1. Title: The pH and amount of rain together with temperatures during Winter in an Urban area of Malta.

2. Abstract

This is a study in which as a school we studied different variables such as humidty, temperatures, precipitation and pH of rain. It was conducted over the winter months during the school days. The study also included an interview with a meteologist.

3. Research Question: This year winter months were drier than usual. Is winter in the Mediterrnean especially Malta becoming drier year after year? Is urbanisation causing a negative effect on rainfall? Winter temperatures this year were within norm or above norm? What is the trend in temperature in Malta and what effect will have on trees?

4. Introducton

The aim of this study is to collect data of rainfall,pH and temperature during winter. Compare it with previuos years and notice if there is a change in amount of rainfall through the years and any trend in temperatures. When a fair amount of rainfall will be collected (more than 3.5mm), pH will be measured too investigate if being an industrial area has an effect on pH of rainfall with all its effect on stone and health. We discussed the following with a meteologist.

5. Research Method

The site identified for research is the roof of the school

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Data Collection: Using the Labdisc almost everyday we collected air temperature, relative Humidty and barometric pressure. Also on each visit the cloud cover was also observed and recorded using the GLOBE Observer App and Cloud data sheet. Rain precipitation was collected by a rain guage and the pH was measured by Labdisc.

All data collected was logged on the GLOBE website as per screenshots below.

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4	2020-01-07 10:52 UTC	X Delete
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18	2020-01-25 11:49 UTC	X Delete
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Data analysis: Average temperature and precipitation was calculated.











Discussion:

Unfortunately this year was noted that it was a rather than usual a very dry winter so far. According to the meteologist the Maltese Islands have received a miserable ammount of 20.4 mm only during the months of December and January, contrasting with the average precipitation during the months of December, January and February are 109.2mm, 98.5mm, 60.1mm respectively. Usually December and January are the wettest months of the year. We asked the meteologist about what we noticed. According to the meteologist this year, any rain will continue to be isolated and infrequent. Is there any explaination for this?

The meteologist stated that the reason behind this is because of a positive North Atlantic Oscillation (NAO). The NAO is the interaction between a general low pressure near Iceland (the Icelandic Low) and a general high pressure near the Azores Islands (Azores High). Over time, it was noticed fluctuations in their respective strengths. In its positive state, the Azores High is stronger than normal whilst the Icelandic Low is deeper. This alters the path of the jet stream. The jet stream is a very strong air current that flows west to east across the northern hemisphere, altering temperature and precipitation as portions of it dip southward or crest northward. In a positive NAO, the jet stream keeps to the north. This allows warm air from over Africa to rise far more freely towards the Mediterranean and Europe. It also prevents low pressure systems forming over the Atlantic from reaching the Mediterranean and southern Europe, as they are deviated to the north.

As a result the Maltese Islands experience a warmer and drier winter. A variable NAO is part of a cycle. From past data we had similar winters on numerous occasions in the past. Example The most notable include 1990, 1996, 1998, 2000, 2009 and 2015. The latter was record-breaking. Scientists have discovered a very serious abnormality, however. The oscillations are becoming increasingly unpredictable. They have been varying more dramatically recently. Scientists say the loss of Arctic sea ice due to global warming is causing the Icelandic Low to weaken. This would mean a more frequent positive NAO, and hence an increase in the frequency of warm and dry winters for the Maltese Islands. Summers will also become longer and hotter because of this. Of course, winter has some more weeks to go, so the state of the NAO's could shift. As winter progresses, the chance of a shift becomes less likely, however.

Regarding to pH unfortunately due to limited amount of rain we couldn't have a number of readings to confirm if rain pH is affected from surroundings.

According to statistics (1947 – 2017) taken from a study and a weather page average high temperatures for December, January , February. Mean temperatures are 17.5, 16.1, 16 respectevly.

Photos:



References:

https://www.globe.gov/globe-data/visualize-and-retrieve-data

http://www.maltaweather.com/

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