DEPARTMENT OF ENVIRONMENTAL IMPROVEMENT
WARSAW AGRICULTURAL UNIVERSITY

MOISTURE CONTENT VARIABILITY IN DRAINED FEN SOIL

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Wierzba, 22-25.09.2005

"EUROPEAT" PROJECT
QLRT-2001-01835

Kwatera 17

w. 0-10 cm

Kwatera 17

w. 10-20 cm

Kwatera 17

w. 20-35 cm

Kwatera 17

w. 40-50 cm

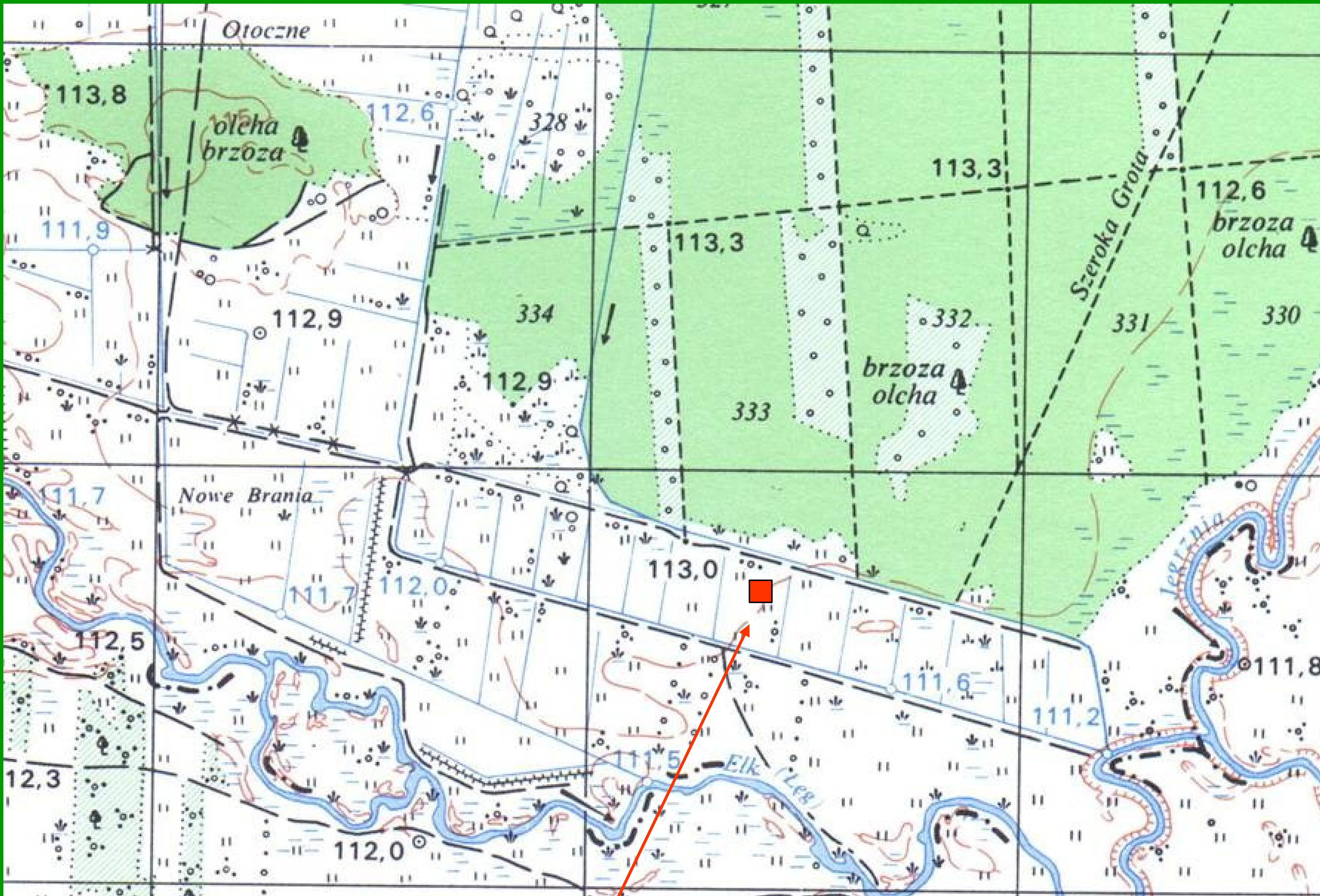
Kwatera 17

w. 70-80 cm

THE OBJECTIVES:

- characterise the variability of soil moisture content over short distance in peat-moorsh soil,
- evaluate of the soil water repellency,
- study soil volume changes.


POLSKA


Otoczne
113,8
olcha
brzoza
112,6
328
113,3
112,6
111,9
113,3
Szeroka Grota
brzoza
olcha
112,9
334
332
331
330
112,9
brzoza
olcha
333
111,7
Nowe Brania
113,0
111,7
112,0
112,5
111,8
111,6
111,2
12,3
111,5
Ełk (Łeg)
112,0

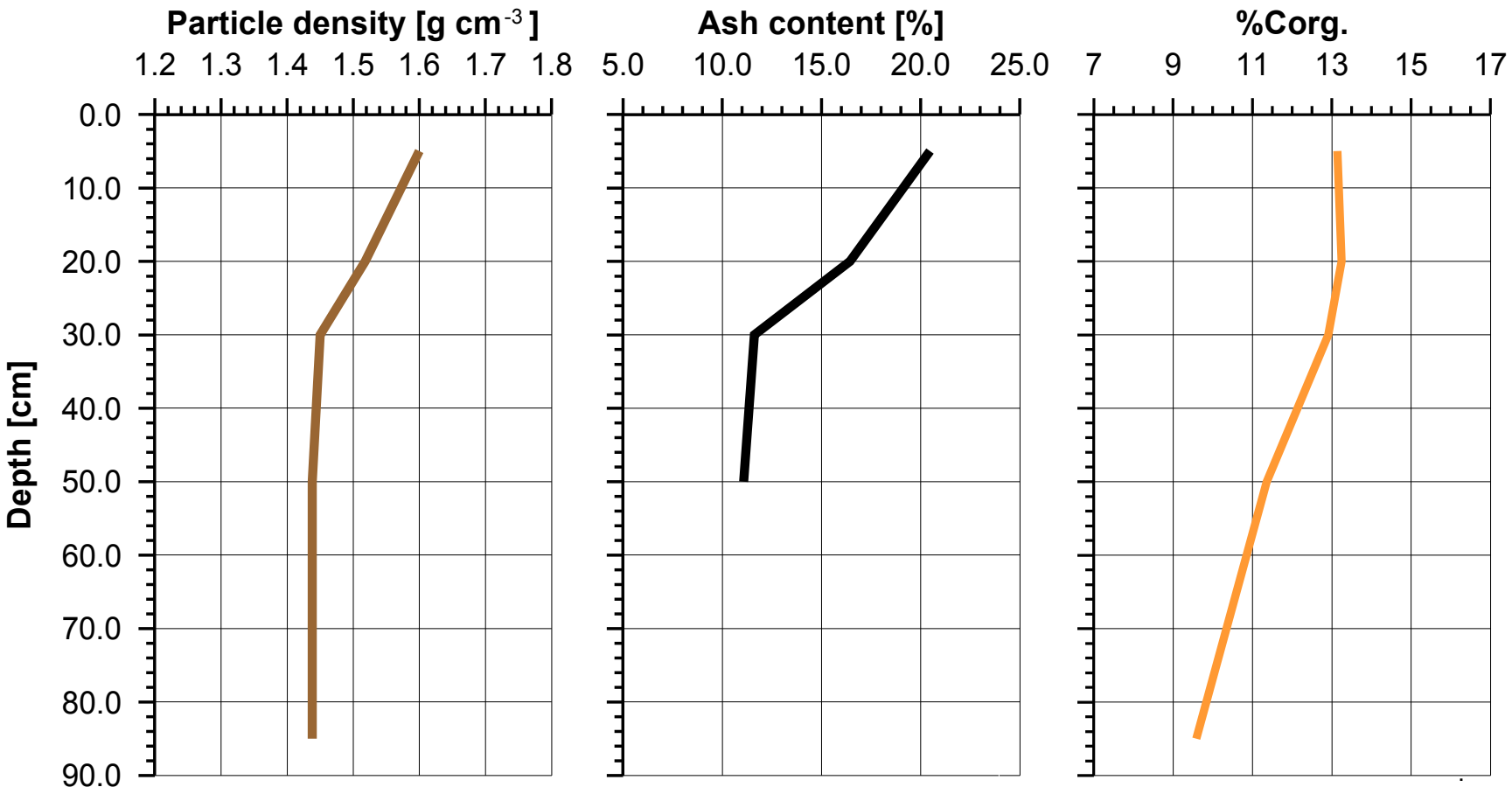
0 - 10 cm layer,
Moorsh developed from sedge-grass peat,
Cloddy structure, with low admixture of turf roots.

15 - 25 cm layer,
Moorsh developed from sedge peat,
Cloddy structure, without visible roots.

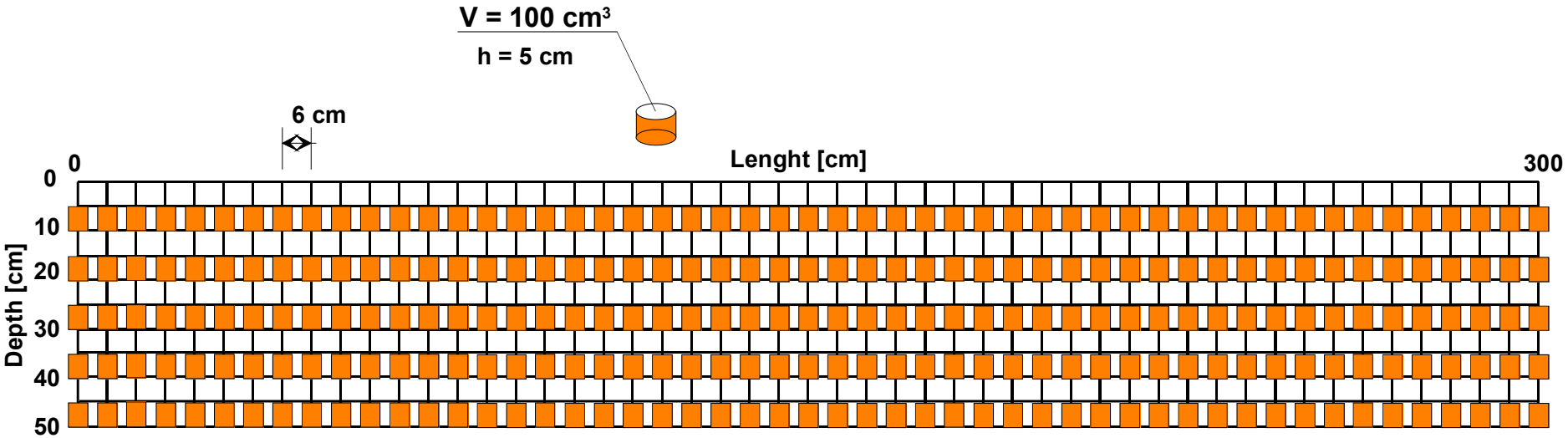




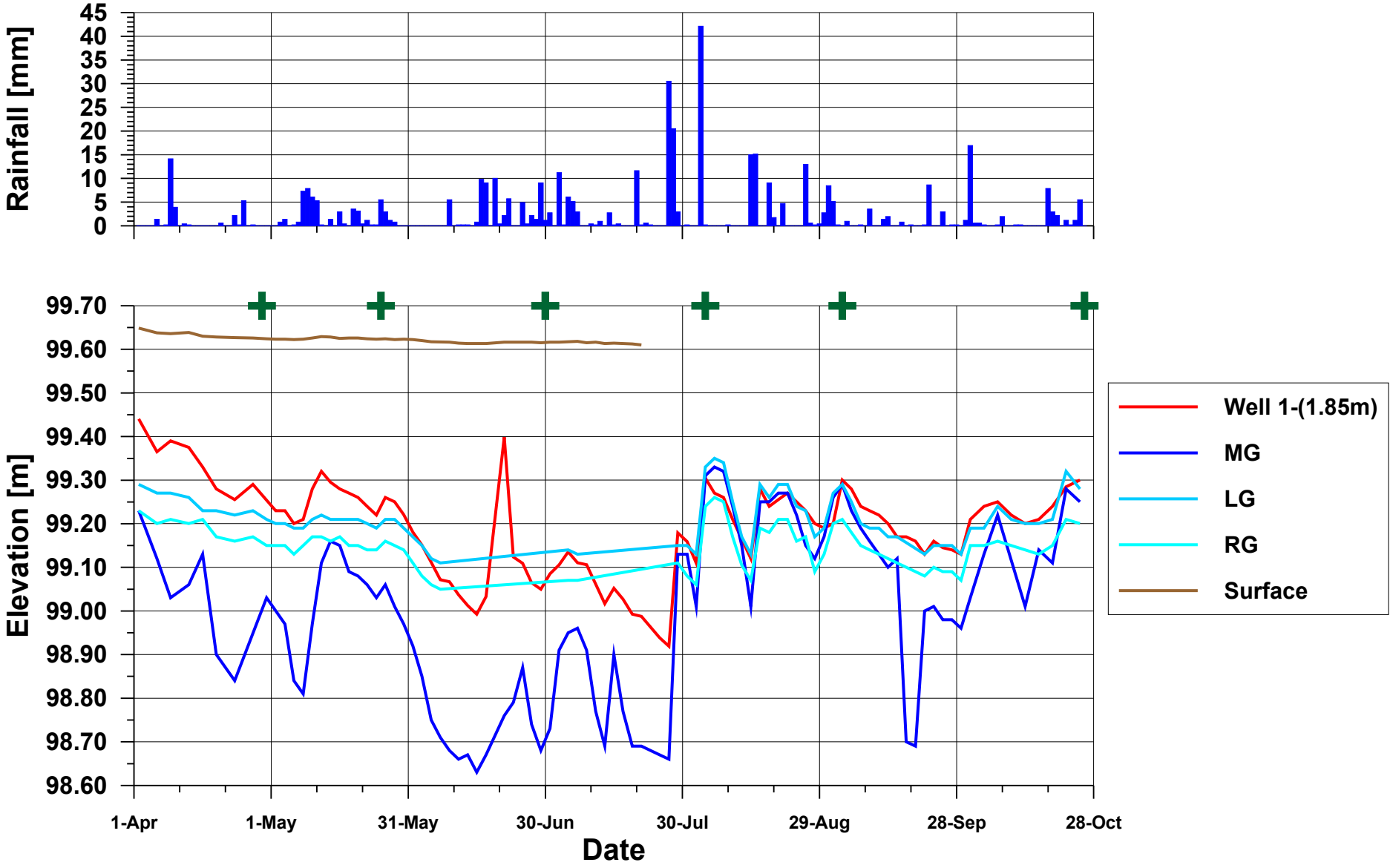
BASIC SOIL PROPERTIES



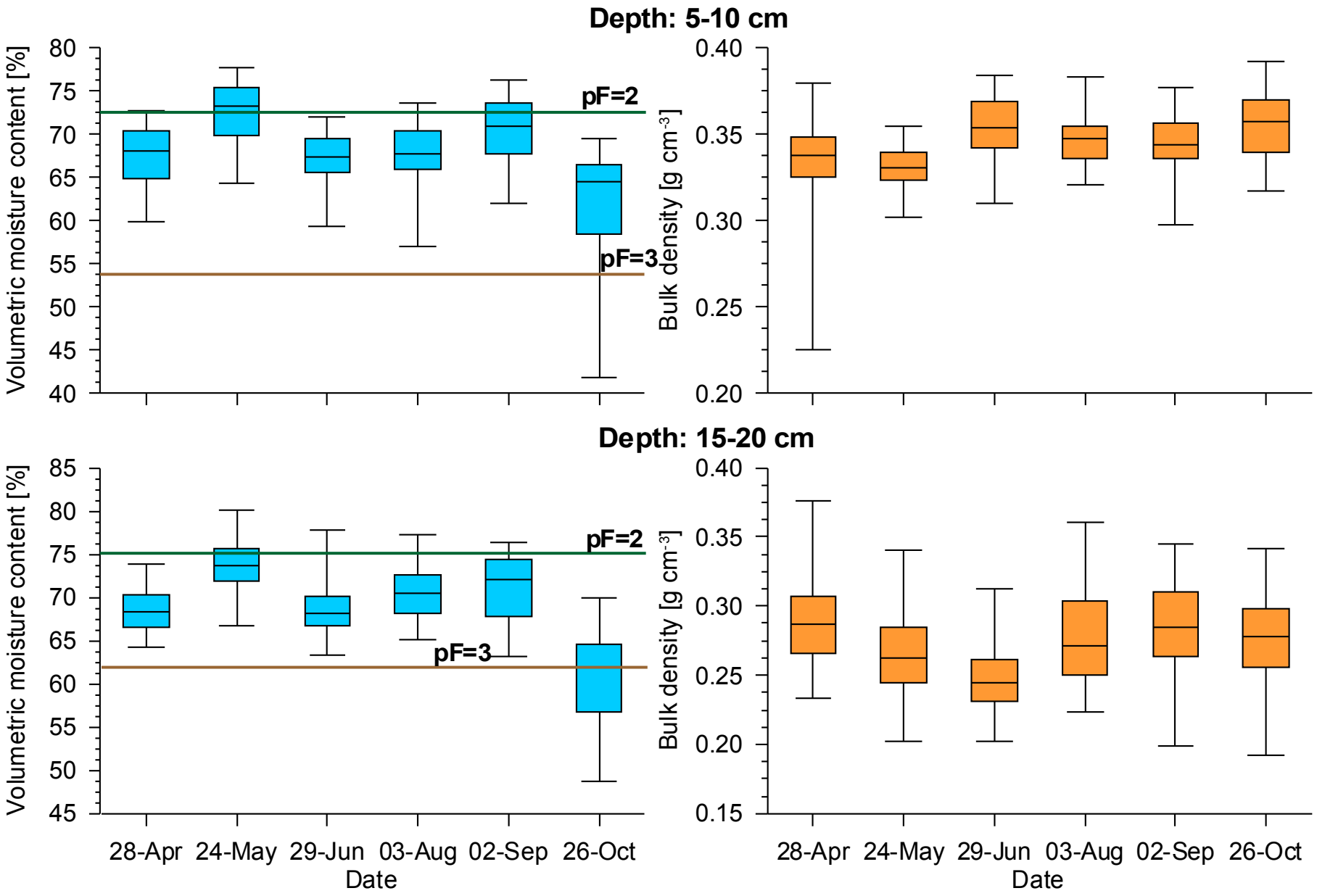
SAMPLING



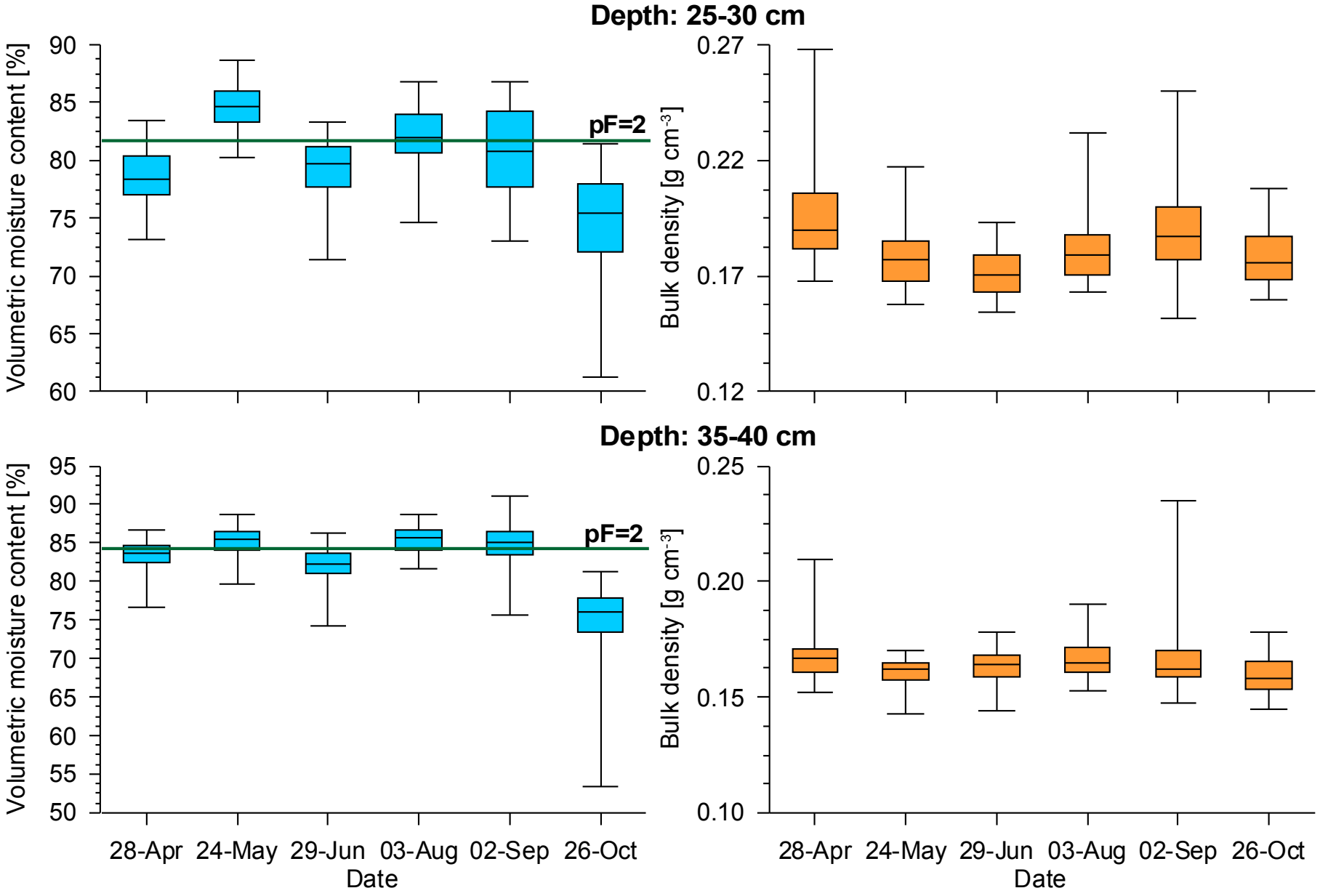
WATER CONDITIONS



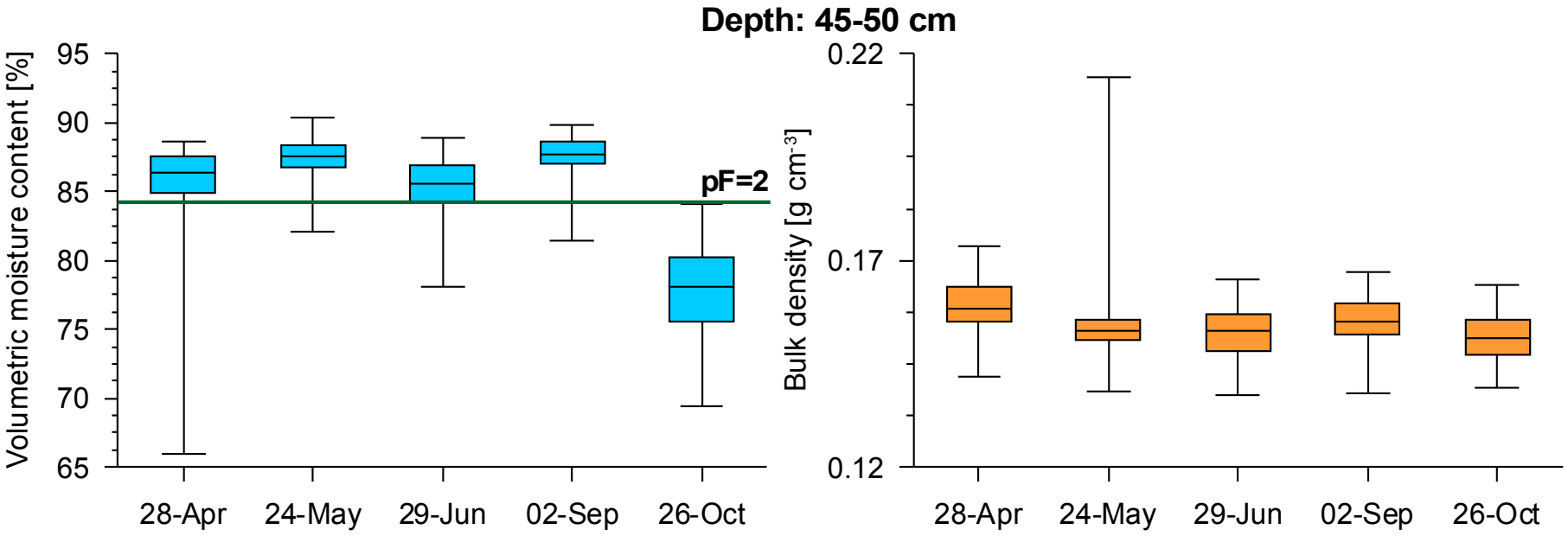
MOISTURE CONTENT AND BULK DENSITY



MOISTURE CONTENT AND BULK DENSITY



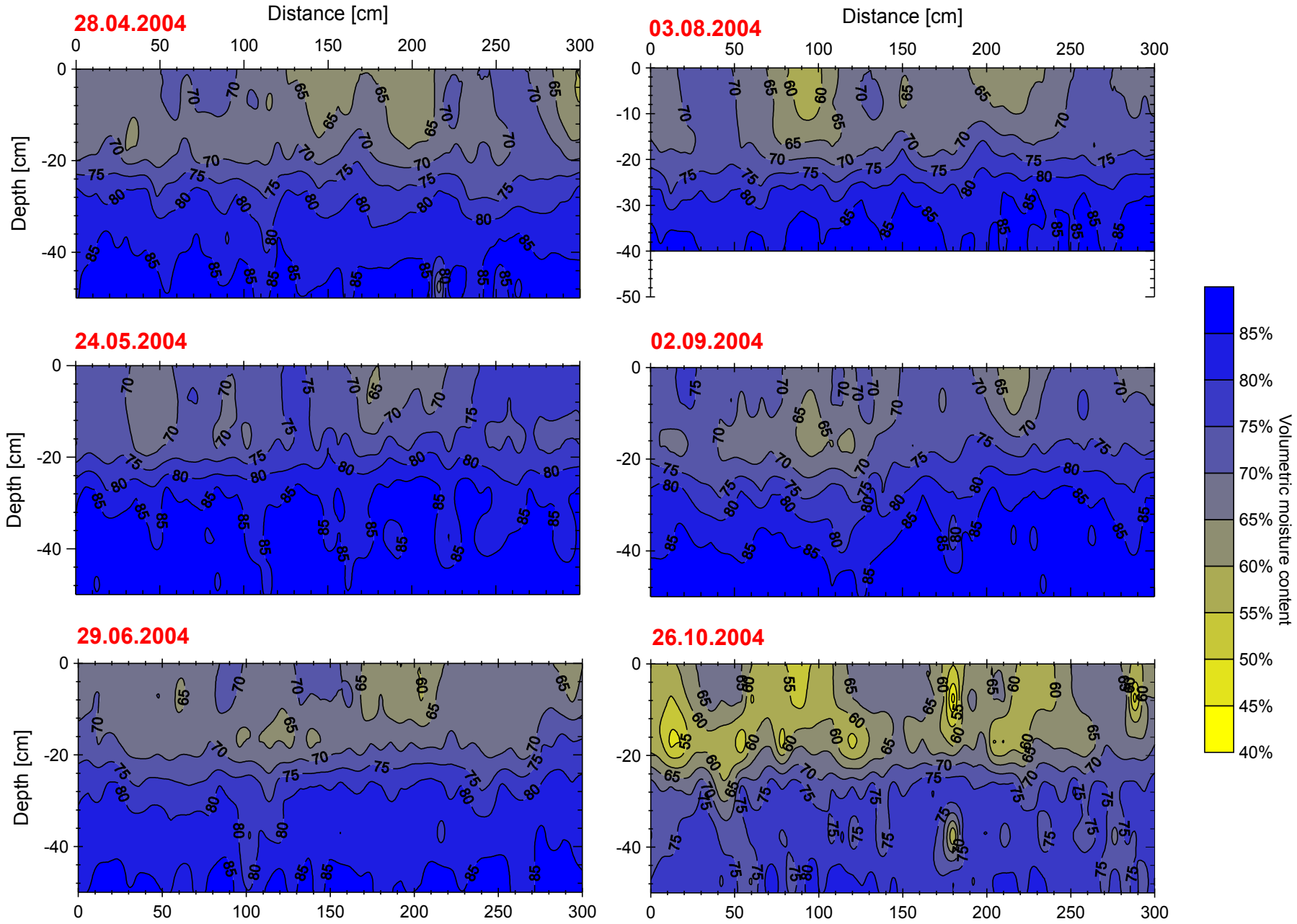
MOISTURE CONTENT AND BULK DENSITY



MOISTURE CONTENT AND BULK DENSITY

Date of sampling	Statistic	Volumetric moisture content [%] at depth [cm]					Bulk density [g cm^{-3}] at depth [cm]				
		5-10	15-20	25-30	35-40	45-50	5-10	15-20	25-30	35-40	45-50
28 Apr	average	67.41	68.49	78.50	83.38	85.75	0.335	0.290	0.195	0.167	0.159
	CV [%]	5.28	3.40	3.21	2.26	3.92	7.11	10.04	9.87	5.07	4.09
24 May	average	72.44	73.67	84.54	85.25	87.36	0.330	0.267	0.179	0.160	0.151
	CV [%]	4.84	3.99	2.40	2.24	1.76	3.34	11.66	7.17	3.40	13.37
29 Jun	average	67.26	68.64	79.28	82.22	85.29	0.354	0.248	0.171	0.163	0.153
	CV [%]	4.36	4.74	3.06	2.55	2.46	5.03	9.60	5.84	4.19	3.76
03 Aug	average	67.44	70.41	81.98	85.47		0.346	0.278	0.181	0.167	
	CV [%]	5.53	4.08	3.14	1.96		3.80	12.88	8.20	4.93	
02 Sep	average	70.52	70.86	80.60	84.71	87.58	0.343	0.285	0.190	0.165	0.156
	CV [%]	4.87	5.58	4.85	3.15	1.74	4.50	11.51	11.36	7.70	3.82
26 Oct	average	62.08	60.95	74.77	75.13	77.82	0.354	0.278	0.178	0.160	0.152
	CV [%]	9.44	8.62	5.50	5.84	4.22	4.99	11.81	6.90	5.27	3.75

MOISTURE PATTERN



WATER DROP PENETRATION TIME TEST (WDPT)

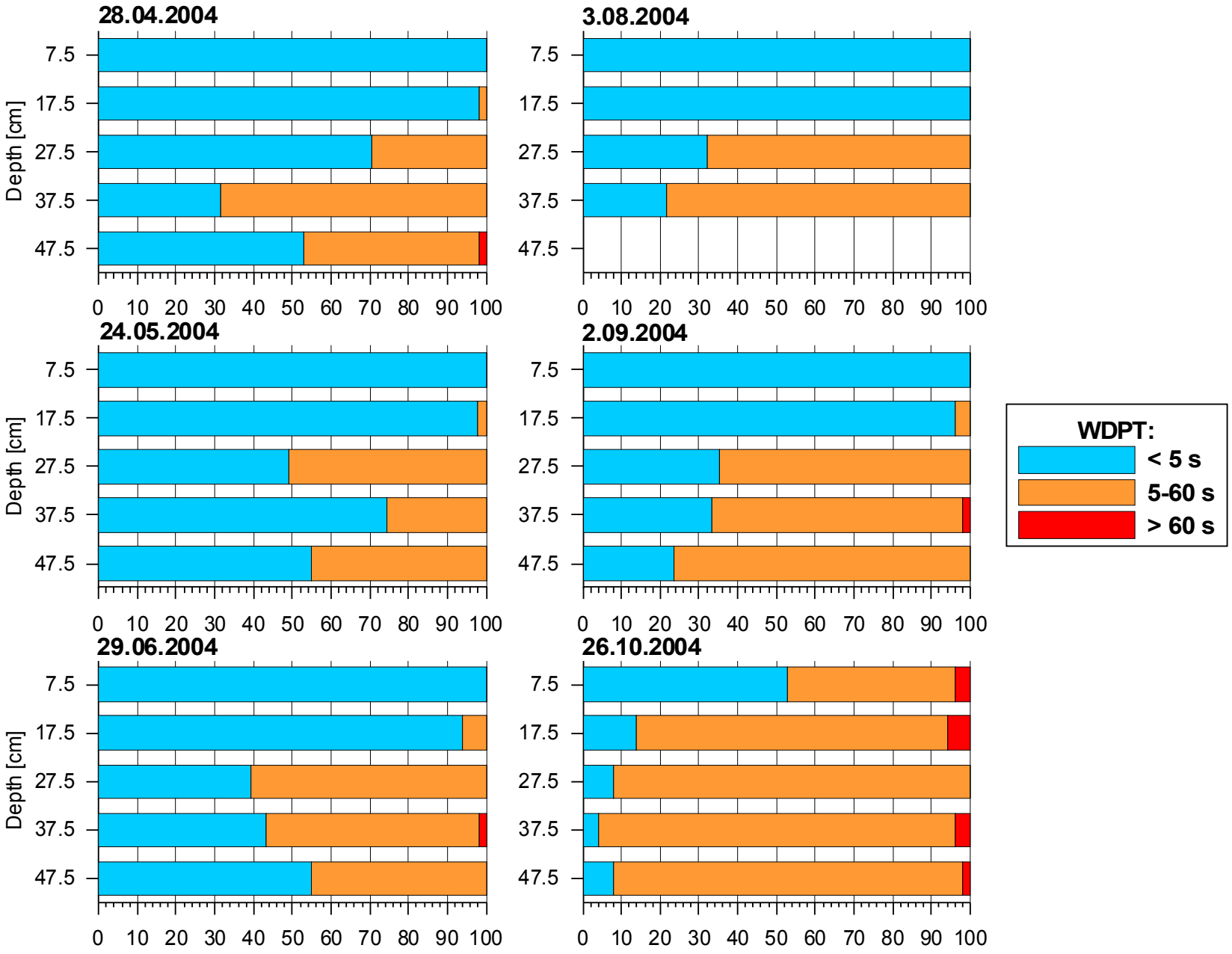
CLASSIFICATION OF THE SOIL WATER REPELLENCY

Classification of the persistence of soil water repellency

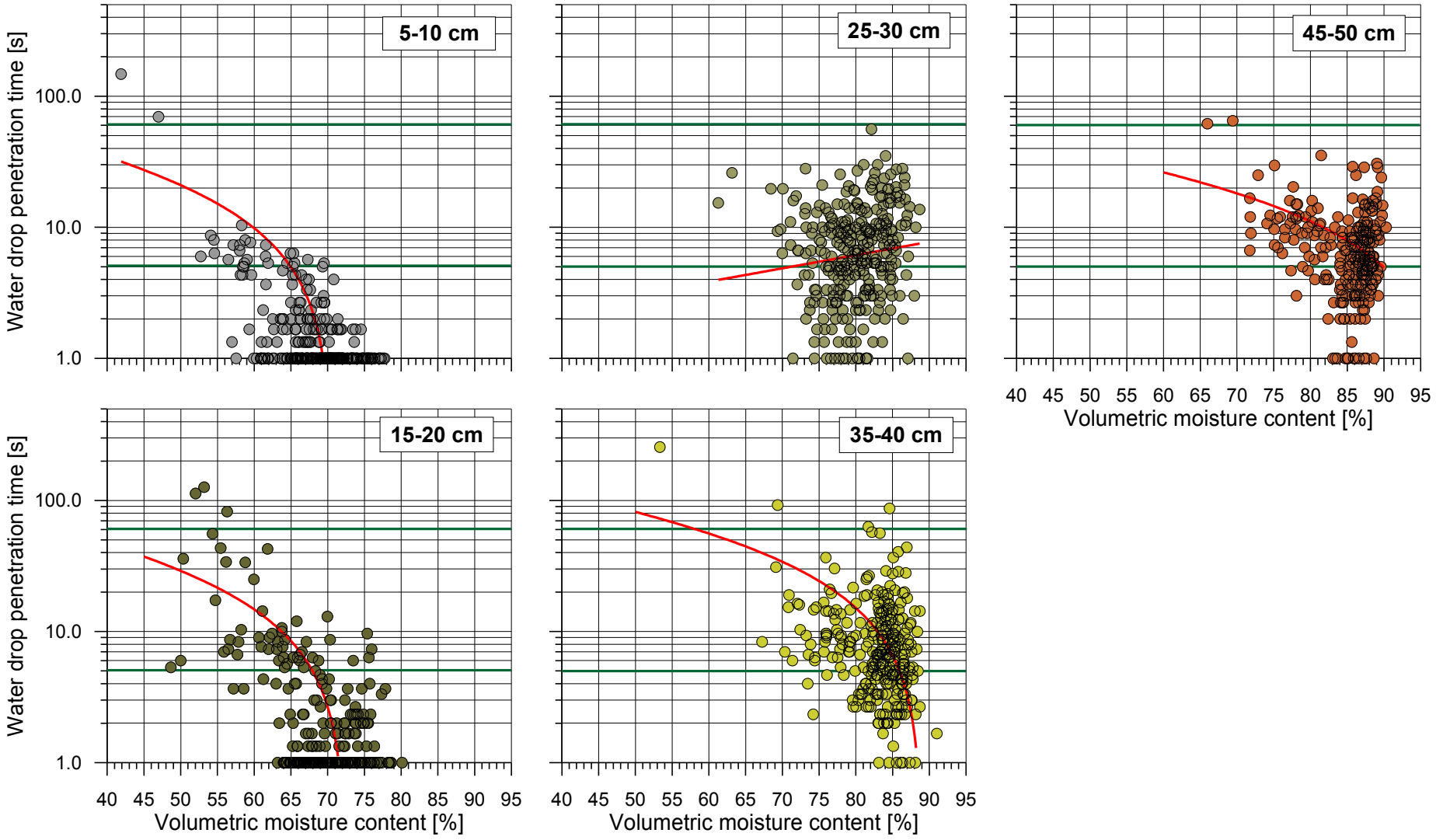
(Dekker and Ritsema, 1994)

Waterdrop penetration time WDPT [s]	Nomenclature
< 5	wettable; non-water repellent
5 - 60	slight water repellent
60 - 600	strongly water repellent
600 - 3600	severely water repellent
> 3600	extremely water repellent

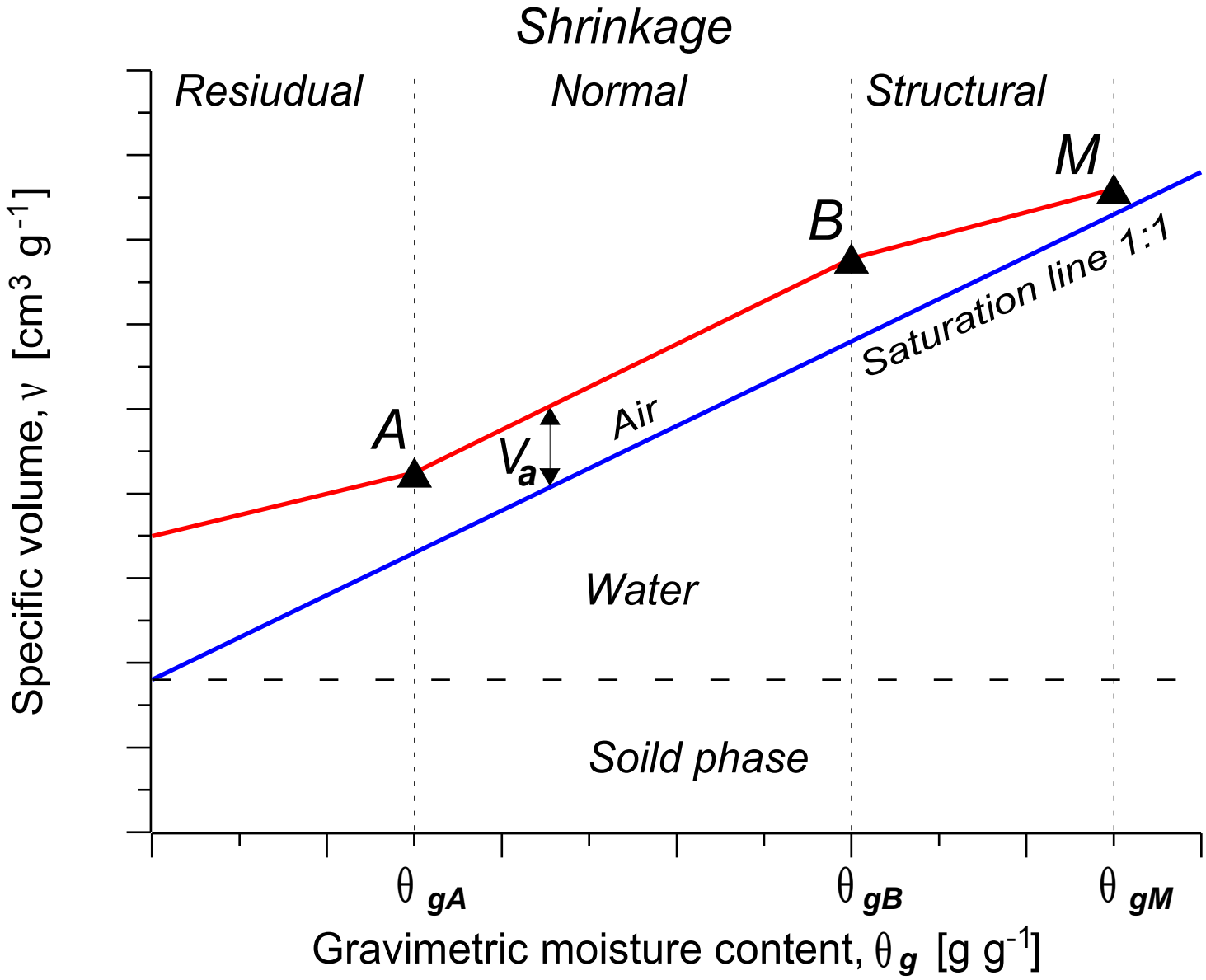
SOIL WATER REPELLENCY



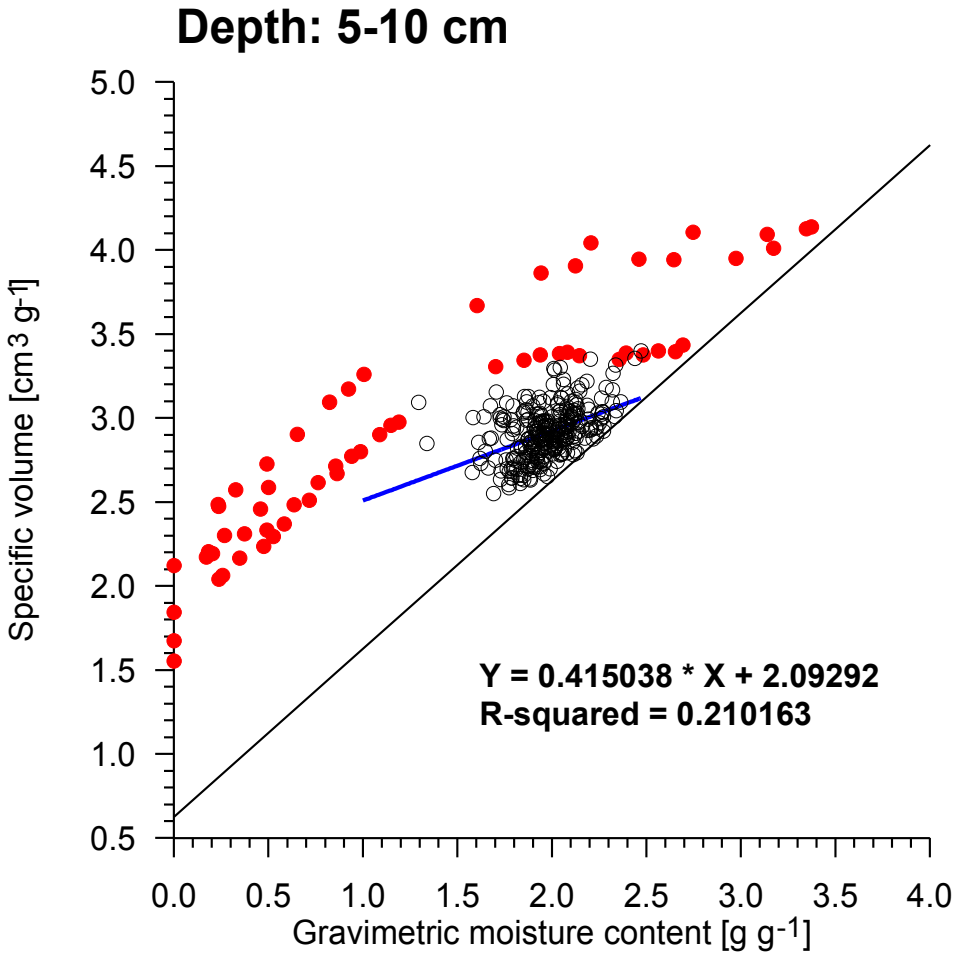
SOIL WATER REPELLENCY

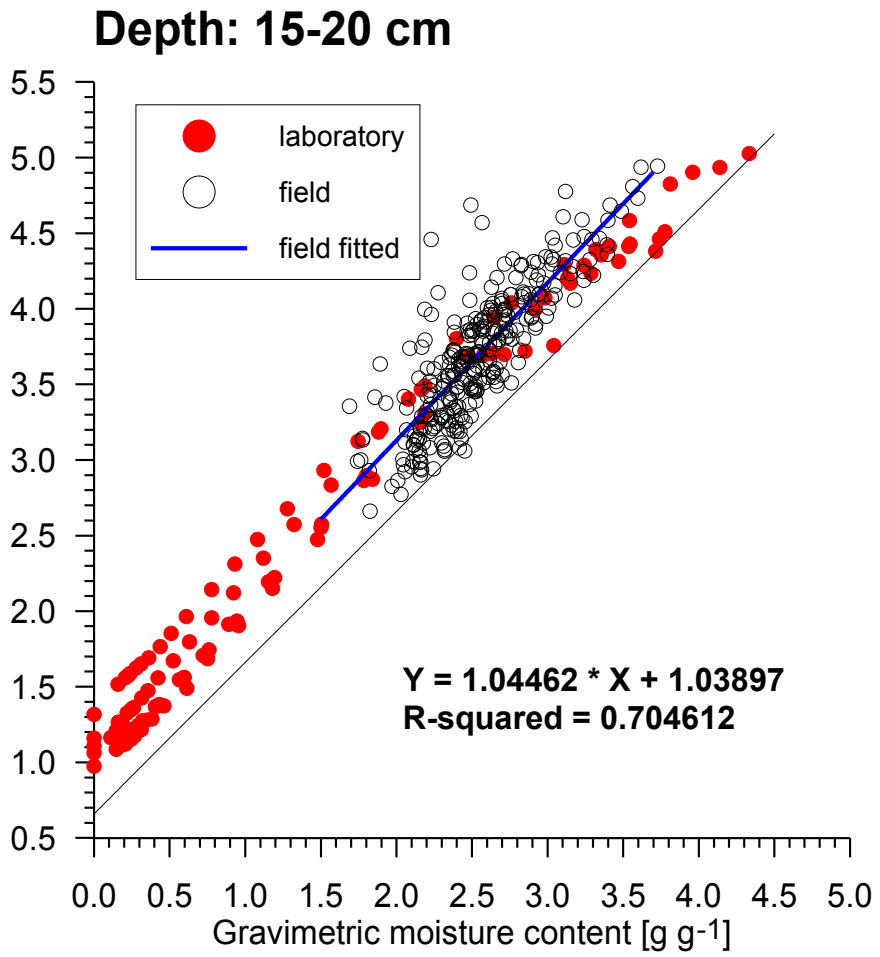


SHRINKAGE CHARACTERISTIC

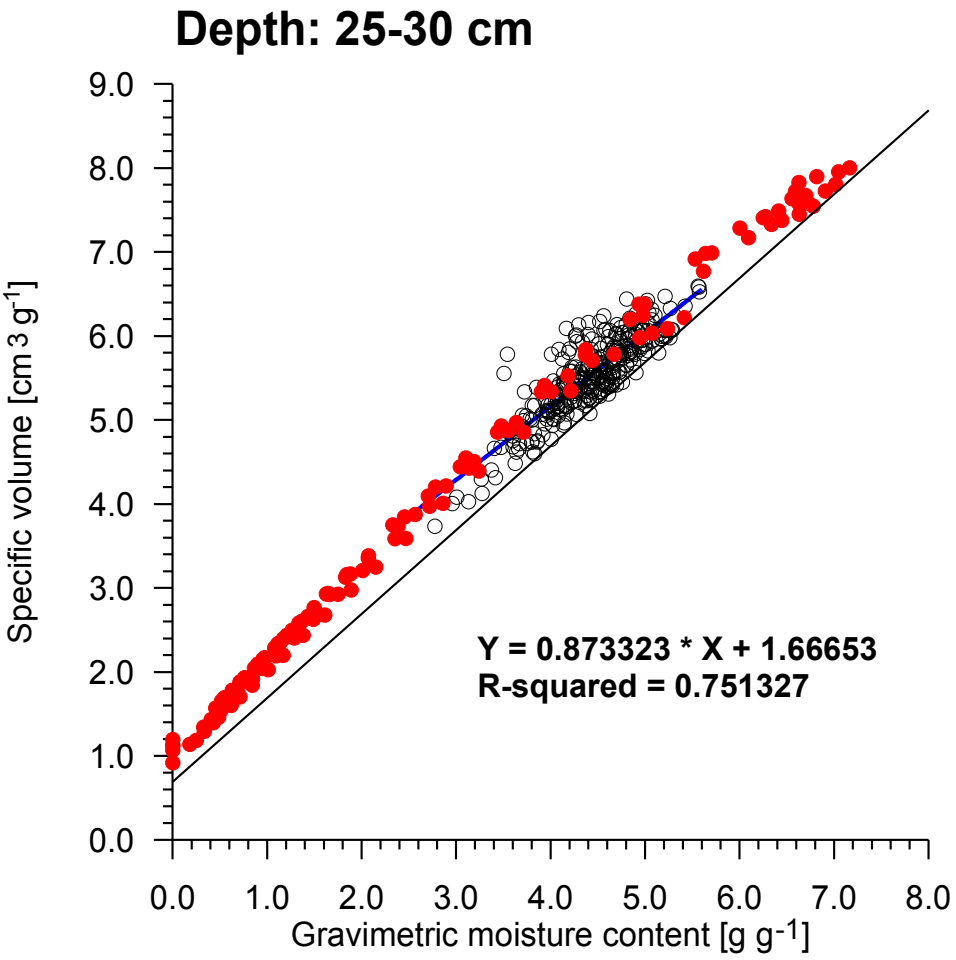


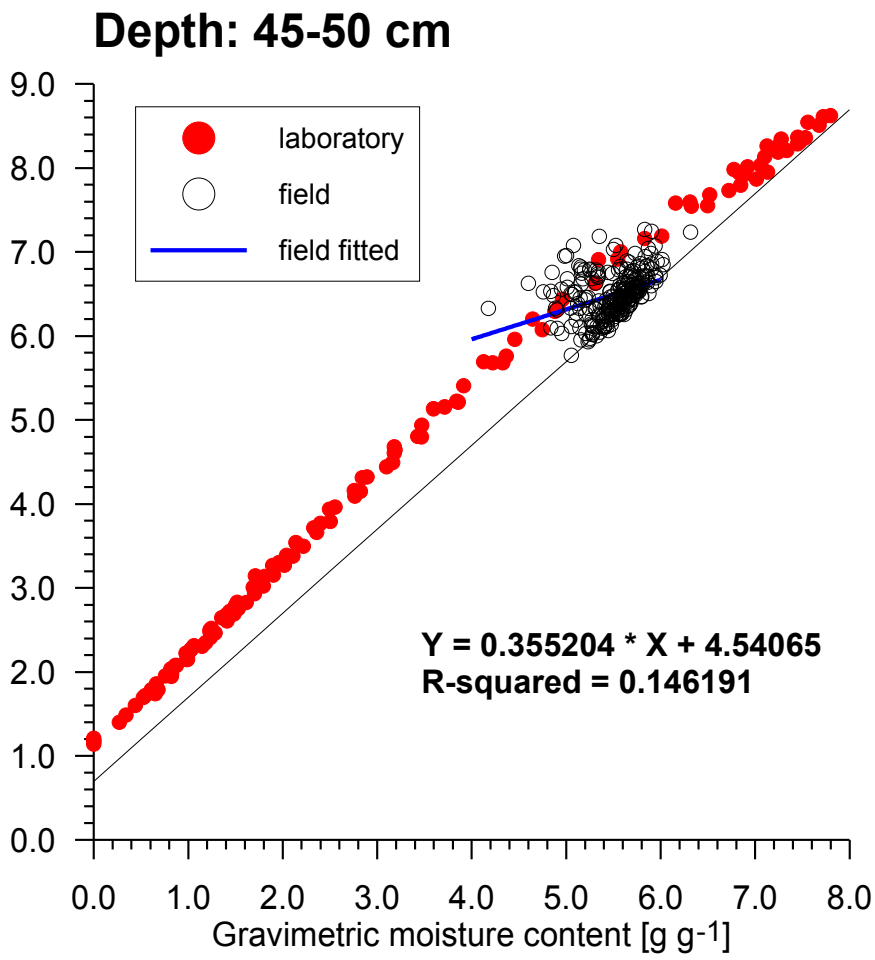
SHRINKAGE CHARACTERISTIC





SHRINKAGE CHARACTERISTIC





CONCLUSIONS

- The coefficient of variation (CV) of the soil water content for five depths in the six trenches varied between 1.75 and 9.44%,
- Soil moisture patterns suggests occurrence of preferential water flow,
- The CV of soil bulk density varied from 3.3 to 13.4%,
- Water repellency measured by water drop penetration time test in considered peat-moorsh soil is extremely depended on soil water content,
- Moorsh samples are hydrophobic at moisture content 65-70% where peat samples at 85-90%,
- Volume changes of peat-moorsh soil is dependent on moisture content, good agreement between shrinkage characteristic measured using saran resin method and field samples is observed.