# Improving ECH2O Soil Moisture Field Performance

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Decagon introduced the EC-20 20 cm soil moisture probe in the spring of 2001. Since that time, the probe has been continually tested and modified to improve its performance in the field. Issues that have received considerable attention recently are the probe's sensitivity to differences in electrical conductivity (EC), soil texture, and temperature.

## Electrical Conductivity, Soil Texture, and Temperature

While the EC-20 and EC-10 sensors were adequate for most field applications, some research and commercial project needs were not being met because of these issues. Thus, there was considerable interest in developing a probe that has lower sensitivity to variations in electrical conductivity, soil texture, and temperature while maintaining the qualities that have made the original ECH2O probe so widely accepted.

## Increasing Measurement Frequency

There has been considerable discussion in the scientific literature regarding how increasing measurement frequency improves the salinity, soil texture, and temperature response of soil moisture sensors. With this in mind, we changed the measurement frequency of one of our then-current probes, (EC-10) and two new 5 cm-long sensor (5TE and EC-5) to see if we could improve the response of the probes.

Figure 1 illustrates the improvement that increasing the measurement frequency has made in the EC-10 sensor. The performance of the two new sensors (5TE and EC-5) is similar to that of the modified EC-10 (Fig. 2).

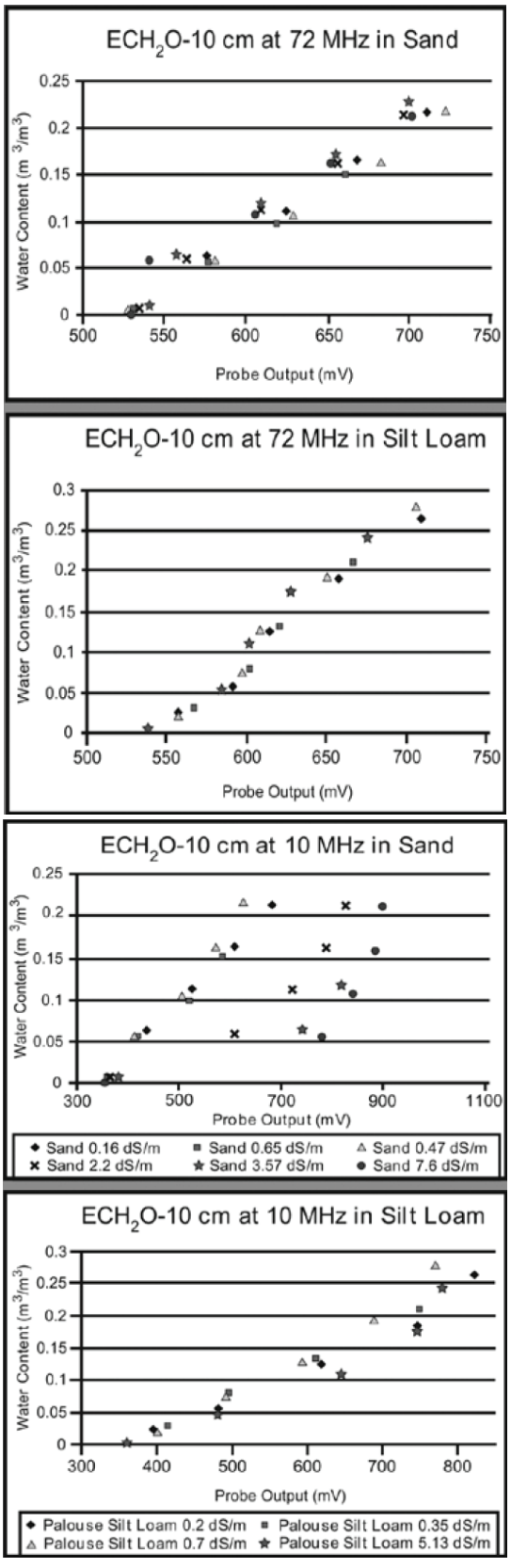


*Fig. 1. EC-10 probe output running at two frequencies in sand and silt loam at several solution electrical conductivities and water contents.*

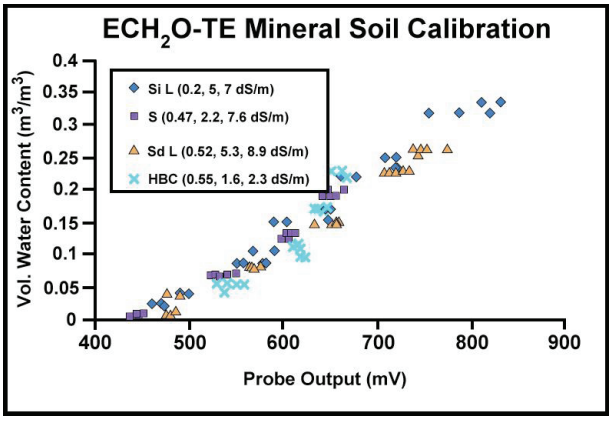


*Fig. 2. Two 5TE probes calibrated in four soil types at varying salinities up to 8.9 dS/m (S - sand, Sd L - sandy loam, Si L - silt loam, HBC - Houston black clay).*

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