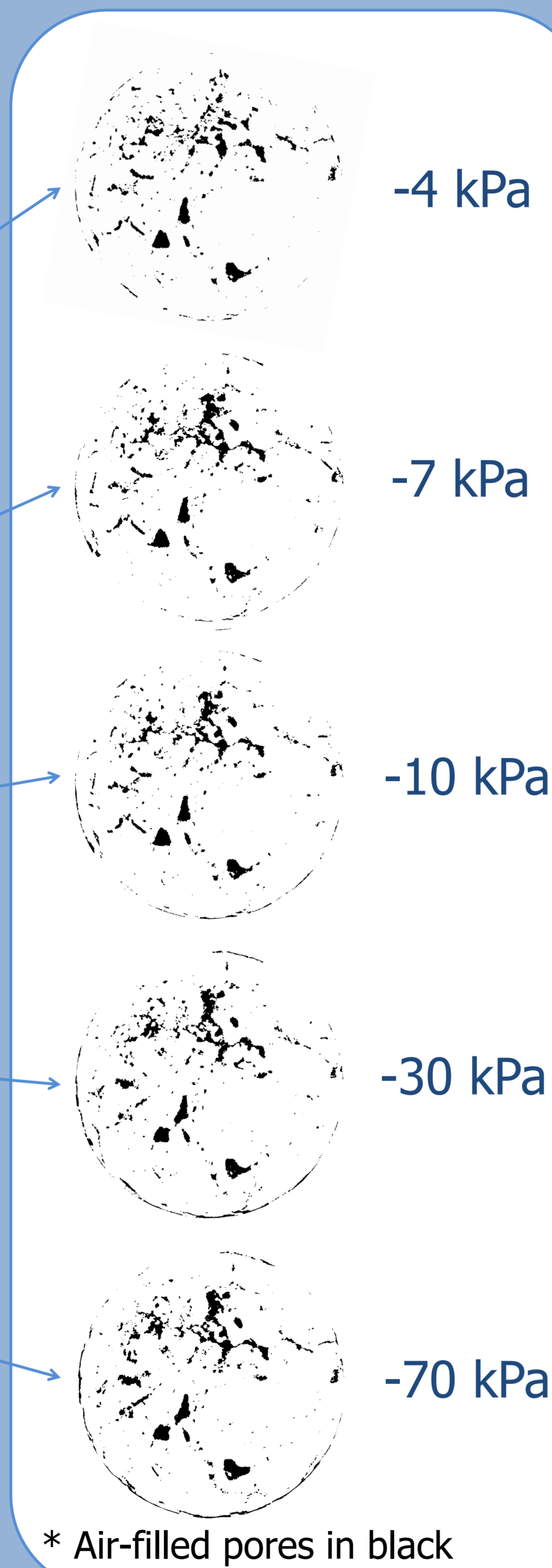
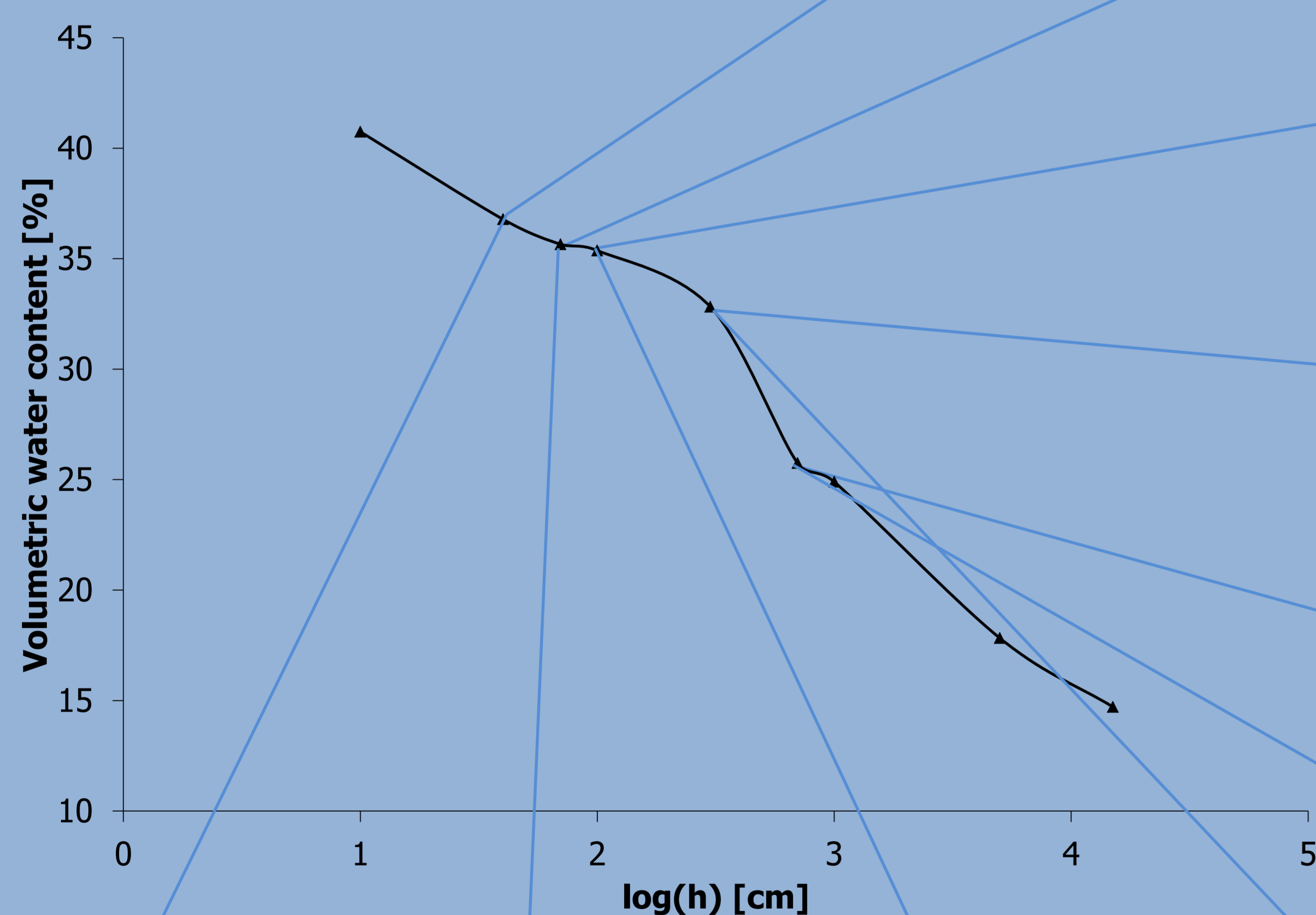
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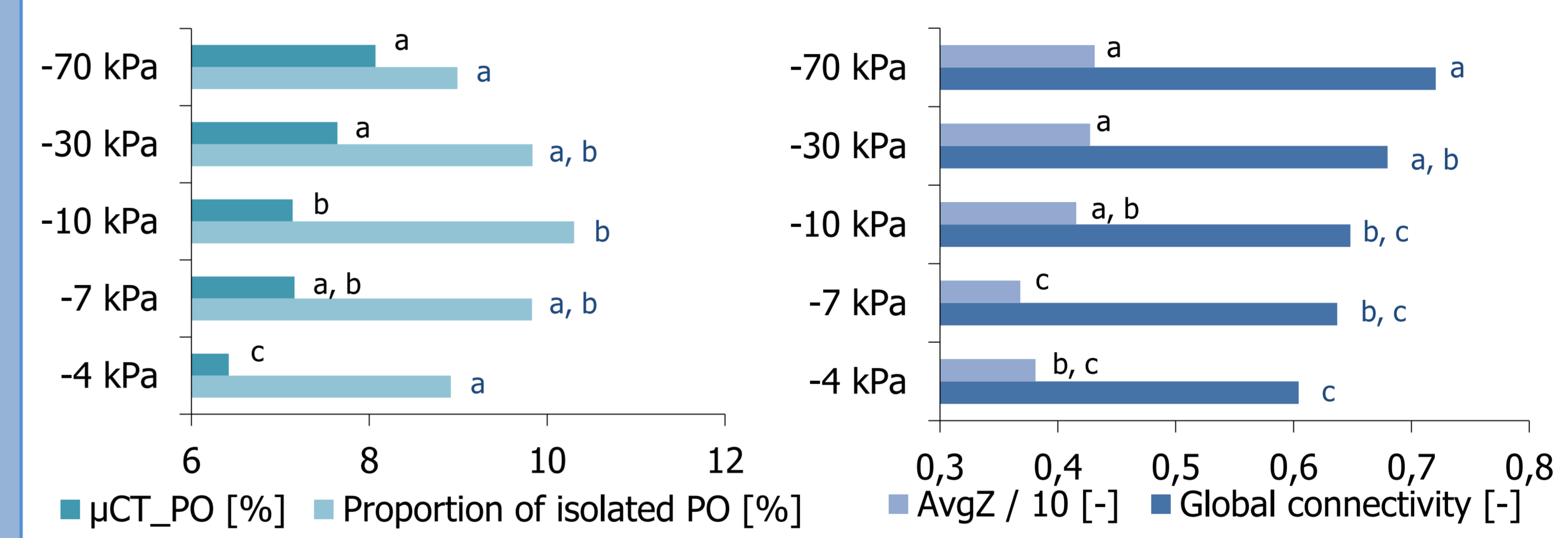
## Materials & Methods

- 20 soil samples (3cm x 5cm) from a silty-loam agricultural field in Gembloux (Belgium)
- Soil water retention curve (SWRC) measured with pressure plates
- Samples scanned at various steps of the SWRC with an X-ray microtomograph (microCT system Skyscan 1172) at a voxel size of  $21,5^3 \mu\text{m}^3$  (resampled to  $43^3 \mu\text{m}^3$ )
- Saturated hydraulic conductivity (Ks) measured at the end of SWRC
- Air permeability (ka) measured at multiple steps of SWRC



## Results

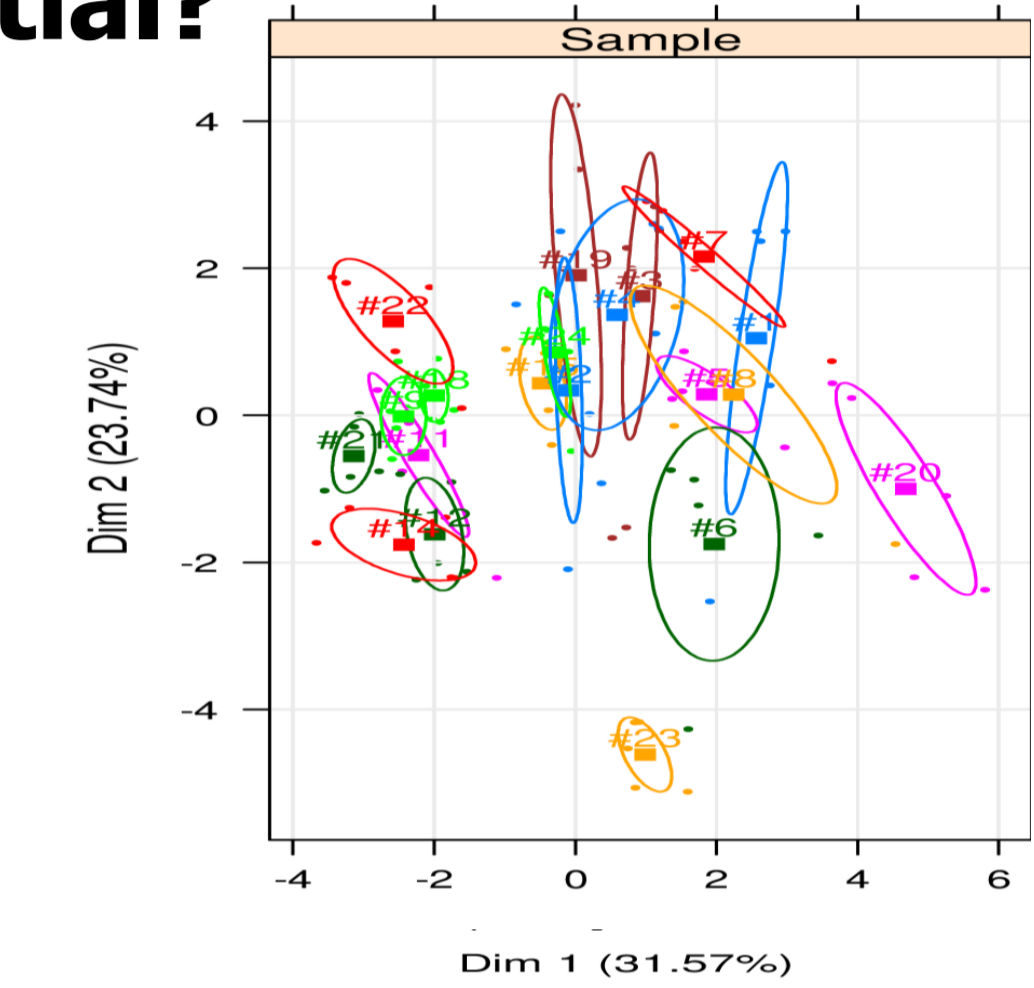
### 1) Are the global geometrical and topological microscopic parameters different between water matric potential?



**Yes**, as well as: the Euler number, the tortuosity ( $\tau$ ), the average pore volume (Avg\_vol), the pore network length (L), the degree of anisotropy (DA), and the fractal dimension (FD)

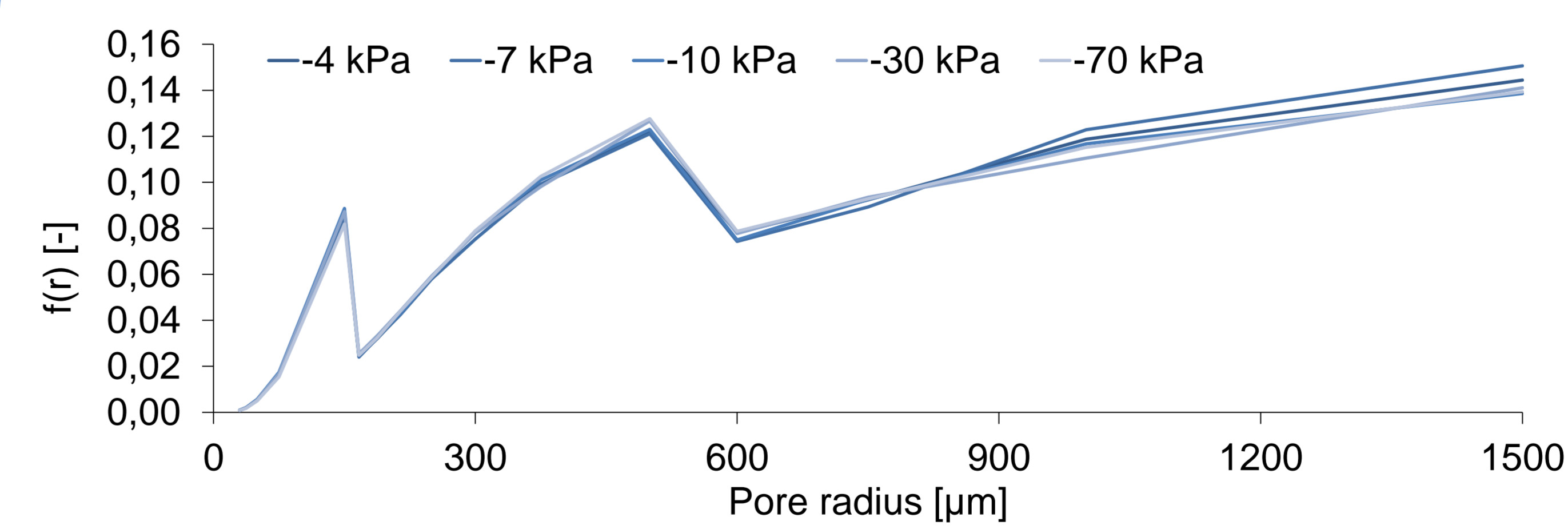
Through **ANCOVA analyses**: the significant differences were explained by the soil sample hydrodynamic properties for:

	$\mu\text{CT\_PO}$	IPO	AvgZ	Global_con	Euler	$\tau$	Avg_Vol	L	DA	FD
Log(Ks)	X	X	X		X		X	X		X
Ka				X	X		X	X		X
SWRC	X	X		X	X		x	X		X

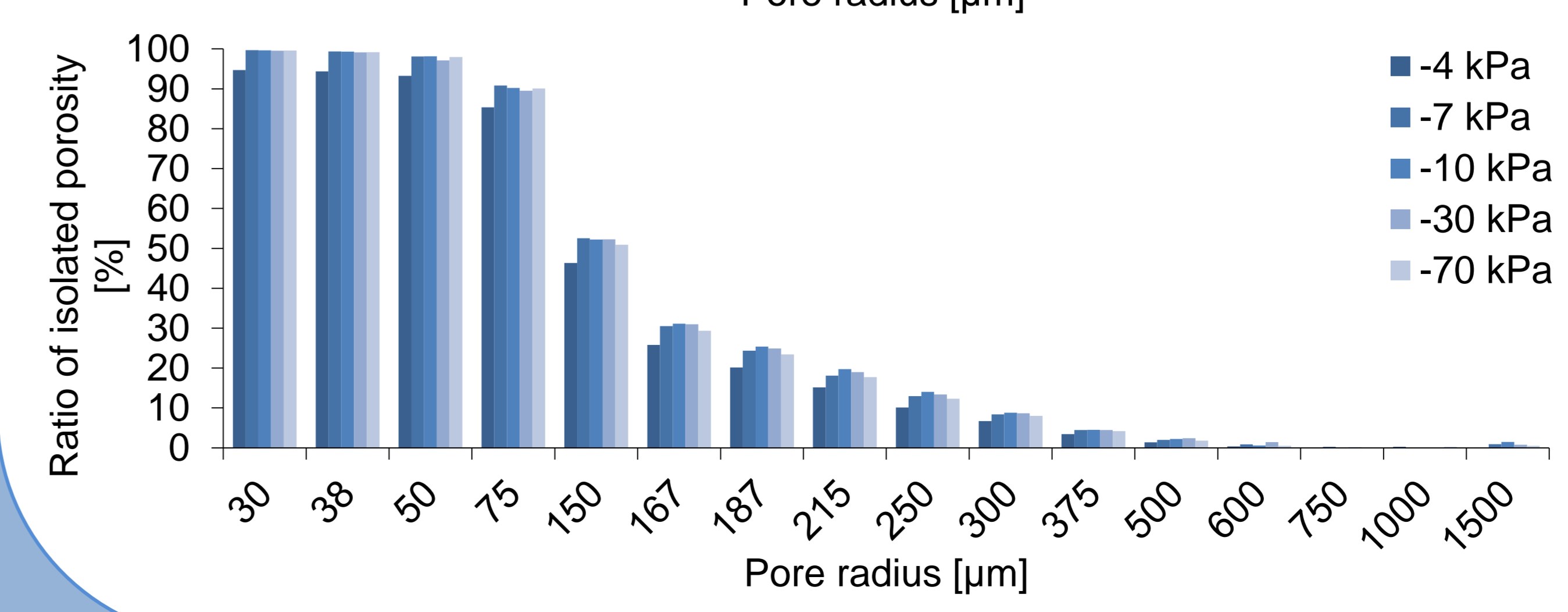


...but, the characteristics of one samples scanned at various water matric potentials (h) remain similar between h

### 2) And if we consider the geometrical and topological microscopic parameters calculated on specific pore size ranges ?



**Calculated parameters:** average pore volume, average coordination number, average surface connectivity, fraction of isolated porosity, and pore size distribution



-> **No significant differences** between parameters calculated on specific pore size ranges between water matric potentials.