Global Warming/Climate Change: Involving Students Using Local Example

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Abstract

The current political climate and apparent confusion between global warming and climate change have led to some doubt among students on global warming. To correct or eliminate such doubt, students make temperature observations in wells either as part of class assignments or as an independent study. Cumulative temperature measurements from all classes are then made available to upper level students for analysis.

Twelve wells in a well field at IPFW campus are used regularly by students to measure the depth of groundwater, water temperatures, and other basic water chemistry parameters like pH, conductivity and total dissolved solid (TDS) as part of their class group project. More than 500 undergraduate students have been involved in data collection for over a decade. The temperature data shows the seasonal variation as one would expect, but it also shows an upward trend (warming). The data demonstrates a change in climate and in warming and the students could observe global warming within their local environment.

Background Information:
With the current political climate in 2016, it is apparent that some in the general public do not believe in global warming. Also, there appears to be some confusion between terms: global warming and climate change; global warming is one aspect of climate change. Some non-science students doubt global warming.

Problems:
* Science vs. Politics
* Lack of understanding amongst students, especially, non-science based students
* Scientists are too pompous: “Trust me, I’m a Scientist”
* Not 100% agreement amongst scientists…there are few deniers and skeptics, especially when it comes to anthropogenic effect…Sigma Xi Members to Members Digest (Nov. 9, 2016)

Approach:
Some upper level undergraduate students are required to conduct water level/temperature measurements as part of their course grade.

Four upper level courses: hydrogeology, environmental and urban geology, environmental conservation and wetlands utilize the well field regularly.

Some students use the well field for their research projects

Results/Discussions:

Temperature readings of the well waters are shown below.

Figure to the right shows the trend within a year: Readings were taken two to four times a month at the beginning of the well field monitoring. The graph shows a plot of five well data. The drop in temperature is due to change in season.

More than a Decade Temperature Data

The figures above and below show seasonal variation as should be expected. All wells in the well field exhibit similar trend; an upward trend. The upward trend is in agreement with observations made in the USA and other parts of the world. Note that each peak corresponds to summer season in the northern hemisphere.

Conclusions:
Local data shows upward trend in temperature. Students learned and were able to relate their data to research articles. I have yet to evaluate if there is any change in mind about global warming.

Acknowledgment:
My thanks to all the IPFW undergraduate students involved in data collection.

References:
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