



Precipitation and Soil Water Holding Capacity

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Abstract

Precipitation affects many elements of an ecosystem. One of these elements is the soil, which supports plant growth and regulates and filters water flows. The purpose of this investigation is to understand how does the soil water holding capacity and precipitation connect and influence one another. The graphs interpret the amount of precipitation in the last 3 decades. This will help to the visualization of the amount of rainfall the soil has to regulate. The soil water holding capacity is controlled primarily by the soil texture and the soil organic matter content (Agvise Laboratories, 2018).

Introduction

The Luquillo CTER/CZO Schoolyard Data Jam is an accessible database that provides information from the El Yunque National Rainforest. The data collected on the rainfall by year from 1990-2016, from Luquillo Critical Zone, was used in this investigation. El Yunque is a tropical rainforest with diverse flora and fauna, consisting of 28,434 acres. The average soil depth in El Yunque can be as little as 2-7 inches, is brownish-gray in color, it contains an average of 40-70% clay and 2.0 to 8.0 % of organic material, and a water holding capacity of 0.15 to 0.20 In/in (United States Department of Agriculture, 2002). The precipitation in the last three decades in total has been 98,611.15 mm.

Interpretation of data

The rainfall data was divided in 3 decades: 1990's, 2000's and 2010's. The graph shows the amount of precipitation by year. The year with the lowest rainfall was 1994. One of the characteristic of soil is that it has water holding capacity (Doran, Coleman, Bezdicek, and Stewart, 1994). Soil water holding capacity is the amount of water that a given soil can hold (Curell, 2011). In 1994 and 2015 the soil water holding capacity helped maintain the forest through the drought seasons. It also, managed the periods of higher rainfall. Forests can retain excess rainwater and help mitigate the effects of droughts. The decade with the lowest precipitation was the 1990's. During the decades of 1990's and 2010, there were drastic changes in the rain pattern.

Problems and hypothesis

The precipitation is different every year. When the rainfall increases, the soil needs to regulate more water than the usual. If the soil water holding capacity is not as good as it should be, what consequences will this have in El Yunque Rainforest?

Rainfall patterns in El Yunque are mitigated by the soil water holding capacity.

Patterns

- 1994 and 2015 where considered years of drastic drought.
- The years of 1998, 2004 and 2010 had the highest rainfall.
- The years of 1994, 2000 and 2015 had the lowest rainfall
- The average precipitation pattern is from 2000 mm to 4000 mm.

Dissemination plan

Arts could have a big impact in peoples lives. Corporal movement can express any idea. The creative part of the project is to have two dancers: one representing the precipitation and the other representing the soil. A physical representation of the effect of precipitation on the soil can help a wider public understand the analysis or results. Water and soil are considered abiotic factors but are essential to life.

Reflection

There were many factors that made this a very difficult investigation. After hurricane María school was shut down for some time. That took me a few steps backwards on my work. Thankfully, my teacher was always reminding me about getting it done, so I did. Responsibility and commitment were key factors to this.

Sometimes people do not recognize the importance of soil. Soils water holding capacity is one of its many benefits. It controls water flow better than impervious surfaces. The amount of precipitation changes every year, and global warming is making this more unstable.

Projection

- In the soil there are a lot of nutrients, we could identify what nutrients are affected by the amount of precipitation.
- What native species are influenced by the soil quality and how?

Bibliography

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Graphics

