

DET SUNDHEDSVIDENSKABELIGE FAKULTET
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Proximal Soil Sensing

Development of Near Infrared Spectral Libraries of Danish Soils

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Introduction

Near infrared reflectance spectroscopy (NIRs) has been used for prediction of soil physical, chemical and biological properties

Physical non-destructive
Highly reproducible
Rapid and inexpensive

Powerful tool

Digital soil mapping
Soil monitoring
Soil process modeling

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Objectives

Veris-Shank
Veris-Probe
Labspec

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Soil samples

	N	Min	Max	Mean	SD
Global	3534	0	55.2	2.1	6.4
Non-organic	3330	0	11.2	0.8	1.2
organic	204	6	55.2	24.5	13.6

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Spectra acquisition

Air-dried, 2 mm sieved, 2 replicates average.
Reference C measurement by LECO CN-2000 instrument

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Data analysis

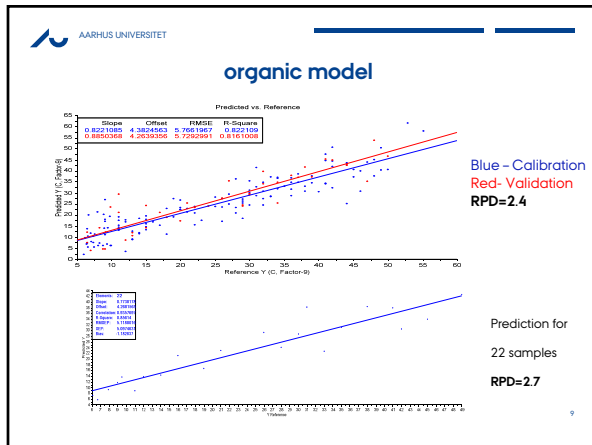
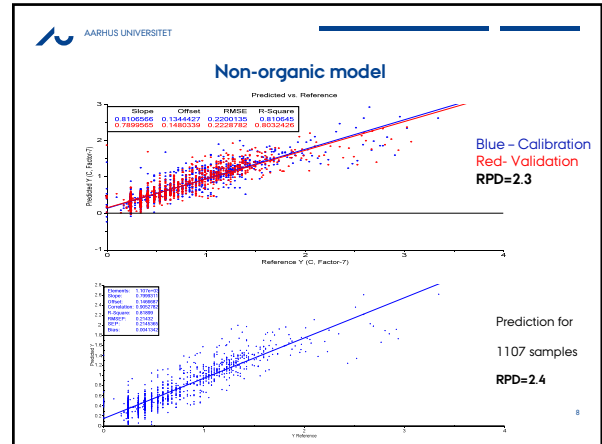
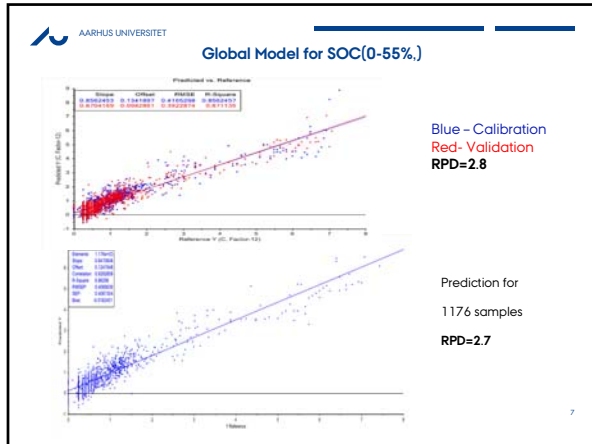
Unscramble 10.1
Spectroscopy pretreatment
Principal component analysis
Partial Least Square Regression

R^2
Regression coefficient

RMSE
Root Mean Square Error

RPD

- RPD = SD/RMSE
- RPD > 2, good model
- 1.4 < RPD < 2, intermediate
- RPD < 1.4, unacceptable



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Conclusion

- The global model has the best performance
- Feasibility of making efficient SOC lab measurement
- Application of soil spectral library for soil sensors in the field

