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An Exploration of Climate Change in the K-12 Classroom

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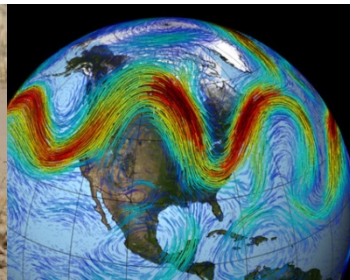
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An Exploration of Climate Change Education in the K-12 Classroom

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2018 Interdisciplinary STEM Teaching and Learning Conference



Overview



- Have you ever wondered how climate change is being taught and portrayed in the K-12 classroom?
- How are teachers being taught to teach climate change? What are the best practices?
- Phase 2 of research to understand current education methods and content foci of climate change education

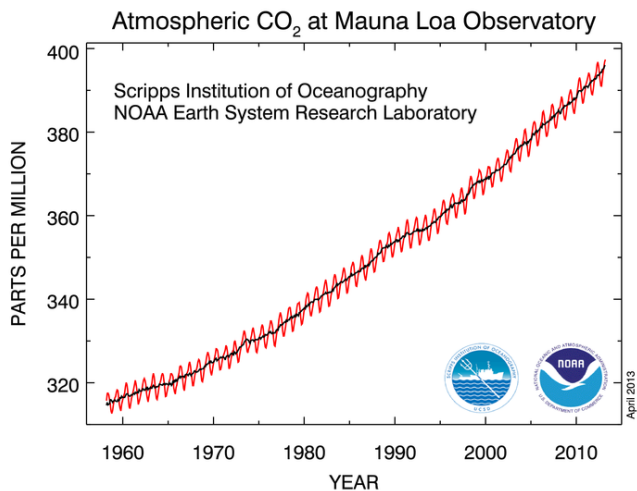
Acknowledgements

- Madyson Walker and Shannon Garrett – our colleagues on this project
- Geographic Alliance of Iowa
- UNI Conservation Corps
- UNI Department of Geography



Climate Change

- Strong evidence of occurrences from the global to local scale
- Scientific consensus



Climate Change Education in the U.S. K-12 Classroom

- The idea of anthropogenic forcing of the climate system has been part of science education for nearly 60 years, however inconsistently and variably

(McCaffrey and Buhr, 2008)

- Teaching climate change in the K-12 classroom, has not yet become a wide spread practice



Next Generations Science Standards (NGSS)



- In 2013, the Next Generation Science Standards were released
 - They have standards and student performance expectations that specifically teach climate change
- Now, teachers in the states who have adopted the NGSS are required to teach a subject they likely do not have any content or pedagogical knowledge in teaching



A lot of good stuff has come from this...

What is the future of Earth's climate? High-Adventure Science

Menu Activity 1: Earth's changing climates

Welcome, Anonymous

Like Tweet

Earth's changing climates

What is the future for Earth's climate? Explore data from NASA showing temperature changes over the past 120 years and data from the Vostok ice core to look at climate trends over different time scales. Evaluate what information the data provides and consider the limitations of conclusions that can be drawn from the data.

Thumbnail credit: NASA Goddard Institute for Space Studies

Estimated Time to Complete This Module: 45 minutes

Pages In This Activity

1. What will Earth's climates be in the future?
2. Trends of the past (part 1)
3. Trends of the past (part 2)
4. Predicting the future
5. Way, way back in time
6. Vostok Research Station, Antarctica
7. Predicting the future from the past
8. Looking to the future

Begin activity

ESSEA Earth System Science Education Alliance courses

HOME ABOUT ESSEA MODULES PARTICIPATING INSTITUTIONS BECOME A MEMBER UPCOMING EVENTS/NEWS

NASA Global Climate Change Education Modules

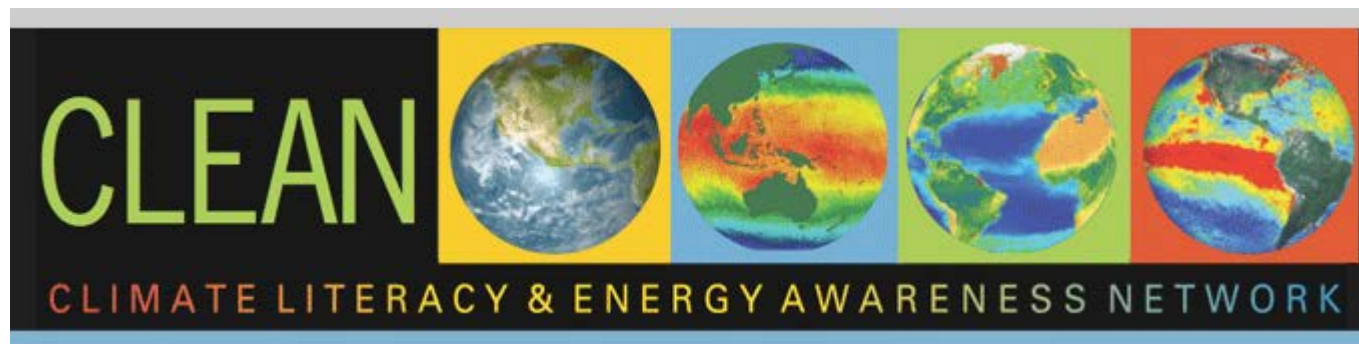
About this Collection

NASA support for ESSEA under the [Global Climate Change Education \(GCCE\) program](#) is enabling IGES to develop shared educational resources - including modules and courses - that are based on NASA climate science and data.

The NASA GCCE ESSEA modules are designed for teachers who are taking ESSEA courses. Teachers can also use the GCCE ESSEA course modules with their students. Print them out, or have your students read them online. They have situations, connections to the standards, resources and sample investigations. Unless a module is labeled K-4, you can adapt it for middle and high school students.

Go to [How to Use this Site with K-12 Students](#) for more detailed suggestions. The section entitled, [Inquiry Strategies to Use in Your Classroom](#) may also be helpful to you in using the modules with your students.

Arctic Oscillation	Carbon City	Carbon Monoxide: An Agent of Climate Change	Contrails and Global Climate Change
Dust World	Energy for Me: Sustaining My Community with Renewable Energy	Fracking - Marcellus Shale	Infectious Disease and Climate Change



So how is this being translated into the K-12 classroom?

- How: Qualitative analysis of academic literature on teaching climate change
- Why:
 - Summarize to understand how climate change is being taught and recommendations for teaching
 - Identify opportunities for growth and other possible concerns

Phase 1: Background on the (turned out to be) Pilot Study

- **As part of the reading for my dissertation** in climate change education, **I started to notice a patterns** in the literature that had little to do with my actual dissertation....
 - (My dissertation investigated using GIS and the local perspective as a mechanism to teach new NGSS climate change standards in the 7-12 classroom)
 - This happened during 2015-2016



Qualitative Analysis of Literature on Teaching Climate Change

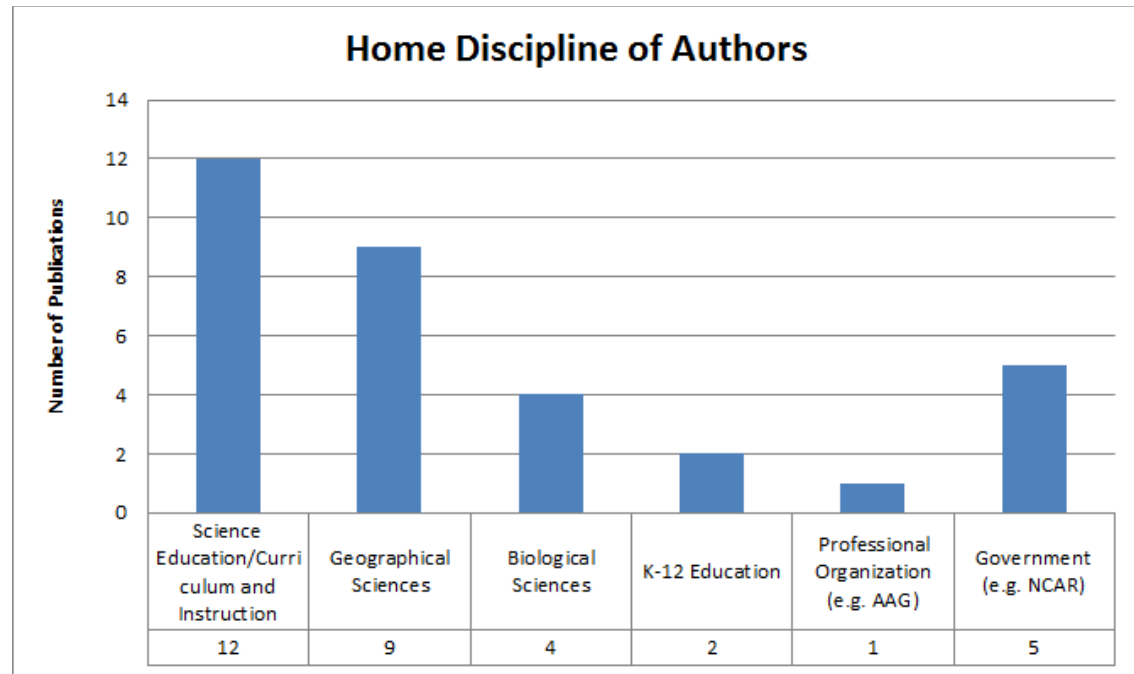
- Criteria:
 - USA and Canada
 - Since 2000
 - Peer reviewed and scholarly literature based
 - No websites
 - K-12 education specific
 - Empirical research
 - Lessons/activities
 - Discussion of methods/processes
- Keywords used in searches:
 - K-12, elementary, secondary, climate change, climate change education
- Sources searched :
 - Google
 - Google Scholar
 - Pro Quest and ProQuest ERIC (Education Resources Information Center)
 - Educational Full Text
 - Web of Science
 - Scopus

General Article Information

- 20 articles total

- Location
 - 18 from the USA
 - 2 from Canada

- Type
 - 6 empirical research
 - 9 lessons and activities
 - 5 methods and practices



Putting the Pieces Together

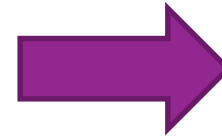
Focus: 66/33 student-teacher split

Grade level: 6-8 middle level occurs most often, but not yet a defined pattern

Length of activity: one-day lessons or activities occurs most, but not yet a defined pattern

Content: general climate and weather occurs most, then a bunch of other stuff

Teaching methods: use of graphics/maps/images occurs most, then a bunch of other stuff



Consensus

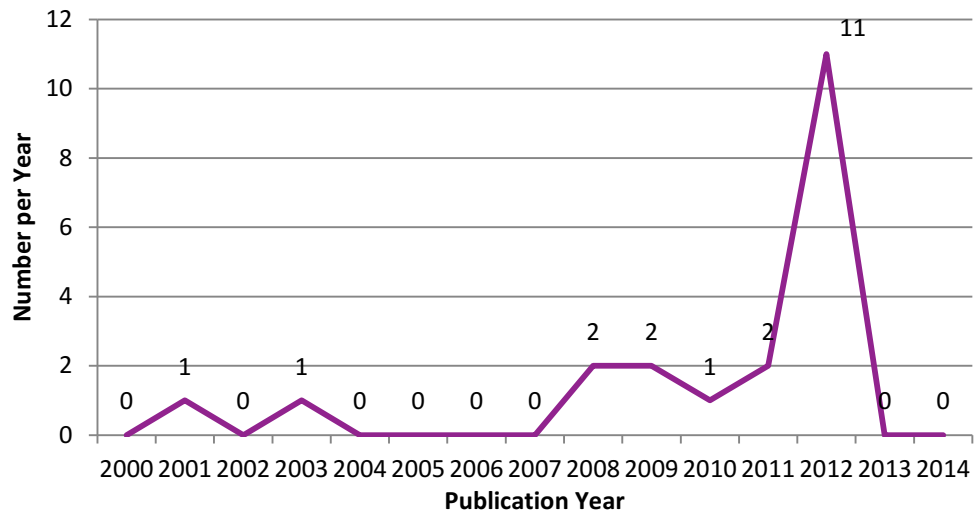
Need to determine our audience and the amount of time it takes to teach about climate change more specifically

Off to a good start, but need a clearer definition about essential content and methods for teaching about climate change

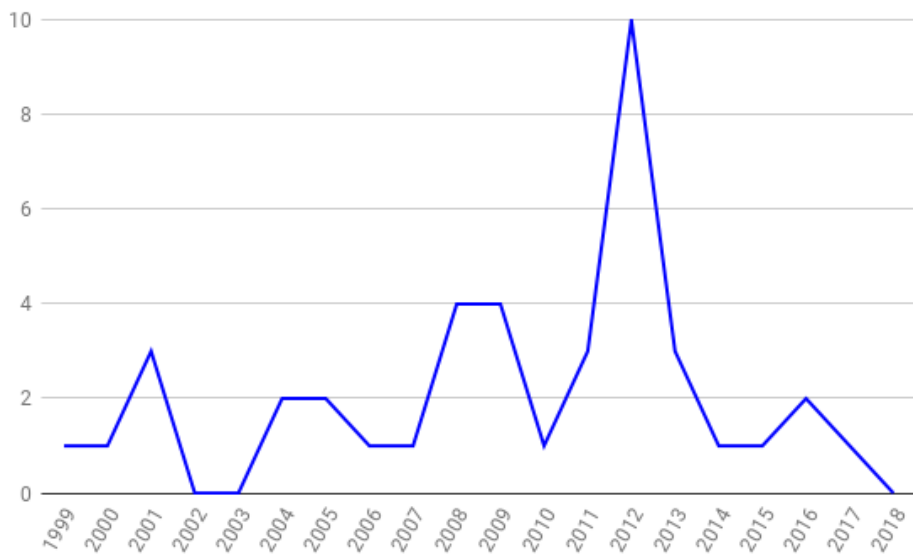
Phase 2

- Number of articles, based on the same search terms, has doubled, from 20 to 41
- Compared publication years
- Annotated bibliography is well underway, and will be built into comprehensive literature reviews, then coded for themes
- Ask for teacher feedback on the themes and recommendations

Pilot Study Publications by Year



Articles by Year



Long Term Goals for this Project

- Influence types of educational outreach materials and activities to create and how to share and promote these materials
- Gives consideration as to how we want to mold the future of climate change education
 - Perhaps creation of an educational model on teaching climate change?



Thank You!

Questions, thoughts,
comments?

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