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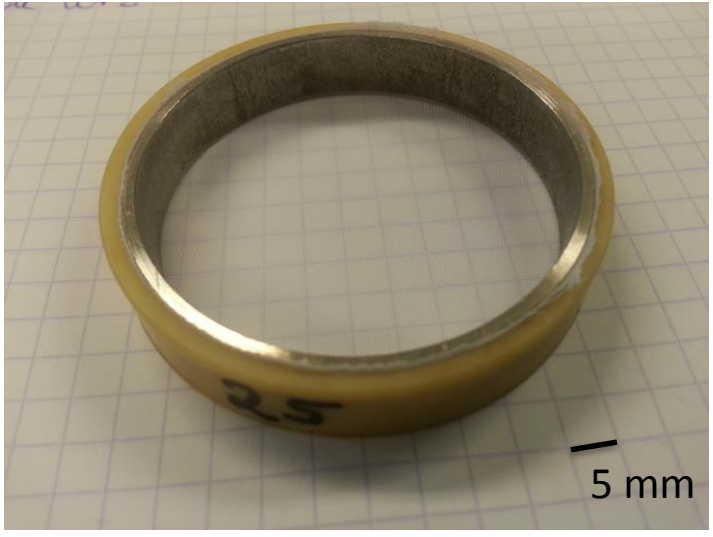
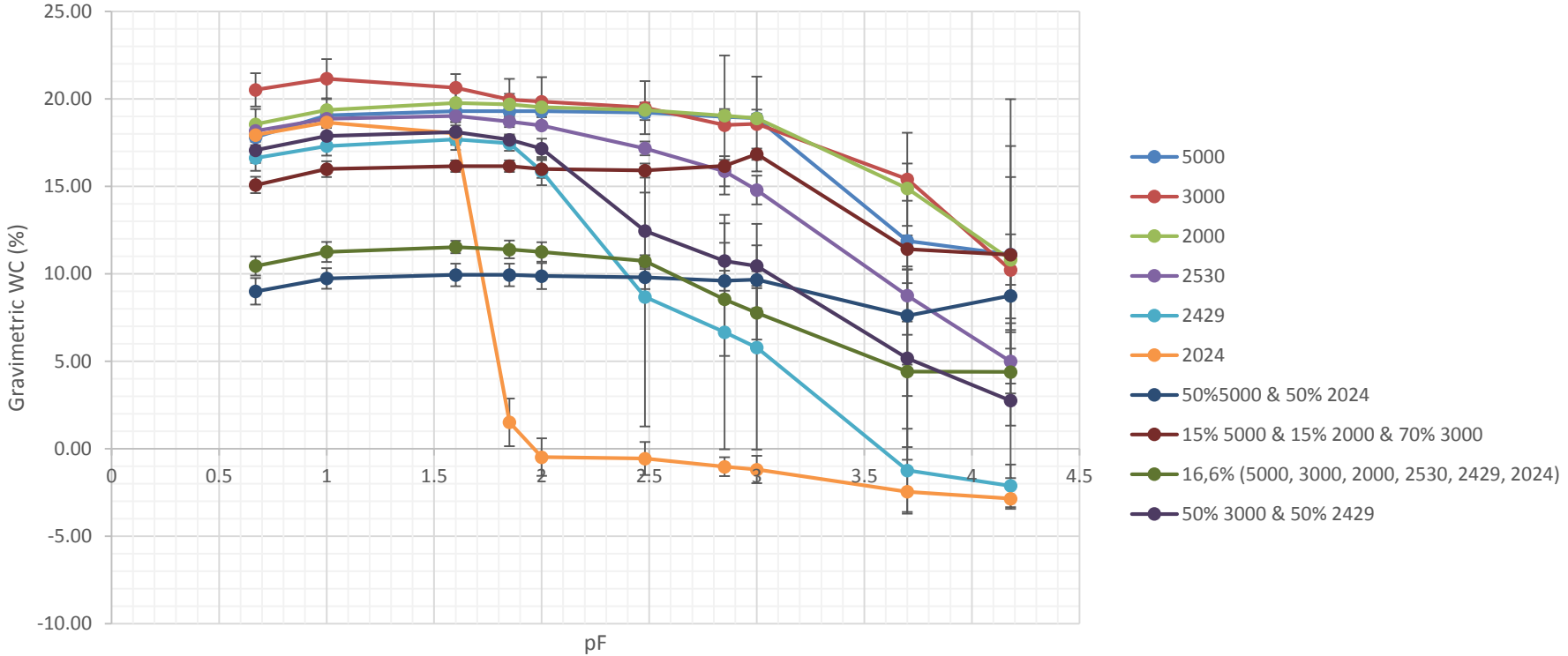
A trial with glass beads

Aurore @ WUR

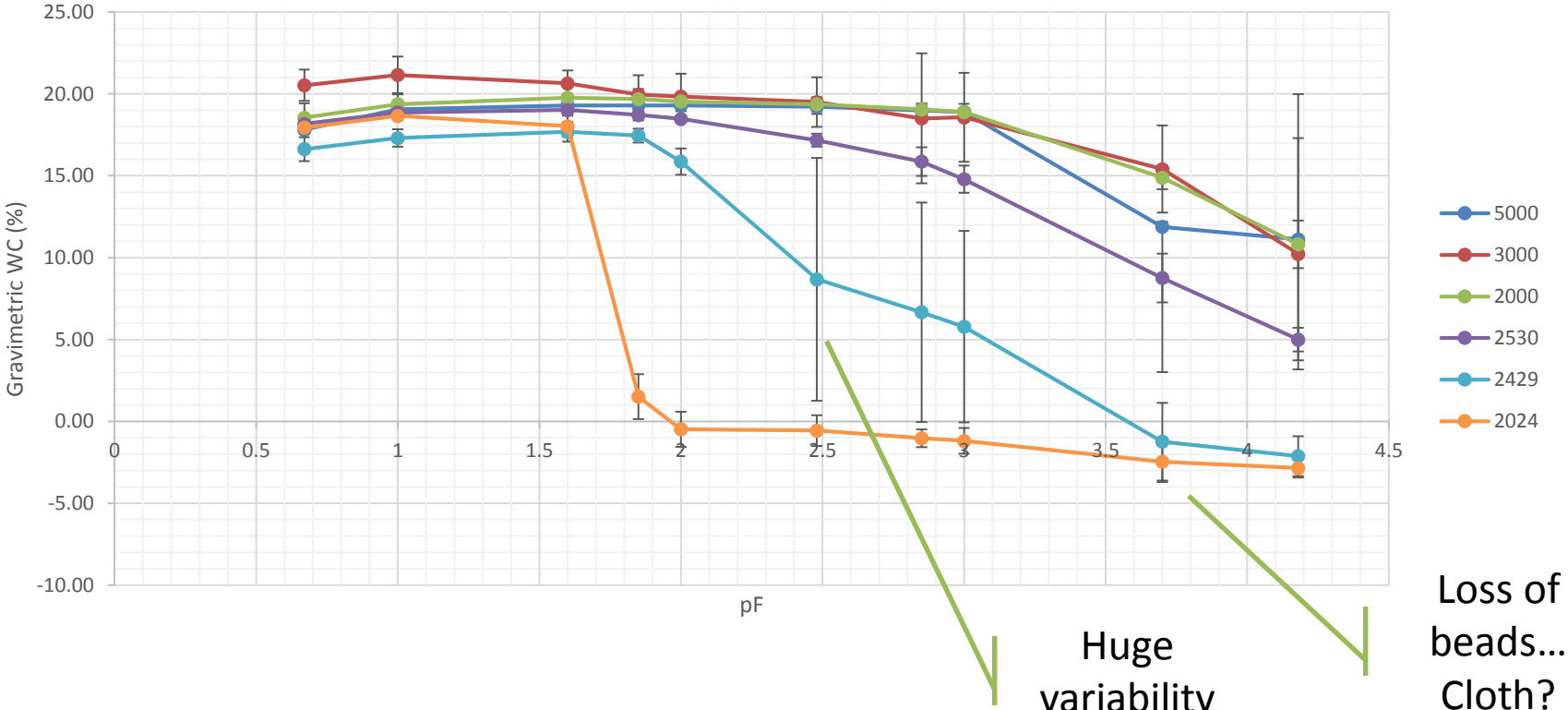

ϕ 3.5-7
ϕ 12-25
ϕ 27-36
ϕ 56-70
160-230
230-31


25
5 mm

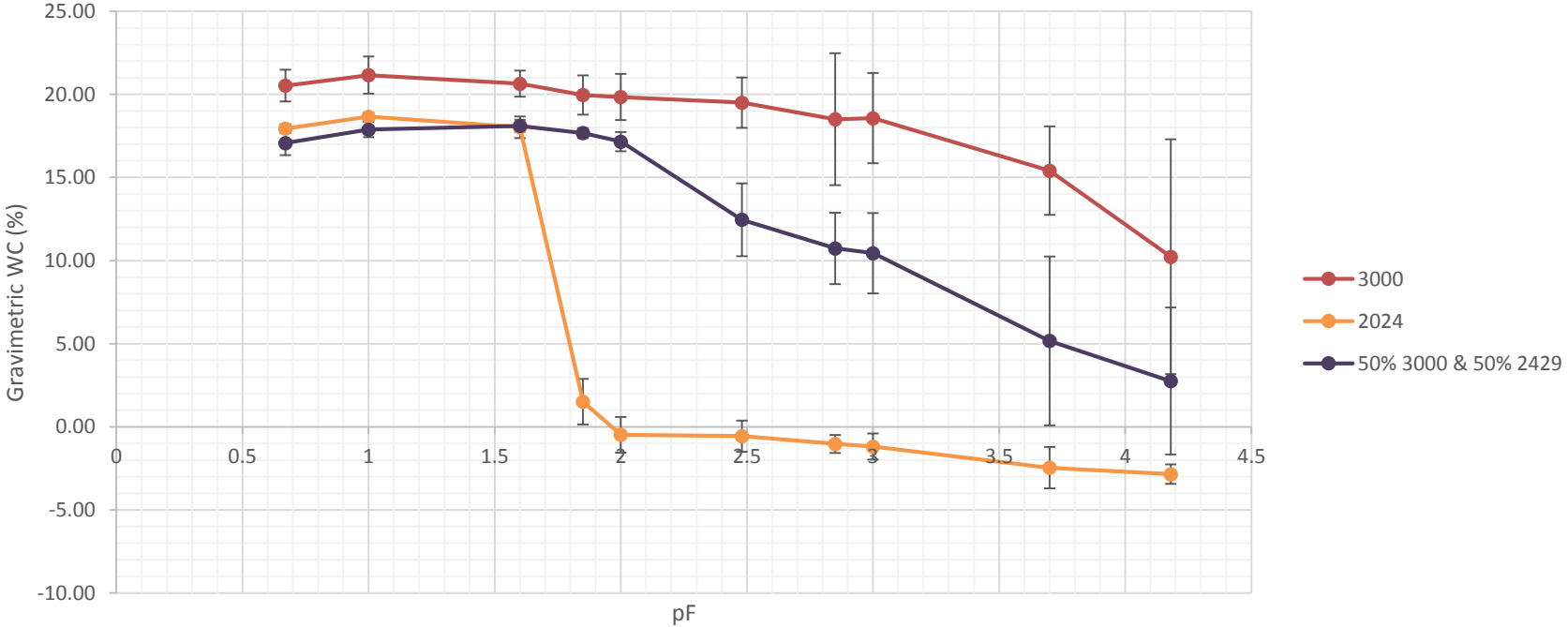
Pure and mixed samples of glassbeads



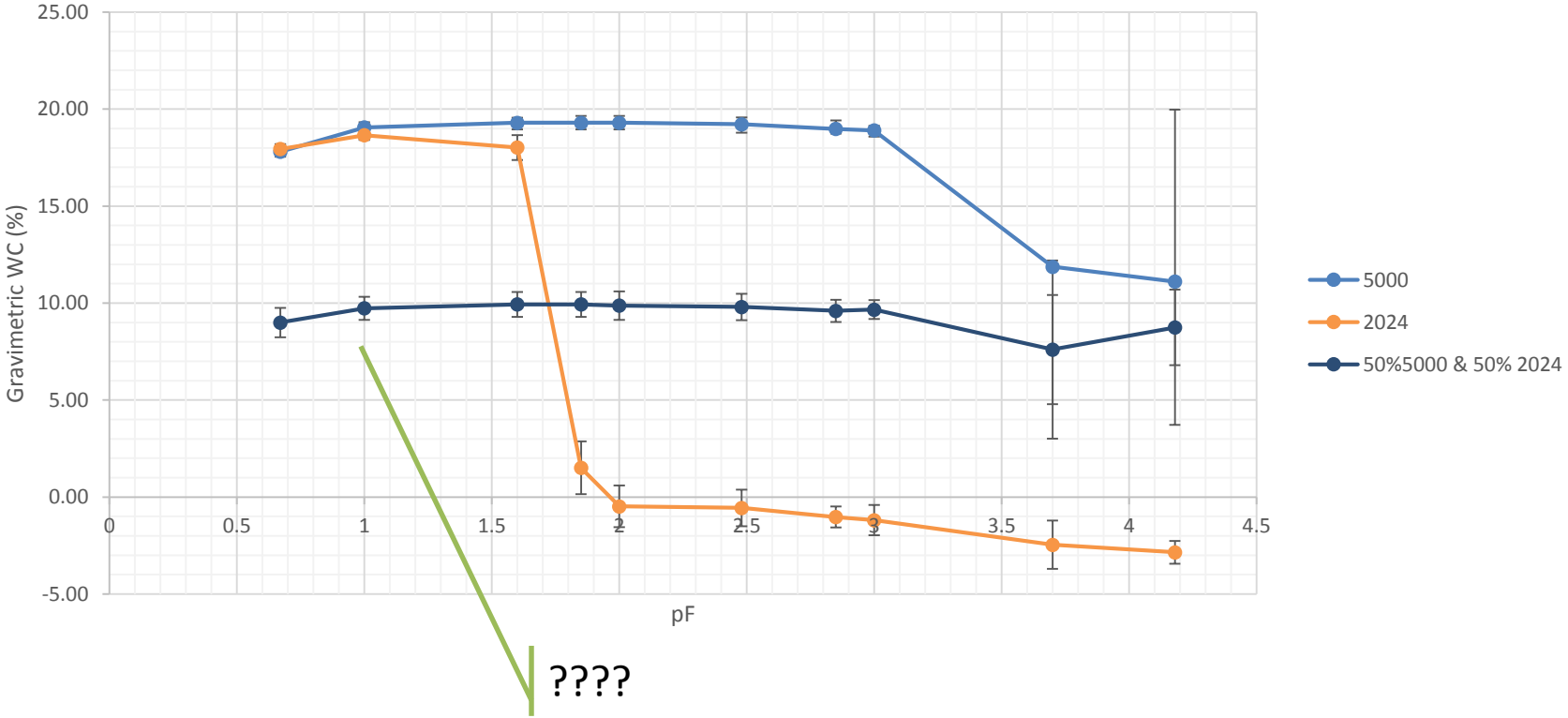
« Pure » glass beads



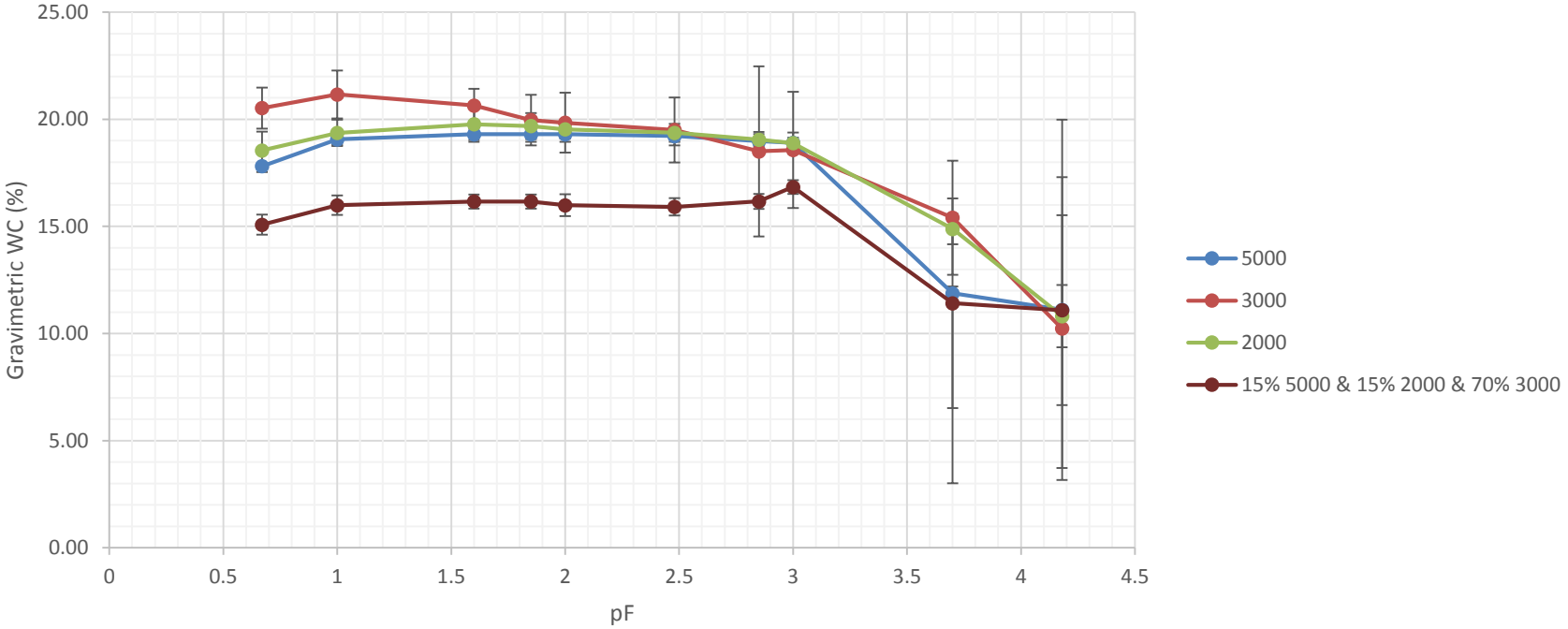
A first trial to mix 2 sizes



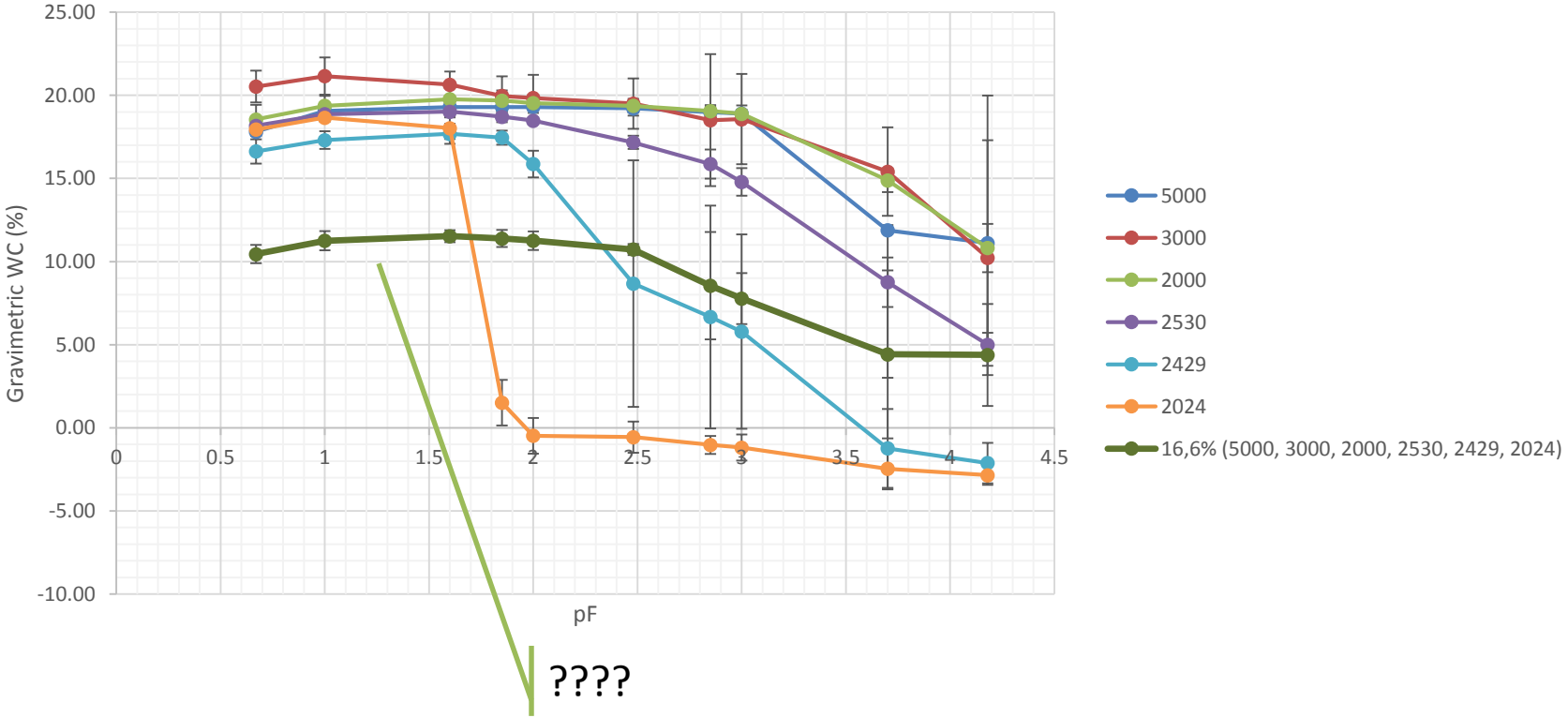
Another trial



Mix of 3 sizes



Mix of 6 sizes



Glass beads….

- worth going further?

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Reference for -33kPa and -1500kPa

Rich Ferguson & Adrien Metcalf

Kellogg Soil Survey Laboratory - USDA

Process control sample

- “Sample 117 is a < 2 mm unconsolidated soil that was at one time collected from the field in large bulk quantity, dried, homogenized, and then repetitively tested for 1500 and 33 kPa water retention”
- https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1253872.pdf

  Pages 107 & 165

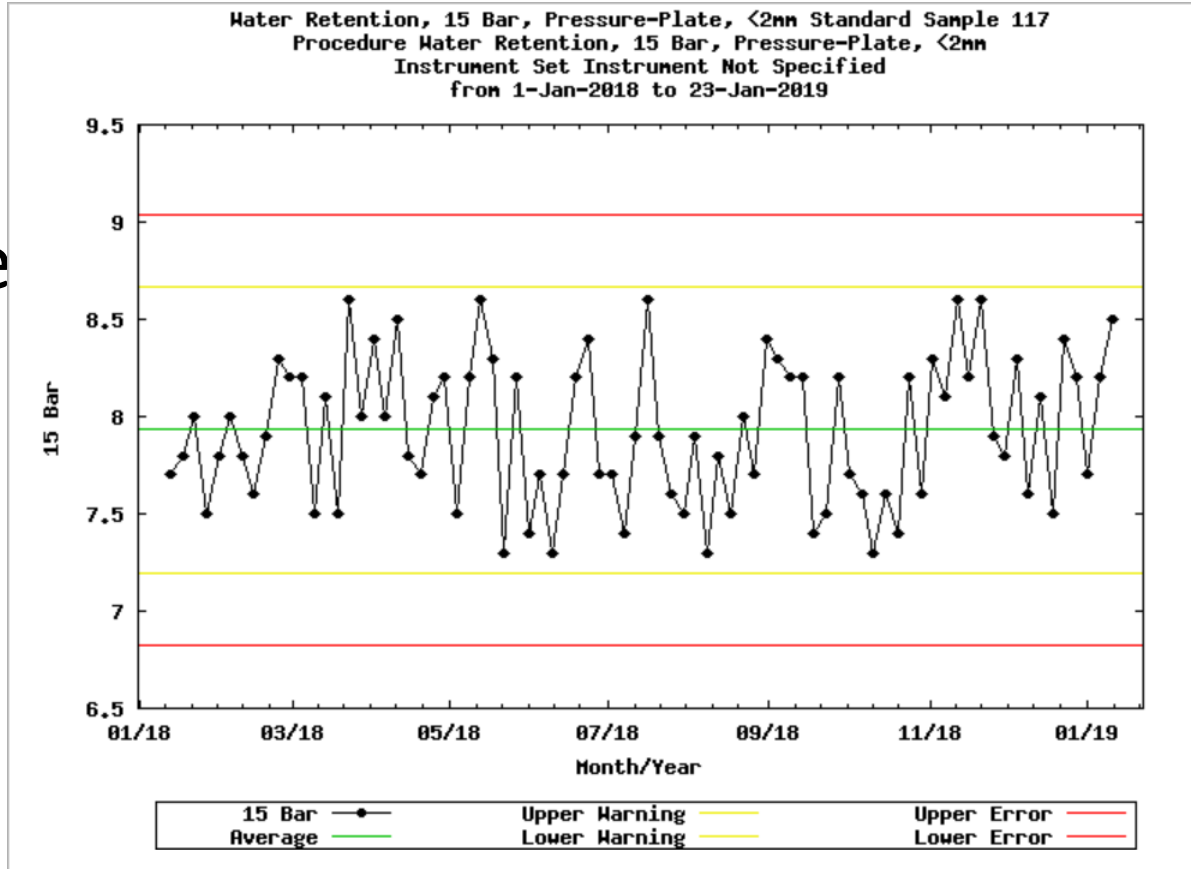
1500 kPa – USDA procedure

Figure 3C2a-2.—Pressure-membrane extraction at 1500-kPa for <2-mm samples.

Sample #117

- 1500 kPa
- Pressure plate
- From Jan 18

Stats	
N	80
Min	7.31
Max	8.64
Mean	7.93
Std Dev	.37
% RSD	4.65
wl upper	8.67
wl lower	7.19
cl upper	9.04
cl lower	6.83



33 kPa and bulk density – USDA procedure

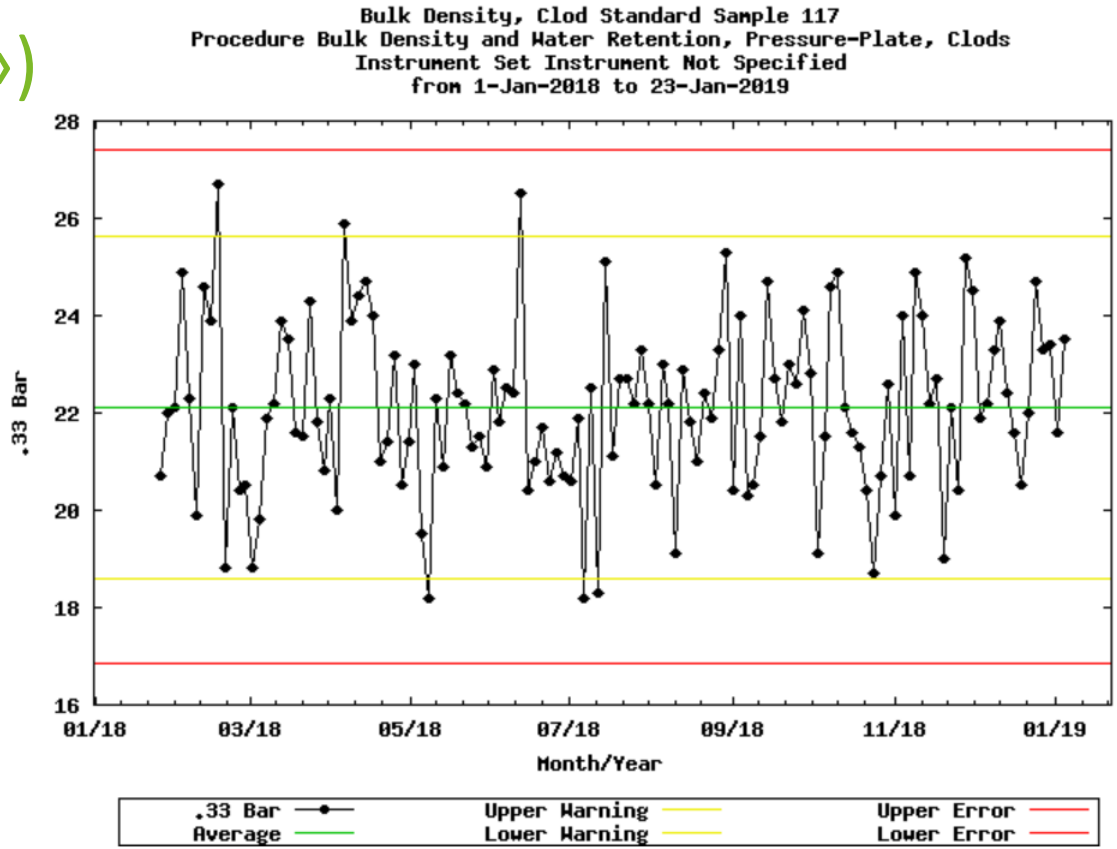
Figure 3B1b-1.—A round stock tag with sample identification number is prepared. The cut copper wire is looped around the clod.

Figure 3B1b-2.—After a flat surface on the clod is cut with a diamond saw, the clod is placed on a tension table, maintained at 5-cm tension.

Sample #117 (« clod »)

- 33 kPa
- Pressure plates
- From Jan 18

Stats	
N	129
Min	18.15
Max	26.67
Mean	22.12
Std Dev	1.76
% RSD	7.96
wl upper	25.64
wl lower	18.60
cl upper	27.40
cl lower	16.84



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3D printing

Original Research

Three-Dimensional Printing of Macropore Networks of an Undisturbed Soil Sample

Matthias Bacher, Andreas Schwen, and John Koestel*

AAPG Bulletin
Volume 102, Issue 1, January 2018, Pages 1-26

Three-dimensional printing for geoscience: Fundamental research, education, and applications for the petroleum industry (Article)

Ishutov, S.[a,b], Jobe, T.D.[a], Zhang, S.[a], Gonzalez, M.[a], Agar, S.M.[a], Hasiuk, F.J.[b], Watson, F.[c], Geiger, S.[c], Mackay, E.[c], Chalaturnyk, R.[d]

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Abstract

View references (155)

Three-dimensional (3-D) printing provides a fast, cost-effective way to produce and replicate complicated designs with minimal flaws and little material waste. Early use of 3-D printing for engineering applications in the petroleum industry has stimulated further adoption by geoscience researchers and educators. Recent progress in geoscience is signified by capabilities that translate digital rock models into 3-D printed rock proxies. With a variety of material and geometric scaling options, 3-D printing of nearidentical rock proxies provides a method to conduct repeatable laboratory experiments without destroying natural rock samples. Rock proxy experiments can potentially validate numerical simulations and complement existing laboratory measurements on changes of rock properties over geologic time