

Mentor: Amoozegar

I. Development of a rapid procedure for determining soil water content

We have some preliminary results that show a vacuum pycnometer can be used to determine soil water content of intact or repacked samples quickly. We like to expand the experiment and use both the vacuum pycnometer and the gas pycnometer to evaluate the procedure. If successful, the method can offer a rapid and reliable method of determining soil water content without requiring oven drying the sample.

II. Assessment of the impact of temperature on soil saturated hydraulic conductivity

Temperature has a significant impact on water viscosity, and to a much lesser impact on water density. Water viscosity also has a significant impact on soil hydraulic conductivity. Therefore, the impact of temperature on soil hydraulic conductivity may be significant. As a general recommendation, particularly for field measurements, the measured saturated hydraulic conductivity (K_{sat}) at a given temperature can be corrected to a desired temperature (e.g., 20°C) by multiplying the measured K_{sat} value and the ratio of viscosity of water at measured temperature to the viscosity of water at the desired temperature. Based on the results of a field investigation, however, the use of viscosity ratio for correcting measured values to a standard temperature may result in overestimation when the temperature is low and underestimation when the temperature is higher than the standard temperature. We like to conduct a series of laboratory measurements of K_{sat} of a number of soils at different temperatures to determine the most proper method of correction of measured K_{sat} values for temperature.