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HANDBOOK OF EXPERIMENTS

SG6157E Environmental Radioactivity Outdoor

Soil water content evaluation with gamma ray spectroscopy

Environmental radioactivity

EDUCATIONAL KIT

SP5640

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Soil water content evaluation with gamma ray spectroscopy

Categories: Environmental radioactivity | Tags: Geiger-Müller (GM) Detectors

Hardware setup

This experiment guide is referred to the **SP5640** educational kit.

Equipment: SP5640 – Backpack Detector

Model	**SP5640**
Description	Backpack Detector

Purpose of the experiment

The experiment topic is aimed at understanding how γ-ray measurements can provide information about the water content of the soil.

Fundamentals

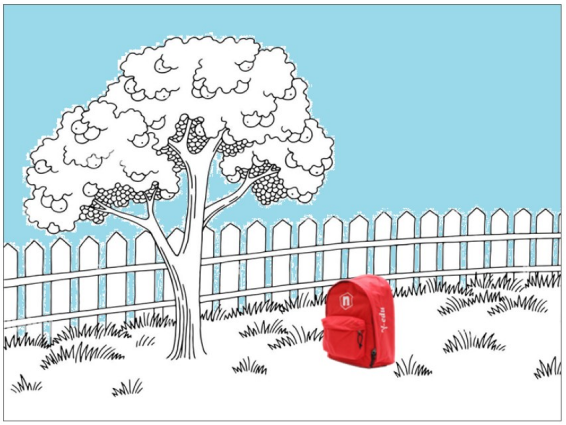
The global warming effects put in danger global water availability and make it necessary to decrease water wastage. A lot of researchers are focusing their attention on monitoring global irrigation due to global irrigation information is scarce due to the absence of a solid estimation technique. Recent studies show that proximal γ-ray spectroscopy represents an innovative approach able to fill the spatial gap between punctual and satellite soil water content measurements.

A γ-ray station measures the ^{40}K in the soil and monitors the moisture for the rational use of irrigation water. When it rains, the γ-signal is attenuated by the water and it drops down, while when the soil dries up, the γ-signal rises again.

Requirements

No other tools or instruments are needed.

Carrying out the experiment



Power on the γstream inside the red backpack. Power on the tablet and associate the two devices via Bluetooth. Take care that the γ-stream internal battery is charged, otherwise use the external power system.

Start the measurement campaign in the land field and place the backpack on the floor almost 1m far from the trees, manhole or other construction. Set the acquisition time to about 5 minutes and see the results. If the statistic is not enough to increase the acquisition time.

Repeat the measurements in the same place but in different weather conditions. Remember that it is good practice to repeat the measurement to obtain the mean and standard deviation of the result.

Results

This experiment represents a simple way to observe how Potassium 40 detection is affected by the water content in the soil.

HEADQUARTERS

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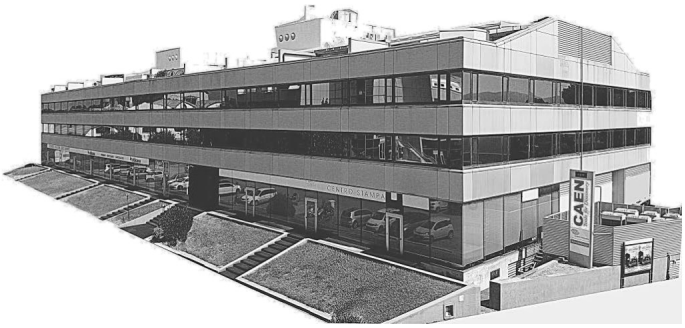

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