

Geologic Issues: Community Impacts and Science Communication

Homework Assignment

Due: Last day of the semester (2-2.5 weeks)

Assignment Goals:

- Identify a geology-related issue likely to have a negative impact on your community within the next 50 years.
- Communicate the importance of understanding the science behind this issue to help prepare your community to minimize anticipated effects.
- Identify your political representative – someone who has the potential to affect change with this knowledge – for your community.

We live on a dynamic planet and this ever-changing environment can have a negative impact on people and communities. Early civilizations developed near tectonic plate boundaries, oceans and rivers due, in part, to the wealth of natural resources in these locations. However, tectonic activity creates abundant natural hazards such as earthquakes, volcanoes, and tsunamis, and rivers flood. According to the U.N., about 40% of the world's population lives within 100km of the coast and half the world's population lives in urban areas, which rely on fresh water piped in from surrounding areas. *What natural geologic issues could have a negative impact on your community?*

Human interaction with the environment has the potential to exacerbate existing hazardous phenomena (e.g., effect of urbanization on flood intensity) or to create new ones (e.g., the rise of earthquakes in regions with fracking and waste-water injection disposal). *What human-induced geologic issues might be found in your community?*

Assignment

Write a letter to your political representative¹ about an important geology-related issue (natural or human-induced) likely to have a negative impact on your community² within the next 50 years. In this letter:

- Identify the **person** to whom this letter is addressed including their title and mailing address (Note: you do NOT need to send this letter – it is not required for this assignment).
- Write an **introductory paragraph** introducing yourself as a concerned constituent and, briefly, introducing the contents of the letter: that this geology-related issue may affect your community and what you will be requesting of the reader. (1 paragraph)
- Describe this **geology-related issue** accurately, using correct terminology and communicated in a way accessible to the general public (i.e., a scientist is not your audience). In other words, explain the problem and provide enough detail so your argument is convincing but not so much that you overwhelm your reader. (1-2 paragraphs)
- Describe the potential **economic impact** of this hazard on your community (for example how drought affects farming or urban water use/availability and cost, or how sediment build up behind dams decreases reservoir volume and thus water supplies/cost). In other

¹ This should be someone who has the potential to affect change in your community such as members of Congress, your state governor, your town manager, etc. If your community is outside of the United States, you will need to identify the appropriate policy maker within your home country's system of government.

² How you define your community is a personal choice. It might be where you currently live, where you spent your childhood, where most of your family resides, or other personal criteria.

words, use an argument about the potential money lost to convince them why they should care about this issue. (1 paragraph)

- Describe 1-2 other **significant impacts** on your community. In other words, use additional arguments to convince your political representative why they should care about this issue. (1 paragraph)
- Include a specific **request** of your policy maker – one that she has the ability to fulfill (e.g., cosponsoring a bill, taking a leadership role on an issue, funding a small informational education program). In other words, what would you like them to do to address the issue? (1 paragraph)
- Summarize the ways in which the **use of science** will help provide a solution to the issue (e.g., how a well-developed seismic network can enable an early warning system for earthquakes or how we can use wells to monitor groundwater levels and/or quality). In other words, what information can scientists collect or what technology can scientists and engineers put in place to help inform, prepare for, or address the issue? (1-2 paragraphs)
- End with a **concluding paragraph** that, briefly, summarizes the key points that you would like your reader to take away from this letter, includes an offer to discuss the information further, and thanks them for their attention to this issue. (1 paragraph)
- Optional: Include 1-2 **graphs** or charts with scientific data that clearly illustrate key relationships that support your position (indicate your source).

Your letter should be between 700 and 900 words (typed, 11 point font, 1" margins, 1.5 line spacing), which is approximately 2 pages.

Topics: The range of possible topics for this assignment is quite large; depending on how you identify your community, you can discuss a naturally occurring phenomenon (e.g., volcanic eruptions, coastal erosion) or human-induced (e.g., land subsidence due to excess groundwater withdrawal, contaminated groundwater). Part of this assignment is to identify a local geoscience-related problem and solution. As such, global effects of climate change will not be a particularly effective topic. Instead, addressing a particular impact of climate change (e.g., how sea level changes are affecting your particular section of the coast, or how an increase in annual temperature affects farming in your community) will be much more effective. *Which is your political representative likely to find more compelling – a problem that impacts her constituency or one that may affect people outside of her sphere of influence?*

I am happy to talk over possible topics with you, either in person or via email.

Resources:

- Tips for science communication:
 - <https://sharingscience.agu.org/files/2016/11/S2-Tools-and-Tips-Flyer.pdf>
 - <http://blogs.agu.org/sciencecommunication/2017/01/05/communicating-real-science-time-fake-news/>
- Tips for communicating with your policy maker:
 - <http://www.ucsusa.org/action/writing-letters.html>

Grading Rubric for Science Communication Homework

Grading Rubric:

- a) (10 pts.) Written mechanics: appropriate grammar, correct spelling, clear sentences, etc. are used. This is clearly a proofread and polished piece of writing.
- b) (15 pts.) Clarity and flow of the information: is your text organized, do you use topic sentences for each paragraph, does each paragraph feed off earlier paragraphs and facilitate later ones, do you include introductory and concluding paragraphs; does all information help to support the main point of what you are writing with none of the information being “extra” – i.e., do you have a paragraph that doesn’t contribute to the point of what you’re writing, etc.?
- c) (45 pts.) Strength of support: do you address a significant geology-related issue for this region, is your argument a sound one, do you describe the science correctly, do you build on and go beyond information discussed in class, do you conduct a thorough synthesis and analysis of information and include potential economic and other impacts on the community, does your request address the problem, do you use scientific data to support your argument, and do you illustrate how the use of science can help provide a solution to this local issue?
- d) (20 pts.) Sophistication of argument: a simple argument supported by simple evidence can be sound, but I am also looking for evidence that you have taken things a step or two beyond this intellectually. What is distinctive about your location that affects the geology-related issue? For example, you can say that “sea level is rising along coastal Virginia and this will probably cause flooding.” While this is true, your argument will be more sophisticated if you indicate the rate of local sea-level rise relative to other areas, as well as why the rates may differ.
- e) (10 pts.) Adherence to guidelines: have you done what I asked you to do, both for the assignment and in terms of the mechanics? E.g., your language is accurate and accessible, you address the letter to an appropriate political representative, your letter is ~700-900 words, your submission is in the proper format.

In each category, evaluation is noted as follows:

- “5 stars” indicates an outstanding job, really knocked my socks off! (100% of available points)
- “4” indicates a solid job, may have a few flaws and room to improve (90% of available points)
- “3” indicates acceptable or adequate, with room for improvement (80% of available points)
- “2” indicates barely acceptable, with substantial room for improvement (70% of available points)
- “1” indicates below average performance, would benefit from significant revision (60%)
- “0” indicates unacceptable quality of writing and/or analysis, missing, and/or plagiarized (0-60%, as indicated, depending on quality)

Hence, if your comments indicate:

a. 5 stars b. 3 stars c. 4 stars d. 3 stars e. 5 stars or **5, 3, 4, 3, 5**

This would yield a grade of 88.5/100 – really solid but not quite in the A range, which normally will reflect construction of a solidly grounded analysis with some substance to it that is also clearly and logically presented.