Soil moisture refers to the amount of water stored in the soil above the ground water table. Surface soil moisture (top 5 cm) is important because it directly interacts with the atmosphere and with solar radiation. Surface soil moisture partitions rainfall into runoff and infiltration and is major driver of the Earth's water cycle. Surface soil moisture also partitions incident solar energy into latent heat and sensible heat energy, making it an important factor in the Earth's energy cycle. Soil moisture is also an important component in the exchange of CO_2 on land surface. Thus, the knowledge of soil moisture impacts large numbers of daily social applications such as weather and climate forecasting, crop yield forecasting, water resources management, drought prediction, flood area mapping, and ecosystem health. Improvement in the accuracy and scale of soil moisture measurements will enhance all of these social applications, helping mankind to better manage the environment.

Soil moisture can be measured precisely at local scale using various types of sensors and scientific equipment. This is known as *in situ* measurement. Clearly, *in situ* measurement of soil moisture over the entire Earth's surface is not feasible. NASA's Soil Moisture Active Passive (SMAP) mission will provide a better means to record global soil moisture measurements. SMAP will remotely record measurements of radar backscatter (Active), and of natural emissions (Passive) of the Earth surface from an orbiting satellite. Use of these remote instruments from space will enable the provision of soil moisture measurements at the resolutions required to enhance understanding and management of the environment.

Interesting Facts about Soil Moisture:

Dry soil heats up easier than wet soil: 1 calorie of heat is required to change the temperature of 1 gram of water. By contrast, only 0.2 calories are required to change the temperature of 1 gram of soil. This means it takes five times more energy to raise the temperature of water by 1^{o} C than the temperature of soil by 1^{o} C. Or, given the same amount of energy, the soil temperature will increase five times more than the water temperature.

Water evaporation requires a lot of energy: The solar energy required to evaporate 1 gram of liquid water is approximately 600 times the amount of energy required to increase the temperature of 1 gram of liquid water by 1^{o} C and 2400 times the amount of energy required to increase the temperature of 1 gram of air by 1^{o} C.