



BEGIN SCHOOL. DIMONA, ISRAEL

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THE GLOBE PROGRAM

Global Learning and Observations to Benefit the Environment

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Abstract

Soil moisture plays a crucial role in environmental sustainability, agriculture, and water resource management. This study investigates the relationship between soil type and relative humidity in various geographic regions of Israel, utilizing the SMAP protocol from the global GLOBE program for systematic data collection. The research examines soil samples from four locations—Dimona, Dir Hanna, Rosh HaAyin, and Herzliya—analyzing their moisture retention capacity and the impact of climate variables such as precipitation, cloud cover, and topography.

Research Question

How different Soil Type influences Relative Humidity in Four Regions of Israel?

Introduction

Understanding the connection between soil type and relative humidity is essential for sustainable water management and agriculture. Soil properties affect water retention, evaporation, and plant growth, influencing local ecosystems. This study examines four regions in Israel—Dimona, Dir Hanna, Rosh HaAyin, and Herzliya—using the GLOBE SMAP protocol to analyze soil moisture retention and climatic factors.

Findings show that clay soils retain the most moisture, sandy soils dry quickly, loamy soils balance absorption and drainage, and coastal soils fluctuate due to sea influence. This study also fostered collaborative learning between Jewish and Arab schools, promoting scientific literacy and environmental awareness.

The research contributes to global climate studies and supports local applications in agriculture, irrigation planning, and water conservation, bridging the gap between scientific research and real-world environmental challenges.

Research Methods

Soil moisture and climatic data were collected from four regions in Israel—Dimona, Dir Hanna, Rosh HaAyin, and Herzliya—using the GLOBE SMAP protocol for standardized and globally comparable data collection. **Soil Sampling:** Multiple samples were taken from each site at a 5 cm depth, classified by texture (clay, sand, loam, mixed).

Moisture Measurement: Soil was weighed before and after drying using a precision digital scale, with drying conducted under a heat lamp for uniform evaporation. Air temperature and humidity were recorded using the LABDISC ENVIRO multi-sensor device.

Precipitation was measured using a standard GLOBE rain gauge.

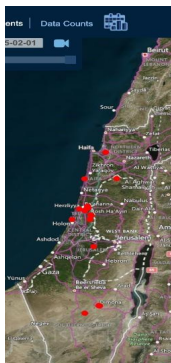
Cloud cover and type were documented using the GLOBE Cloud Observation Protocol and classification charts.

Students from four schools across Israel conducted monitoring on the same dates and times to ensure consistency.

Data was collected simultaneously, allowing for accurate comparisons across regions. All recorded data was entered into the official GLOBE database, contributing to global environmental research.

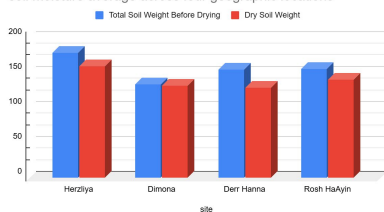
Collaboration: This study was carried out as a joint learning initiative between Jewish and Arab students, promoting scientific cooperation, environmental awareness, and cross-cultural collaboration.

This structured methodology ensured high accuracy, reliability, and alignment with international climate studies while fostering scientific engagement among students.



Results

soil moisture average across four geographic locations



Soil moisture retention varied across four geographic locations in Israel, reflecting differences in soil type and climate:

- Herzliya (Coastal - Mixed Sandy-Clay Soil) retained moderate moisture, influenced by sea humidity.
- Dimona (Arid Desert - Sandy Soil) had the lowest moisture retention, due to rapid drainage and high evaporation.
- Dir Hanna (Mediterranean - Loamy Soil) showed balanced retention, ideal for agriculture.
- Rosh HaAyin (Transition Zone - Clay Soil) retained the most moisture, due to high water absorption capacity.

These findings confirm that clay soils hold the most moisture, sandy soils drain quickly, and coastal soils fluctuate based on humidity levels, reinforcing the importance of soil type in water conservation and land management.

Discussion

The results confirm that soil type significantly influences moisture retention, impacting agriculture, water conservation, and climate interactions. Clay soils (Rosh HaAyin) retained the most moisture due to high water absorption, making them ideal for water-dependent crops.

Sandy soils (Dimona) exhibited low retention, requiring efficient irrigation strategies in arid regions. Loamy soils (Dir Hanna) provided balanced absorption and drainage, making them optimal for farming. Coastal soils (Herzliya) showed fluctuating moisture levels, influenced by humidity and sea proximity.

These findings highlight the importance of soil characteristics in environmental planning. Understanding soil-moisture interactions can help optimize irrigation, prevent land degradation, and support sustainable agriculture. Future research should explore seasonal variations, vegetation impact, and long-term climate trends to refine soil-water management strategies.



Conclusions

Clay soils (Rosh HaAyin) retain the most moisture, making them suitable for water-intensive agriculture. Sandy soils (Dimona) drain quickly, requiring efficient irrigation in arid regions.

Loamy soils (Dir Hanna) provide balanced retention, ideal for farming.

sandy soils (Herzliya) show fluctuating moisture due to sea humidity.

These findings highlight the crucial role of soil type in water retention, supporting better irrigation planning, sustainable agriculture, and environmental management.

Bibliography

GLOBE Program. (2025). *SMAP Soil Moisture Protocol*.

Retrieved from www.globe.gov

Israeli Meteorological Service. (2025). *Climate Data and Soil Analysis in Israel*.