

## PART III

# PART 3: GEOMEDIA

This part aims to assist teachers in becoming familiar with utilizing web-based user-friendly interactive-maps and digital documentaries to help foster active teaching and learning within the field of Geography and beyond. In order to do so, the first section defines and connects the studies of geomedia (such as georeferenced media) and ecocinema (such as environmental documentary) which together form engaging and educational geomedia projects. The second and third sections offer examples of practical open educational resources (OERs), which include interactive maps and environmental documentaries, as well as sample activities and guiding questions, that teachers can implement as presented or reference to help guide their own active teaching and learning goals.

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### **Resources discussed in this part:**

- Climate Central’s Surging Seas: Risk Zone Map
- The Anthropocene Education Program



# WHAT IS GEOMEDIA?

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This part defines geomeia projects and has been adapted from research in my book chapter, ‘Geomeia as a Pedagogical Tool: Toward Sustainability Competence’ in *Mapping the Environmental Humanities: The Emerging Role of GIS in Ecocriticism* (2022), published by Rowman and Littlefield. In that research, I explore how geomeia, which can refer to “interactive technologies using multimedia to present the spatial information in the form of digital maps and georeferenced photos, videos and texts” (Motive and Attract Students to Science, 2021), can be paired with ecocinema, which can refer to educative and issue-based environmental documentaries (or ‘eco-docs’) and short digital documentaries, such as video essays found on YouTube, Vimeo and other platforms. The pairing of geomeia and ecocinema, here called geomeia projects, is the amalgamation of interactive and/or digital maps and eco-docs, which are particularly helpful pedagogical tools for engaging with geography subject matter.

One example of the merging of geomeia and eco-docs is the Geo-Doc created by Dr. Mark Terry. In his book, *The Geo-Doc: Geomeia, Documentary Film, and Social Change* (2020), Terry explores the potential of combining digital documentaries with geomeia in order to foster positive social change by high-level changemakers. In particular, Terry’s Geo-Doc project, the Youth Climate Report (YCR), has been adopted by the United Nations and presented at numerous recent Conference of the Parties (COP) held yearly by the United Nations Framework Convention on Climate Change (UNFCCC).

The YCR is a Geographic Information Systems (GIS) map that contains georeferenced short documentaries, created by youth from around the world, about pressing environmental issues. One of the many benefits of the YCR is that the georeferenced digital documentaries help to bridge the communication gap between scientists and policymakers by presenting the information in digestible ways. Another benefit of the YCR is that the Geo-Doc can be used as a pedagogical tool because it offers a substantial database of issue-based information on topical subjects like climate change, permafrost, and sea-level rise, as well as providing opportunities for experiential education through creating and/or interacting with the interactive maps and documentaries.

The geomeia project resources offered in this OER, namely Climate Central’s *Surging Seas: Risk Zone Map* and The Anthropocene Education Program, are the practical applications of my geomeia research, aimed towards active teaching and learning. Specifically, these geomeia projects can help to simultaneously teach issue-based topics (sea-level rise, and climate change) and soft skills (such as values thinking, futures thinking, and systems thinking) while also helping to achieve goals of experiential learning (through active

engagement) and Universal Design for Learning (through multiple means of engagement with learning materials).

## References

Long, M. (2022). Geomedia as a Pedagogical Tool: Toward Sustainability Competence. In *Mapping the Environmental Humanities: The Emerging Role of GIS in Ecocriticism*, Edited by Terry, Mark Ph.D. and Michael Hewson, Ph.D., Rowman and Littlefield.

Motivate and Attract Students to Science, 'Geo-media' General Description. MASS. <http://www.mass4education.eu/geo-media>. Accessed November, 2021.

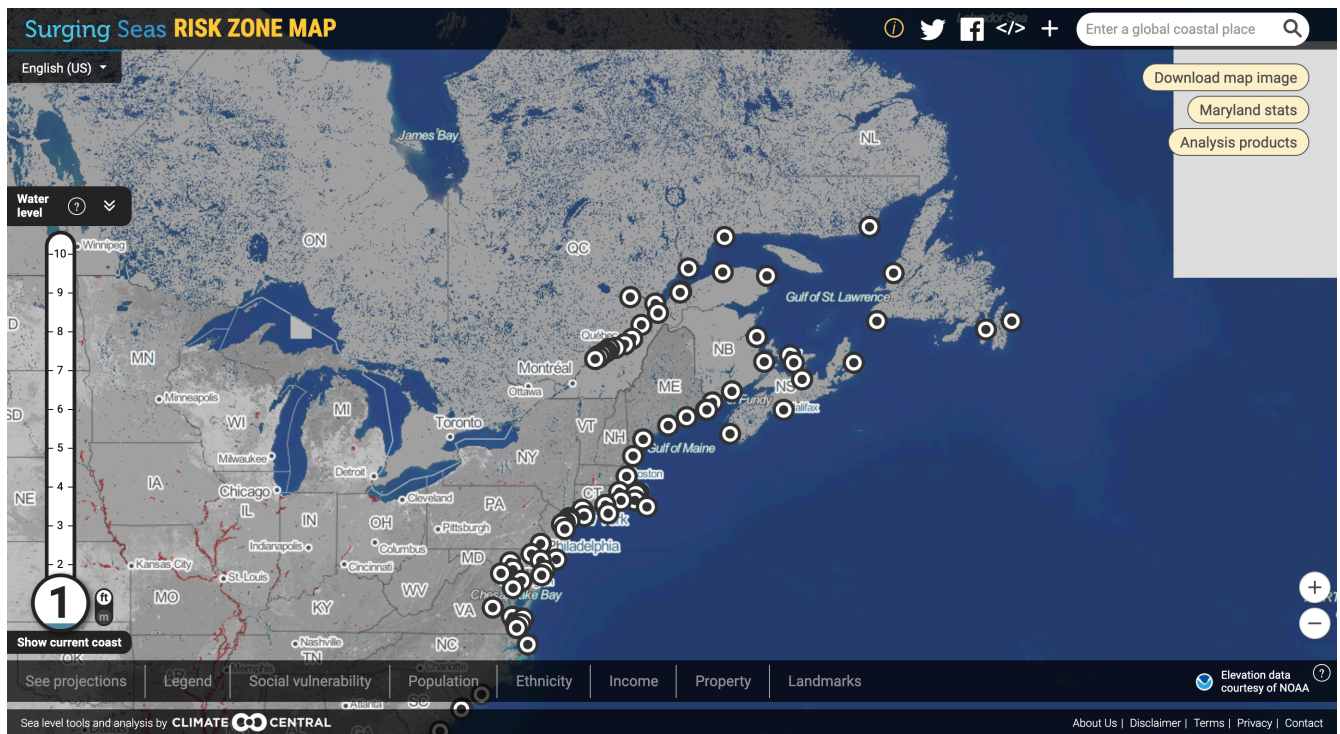
Terry, M. (2020). *The Geo-Doc: Geomedia, Documentary Film, and Social Change*. Palgrave Macmillan.

Youth Climate Report. (2021). The United Nations Climate Change Secretariat. <https://youthclimatereport.org/>. Accessed November, 2021.

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# CLIMATE CENTRAL'S SURGING SEAS: RISK ZONE MAP

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*Click on the image to visit [Surging Seas: Risk Zone Map](#)*

## About Climate Central's Surging Seas: Risk Zone Map

Surging Seas: Risk Zone Map is an interactive program by Climate Central (CC) which is an independent climate change research and communication organization that analyzes and shares facts about climate change with the public and policymakers in easily accessible ways. It does so by amalgamating science, data, and technology to tell stories through capturing visuals about climate change, sea-level rise, extreme weather, and energy. CC's Sea-Level Rise program provides current and projected data on sea-level rise and coastal flood hazards, across the globe, through user-friendly maps and tools.

The Surging Seas: Risk Zone Map series, in particular, were the first interactive online maps presenting sea-level and coastal flooding information, backed by peer-reviewed science, and the most recent iteration was featured by the White House Climate Data Initiative.

## SAMPLE ACTIVITY

In 1938, British scientist, Guy Stewart Callendar, argued that the link between rising Carbon Dioxide (CO<sub>2</sub>) concentrations in the Atmosphere and a rise in global temperature would have other subsequent and varying changes on the Earth's climate patterns. Now, the vast majority of climate scientists (95-98%) know that recent climate changes are due to the burning of coal, oil and gas.

The effects include changes to existing weather events such as hurricanes, floods, droughts, wildfires, and more. However, in this activity, we will focus on the effects of climate change on the world's oceans because they cover 70% of the Earth which means they take the large brunt of the change. In short, sea-level rise is an increase in the level of the planet's oceans because of global warming which contributes to a) added ocean water from melting glaciers and ice sheets, and b) the expansion of warming seawater. As the temperature of the atmosphere rises due to the burning of fossil fuels and the release of excess greenhouse gases (such as carbon dioxide) the oceans absorb this heat which causes the water molecules to expand.

Moreover, as the atmospheric temperature rises, land-ice (such as in Greenland and Antarctica) is also affected and melts into the oceans at an accelerated rate, which contributes to the amount of seawater. According to the National Oceanic and Atmospheric Administration (NOAA), the global mean sea-level rise has been approximately 8-9 inches since 1880. It is projected that sea levels are likely to rise even more in response to historic greenhouse gas emissions, which threatens low-lying island nations, global coastlines, freshwater supplies, and wildlife habitats from increased storm surges, flooding and damage to coastal areas.

### **Video Essays**

Please watch the following Video Essays:

'This is what Sea Level Rise will do to Coastal Cities,' by The Verge Science (7 minutes)

'6 Major US cities could be underwater within 80 years — here are the disturbing 'after' images' by Business Insider (3 minutes)

## Interactive Map

Instructions:

- 1) Open Climate Central's Surging Seas: Risk Zone Map .
- 2) Click the '-' minus button on the bottom-right of the screen to scroll outward and see more of Vancouver, British Columbia, Canada.
- 3) Click the double-arrow beside 'Water Level' on the bottom-left of the screen, then click 'Show Current Coast'.
- 4) Click the double-arrow again, and scroll through the various levels of sea rise (1 to 10 in feet) to learn how Vancouver may be impacted.
- 5) Use the search bar on the top-right of the screen to learn about sea level rise in locations of your choosing.

## Supplemental Resources

Read, watch and listen to the following material:

- Reading Material – NOAA Climate.gov 'Climate Change: Global Sea Level'.
- Watching Material – The Verge Science 'Sea level rise is so much more than melting ice' (Video Essay, 6 minutes).
- Listening Material – NPR 'Why Scientists are Racing to Save Historical Sea Level Records'(Podcast, 12 minutes) .

## Guiding Questions

1. Can you define Global Warming?
2. What is the connection between the Greenhouse Gas Effect and Global Warming?
3. Can you define Climate Change?
4. What is the difference between Climate Change and Global Warming?
5. Can you describe how Climate Change leads to Sea Level Rise?
6. How much Sea Level Rise has occurred and is projected to occur?
7. What are and will be the impacts of Sea Level Rise on people and health, infrastructure and economies, coastlines and environment, and weather events?

### References

- Climate Central. (2021). Surging Seas Risk Zone Map.  
[https://ss2.climatecentral.org/#12/40.7297/-74.0072?show=satellite&projections=0-K14\\_RCP85-SLR&level=5&unit=feet&pois=hide](https://ss2.climatecentral.org/#12/40.7297/-74.0072?show=satellite&projections=0-K14_RCP85-SLR&level=5&unit=feet&pois=hide) Accessed November, 2021.
- Long, M. (2022). Geomedia as a Pedagogical Tool: Toward Sustainability Competence. In *Mapping the Environmental Humanities: The Emerging Role of GIS in Ecocriticism*, Edited by Terry, Mark Ph.D. and Michael Hewson, Ph.D., Rowman and Littlefield.
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# THE ANTHROPOCENE EDUCATION PROGRAM

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*Click on the image to visit Anthropocene Education Program website*

## About The Anthropocene Education Program

The Anthropocene Education Program (AEP) is a joint effort between The Anthropocene Project (TAP) and the Royal Canadian Geographical Society (RCGS) that is available through Canadian Geographic Education. The AEP is an interactive tool for teaching the impact humans have on the planet and includes a documentary (Anthropocene: The Human Epoch 2019), short films, audio clips, augmented reality (AR), 360 virtual reality (VR), and interactive gigapixel photos. TAP was created by renowned documentarians Edward Burtynsky, Jennifer Baichwal, and Nick de Pencier (Manufactured Landscapes 2006, Watermark 2013) to provide engaging ways for learners to comprehend and connect with the scale of human-induced changes to the functioning of the planet.

## SAMPLE ACTIVITY

The AEP is founded on the research conducted by the Anthropocene Working Group (AWG), which is a scientific committee that seeks to gather evidence and recommend whether the Anthropocene Epoch should replace the Holocene Epoch as the current time frame on the Geologic Time Scale. At the moment, the Anthropocene is under consideration as a new Epoch by leading geological and scientific institutions around the world. However, for this geologic time change to become official, there need to be indicators to track that change. As the AWG has discovered, there are not only individual indicators of this human impact, but there are entire categories of indicators including Global Warming and Climate Change, Terraforming, Techno-Fossils, Anthroturbation, Extinction, and Extraction.

In this activity, we will learn about the history and science behind the Anthropocene Epoch, and the AWG and their 6 categories of anthropogenic harm to the planet. In doing so, we will also exemplify this harm by focusing on the category of Terraforming, which is the widespread transformation of the surface of the planet by human activity. Although there are numerous ways to access the AEP, such as on-loan classroom kits, we will utilize the free online resources. These materials include a 360 virtual reality video, and interactive gigapixel photos taken by Edward Burtynsky that contain embedded visual triggers which reveal audio clips and short films about the particular category under study. When using geomeia projects in education, it is necessary to supplement the AEP's content with instruction and external materials in order to achieve the desired learning outcomes.

### **Documentary**

Watch the documentary: 'Anthropocene: The Human Epoch' (87 minutes). You can access the film through your Kanopy account. If you are having trouble gaining access, please follow these instructions. We recommend that you watch the entire documentary, but please focus on the segment beginning at 12 minutes, titled 'Carrara, Italy.' If accessing Kanopy is not feasible, consider substituting the documentary for the video essay listed below in part 3.

### **360 Virtual Reality and Gigapixel Photo**

Navigate through the interactive materials below, which are intended to provide an experiential account of one of the AWG categories. Although there are many AEP materials that elaborate on the various categories of harm outlined by the AWG, which you are free to explore (Techno-Fossils, Extinctions), please focus on the AWG category of Terraforming, in particular.

360 VR Film Instructions:

- 1) Open the attached link;
- 2) Play the video (8 minutes), and use your mouse to scroll around the screen.

Note: If you do not have sound, click and unclick the volume icon.

Gigapixel Photo Instructions:

- 1) Open the attached link;
- 2) Locate all 9 triggers that are embedded into the photo, and watch, listen or read the information found in each trigger.

Note: There is a 'Hint' button in the menu at the top left of your screen to help locate triggers.

### **Supplemental Resources**

Read, watch, and listen to the following material:

- Reading Material – CNN 'Has humans' impact brought about a new era for the Earth?'
- Watching Material – It's Okay To Be Smart '100,000,000 Years From Now' (Video Essay, 6 minutes) .
- Listening Material – The Guardian's Audio Long Read 'The Anthropocene Epoch' (Podcast, 39 minutes).

### **Guiding Questions**

1. What is the Geologic Time Scale?
2. What are the time frame and key characteristics of the Holocene Epoch?
3. What are the time frame and key characteristics of the Anthropocene Epoch?
4. What is the Anthropocene Working Group (AWG)?
5. What are the 6 categories of anthropogenic harm to the planet outlined by the AWG?

### **References**

Canadian Geographic. (n.d.). Anthropocene Education Program.  
<https://anthropocene.canadiangeographic.ca/>. Accessed November, 2021.

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