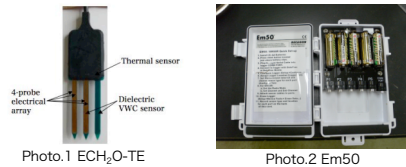


1. Introduction

TDR is increasingly used for field soil water estimation at various places because it enable us to measure non-destructive soil moisture. Decagon Devices, Inc. developed a kind of TDR probe (ECH₂O-TE) which can give economically us a water quantity, temperature and EC values at the same time. However, the influence of soil bulk density, salt concentration and temperature on soil moisture measurement have not been reported. The purpose of this study is to estimate the influence of soil bulk density and soil types on ECH₂O-TE measurement, and to provide an appropriate calibration equation.

2. Materials and Methods

- Sensor : ECH₂O-TE
- Data Logger : Em50
- Software : DataTrack ver.2.71



- Soil Samples
Toyoura Sand, Clay Loam, Andisols
- Dry Bulk Density (Mg/m³)
Toyoura Sand : 1.55, 1.60, 1.64
Clay Loam : 0.40, 0.46, 0.50
Andisols : 0.60, 0.65, 0.70
- Initial Water Content : Saturated (Deionized Water)
- Temperature : 20°C
- R.H. : 40%

• Evaporation Experiment

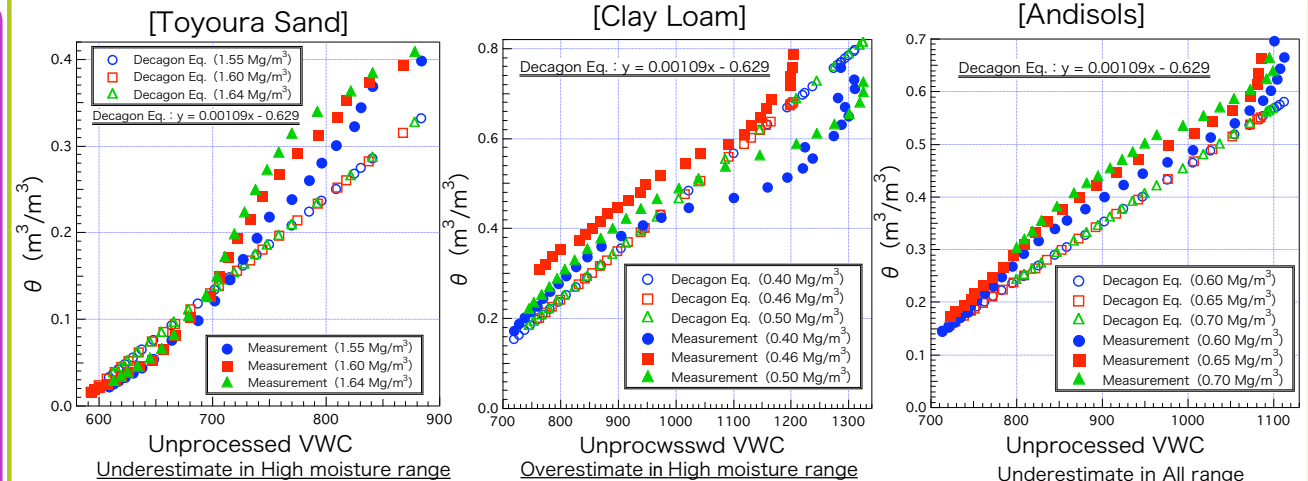
〈 Experimental Process 〉

1. Filled a column with soil samples.
2. Injected distilled water to a column from the lower part.
3. 24 hours drain from the column after 24 hours saturation.
4. Inserted a ECH₂O-TE perpendicularly.
5. Measured the value for every 10 minutes by Em50.



Photo.3 Apparatus of Evaporation Experiment

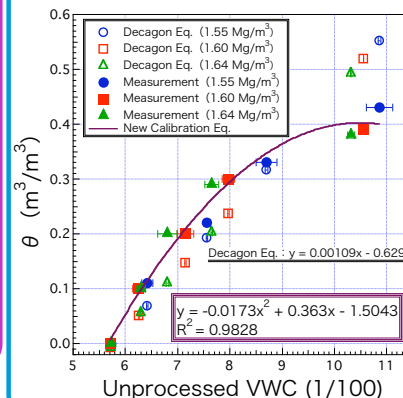
3. Results and Discussion



↳ The relationship between θ and VWC can be expressed as a different sigmoid curve.

↳ It may be attributed to bulk density or water distribution in a column ?

[Toyoura Sand : Water Content Adjustment (WCA) Method]



- 〈 Decagon Eq. 〉
- High moisture range → Overestimate
 - Low moisture range → Underestimate

- 〈 WCA Method 〉
- The influence of dry bulk density did not appear.

4. Conclusion

1. In evaporation method, water distribution in a column may strongly affect on calibration results.
2. In water content adjustment (WCA) method, there were little influence of dry bulk density and water distribution in a column.
3. We proposed a quadratic equation for sand.
4. We should study more about calibration method for various kind of soils.