



SOIL PHYSICAL PROPERTY DATA of the U.S. CLIMATE REFERENCE NETWORK (USCRN)

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OBJECTIVE

Provide accurate soil physical property data of the USCRN soil moisture measurement sites with important impact on soil moisture variability.

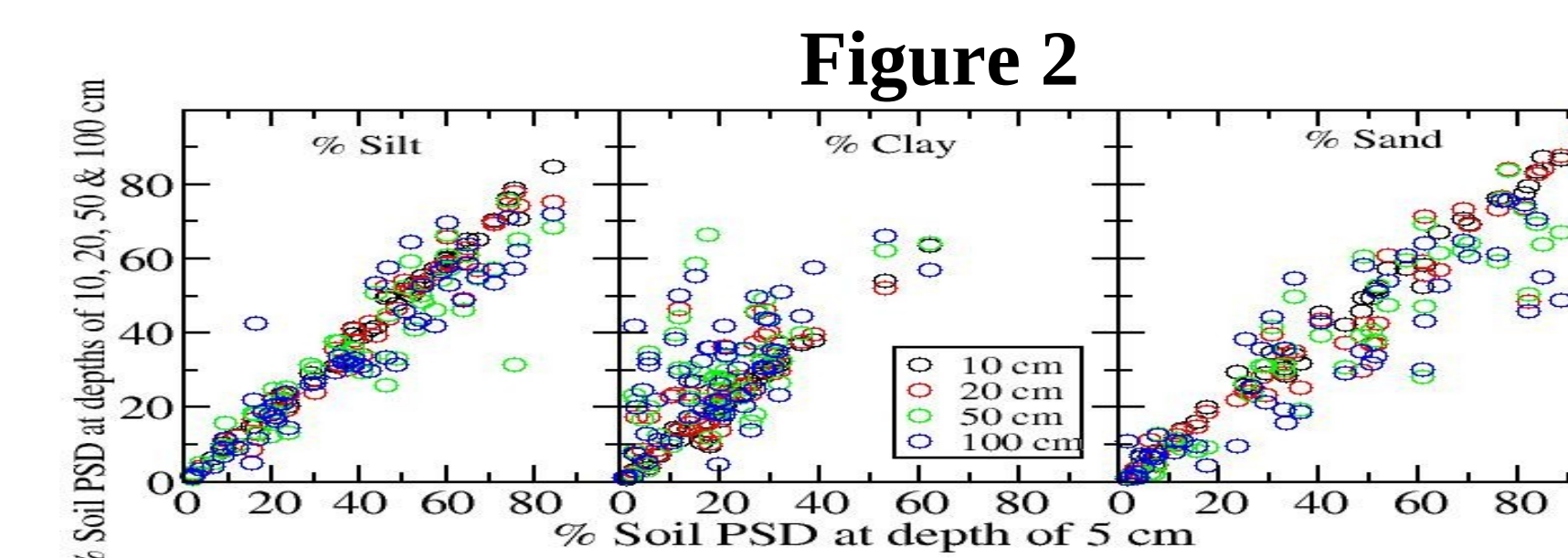
Introduction

- During 2009-2011 the USCRN deployed soil moisture and soil temperature probes at 114 climate observation sites across the continental United States.
- Probe calibrations used to determine soil moisture measurements were based on generic soil physical properties.
- In situ soil property data are needed to accurately evaluate the USCRN soil moisture measurements because of the wide variability of soils, vegetation and climate among the measurement sites.

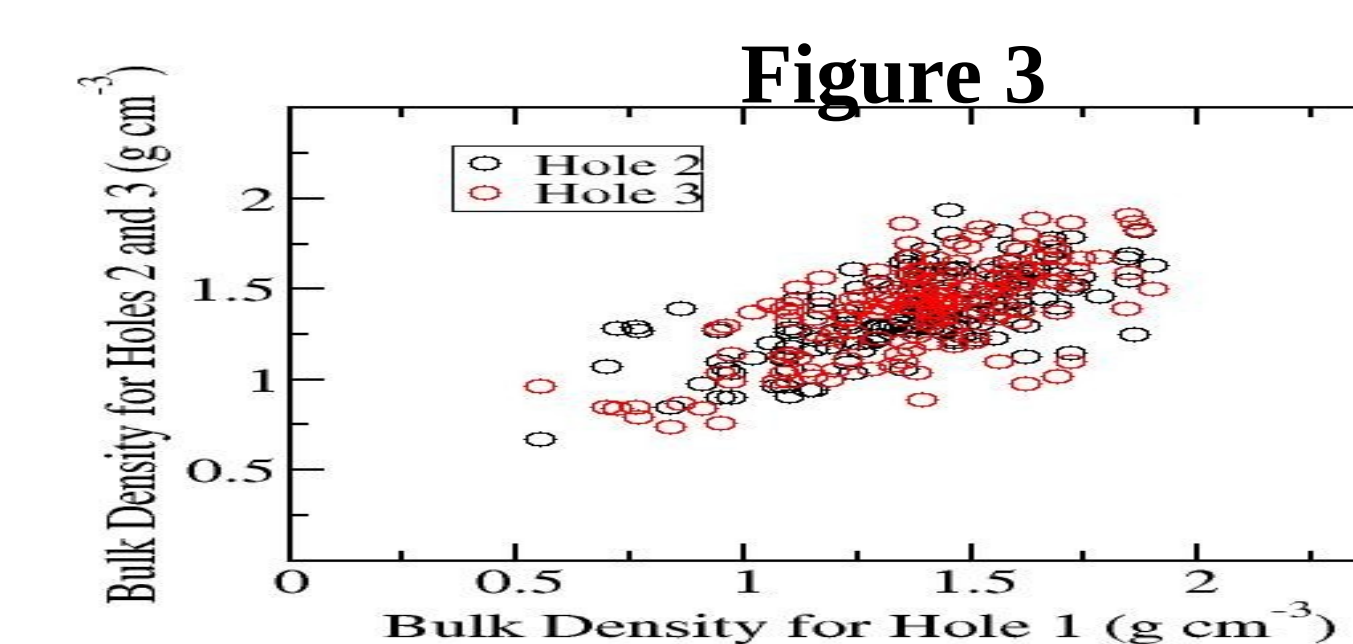
Methods

- Soil cores of cylindrical volume about $90.43 \times 10^{-6} \text{ m}^3$ (diameter 0.048 m and length 0.05 m) were collected at the actual depths and locations of the soil moisture probes at the USCRN sites (**Figure 1**).
- Analyses of the soil cores were conducted by the National Soil Survey Center, Lincoln, NE to determine the soil particle size distribution (**PSD**), bulk density (**BD**) and soil water content at potentials of 33 kPa (field capacity, **FC**) and 1500 kPa (permanent wilting point, **PWP**) at three locations and five depths at each USCRN site.
- The **PSD** analysis for each depth was made from a composite of the soil cores from the three hole locations per site.
- The **BD**, **FC**, and **PWP** were analysed for each depth and for each of the three hole locations per site.

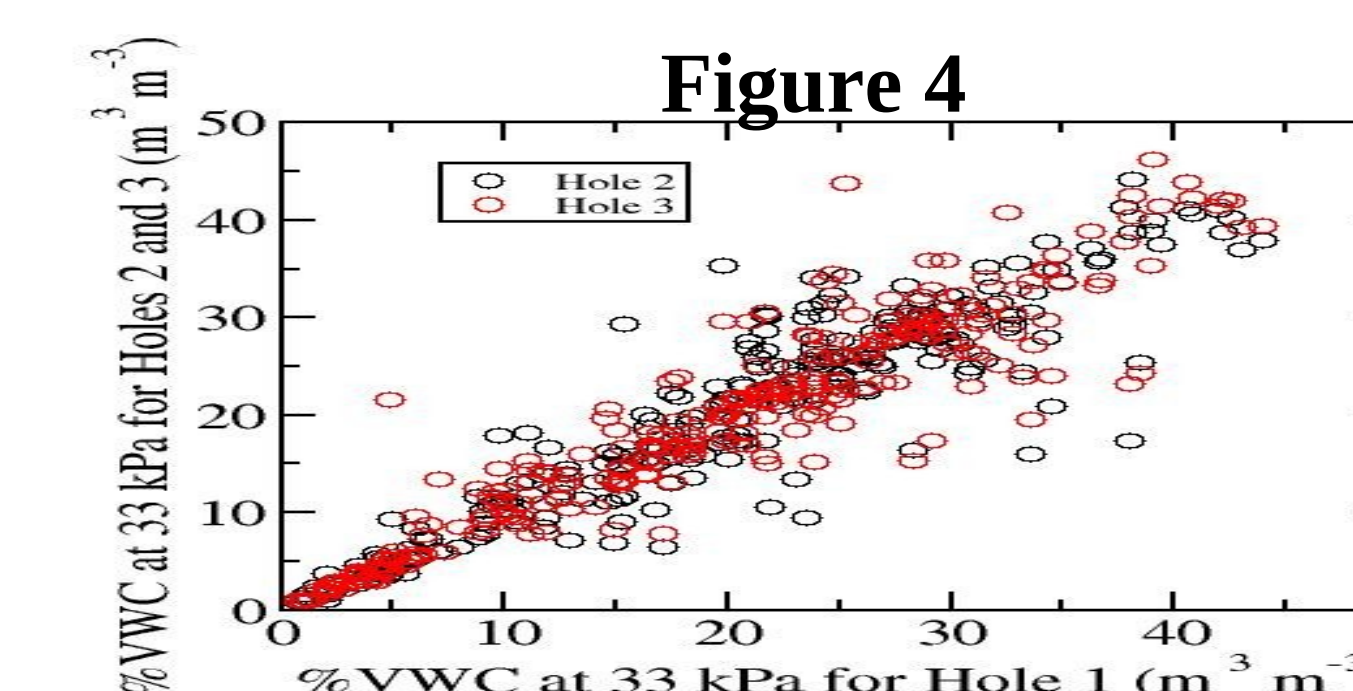
Results & Discussions



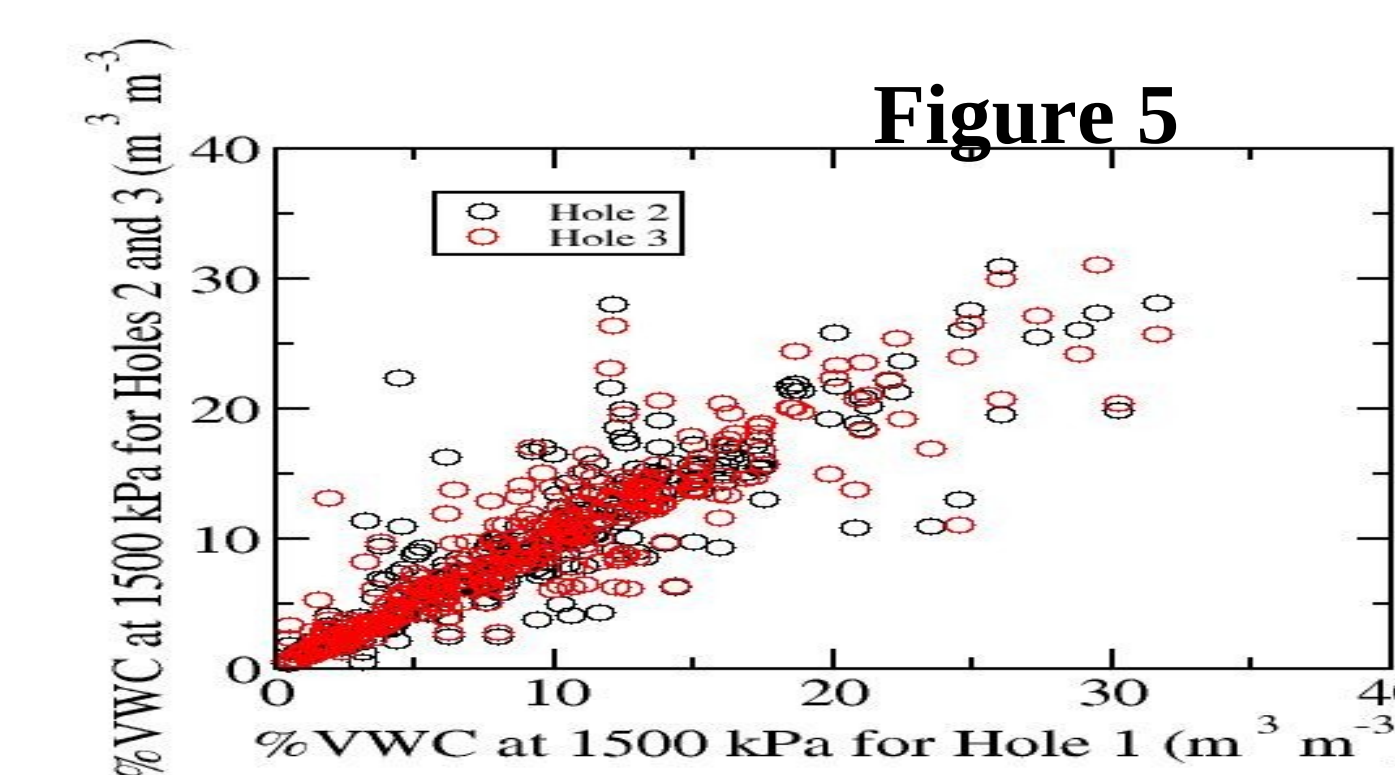
The **PSD** of % silt, % clay and % sand indicates differences among soil depths (**Fig.2**).



Comparison of **BD** with hole 1 vs. holes 2 & 3 is shown in **Figure 3**.



The scatter plot of **FC** shows large variability among hole locations for USCRN sites (**Fig. 4**).



Comparison of **PWP** with hole 1 vs. holes 2 & 3 is shown in **Figure 5**. We are continuing to evaluate in situ soil property data in assessing soil moisture aimed at identifying site-specific drought and flood conditions.

Conclusion

Soil moisture probe routine operations require accurate in situ soil data to provide accurate and useful soil moisture measurements in monitoring soil moisture in naturally complex soil environments.

Figure 1

