Applying Bayesian updating to CPT data analysis

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ABSTRACT:

Evaluation of geotechnical parameters on a project site is a necessary step in geotechnical engineering. However, due to the inherent variability of soil properties and the lack of data, many unavoidable uncertainties arise during a site-specific geotechnical characterization. This challenging task can be address under the Bayesian framework. The aim of this paper is to apply the Bayesian approach to some design examples discussed during the European technical committee 10, using the Bayesian Equivalent Sample Toolkit (BEST). BEST is an Excel VBA program for probabilistic characterization of geotechnical properties. In particular, in this study the statistical analysis has been performed using CPT tests from reference field studies. The results obtained for different examples involving CPT are discussed.
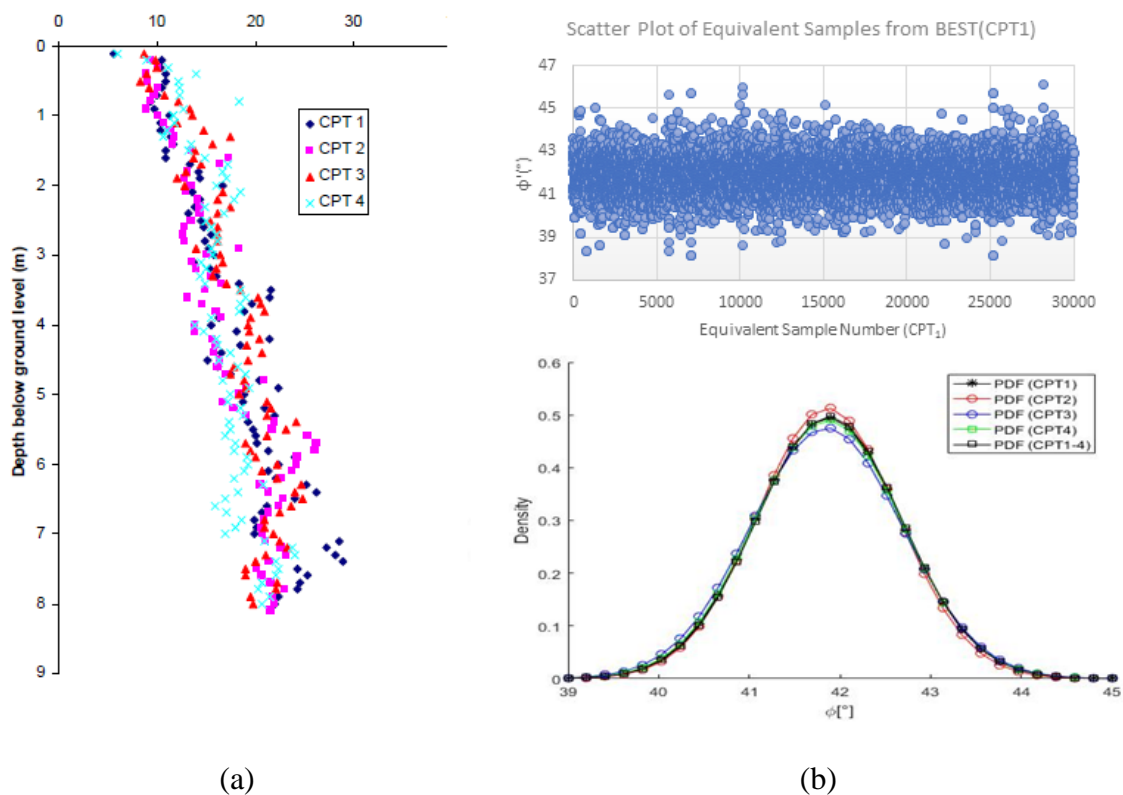
(a) (b)

Figure 1 (a) example of CPT data and (b) Scatter and probability density function of the friction angle ϕ'using BEST.